Electric Railway Journal

Vol. XLI NEW YORK, SATURDAY, JUNE 14, 1913 No. 24

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.

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.*

RULES FOR SAFETY

As a part of its safety campaign the Pennsylvania Railroad Company has issued a booklet of hints and suggestions to employees, covering the road, the yard and the shop. There is also a list of unsafe practices, examples of which can be seen on almost any road. Safety is not a matter of teaching rules but of instilling a sense of personal responsibility and of responsibility toward others. The emphasis laid upon this factor in safeguarding the worker from his own carelessness and recklessness is the feature that makes the Pennsylvania booklet noteworthy. On these points Vice-president Atterbury says: "The problem of safety is not altogether a question of rules and their enforcement, safety appliances and their application, but the development of inherent self-restraint and control." S. C. Long, general manager, makes this even more positive statement: "Safety in railroad operation is not a question of safeguards, but of intelligent caution constantly exercised. The ultimate aim of the safety work is to develop in each employee a sense of personal responsibility, not alone in taking measures for his own safety, but for that of his fellow employee as well." Read with these precepts in mind, the Pennsylvania shop rules and many of the operating rules are worthy of general adoption, but the main thing to learn from them is the necessity for education in responsibility and caution.

A. E. R. A. MEMBERSHIP

By no means content with a company membership which comprises 76 per cent of the mileage of American electric railways, nor with the roster of 2800 individual members, the campaign continues to bring into the American Electric Railway Association fold the companies operating the 24 per cent of mileage not now represented and to increase the individual membership to 5000. Two new pamphlets have just been issued by the association, one bearing on company membership and the other aimed to bring in applications for individual membership. The keynote of the former publication is that in union there is strength, and in addition to the clear-cut statement of the advantages of company membership there is an impressive argument in the list of member and non-member companies in each state with the percentage of mileage operated by each group. In some states it must make a company feel lonesome to be outside the ranks of the associated companies working all together for the common good. The individual membership pamphlet is as effective in its way as the company booklet. Both are good campaign literature, and while no doubt wide circulation will be given to them by the association, it would aid its efforts and the cause in general if present members should add a personal note to the printed appeal. With every member a self-constituted but active coadjutor of the membership committee, there is no doubt that before this year's convention both the company and individual roll can be materially increased. Maximum results, in fact, can be obtained in no other way than by general co-operation with the officers of the association, who, of course, welcome requests for printed ammunition to be used in effort of this kind.

ELECTRICITY ON THE FARM

Under this heading a report was presented to the N. E. L. A. convention which tells of investigations made in the field of rural electrical extensions in the Eastern States, a matter which is of interest to electric railways as well as to electric lighting companies. While it is true that the efforts of some of the Eastern companies to push this work in their respective territories are admirable and along varying lines, such as those of the Boston Edison Company, with its traveling exhibits of devices and appliances capable of use in rural life, and the 4600-volt, three-phase lines of the Eastern Michigan Company, reaching twenty-five towns, much more has been accomplished in the Far West probably than elsewhere in the country. There electric power is used extensively for irrigation and farm service along the extensive power transmission lines which cross and intersect such states as California and Utah, for instance. The chief objection made by the electric companies to this class of service is the cost of securing it, owing to the low density of the business and to the characteristically small units of area. We can readily see that business of this kind might not warrant an extensive investment in a distribution system, but where the distribution system is already installed the question presents a different aspect. This is, of course, the situation with the electric railways, and we believe that more attention might profitably be given to the development of the power business from railway circuits than has been the case in the past. There are certain technical difficulties, to be sure, on

account of the fluctuating voltage and grounded circuit, but these are not serious objections to the sale of energy for most purposes where power would be used on the farm, and indeed at least one railway company in the Central States has developed quite an extensive service of this kind. The matter is certainly worth looking into.

FRANCO-BRITISH VIEWS ON RAILWAY ELECTRIFICATION

The active state of the railway electrification problem abroad is evident from a perusal of the proceedings, as reported elsewhere in this issue, of the joint meeting of the Institution of Electrical Engineers and the Société Internationale des Électriciens which was held in Paris during the week beginning May 21. Six papers were presented on railway electrification while a seventh paper dealt with high-tension d.c. transmission, which, of course, is very close to the same subject. It is noticeable from both the papers and discussions that European engineers are close students of American electrification practice and appreciate clearly the difference in conditions, more notably in the maximum weights of trains. Mr. Gratzmuller's paper on high-tension d.c. railways sets the present safe maximum voltage for an overhead d.c. line at 3000 volts, and he finds that with a current of 500 amp the total input of 1500 kw would be insufficient to handle the heaviest trains by means of single locomotives. It may be pointed out that in the case of the 2400-volt d.c. Butte, Anaconda & Pacific electrification, as described in the Electric Railway Journal for June 7, two four-motor locomotives are required to handle a 3400-ton train. The combined continuous capacity of these locomotives is 8 × 190 amp at 1200 volts or 1824 kw. The limiting feature as regards the weight of a train, with the electric locomotive, is of course not the power which can be put in the locomotive but the strength of the drawbars on the forward cars in the train. Mr. Gratzmuller's belief that 1200 volts per motor should be attainable is already confirmed by the Butte equipment, and higher voltages are in sight.

The papers of Messrs. Jullian and Mazen were of particular interest in contrasting the opposite policies of the Midi and the Western State Railways. The Midi company is electrifying nearly 300 miles of track on the single-phase system for branch and trunk-line service at line construction costs which are remarkably low for the character of operation. On the other hand, the d.c. third-rail electrification of the Western State Railways at Paris is a typical suburban network. According to Mr. Mazen, the conditions of electricity supply in France are likely to have great influence on the system of electrification, most central stations supplying fifty-cycle, three-phase current. He finds that as a rule French railways could use current from nearby existing stations after converting it at their own substations. If energy can be purchased at 1 cent per kw-hr, from central stations at other points besides Paris, the French railways are certainly in a most favorable position for accelerating electrification. No reports on the construction and operation of English lines were presented at the meeting, but reference was made to early high-tension d.c. electrifications in districts where, apparently, the tracks have reached their capacity with steam.

THE N. E. L. A. CONVENTION AT CHICAGO

The similarity of a great many of the problems in the electric light industry and in the electric railway industry is shown in the abstracts of the papers and reports presented at the N. E. L. A. convention in Chicago published in the issues of this paper for this week and for last week. This similarity is not confined simply to the apparatus used, although a great many of the problems of a technical nature are the same and many of the accounting problems are also alike. But both classes of public utilities have a further correspondence on account of their susceptibility to regulation from the same bodies, to onerous franchises and to tax burdens—in fact, in all of the broad questions of public policy.

As the urban railways were established long before the lighting systems, they have passed through forms of complete physical reconstruction to an extent from which the light and power companies, fortunately for them, have been spared up to this time. The history of the railway industry, involving progress through destruction, contains lessons which the lighting industry should heed. The railway industry, on the other hand, can well afford to study the aggressive commercial methods adopted by the light and power companies as a means of introducing and developing their service. The two principal points of difference between the two utilities are, perhaps, that the lighting companies are not such large employers of labor and that, since their employees are brought much less into physical contact with the public, every transaction with customers does not mean, as it does with the railway, an opportunity for personal disagreement with an employee. Another point of difference is the system of rates, because the lighting companies are reasonably free to vary their charges for different forms of service, although their maximum rate may be regulated. Their rates, also, are proportioned to the service given to a greater extent than on the railways. The latter have a unit charge regardless of the service rendered, corresponding somewhat to the original plan of charging for electric lighting before the energy supplied to the customer was metered. If this original plan of charging for electrical energy had been continued by the electric lighting companies, they would be as regards rates in a position very similar to that of the city electric railway companies with their 5-cent fare. Fortunately, however, they not only adopted early the meter principle, but the introduction of the tungsten lamp some five years ago has enabled them to make a material reduction to their customers in the cost of illumination without any increase in their own operating expenses per unit of energy delivered.

One condition which is bringing the two classes of companies together is the growing practice of an amalgamation of the railway load with the lighting and power load of the same central station. The tendency in this direction is stronger now than ever before, and a discussion of the economies which result from it formed a part of the proceedings at the National Electric Light convention. Chicago affords a conspicuous example in this respect, but there are many others. Arrangements of this character give to the lighting companies a new interest in railway operation, although the railway companies do not lose their

concern in the effectiveness and economy required in the generation of power. In consequence, the two classes of properties should come closer together with the march of evolution.

THE MINNESOTA RATE CASE DECISION

The practical effect of the decision in the Minnesota rate case handed down by the United States Supreme Court is to leave the status quo of the question undisturbed. The right of the states to exercise over intrastate rates the control that they have exercised for a generation has been confirmed, and their regulations will be legal provided they are not confiscatory and do not directly affect interstate commerce. The ruling now reaffirmed is the old familiar one, and the only departure seems to be the definite emphasis that is given to the facts that Congress has full power in the doubtful zone where interstate and intrastate rates become inextricably mingled and that here federal control must be exercised through the body created for that purpose, the Interstate Commerce Commission. Under the system of regulation defined by the Hepburn act, that body alone has power to declare that discrimination in fact against points outside a state has resulted from the exercise by the state of its admitted powers within its borders. As the Interstate Commerce Commission did not investigate the alleged discrimination in the Minnesota case, the state law was sustained merely on general constitutional grounds. Confirmation in regard to this duty of the commission, however, must await the decision in the Shreveport case. Here the Interstate Commerce Commission set aside rates fixed by the laws of Texas on the ground of discrimination against foreign points, and not until this matter is adjudicated will the precise scope of the power over intrastate rates reserved to the states be known.

It is the second part of the decision, however, rather than the above, that will particularly engage the attention of students of electric railway problems—the sections where the court discusses railway values and their computation. No affirmative rule is laid down, but from the principles of valuation negatively set up it appears that the attempt of railroads to establish the cost of reproducing their property new as equivalent to the "fair value" upon which they are entitled to earn rates is doomed. The method of valuation by the cost of reproduction new is, in the eyes of the court, inseparably linked with the use of an artificial multiplier applied to the market value in order to determine approximately what the acquisition of the land would cost, including expensive condemnation proceedings, razing of hypothetical buildings, etc., and other expenses incidental to its purchase. Thus, in estimating the value of the railroad property, the federal court in Minnesota allowed the railroad to multiply the normal market value of land by two in order to arrive at the cost of reproducing anew a right-of-way outside the three large cities in Minnesota, thereby taking cognizance both of the hypothetical condemnation expenses and of the peculiar "railroad value" of the land. Justice Hughes held, however, that as the amount of this additional value is largely mere speculation, the railroads must be satisfied with a fair average market price, an increase in the original investment being allowed only in so far as any is shown by similar adjacent property owned by others. We understand from the decision, however, that the court is prepared to consider the investment where it is in excess of the market value and has not been made in an improvident and reckless manner. Thus it will be seen that the approved method of valuation is neither that of "cost of reproduction new," as that term is usually understood, or the investment, but possesses some features of both methods. It is also evident that the court, in objecting to the use of multipliers, did not intend to eliminate the construction costs such as grading, and that it also recognized the propriety of such intangible elements as engineering, superintendence, legal expenses, contingencies and interest during construction, when based upon a proper valuation.

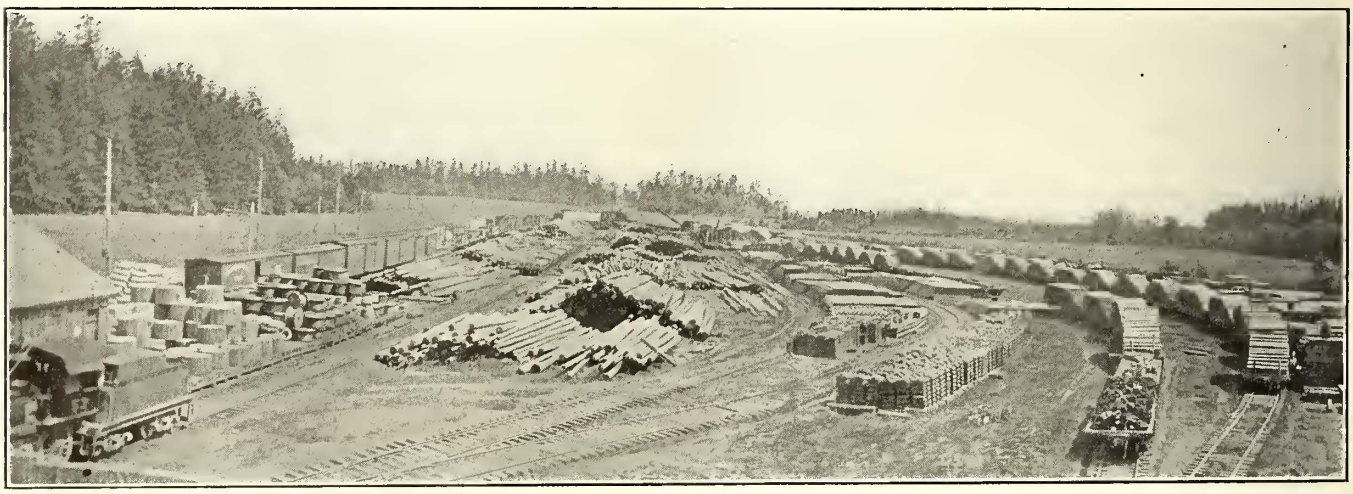
In deciding that the rates for the Minneapolis & St. Louis Railway were confiscatory and that such a claim had not yet been proved for the other roads the court has not made any definite statement as to what might constitute a universal legitimate return on the valuation. In one of these cases, decided in the Circuit Court by Judge Sanborn in 1911, it was stated that the companies were entitled to "a net return of 7 per cent per annum upon the respective values of their properties devoted to public use," and that "since it is an economic axiom that the greater the risk the greater the return must be upon invested capital, the conclusion is irresistible that a net return of 7 per cent is not more than fair." In reversing Judge Sanborn's decision, however, the Supreme Court does not at all generalize upon the adequacy of any percentage of return. As we stated above, it has overthrown the basis of valuation set up by the lower court, but as to whether 7 per cent is in general a reasonable return, or as to whether since 1911 the various risks and local conditions have not changed so much that 7 per cent is insufficient, the court is silent. As in previous discussions of the rate of return the court has always considered the local rates for different classes of investment, we assume that the same rule will apply and that in all subsequent rate cases each will have to stand on its own merits as to the adequacy of the rate of return.

One final point might well be mentioned. In adhering strictly to its practice of not attempting legislation beyond its power and of not settling by judicial fiat disputes political in their character, the Supreme Court has refrained from telling in any specific way what rules should be adopted in arriving at railway values. It recognizes the complexity of the problem, but while overthrowing the adoption of the inappropriate method of valuation employed in this case, it leaves to the Interstate Commerce Commission the real problem of valuation. In the nation-wide valuation on which the Interstate Commerce Commission is beginning to work this decision will have to be reflected, so far as it goes by prohibition. Then besides the valuation of each entire railroad system by the Interstate Commerce Commission there must be a separate valuation of the parts lying within the boundaries of each state, with the attendant problems of the allocation of terminal investments, in order to determine whether particular intrastate rates are confiscatory. With these valuations necessary the narrowing down of the field of valuation by the decision at least serves as a guide for the future.

The Oregon Electric Railway

This Line Operates Trains with Observation Cars and Sleeping Cars Between Portland and Eugene, a Distance of 122 Miles —It Is Equipped with 1200-Volt Apparatus and Has Recently Built a Number of Important Extensions

One of the longest electric railways recently put in operation is the Oregon Electric Railway, which extends from Portland south through the Willamette Valley to Salem, Albany and Eugene, with branch lines to the west. This line is a part of the Spokane, Portland & Seattle Railway, a steam railroad, which is owned jointly by the Great Northern and the Northern Pacific Railways, and the construction in Oregon represents the most important electrical railway project yet undertaken by these large steam railway interests. It is interesting to note that the Southern Pacific Railroad, which previously operated the only railroad extending the entire length of the Willamette Valley, is electrifying portions of its line and is building new track for electrical operation to connect therewith so that it will also have a through electric line between Eugene and Portland, a distance of about 125 miles, and several lines on each side of the Willamette River between Salem and Portland, which are distant about 50 miles. The accompanying map, reproduced from the Electric Railway Journal for Jan. 25, 1913, shows the lines in operation as projected by both companies.



Oregon Electric Railway—Material Yard, Showing System of Storing Material by Shifting Tracks

Of the system of the Oregon Electric Railway, shown in the accompanying map, all of the lines have been built with the exception of the branch from Tigard to McMinnville.

History of the Line

The Oregon Electric Railway was built originally as an independent interurban railway between Portland and Salem by W. S. Barstow & Company and was described in the Electric Railway Journal for Oct. 2, 1909. It was purchased by the present owners three years ago. The extensions made since that time have all been built on steam railroad standards, the bridges and clearances being such as to accommodate standard steam trains. On one part of this line, that between Albany and Eugene, the company has a tangent 24 miles long. The section between Portland and Salem is being reconstructed along steam railroad lines.

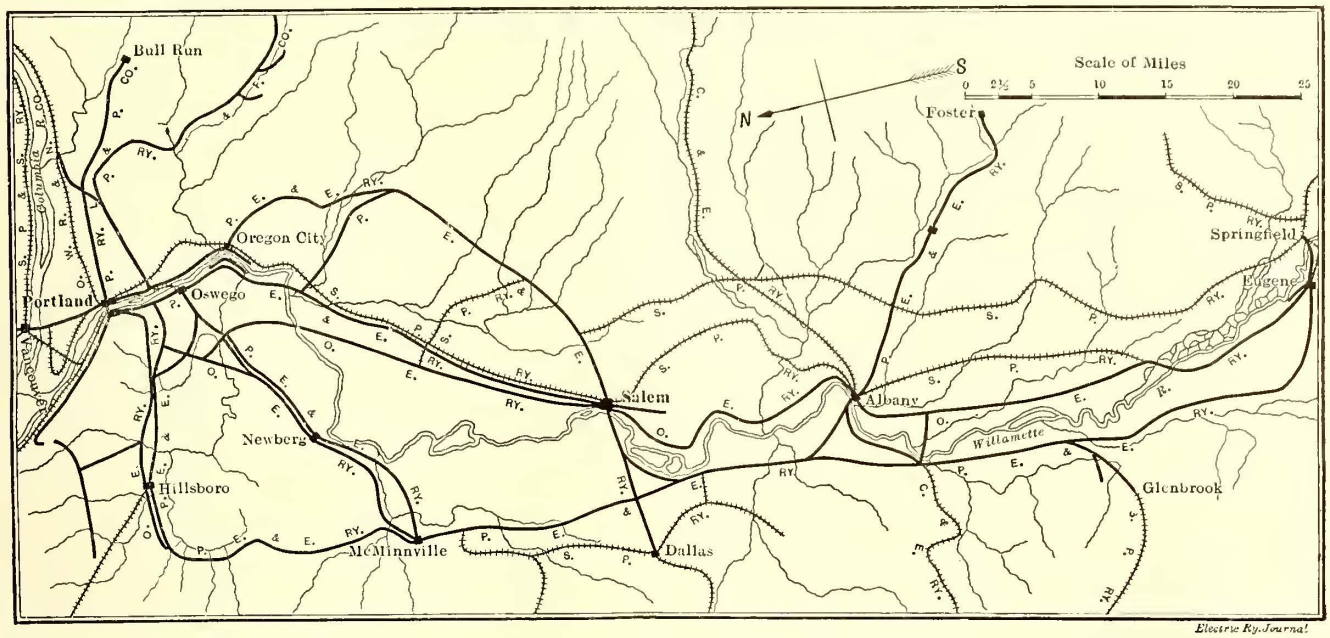
Cars are operated in trains made up of two or more. At present all passenger trains start from the main station of the Spokane, Portland & Seattle Railway at Eleventh and Hoyt Streets in the northern part of Portland and run south through the streets for about 1½ miles. While in the city the trains stop at designated corners to receive passengers and then make a regular stop for passengers and baggage at the Oregon Electric station at

Oregon Electric Railway—Two Trains Passing in Front of Salem Station and View in Main Street of Salem

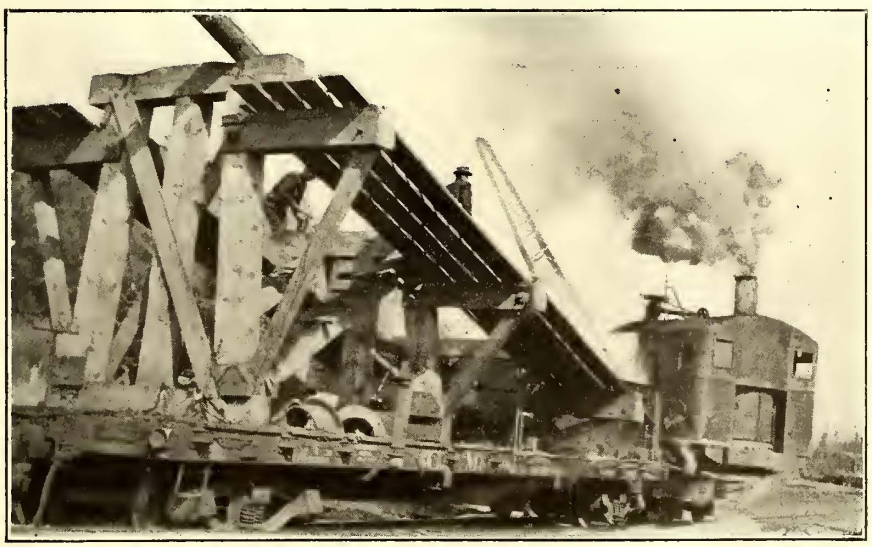
Front and Jefferson Streets in the southern part of Portland. The company is now rebuilding that part of its line between South Portland and the Oregon Electric depot in South Portland so as to bring it in on private right-of-way instead of city streets.

In the city streets the sharpest curve has a radius of 70 ft. There are several of these curves in Portland, and for this reason passengers are not allowed to pass through the vestibules from one car to another while the cars are running through Portland.

The company is now building a freight cut-off between Orenco and Helvetia. The former station is on the Oregon Electric Railway and the latter is on the line of the United Railways. When completed this cut-off will allow the freight trains to be taken off the portion of the system of the Oregon Electric Railway where traffic is most dense.



Oregon Electric Railway—Map of Electric Railways in Operation or Under Construction in Willamette Valley



Oregon Electric Railway—Treating Poles with Preservative

This cut-off is being constructed on a grade of five-tenths of 1 per cent. All new main line of the Oregon Electric Railway is constructed with a maximum of four-tenths of 1 per cent grade and a 3 deg. curve, as the company anticipates a large freight business and wishes to be able to take care of it economically.

The company is also double-tracking its line between Portland and Garden Home. In this work the deepest cut is from 40 ft. to 50 ft. and the highest fill is 90 ft. The deepest cut required the excavation of 185,000 cu. yd. of dirt, and for one section of track 5000 ft. in length the company will have 335,000 cu. yd. of fill and excavation. The double-track grade will be 32 ft. wide when finished, the cuts being 60 ft. wide at the bottom.

MATERIAL YARD

The engraving on page 1050 shows the material yard of the company near Salem. The tracks in this yard are laid in a series of arcs of circles with considerable space between them. The practice of unloading material in this yard is as follows: As the material is brought to the yards it is unloaded by crane on to the ground directly adjoining and on one side of the track. After the entire length of the tracks is filled in this way they are shifted a few feet so that the next lot of material can be unloaded in the empty space, and this process is repeated until all of the material is stored. When the material—ties, rails, etc.—is required on the work the construction cars are loaded by crane from the semi-circular rows last unloaded, and the tracks are then gradually shifted back until all of the material required is taken from the yards.

TREATMENT OF POLES

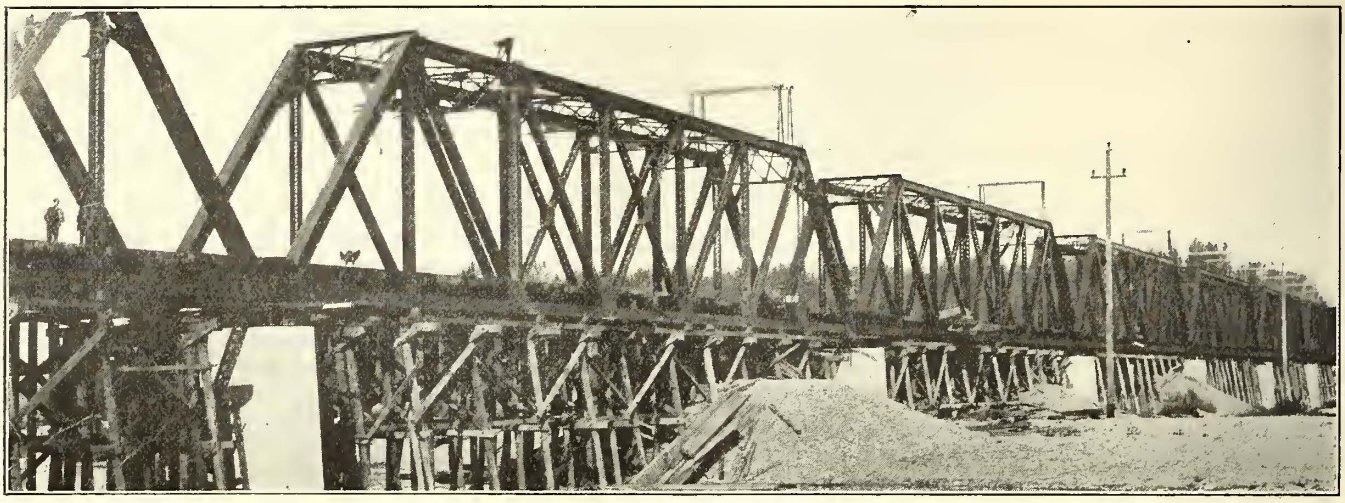
All the wooden poles used on the system are treated at the yards with preservative at their butts before being stored. Upon receipt there they are lifted by a derrick car upon a runway and their ends are dipped in a tank containing hot creosote, where they remain from ten to twenty minutes. They are then lifted out by the same derrick car and set into a tank of cold creosote, where they are allowed to remain about the same length of time. The poles are treated in this way for a distance of about 8 ft. from the butt. An illustration of this process is presented.

BRIDGES

There are a number of long bridges on the line. The largest is over the Santian River and consists of seven 175-ft. spans. The weather conditions in Oregon are such that only about five months is available for active

construction, so that this bridge had to be erected rapidly and under traffic. After the false work was put in the trusses were erected, and piers were sunk under them while the bridge was being used for traffic. To avoid interference with the erection derricks from the live trolley wire, the company used a third-rail in the middle of the track for current supply. It was supported on hard-wood blocks which were mounted directly on the ties. The wooden blocks were painted with P. & B. paint, and the rail was connected to the 1200-volt supply at one end through a switch, so that there was no voltage on the rail except when the trains were running. The cars were not equipped with a third-rail shoe, but a hand car, provided with a third-rail shoe which could be raised and lowered by a lever, was used for making the connection. When a train arrived at the bridge the hand car was put in front of it, and a jumper was connected between the shoe terminal and the head motor car. To warn the bridge workers of the passage of a train, bells were connected in the third-rail circuit and rang continuously while the third-rail was alive. After the train had crossed the bridge the hand car was taken off at a portable turntable, and the train proceeded. It required only three minutes to take the train across the bridge in this way.

Another bridge at Harrisburg crossing the Willamette River consists of three 200-ft. spans and two 100-ft. spans.

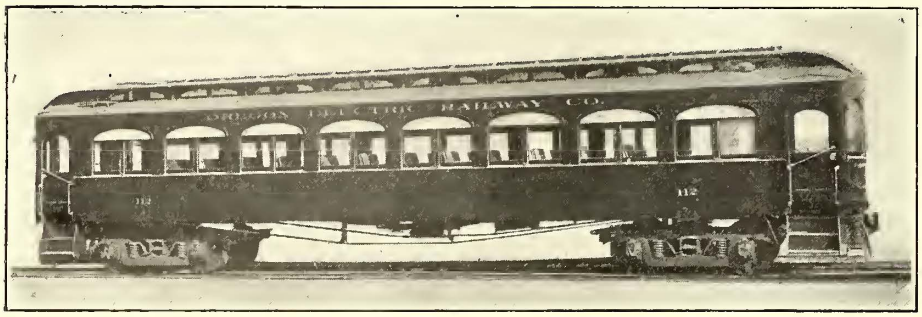


Oregon Electric Railway—Bridge Over the Santian River While Under Construction

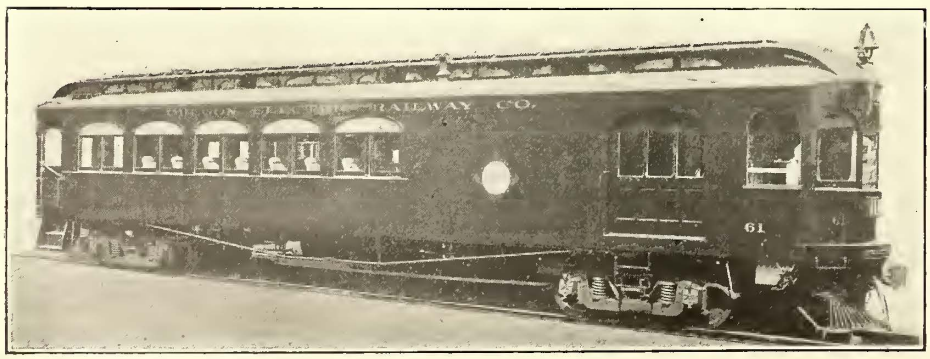
This bridge, however, was not erected under traffic as it was finished before service was established out of Albany. Another bridge with a 150-ft. span was erected 2 miles south of Albany. This bridge was erected under traffic, but it was so short that the trains were able to coast across it.

CHANGE FROM 600 VOLTS TO 1200 VOLTS

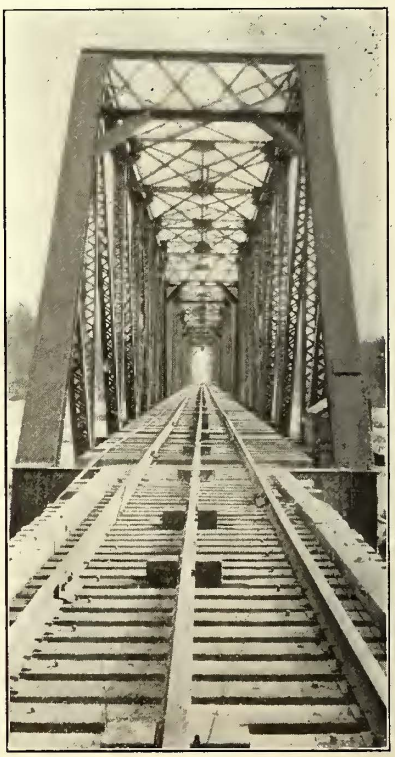
The Oregon Electric Railway was originally equipped for operation with 600 volts. After the company had decided to build the extensions mentioned above, it was evident that more feeder capacity would be required soon, and the advisability of changing from 600 volts to 1200 volts was carefully considered. At that time there were five substations, four on the main line at Multnomah, Tonquin,



Oregon Electric Railway—Standard Passenger Motor Car

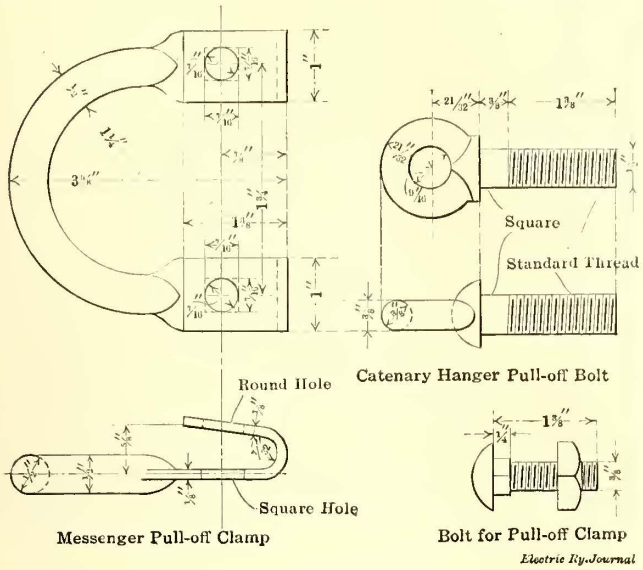


Oregon Electric Railway—Standard Combination Car



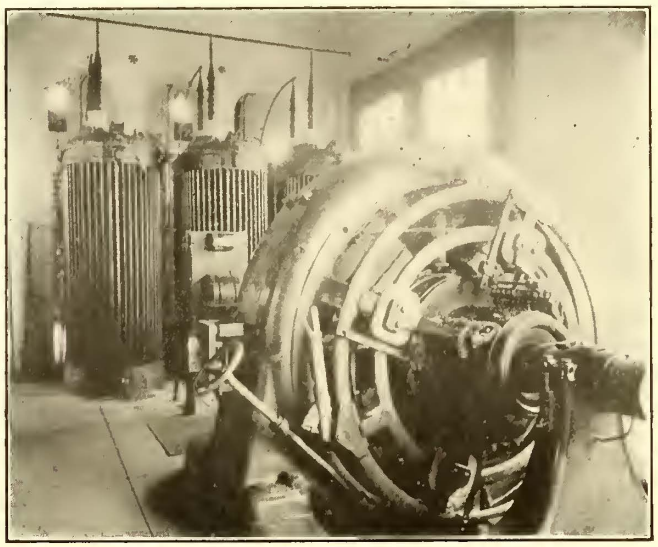
Third-Rail on Santian Bridge

Donald and Waconda and one on the Forest Grove line at Moffatt. These stations were approximately 12 miles apart. It was estimated that the company could electrify 72 miles of track south of Salem on the 1200-volt system at a saving over the 600-volt electrification sufficient to justify the changing over of the original mileage to 1200 volts, when the capitalized value of the saving in operating expenses on the entire system at 1200 volts was also taken into consideration. In consequence the company abandoned its substation at Donald and moved the 500-kw, 600-volt rotary at that point to Moffatt, where it was put in series with a similar rotary to give 1200 volts. The 500-kw rotary at Waconda was installed in the Tonquin substation in series with the one there, and a new 1200-volt, 500-kw rotary was installed at Waconda. At Multnomah there were two 600-volt rotaries in parallel. These were connected in series and a new 1200-volt rotary was installed there. The trolley wire on the existing line was re-insulated, and new substations were built south of Salem so that the spacing between substations is now between 18 and 20 miles. All substations are of concrete and steel, and on the new line the company has also built a combination with operators' cottage for three families. This permits the substation attendants, who work in three shifts of eight hours each, to be always near their place of work.



Oregon Electric Railway—Pull-off for Curves

The company has a 500-kw, 1200-volt portable substation in a steel car. Each of the standard substations of the company contains a track connected with the main line so that this portable substation can be run into any of the standard substations of the company and coupled up with the equipment there. It has been found almost indispensable for this service to carry the load while changes are being made in the apparatus at the substation thus assisted. The portable substation is also used for caring for unusual load conditions. Practically all of the electric equipment is of the General Electric make.

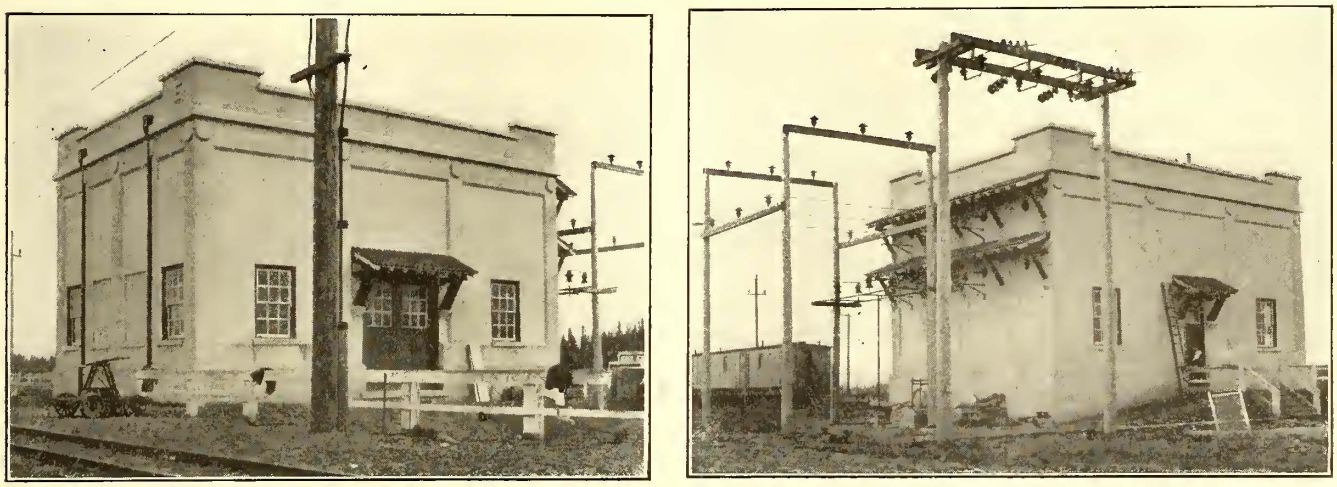


Oregon Electric Railway—Interior of Substation at Pirtle

When the line was acquired a transmission voltage of 33,000 volts was being used. This was increased to 60,000. The high-tension insulators were changed in accordance, and new step-up transformers were installed at the station of the Portland Railway Light & Power Company, from which all power used on the line is taken. All of this work in changing from 600 volts to 1200 volts was done at night without any interruption to the service.

PASSENGER STATIONS AND OTHER BUILDINGS

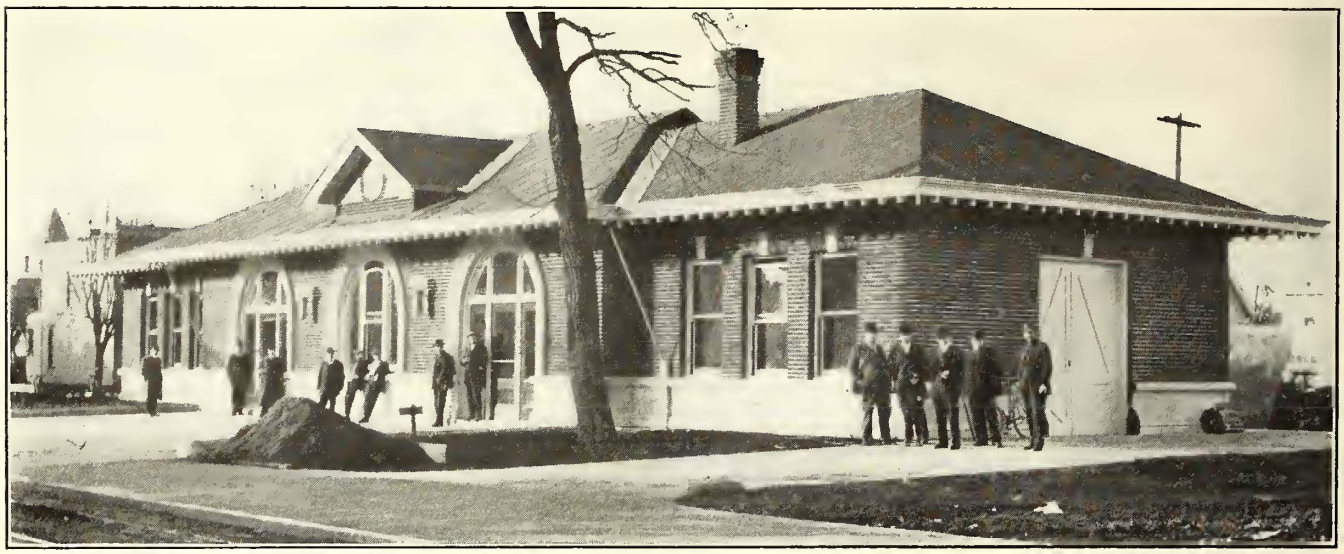
At the large cities on the line, like Salem, Albany and Eugene, the company has erected large modern passenger stations equal in appointments if not superior to those which would be erected by steam railroads in cities of the same size. In Albany and Eugene these buildings are devoted entirely to railroad purposes, but in Salem the station occupies part of the ground floor of a large office building.



Oregon Electric Railway—Exterior Views of Substation at Pirtle

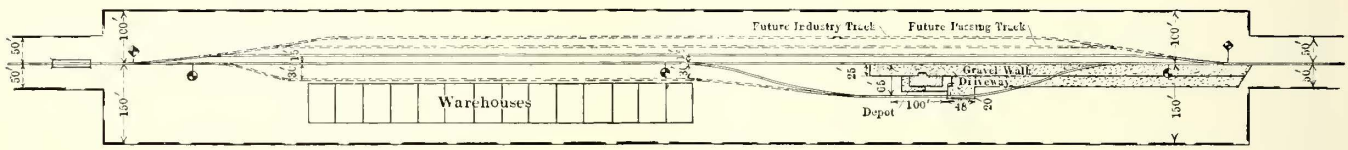
At other stops the company has erected three different types of stations. At the more important points it has built stations of its standard "C" or "D" type. The "D"

type of station is the smaller and consists of a single-story building 61 ft. in length and 21 ft. to 28 ft. in width, with a front platform for passengers and an end platorm, 18 ft. 6 in. in length by 26 ft. 4 in. in width, used for unloading the freight. The station includes a waiting room about 22 ft. by 15 ft., ticket offices, etc., about 12 ft. by 22 ft. and a freight room about 33 ft. by 22 ft. When the traffic at such a station increases sufficiently it is changed to a type "C" station by extending the freight room and devoting a part of it to the baggage room. The freight room in a type "C" station is 66 ft. in length and the baggage room is 15 ft. in length. The other portions of the stations, the waiting room and ticket office, are the same as in the smaller station.



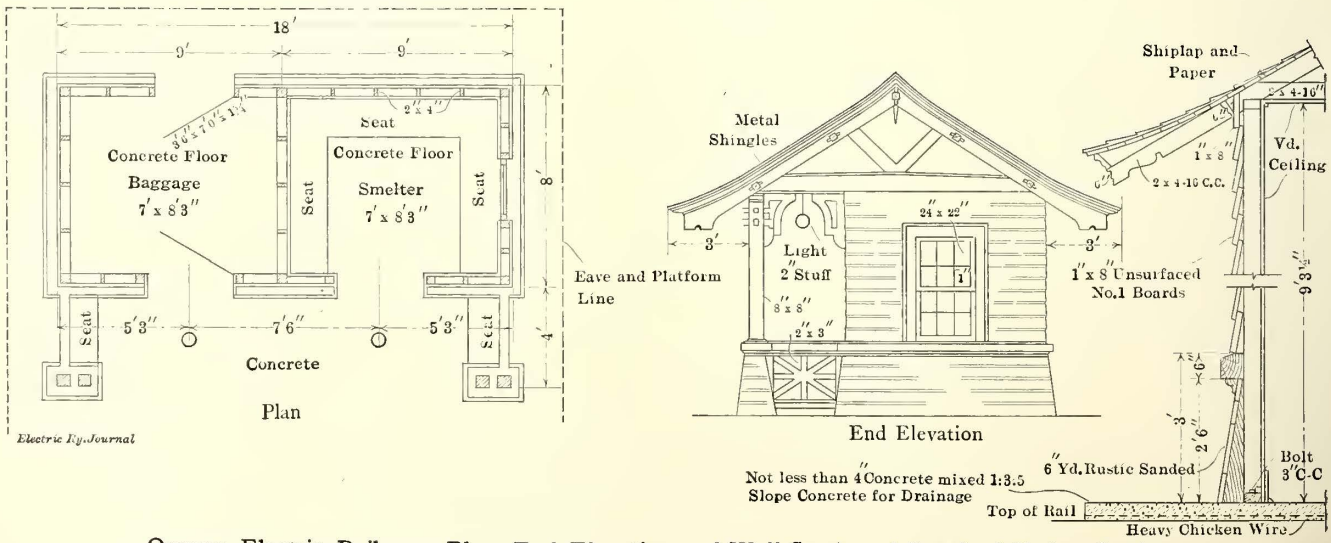
Oregon Electric Railway—Passenger Station at Albany

can be used as a part of a double track later. Each turnout is 2000 ft. in length, and ultimately the company expects to have one every 4 miles. In most cases the turnout is located at a station, and a typical layout of this kind is illustrated on this page. At the east end of the station a branch freight house track leaves the main track, and after passing behind the station has a double end connection, one connection leading back of the main line and the other paralleling the main line for a distance of 800 ft. or 900 ft., passing in front of a series of warehouses. The sites of these warehouses are leased to local shippers for a nominal sum so that on them the shippers may erect their own warehouses. On the opposite side of the standard turnout is room for two other passing or industry tracks.



Electric Ry. Journal

Oregon Electric Railway—Plan of Typical Way Station Grounds, Showing Freight Sidings and Warehouses



Electric Ry. Journal

Oregon Electric Railway—Plan, End Elevation and Wall Section of Standard Shelter Station

TURNOUTS AND STOREHOUSES

The right-of-way of the Oregon Electric Railway is wide enough for a double track throughout its entire length, and although the line is now single track from Garden Home south, all turnouts are constructed so that the second track

TRACK CONSTRUCTION

All interurban track is laid with 75-lb. rail on 7-in. x 9-in. x 8-ft. ties, spaced eighteen to twenty ties to a 30-ft. rail. In paved streets the company uses a 6-in. T-rail mounted on a ballast of thick gravel or crushed rock and

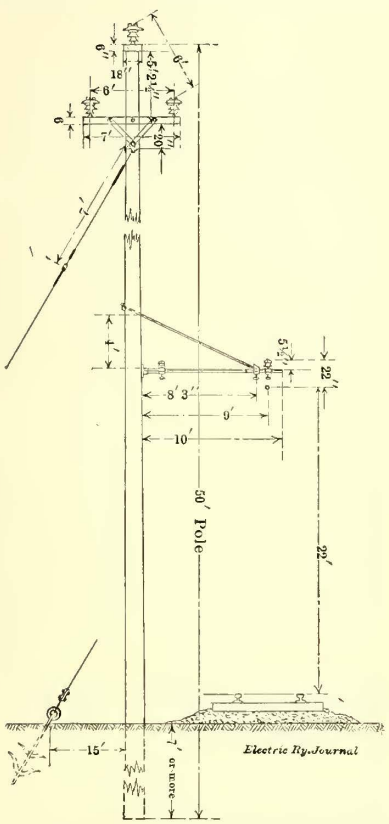
with concrete between the ties. A vitrified paving brick is used between the rails. This construction costs $7.25 per foot of single track, including the rail. On the greater part of the line welded rail bonds of the American Electric Railway Improvement Company are used and were attached with a bonding car. Under certain circumstances, in city streets, the compressed bonds of the American Steel & Wire Company are employed.

OVERHEAD CONSTRUCTION

The overhead construction is of single catenary type with hangers spaced 25 ft. apart on tangents and 22 ft. apart on curves. The hangers are of a special type made by the Ohio Brass Company, with 3-in. loops at the top and mechanical clips designed to hold the No. 0000 trolley. They were described in the ELECTRIC RAILWAY JOURNAL for Sept. 21, 1912, page 460. The pull-off, which was supplied by the Ohio Brass Company, is also of a novel type because it is not attached directly over the hanger but has a bridle which surrounds the hanger so that the latter can rise and fall and have the same freedom of movement as on straight track. This pull-off is illustrated. The messenger is 5/8 in. extra-strength steel. The feeders used south of Salem are of aluminum, with a 300,000-circ. mil section. All dispatching is by telephone, and the company has an independent telephone line with Gill selectors.

BLOCK SIGNALS

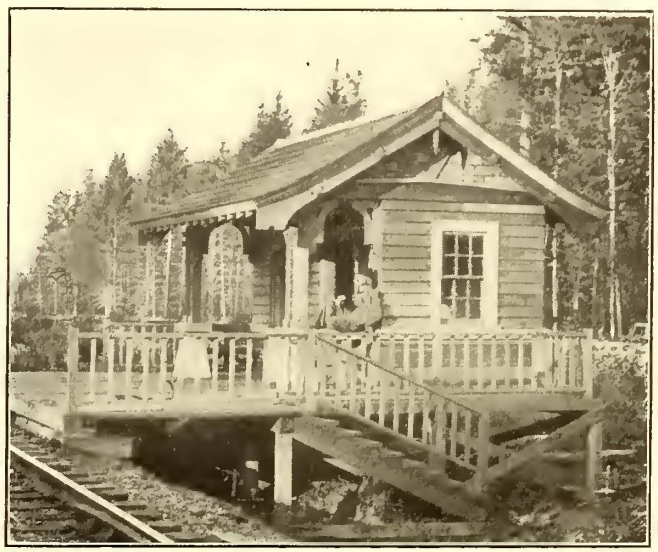
Between Portland and Garden Home the railway is equipped with the General Railway Signal Company's continuous track circuit block signal system covering 7 miles of single track. This system will be altered for double-track use when the second track between Portland and Garden Home, on which work is now being conducted, is completed. At present there are twenty-two of the company's Model 2A semaphore signals operating three-position in the upper left-hand quadrant. Energy for the signal system is transmitted at 2200 volts, single-phase, 60 cycles, then is stepped down to 110 volts for signal operation and to 2 volts to 6 volts for the track circuits.



Section of Standard Overhead Line

SERVICE

The company operates twenty trains each way between Portland and Garden Home, a distance of 8 miles; ten trains each way between Portland and Salem, a distance of 50 miles; seven trains each way between Portland and Albany, a distance of 77 miles, and five trains each way between Portland and Eugene, a distance of 122 miles. It also runs nine trains each way daily between Portland and Forest Grove, a distance of 27 miles. The fare charged is 3 cents a mile, with no reduction in price for a return ticket unless used the same day. The company, however, sells sixty-ride commutation tickets for 1½ cents a mile and 1000-mile books for $25. Week-end excursion tickets are also sold at reduced rates.



Oregon Electric Railway—Typical Shelter Station

Two trains each way daily between Portland and Eugene are called limited trains, and each makes the run of 122 miles in four hours. These trains are usually made up of two motor cars and one observation parlor car, on which an extra fare is charged and on which there is buffet dining service.

There is also a night passenger train each way made up of one day coach and one sleeping car. These sleeping cars were described in the ELECTRIC RAILWAY JOURNAL for Jan. 18, 1913. The usual local train is made up of a combination baggage and passenger car and a standard coach, both motor cars.

Oregon Electric Railway—Standard Freight House

The following are the dimensions of the standard cars of the company:

Combination Smoking and Baggage Cars

Length over buffers	57 ft. 11¾ in.
Width over side sills	9 ft. 0 in.
Width over sheathing	9 ft. 1½ in.
Length baggage compartment, inside	17 ft. 10¾ in.
Length smoking compartment, inside	19 ft. 7⅛ in.
Seating capacity	38
Weight, fully equipped	94,000 lb.
Motors	two GE-73 and two GE-205, 75-hp
Trucks	Baldwin 78-30

Combination Passenger, Smoking and Baggage Cars

Length over buffers	57 ft. 11¾ in.
Width over side sills	9 ft. 0 in.
Width over sheathing	9 ft. 1½ in.
Length baggage compartment	7 ft. 10¾ in.
Length smoking compartment	19 ft. 0 in.
Length passenger compartment	19 ft. 6 in.
Seating capacity	54
Weight, fully equipped	93,000 lb.
Motors	two GE-73 and two GE-205, 75-hp
Trucks	Baldwin 78-30

Passenger Coaches

Length over buffers	58 ft. 4½ in.
Width over side sills	9 ft. 0 in.
Width over sheathing	9 ft. 1½ in.
Length inside	46 ft. 6½ in.
Seating capacity	62
Weight fully equipped	84,000 lb.
Motors	two GE-73 and two GE-205, 75-hp
Trucks	Baldwin 78-30

The company has also six electric locomotives, two of 50 tons capacity and four of 60 tons capacity. The former are equipped with four GE-207 motors and each of the latter with GE-212-G motors.

POWER

At present the company purchases power from the Portland Railway, Light & Power Company, but it is planning to develop hydraulic power in the McKenzie River at Clear Lake, where from 25,000 kw to 40,000 kw will be available. The company will erect here this spring a temporary dam to determine whether the surrounding soil, which is of recent lava origin, will hold the water. This test will show the proper height of the dam to be erected at this point. After this is determined, the company will be able to locate the elevation of the conduit which will lead the water at Clear Lake to the forebay above the power station. The conduit will be lined with concrete 28,000 ft. in length and will have a finished area of 68 sq. ft. and a grade of 7½ ft. to the mile. The head at the power house will be 970 ft. The penstock lines between the forebay and the power house will be carried in a solid rock tunnel, steel-lined, and the power station itself will be of concrete. The storage facilities to be provided at Clear Lake will permit the development of 60,000 hp for such times as are necessary to care for normal loads. Transmission to Salem, where this transmission line will connect with the present high-tension lines, will be at 60,000 volts.

MEETING OF THE RAILWAY SIGNAL ASSOCIATION

A meeting of the Railway Signal Association was held in New York City June 11-12, 1913. The program included the presentation of reports of a number of committees, which generally took the form of specifications for signaling apparatus and accessories and for methods of construction.

The committee on automatic block signals reported that it had spent considerable time on experiments and study to find a practical and simple method for testing the iron used in magnetic circuits but that it had so far been unsuccessful in arriving at any definite conclusion. The committee also reported that it had continued its investigation of the causes and remedies for the sweating of relays. While nothing definite had been determined, the investigation indicated that ventilated relays would sweat less than non-ventilated relays and that, in consequence, relay boxes should be ventilated. Relays in wooden boxes or in iron boxes with wood lining having an air space between the iron and wood appeared to sweat less than relays in plain iron boxes or in signal mechanism cases. In the opinion of the committee openings from relay boxes to ground should be sealed.

The committee on manual block signals made a report which stated as additional information on manual blocks that the plain manual block was the most flexible system, providing the easiest method for cutting offices in and out and being the cheapest to install and maintain, but it did not protect itself against open switches, broken rails or cars which were outside of clearance points. With regard to the controlled manual block, the report stated that it was more expensive to install and maintain than the manual block and that it did not in itself protect against open switches, broken rails or cars outside clearance points. It provided, however, a mechanical check to secure co-operation between operators before the "proceed" indication was displayed. With regard to the staff system, the report stated that it did not in itself protect against broken rails but did provide facilities for movements of trains without written orders, giving a continuous indication to the operator and to the train regarding the condition of the block. The report of this committee included also a statement of the costs of various installations of manual block signals without track circuit control.

The report of the committee on electric railways and alternating-current signaling included recommendations for revisions of the specifications and requisites for apparatus and material for an alternating-current automatic block signal system for railways which used alternating propulsion current. The committee also submitted complete specifications for core-type impedance bonds for both alternating and direct-current propulsion and for single-phase track transformers for 250 volts or less. Additions to the existing specifications for apparatus and material for alternating-current automatic block systems were also recommended, together with complete specifications for slate switchboards and equipment for alternating-current signal systems.

Two papers were presented at the meeting by J. E. Saunders, assistant signal engineer Delaware, Lackawanna & Western Railway, as matters of information. They were entitled "Selection of Motor Generators for Use as Frequency Converters" and "Twenty-five-cycle Versus Sixty-cycle Power for Railway Signals." In the former paper the author spoke of the necessity for the purchase by steam railroads of current from local power companies. As this was generally at sixty-cycle frequency, it was necessary to convert it from sixty to twenty-five cycles for use with the signal system, and the only satisfactory frequency changer was, he said, the motor generator. As the complication of synchronous motors practically compelled the use of induction motors, the lack of exactly suitable motor speeds involved considerable variation from twenty-five cycles in the frequency of current which was delivered. The author presented tables showing the frequencies obtained by motors with different numbers of poles and recommended that where practicable fourteen-pole motors be used. When this was impossible the use of a ten-pole motor was recommended.

In the comparison of twenty-five-cycle and sixty-cycle power for railway signaling Mr. Saunders submitted figures to show that the ultimate length of transmission for a 10 per cent drop in a 4400-volt three-phase line with No. 6 copper wires 2 ft. apart would be 65 miles for twenty-five cycles and 45 miles for sixty cycles. For double-track signaling with one-mile blocks the maximum power required at the generator would be for a 65-mile line at twenty-five cycles, 11.37 kw, with a power factor of 0.728. For 45 miles of sixty-cycle signaling 14.28 kw would be used with a power factor of 0.629. This indicated the desirability of twenty-five-cycle current from the standpoint of both transmission distance and power consumption. The author presented a list of the few cases where twenty-five-cycle signaling could not be used to advantage and gave the reasons in each case.

Papers and Discussions at the N. E. L. A. Convention

A Continuation of the Abstracts of Papers and Discussions of Railway Interest at the National Electric Light Convention in Chicago Last Week

Abstracts of a number of the papers and reports presented at the N. E. L. A. convention in Chicago last week were published in the issue of June 7. Abstracts of other papers and reports of electric railway interest follow:

PUBLIC POLICY

The report of the public policy committee, signed by Arthur Williams, as chairman, and by N. F. Brady, Everett W. Burdett, H. M. Byllesby, Henry L. Doherty, Charles L. Edgar, W. W. Freeman, George H. Harries, Samuel Insull, Joseph B. McCall, Thomas E. Murray, Samuel Scovill, Charles A. Stone and Frank M. Tait, ex officio, is in itself compact, but added to it are appendices relating to: (1) the service annuity plan of the Edison Electric Illuminating Company of Boston, (2) welfare work of the Public Service Corporation of New Jersey, (3) decision of the Supreme Judicial Court of Massachusetts in the case of the Fall River Gas Works Company versus the Board of Gas and Electric Light Commissioners, and (4) the decision of the Railroad Commission of Wisconsin in relation to electric-service rates in Milwaukee.

The committee believes that where a given territory is occupied by an electrical corporation rendering good service at fair prices, treating its employees fairly and otherwise holding itself in alignment with the public interest, it should be protected against "raiding" or destructive competition. The natural and proper tendency of the industry is toward a regulated monopoly. One of the advantages to be gained is a unified system of enhanced capacity, which as a result is capable of rendering better and cheaper service. Anything which seeks to disturb this condition is not in the interest of the public, either that part served by the corporation or that holding its securities.

So far as the committee can learn, the plan for minimum wage has been carried out without complications or labor disturbance or seriously objectionable increase in the cost of manufacture. The results seem to have been beneficial and the committee repeats that the industry must suffer if its employees are inadequately compensated. It urges the care of employees as a definite responsibility and says that nothing to insure a healthy, contented and well-trained human organization in a public utility industry should be left undone.

Prevention rather than cure should be the attitude of the industry toward questions of safety and sanitation. Accidents entail loss upon the public as well as upon the company and its employees, and in the end the public pays the cost of all industrial accidents. In relation to sanitation, the committee points out the importance of providing pure drinking water at a proper temperature. This is spoken of as an economic necessity. A note of warning is sounded in relation to the methods followed by some of the casualty corporations in adjusting claims of injured employees. It is urged that members using this insurance shall themselves see to it that their employees receive fair treatment.

Under the head of "Important Commission and Court Decisions" the committee lists the recent commission decision in New Jersey in relation to the rates of the Public Service Gas Company; the New York Second District Commission's decision in the matter of complaint of the city of Buffalo against the Buffalo central station companies, reducing rates from 25 to 28 per cent; the decision of the First District Commission of New York reducing gas rates of the Kings County Lighting Company (in this case the Appellate Court has reversed the order of the commission); the Des Moines gas case; the decision of the Maryland Public Service Commission reducing rates of the Baltimore company, and, one of the most important, the decision of the Supreme Judicial Court of Massachusetts in the case of the Fall River Gas Works Company against the Board of Gas and Electric Light Commissioners. This last decision is reproduced in full in the appendix. A decision of the Wisconsin commission in relation to electric rates in Milwaukee is reproduced practically in full in the appendix.

The committee refers to the joint meeting held with the same committee of the American Electric Railway Association and appreciatively mentions the services in this connection of General Harries and Thomas N. McCarter.

A renewal of the tendency toward municipal ownership and operation of public utilities seems imminent, in the judgment of the committee. The Socialist party is making special efforts in this direction, and where members are threatened with competition of this character they are urged to get in immediate touch with the officers of the association. The committee commends the recent movement which has resulted in the organization of commercial educational courses and in summing up calls attention to the serious state of public unrest here and abroad. Much good, it says, will be accomplished in continuing the policy of the past of approaching these problems in a spirit of earnest interest, fair play, good will and sincere regard for those associated with the central staiton interests in the conduct of the industry.

RESUSCITATION FROM ELECTRIC SHOCK

The report of the commission on resuscitation from electric shock, presented by Past-president W. C. L. Eglin, reviewed exhaustively the work of the commission, with a discussion of the relative merits of the Silvester and Schaefer manual methods of artificial respiration. An important feature of the report was a critical analysis of the claims made for the pulmotor as an efficient mechanism for reviving unconscious subjects and an outline of the mechanical method of artificial respiration by pharyngeal insufflation as developed by Dr. S. J. Meltzer, head of the department of physiology and pharmacology in the Rockefeller Institute for Medical Research.

The commission concedes that the Schaefer method is superior to the Silvester through its greater simplicity and ease of performance, absence of trouble from the tongue falling back and blocking the air passages and reduced danger of injuring the liver or breaking the ribs in the application of pressure. Observations indicate that, so far as the amount of ventilation of the lungs is concerned, the Schaefer method, reinforced by the extension of the arms forward, is decidedly better than that suggested by Silvester. This advantage, taken in conjunction with its greater simplicity and safety, caused the commission to vote unanimously in favor of the prone-pressure method of artificial respiration as an effective means of giving immediate aid. Reference was made to the commission's booklet on resuscitation, which has been prepared as the outcome of the work.

Even a relatively poor method of artificial respiration, if begun immediately, may maintain life and permit ultimate recovery in cases in which an ideal method, with all the resources of the laboratory and hospital, would be ineffective after a few minutes. In order to test the action

of devices now being advocated, a sub-committee, with Dr. Meltzer as chairman, was appointed. The apparatus examined was used according to directions, and the effects were demonstrated before the members of the committee. At leat four machines for performing artificial respiration are now in the market—the pulmotor, the Du Brat apparatus, the "lungmotor" and the "salvator." The last two devices were not examined. The apparatus of Du Brat seems never to have become a successful commercial article. The committee emphasizes the wide publicity which the pulmotor has received through the daily press, but points out at length that the pulmotor has lacked scientific, surgical and medical sponsors. Efforts to obtain scientific details and other reliable information bearing upon specific cases in which the pulmotor has been used lead to the conclusion that the cases available to the committee do not furnish convincing proof of the necessity or exceptional value of this apparatus. The committee agrees that the instrument is probably capable of creditable performances and doubtless has in some instances favored the restoration of normal breathing. Its present vogue, however, is not supported by a critical examination of the principles involved in its mechanism or of its effect when used for long periods. No well-considered testimony as to its action is to be found in medical literature, and in this country at least its loudest sponsors are the newspapers, which have spread the impression that the pulmotor is a perfect resource when inspiration is suspended. In view of the facts obtained by study of the Du Brat apparatus and the pulmotor, the members of the sub-committee agreed upon the following suggestions: In cases without any respiration the pulmotor should be used only when guided by hand and then not faster than twelve to fifteen complete respirations per minute; when left to run automatically it is liable to be ineffective and dangerously deceptive. Because of suction on the lungs neither the pulmotor nor the Du Brat should be used more than five or six minutes at a time. If nothing better is available one of them should be alternated with the Schaefer method combined with oxygen inhalation. In cases of slow and stertorous breathing, however, both machines can probably be used for a longer time with benefit and without danger.

The remainder of the report describes the mechanical method of artificial respiration used by Dr. Meltzer, based on pharyngeal insufflation. The apparatus which Dr. Meltzer has devised has the following commendable features: (1) Its positive action is determined by the operator and not left to a mechanism which may fail to work; (2) it is free from a sucking action during expiration, as the latter results from the natural recoil of the disturbed parts; (3) it is light; (4) it is relatively inexpensive; (5) it is simple, and (6) it embodies in a form which can be used by laymen a method of artificial respiration which has been employed for many years in scores of laboratories and on thousands of animals and is known to be effective and free from danger. The commission recommends this apparatus as a satisfactory means of continuing artificial respiration and suggests that in cases of suspended breathing the modified prone-pressure method be supplemented as soon as possible by the use of the apparatus.

ELECTRICITY ON THE FARM

The committee for the Eastern States on electricity on the farm submitted an interesting account of the possibilities and progress made in the rural districts in the East. It was stated that of the Eastern States, New York, New Jersey and Connecticut, on account of their population density, are conceded to offer the most promising field for exploiting electricity in the rural districts. The installations on the farms themselves should be rugged, and in this connection the polyphase induction motor is thought to offer the best solution of the problem, because it is low in first cost and gives comparatively little trouble in operation. Technical efficiency should be considered as secondary to convenience, reliability and low cost. The value of the farm district load to the central station was considered, and an instance was cited where a Western plant, now serving a farming community, had been able to transfer its period of maximum demand from the winter to the summer months. The sub-committee for the Central States of the committee on electricity on the farm made a less optimistic report. It believed that some reason other than the farming business must be found for extending lines across the country and the farm business must be considered as a by-product. Other industries in the rural districts which deserve attention are irrigation and drainage projects, coal mines, stone quarries, brick and tile works and cement plants. The data gathered by the committee show that in each of these industries lies an opportunity for an installation of 300 kw or more. In spite of the various means which have been resorted to in order that a part of the investment cost may be shifted from the central station to the users, it is the opinion of the committee for the Central States that the farming business as developed at present does not furnish returns commensurate with the capital investment.

PROGRESS TOWARD UNIFORM ACCOUNTING

The committee on uniform accounting, of which Mr. E. J. Bowers, of the Kansas City (Mo.) Electric Light Company, was chairman, reported that during the past year it had appointed sub-committees on public service relations, uniform classification of accounts, and statistics and forms. The latter committee will make a collection of forms now in use in the industry arranged according to population of towns. It was stated further that some attention had been given during the year to an attempt to co-operate with the various public service commissions in an effort to secure standardized forms that would be of most service both to government and to the companies. Still another line in which progress has been made during the year was explained in the report, where details were given of a meeting held in Chicago in February, 1913, at which it was decided to include in the report for 1913 a complete index by topics of all the papers that have been read on accounting matters before the association. The topic heads chosen were general accounting matters, depreciation, purchasing and stores, work-order systems, meters and meter records, customers' accounts, collections, statistical, and miscellaneous, and in pursuance of this policy the report closed with abstracts of these papers.

In the discussion H. M. Edwards, New York, said that the report of the sub-committee on a tentative classification of accounts was superior to any forms so far promulgated by the public service commissions in this country. A. S. Scott, Chicago, said that the system could not be applied to hydroelectric and transmission business without several amplifications. Copies of the uniform system of accounting were distributed at the end of the session in order that suggestions or changes might be recommended.

PRIME MOVERS

W. L. Abbott, Commonwealth Edison Company, Chicago, opened the discussion on the report submitted by the committee on prime movers through I. E. Moultrop, chairman, as abstracted on page 1012 of the Electric Railway Journal for June 7, 1913. He called attention to the recent order of a 30,000-kw steam turbine for the company's service as evidencing the rapid progress of the art even in the brief interval since the prime movers committee report was prepared about three months before.

I. E. Moultrop, Boston, closed the consideration of this paper by reading a letter from the General Electric Company which stated that the breaking of the turbine diaphragm nozzles mentioned in the report was not due to their having been cast in solid with the diaphragms, but to the fact that 30 per cent nickel steel was used in the partitions, instead of 3½ per cent nickel steel. Where the cast-in nozzle type of machine was used the smaller percentage

of nickel was desirable for the partitions. A removable nozzle had been developed for some of this manufacturer's turbines, and in replacing broken nozzle diaphragms, the removable-nozzle feature had been applied where the customer considered that this feature was worth the additional price.

ELECTRICAL APPARATUS

The discussion on the report of the committee on electrical apparatus, submitted by L. L. Elden, chairman, and abstracted on page 1012 of the ELECTRIC RAILWAY JOURNAL for June 7, was opened by R. F. Schuchardt, Chicago, who said that the 30,000-kw generator for the Commonwealth Edison Company would operate at 1500 r.p.m., delivering energy at 9000 volts without auto-transformers. About half the reactance was in the machine itself and half in external coils, an arrangement which tended to increase the efficiency about two-thirds of 1 per cent. In the near future the limit of generating capacity per section of the Chicago central-station system will probably be raised from 60,000 kw to 100,000 kw. Regarding noise in substations, Mr. Schuchardt cited the replacement of a frequency changer with transformers as an effective measure. He also mentioned the tendency to supply an exciter on the generator shaft in large units for central station service. Philip Torchio, New York, favored the use of external reactance coils in connection with large turbo units. The bus tie reactances mentioned in the report should have the full carrying capacity of the switch between bus sections. Reactances beween parallel operating stations are as important as between bus sections.

SWITCHBOARD INSTRUMENTS

The discussion on Paul MacGrahan's paper on "Switchboard Instruments," as abstracted on page 1013 of the ELECTRIC RAILWAY JOURNAL for June 7, turned upon the greater reliability of the induction-type, permanent-magnet form of relay as compared with the solenoid-type, bellows-equipped apparatus. C. P. Osborne, of the Portland, (Ore.) Railway & Light Company, emphasized the great need of more reliable relays for the protection of alternating-current circuits. B. H. Smith, of Pittsburgh, and the author, in closing, defended the repuation of the inductive type of relay as capable of meeting a wide range of service demands.

HIGH-TENSION D.C. TRANSMISSION

A general discussion on high-tension d. c. transmission followed the report of the committee on progress which was submitted by T. C. Martin. Dr. C. P. Steinmetz, Schenectady, N. Y., discussed the economic aspects of such transmission, compared with three-phase. He said he had had no opportunity to go over the details of the Trollhättan Falls (Sweden) proposed high-voltage d. c. submarine transmission, but the investigation of many transmission projects elsewhere had never disclosed to him a single instance where direct current was the proper solution of the problem. The choice was largely an economic question. Where it was necessary to cross the ocean bed in a very long and high-pressure transmission it might in some cases be desirable to use direct current. One would get inductive line disturbances from lightning regardless of the character of current used. Direct-current generators were less economical and flexible, and experience favors three-phase, high-tension transmissions. E. A. Lof, Schenectady, N. Y., stated that high-voltage d. c. transmission was less desirable from the operating standpoint. Its selection for the Trollhättan-Copenhagen scheme was largely due to the inability of manufacturers to offer submarine cables one and a half years ago good for over 90,000-volt service. Arthur Wright, London, England, and F. B. H. Paine, Buffalo, N. Y., closed the discussion, the former bringing out the absurdity of considering machines as small as 1500-kw rating for large transmission work. This was about the limit of successful commutation, and it formed a fatal objection to high-tension d. c. transmission.

SUSPENSION INSULATOR DESIGN

A. O. Austin's paper on suspension insulator design, abstracted on page 1014 of the ELECTRIC RAILWAY JOURNAL for June 7, was discussed by Prof. E. E. F. Creighton, who briefly outlined the creepage effects in a three-petticoat insulator accompanying frequency increases. L. C. Nicholson, of Buffalo, said that a greater factor of safety was obtained by placing the insulator disks as closely together as possible. The problem was largely a function of the ratio of dielectric puncture to dry flash-over between terminals. Tests conducted by the speaker indicated that increased mechanical strains tended to hasten electrical failures, although in practically no case had a disk failed immediately after passing the flash-over voltage. The action appeared to be molecular in character. The same percentage of failure was obtained after as during the imposition of a mechanical strain. In closing the discussion the author said that the effect of combined electrical and mechanical stresses was serious with slight flows under mechanical loads.

POLES AND POLE PRESERVATION

Russel A. Griffin's paper on "Poles and Pole Preservation," briefly noted on page 1013 of the ELECTRIC RAILWAY JOURNAL for June 7, led to several questions, in reply to which the author said that the imported carbolineums were giving excellent service, particularly in cold applications. Any of the coal-tar creosotes passing the association's specifications, whether of domestic or foreign make, could be used sucessfully. With the brush treatment it was necessary merely to treat 2 ft. above and 2 ft. below the ground line. On any 30-ft. pole two coats of oil, requiring about 0.5 gal., or 4 lb., of oil were sufficient for this treatment. The inner bark should always be taken off in applying a preservative process.

DISTRIBUTION PROBLEMS

The report of the committee on distribution problems, presented by P. M. Downing and abstracted on page 1013 in the ELECTRIC RAILWAY JOURNAL for June 7, was discussed by F. G. Hamilton, Visalia, Cal., who said that in the San Joaquin Valley the distributing pole line had a spacing of from 300 ft. to 400 ft. Poles 30 ft. long were used on the shorter spans and 35-ft. and 40-ft. poles were employed on the larger ones. At highway crossings the poles were 5 ft. higher than elsewhere. In closing the discussion, L. A. McArthur, of the Pacific Power & Light Company, Portland, Ore., pointed out that 30-ft. poles were too short for Oregon and Washington conditions, where the alfalfa stackers were liable to hit the lines if the farmers were careless.

CIRCUIT BREAKERS AND LIGHTNING ARRESTERS

J. N. Mahoney's paper on "Circuit Breakers and Lightning Arresters," abstracted on page 1014 of the ELECTRIC RAILWAY JOURNAL for June 7, led to several inquiries, to which Mr. Mahoney replied that additional protection against lightning was being secured in oil switches by placing porcelain barriers between the terminals and by installing porcelain tubes over the terminals. The reactance type of breaker, in which a fairly heavy inductance is cut into the circuit for a few cycles prior to the final circuit opening, rendered possible an equalization of conditions in the adjacent line with little danger of surges.

DISCUSSION ON ACCOUNTING PAPERS

The discussion on the paper on "An Accounting School for Employees," published in abstract last week, centered upon the success which the New York Edison Company has had with its accounting school. Members representing smaller cities were anxious to know how such an educational bureau could be conducted by smaller companies. F. A. Birch, Philadelphia, said that it was only when "friendly rivalry and competition" was incited that employees were willing to take advantage of an educational bureau. It was suggested and heartily supported that the employees be allowed to study during work hours and that

certain prizes be offered for the best scholarship. F. L. Riordan, St. Louis, believed that such a school should be conducted to develop the average employee rather than to weed out the "laggards." Another suggestion was that the employees be educated as to the company's policy.

In the discussion of the paper on freight bills by A. S. Scott, of the Public Service Company of Northern Illinois, F. Heydecke, Newark, N. J., told of the work of the National Freight Tariff Bureau, which handles freight bills throughout the country, auditing them for a nominal charge of about 1 cent each. Provisions were made for rebating overcharges. E. C. Scobell, Rochester, N. Y., said that in his case the carting company rendered the bill for freight charges with its carting charge.

In the discussion on depreciation, A. L. Holme, New York, explained the use of separate accounts in charging up poles, lines and service runs. If salvage should be credited to depreciation, in cases where a certain salvage is received f. o. b., the amount paid for freight would actually be lost. He said that the New York practice was to charge replacement to depreciation, except where betterment was involved. C. E. Brenton, St. Louis, said that the labor of removing and installing services was kept under a single account by the Union Electric Company, but not as a construction charge. By means of the unit system used the cost of installing could be easily ascertained.

In the discussion of the paper on handling of bond coupons W. H. Winslow, Superior, Wis., said that he used a book with heavy manila leaves on which were numbers corresponding to the bonds and coupons. As the coupons were turned in they were pasted in this book, overlapping each other but showing the bond and coupon number.

ILLINOIS RAILROAD COMMISSION HEARING ON CLEARANCES

On June 3 the Illinois Railroad & Warehouse Commission held a hearing on clearances at Springfield, Ill., at which all the interurban roads in the State were requested to appear. The engineers of the commission have inspected the various interurban properties in the State with a view of arriving at some limiting dimensions on side and overhead clearances. It is proposed to fix these limits under three classifications, namely, roads handling passengers only, those operating passenger and freight trains not to exceed ten cars in length, and those handling passenger and freight traffic in trains exceeding ten cars. Tentative clearance diagrams were submitted to the representatives of the interurban roads, with a request that each offer its objections. The commission stated that if it did adopt a set of clearance diagrams giving side and vertical clearance limits the ruling would not be retroactive but would govern all future construction. Representatives of twelve of the principal interurban lines in the State were present at the hearings, and each offered his criticisms to the proposed clearance limits. In reply to a question as to why electric roads should not conform to the steam road practice of giving 22 ft. clear headroom in subways, C. F. Handshy, general superintendent Illinois Traction System, stated that with modern rolling stock equipped with automatic aid and M. C. B. couplers there was no reason why a trainman should be required to ride on the top of the car.

MILEAGE OF APPROVED ELECTRIFICATIONS

In the table of lines approved for electrification published in the article on "Electrification Progress in the United States," in the issue of June 7, omission was made of the approved Providence-Boston single-phase electrification of the New York, New Haven & Hartford Railroad. As this is estimated at 216 miles, the total mileage of lines approved for electrification should be approximately 1465 miles instead of 1249 miles. Reference to this future construction of the New Haven company was made in the text although not added to the table.

MEETING OF THE COMMITTEE ON POWER DISTRIBUTION

The last meeting to be held before the convention by the committee on power distribution of the American Electric Railway Engineering Association took place in New York on June 5 to 8 inclusive. At the meeting were present G. W. Palmer, Jr., electrical engineer Bay State Street Railway Company, chairman; Charles R. Harte, assistant engineer Connecticut Company; Gaylord Thompson, vice-president New Jersey & Pennsylvania Traction Company; Edward Heydon, superintendent overhead construction Indianapolis Traction & Terminal Company, and R. H. Rice, electrical engineer Board of Supervising Engineers, Chicago.

At the session on Thursday it was decided by the committee to recommend that line crossings of all types should be considered by one body.

The report of the sub-committee on poles was then presented. The sub-committee, which consisted of Messrs. Rice, Thompson and Heydon, had prepared a remarkably comprehensive statement upon the design, construction and use of wood, tubular steel and reinforced concrete poles, including recommendations which harmonized so far as possible with the standards of the National Electric Light Association, the American Telephone & Telegraph Company and the Western Union Telegraph Company. As a part of the report tables were submitted showing the details of design and the weights of steel and concrete poles for all conditions of service, including formulas for obtaining dimensions, reinforcement and deflections for the concrete poles. Formulas for the computation of horizontal pull of span wire construction upon trolley poles for both single and double track were also submitted, together with a table showing sags, temperature strains, etc. The discussion on this report occupied the remainder of the session on Thursday.

On Friday the committee took up the matter of revision of the specifications for rubber-insulated conductors and cables which had been in the hands of a sub-committee composed of Messrs. Rice, Thompson and Salber. The scope of these specifications covered the furnishing and testing of all kinds of rubber-insulated conductors and cables used for railway power purposes at not more than 2500 volts tension and provided for two grades of insulation. As the specifications were discussed by the committee in most minute detail, not only from the standpoints of technical accuracy and practicability but also with regard to clarity and conciseness of expression, the entire day, including an evening session, was devoted to consideration of the subject.

On Saturday the proposed revision of the specifications for copper trolley wire was discussed.

The preparation of specifications for standard 600-volt overhead construction had been assigned to a sub-committee composed of Messrs. Harte, Heydon and Cadle. The sub-committee prepared this specification in accordance with what was considered the best of the practices adopted as standard by the greatest number of member companies so as to avoid so far as possible changes from the forms of construction which were generally used at the present time. The sub-committee had also taken under consideration the matter of harmonizing the different designs for the various pieces of overhead equipment as furnished by the manufacturers so that complete interchangeability of the different parts would be assured even when coming from different makers. After the discussion of this report, which extended over Saturday and Sunday, the committee approved the report of the sub-committee for recommendation to the convention and the meeting adjourned.

Electric Railway Costs

The Author Suggests that All Power Costs Be Entirely Separated from Transportation Expenses and Presents Actual Operating Results from Three Railways in This Manner, Including in a Final Figure the Cost per Unit of Power Delivered at the Train to Facilitate Comparisons Between the Different Electrical Systems

BY JOHN B. SPARKS, LONDON

With the remarkable spread of railway electrification and the consequent growth of operating statistics, it is essential that some standard form of accounts shall be adopted which will not only enable the results obtained on different railways to be readily compared but will also facilitate comparison with steam operation. In a suggestive article in the ELECTRIC RAILWAY JOURNAL of May 3, 1913, entitled "Accounting Versus Statistics," Milan V. Ayres drew attention to the confusion, in electric railway returns, of the power supply and traction equipment costs and pointed out that the power supply portion of an electric railway undertaking is an enterprise entirely distinct from the operation of the railway. The recent papers read before the American Institute of Electrical Engineers by Messrs. Hobart and Kahler further emphasize the necessity of this distinction, which becomes essential when comparisons are to be made with a railway purchasing its power from an independent undertaking, or between steam and electric propositions.

The object of the present article is to suggest a still more rigid distinction between the power supply and transportation expenses in statistics intended for comparative purposes. It is proposed to determine for each railway the final cost per unit of the power delivered at the locomotive or motor car, thus embodying in this one figure the capital and operating charges of power station, transmission lines, substations, distribution, third-rail or overhead trolley and track bonding. This will dispose entirely, for purposes of cost comparison, of the whole of the expense incidental to the electrical system with the exception of the interest and maintenance costs of the rolling stock, which rightly come under transportation expenses, and will give a clear indication of the relative economy. Further, when making comparisons with steam operation, this final cost per unit of power will correspond with the fuel cost per ton, and thus afford a mode of comparison which will strongly appeal to steam railroad engineers.

Table I shows how the capital and operating charges in respect of the power system may be set out in detail and in logical sequence so as to show at a glance the effect of each link in the system on the final cost per unit. This method of analysis was first proposed by the writer in an article in the *Times Engineering Supplement,* London, March 6, 1912, and the results here given for the Central London Railway and for the West Jersey & Seashore Railway were included in that article. The writer is indebted to Dr. H. F. Parshall, then chairman of the Central London Railway, for permission to analyze and publish the capital and operating costs of that railway and for many valuable suggestions. The results for the Hamburg-Altona railway were kindly furnished by Dr. H. Alexander of the Allgemeine Elektricitäts Gesellschaft of Berlin, with the special permission of the German State railway authorities, as a result of the writer's request for comparative single-phase costs. It should be mentioned that in the case of the Central London Railway the figures given refer only to the plant and the energy used for the trains and do not include anything in connection with the working of the lifts or station lighting.

It will be noticed that the unit costs in Table I are expressed in terms of the electrical units handled so as to show the true cost of the energy at any point in the system. For similar railways equipped with the single-phase and direct-current systems the figures show clearly the relative economy of the two systems in any part.

Other useful statistical figures, such as the cost per kilowatt of plant installed at power station and substations, cost per mile of transmission lines and cost per mile of third-rail or catenary construction, are included. The effect of the comparatively higher cost and lower efficiency of the converter substations of the direct-current system as compared with the transformer substations of the single-phase system is clearly brought out. This is partly balanced, in the final figure, by the higher cost of the track equipment of the single-phase system, which should include the cost of return feeders, transformer boosters and any expenses due to alterations to telegraph and telephone circuits. In the case of single-phase railways in densely populated areas these last items enormously increase the cost of track equipment and seriously affect the economy of this system as compared with the direct-current system. In passing, it may be mentioned that the figure of $3,000 per mile for track equipment and bonding assumed in Mr. Kahler's estimates is much too low.

In the case of a railway purchasing power at the high-tension busbars of its substation or at the far end of its transmission line, the purchase price per unit will correspond with items T and I respectively of the table, and the final cost at the train will be determined by adding the subsequent charges as before.

The objection may be raised that the final cost per unit obtained in this manner does not include any allowance for depreciation, but the writer agrees with the author of "Accounts Versus Statistics" that depreciation ruins for statistical purposes all items into which it enters as a constituent. It should therefore be handled as a special fund, and the amount set aside for the electrical supply and distribution system should be included in the comparative statement or report as a particular deduction from income in the case of electrification. Depreciation items are, therefore, also omitted in the analysis of Mr. Kahler's estimates in Tables I and III.

Having reduced the whole financial burden of the power generation and distribution system to a figure of cost per unit at the train, it only remains to deal with the cost, operation and maintenance of the rolling stock. It has been usual, in the case of railways handling mainly passenger traffic, to express these costs in terms of the car or train miles run, but on account of the difference in seating capacity such figures are of little use for comparison. The ton-mile basis is also unsatisfactory for the same reason, and the seat-mile basis is objected to by some on account of the difference in space allowed per seated passenger on different railways. To overcome all these objections the costs are here expressed in cents per effective foot mile run. The effective foot miles run per annum are equal to the car miles run per annum multiplied by the effective length of a car in feet, the effective lengths being the length of car available for seats, excluding platforms or any lengths taken up by electrical equipment or by the motorman's cab.

Table II shows the actual costs of operating the first three railways of Table I, set out on this basis, and the effect of the different traffic conditions and different classes of equipments can readily be traced. The final figure for

Table I—Cost of Electric Power Delivered at the Trains on Different Railway Systems.

		DIRECT-CURRENT RAILWAYS		SINGLE-PHASE RAILWAYS	
		Suburban Line	Trunk Line	Suburban Line	Trunk Line
	Railway	Central London	West Jersey & Seashore	Hamburg-Altona-Blankenese-Ohlsdorf	Unnamed railroad
		City subway. 6½ miles of double track. All passenger traffic. Third-rail. 550 volts, direct-current [Figures from Central London Railway 1910-11 records]	Trunk Railroad. 74 miles of double track. Practically all passenger traffic. Third-rail. 675 volts, direct-current [Figures from paper by B. F. Wood read before A.I.E.E. June, 1911, 1910 returns]	German Suburban Railway. 16.6 miles of route. 42 miles of single track. Overhead trolley equipment. All passenger traffic. 6,600 volts, 25-cycle, single-phase [1911 returns by Dr. H. Alexander in *Times Engineering Supplement*]	Single-track railroad, 467 miles long. Passenger and freight traffic. Overhead trolley. 11,000 volts, 15 cycles, single-phase [Figures from C. P. Kahler's paper before A.I.E.E., May, 1913]
	Power station	Six 850-kw horizontal engine sets and one 2,000-kw turbine set generating at 5,000 volts, three-phase, 25 cycles. No transformers	Four 2,000-kw turbine sets generating at 6,600 volts, three-phase, 25 cycles, current transformed to 33,000 volts three-phase by twelve 700-kw transformers	Six 1,250-kw, single-phase turbo-generators. 6,600-volt, 25 cycles. One 600-kw turbo set. 6,300 volts, 50 cycles for lighting	Independent undertaking
A.	Rated capacity of plant, kw	5,500	8,000	8,100	.....
B.	Investment, including land, buildings, etc	$859,000	$998,000	$1,008,000	.....
C.	Investment per kilowatt installed (B/A)	$156	$125	$124	.....
D.	Kw-hr. delivered per annum for traction	13,100,000	27,000,000	19,753,200	90,000,000 purchased
E.	Interest on investment at 5 per cent (B×5/100)	$42,950	$49,900	$50,400	.....
F.	Interest cost per kw-hr. (E/D), cents	0.328	0.185	0.256	.....
G.	Operating and repairs costs, including wages, rates and insurance	$96,600	$153,700	$159,300	.....
H.	Operating expense per kw-hr. (G/D), cents	0.737	0.569	0.806	.....
I.	Total cost per kw-hr. delivered (F+H), cents	1.065	0.754	1.062	(Purchase price) 0.750
	Transmission line	From two to six three-conductor 5,000-volt insulated cables of various sections, supported on brackets in tunnels and protected by steel shields	Two 33,000-volt, three-phase overhead lines on separate pole lines with wooden poles. No. 1 B & S gage copper	Two 30,000-volt, single-phase overhead lines with steel poles. Each line has two conductors, 50 sq. mm. each. Part of output of power station used for traction	One 110,000-volt single-phase overhead line with steel towers
J.	Total length of transmission lines, miles	5.8	60	18.2	450
K.	Interest on investment in overhead lines or cables	$107,500	$241,500	$72,000	$2,250,000
L.	Average investment per mile (K/J)	$18,530	$4,025	$3,960	$5,000
M.	Average efficiency of line, per cent	97	96	97	96
N.	Kw-hr. delivered per annum to substations (D×M)	12,700,000	25,900,000	4,120,000	86,400,000
O.	Interest on investment at 5 per cent (K×5/100)	$5,375	$12,075	$3,600	$112,500
P.	Interest per kw-hr, cents	0.042	0.046	0.088	0.130
Q.	Operating and repair costs	Negligible	$3,460	$720	$22,500
R.	Operating expense per kw-hr. (Q/N), cents	Negligible	0.014	0.016	0.026
S.	Increase in cost per kw-hr. due to loss inline (D−N) I/N	0.034	0.032	0.032	0.031
T.	Total cost per kw-hr. delivered to substations (I+P+R+S)	1.141	0.846	1.198	0.937
	Substations	Four substations with a total of ten 900-kw rotary converters supplying lifts, lighting and trains. Large batteries provided as reserve	Eight substations with five 2,500-kw rotary converters, one 2,000-kw, one 1,500-kw and one 1,000-kw. Load chiefly traction	One transformer substation with two 870-kw transformers	Fourteen substations with total of 56,000 kva, installed in transformers, three portable substations (6,000-kva)
a.	Rated capacity of plant, kw	5,850	17,000	1,740	50,000
b.	Capital cost including land, buildings, etc	$256,800	$492,000	$33,600	$712,000
c.	Investment per kilowatt installed (b/a)	$44	$29	$19.3	$14.2
d.	Average efficiency of substation plant, per cent	85	85	95	95
e.	Kw-hr. delivered per annum (N×d)	10,800,000	22,000,000	3,920,000	82,100,000
f.	Interest on investment at 5 per cent (b×5/100)	$12,840	$24,600	$1,680	$35,600
g.	Interest cost per kw-hr. (f/e), cents	0.118	0.112	0.042	0.043
h.	Operating and repair costs including wages	$8,740	$24,450	$1,920	$7,450
i.	Operating expense per kw-hr. (h/e), cents	0.081	0.110	0.050	0.009
j.	Increase in cost per kw-hr. due to substation loss (N−e) T/e, cents	0.202	0.150	0.060	0.049
k.	Total cost per kw-hr. delivered (T+g+i+j), cents	1.542	1.218	1.350	1.038
l.	Kw-hr. delivered per annum to contact conductor and low-tension feeders direct from power station	None	None	15,503,200	None
m.	Total kw-hr. delivered to contact conductor and low-tension feeders direct from power station (e+l)	10,800,000	22,000,000	19,423,200	82,100,000
n.	Average cost per kw-hr. delivered to contact conductor and low-tension feeders direct from power station, cents	1.542	1.218	1.120	1.038
	Distribution to trains	Third-rail, 85 lb. yd. and feeders. Track return and negative feeders	Third-rail, 100 lb. yd. Track return. No feeders (positive or negative)	Overhead catenary with 6,600-volt feeders. Track return but no return feeders	3/0 grooved copper trolley with 2/0 feeder wire for whole length. Bonded track but no return feeders
o.	Length of single track equipped, miles	12.6	142	42	624
p.	Investment of third-rail, overhead equipment, L. T. feeders and track bonds, and cost of alterations to telegraph and telephone circuits	$72,000	$739,000	$307,000	$1,873,720
q.	Investment per mile of single track (p/o)	$5,700	$5,200	$7,310	$3,000
r.	Average efficiency of distribution, per cent	97	95	96	96
s.	Kw-hr. delivered per annum to trains (m×r)	10,450,000	20,900,000	18,640,000	78,800,000
t.	Interest on investment at 5 per cent (p×5/100), cents	$3,600	$36,950	$15,350	$93,680
u.	Interest per kw-hr. (t/s), cents	0.034	0.176	0.082	0.119
v.	Maintenance and repair costs	$4,130	$18,250	$14,250	$66,760
w.	Maintenance cost per kw-hr. (v/s), cents	0.040	0.088	0.076	0.085
x.	Increase in cost per kw-hr. due to distribution loss (m−s) n/s, cents	0.048	0.064	0.048	0.043
y.	Total cost per kw-hr. delivered to train (n+u+w+x), cents	1.664	1.546	1.326	1.285

the single-phase railway works out almost equal to that of the Central London Railway, but it should be remembered that the service in the latter case is much more severe, that the latter railway is much older with correspondingly higher first cost of plant, and that no allowance is included in the single-phase figures for any alterations to telegraph and telephone circuits. The higher costs of the West Jersey & Seashore Railway are chiefly due to the heavier rolling stock required for the high speed and long runs and for the relatively unfavorable traffic conditions.

While these figures admit of a more accurate comparison from the point of view of passenger traffic, a comparison on the basis of the total operating costs per ton mile will probably appeal more to railroad men accustomed to think

TABLE II—TOTAL OPERATING COSTS (PER EFFECTIVE FOOT MILE) INCIDENTAL TO ELECTRIC WORKING ON DIFFERENT RAILWAY SYSTEMS

		DIRECT-CURRENT RAILWAYS		SINGLE-PHASE RAILWAY
		Suburban Line	Trunk Line	Suburban Line
Railway		Central London	West Jersey & Seashore	Hamburg-Altona-Blankenese-Ohlsdorf
Rolling stock		68 (250-hp) motor cars weighing 23 tons without passengers, and seating 34. 170 trailer cars weighing 13.5 tons without passengers and seating 48	81 (400-hp) motor cars weighing 42 tons without passengers, seating 58, and 12 baggage cars	194 (330-hp) motor cars seating 62 each and weighing 32 tons without passengers
a.	Schedule speed in m.p.h.	17	.....	.....
b.	Average distance between stops, miles	0.5	2.5	1.0
c.	Number of motor cars	68	93	194
d.	Number of trailer cars	170	None	None
e.	Composition of train, normal	2 motor cars and 5 trailer cars	3 motor cars	2 motor cars
f.	Car miles run per annum	7,672,000	4,552,500	7,338,600
g.	Effective length of motor car	21 ft.	47 ft.	43.2 ft.
h.	Effective length of trailer car	30 ft.	.....	.....
i.	Effective foot miles run per annum	206,380,000	214,000,000	317,400,000
j.	Kw-hr. consumed per effective foot mile (s/i)	0.0506	0.0977	0.059
k.	Cost of current at train per effective foot mile ($j \times y$), cents	0.084	0.152	0.078
l.	Capital cost of trains	$1,445,000	$1,132,000	$2,208,000
m.	Interest on capital at 5 per cent ($l \times 5/100$)	$72,250	$56,600	$110,400
n.	Capital charge per effective foot mile run (m/i), cents	0.036	0.026	0.034
o.	Operating and repair costs including drivers' pay	$148,500	$180,000	$249,500
p.	Operating expense per effective foot mile run (o/i), cents	0.072	0.084	0.078
q.	Total cost of running trains, including current, per effective foot mile ($k+n+p$), cents	0.192	0.262	0.190

in these figures and will also be of greater service in making comparisons between steam and electric operations on trunk lines.

An analysis on this basis is shown in Table III, the figures in which are deduced from the estimates in Mr. Kahler's recent paper before the American Institute of Electrical Engineers on "Trunk Line Electrification." The railway in question is an unnamed single-track line, 467 miles in length, with a traffic consisting mainly of freight trains. The reader is referred to Mr. Kahler's paper for full particulars, but Table III stands by itself as a comparison between steam and electric operation in the given circumstances. It should be noted that the ton miles run per annum are less in the case of electrical operation on account of the lighter locomotives and the absence of fuel haulage. Some 400,000 tons of coal are consumed per annum by the steam locomotives as compared with some 78,800,000 units of electrical energy at the electric locomotives. Estimated efficiencies of 95, 96 and 95 per cent for transmission line, substations and distribution respectively bring Mr. Kahler's figure of 90,000,000 units purchased down to 78,800,000 used by the trains. Dividing by the ton miles run, one gets a coal consumption of 0.21 lb. per ton mile as against an energy consumption of 24.8 watt-hr. per ton mile (this is too low a figure). The coal cost $2.25 per ton and the electricity 1.285 cents per unit as shown by Table I, so that by simple multiplication it is found that a fuel cost of 0.024 cent per ton mile in the case of steam traction corresponds to an energy cost of 0.032 cent per ton mile in the case of electrical operation. That electrical operation may be more economical, the other operating costs will have to be about 0.01 cent less per ton mile than with steam traction. The capital charge is greater with electric traction, but the charges in respect of maintenance, repairs, wages and engine-house ex-

TABLE III—COMPARATIVE OPERATING COSTS (PER TON MILE) FOR STEAM AND ELECTRIC WORKING

		Single-track railroad, 467 miles long, taken as example in paper "Trunk Line Electrification," by C. P. Kahler, A.I.E.E., May, 1913	
		Steam Operation	Electric Operation
Rolling stock		140 steam locomotives	Single-phase, 11,000-volt, 15-cycle trolley. 64 locomotives, 14 motor cars
a.	Total ton miles run per annum	3,815,000,000	3,188,000,000
b.	Total tons of coal burned in locomotives	400,000	.....
c.	Total kw-hr. consumed per annum	.....	78,800,000
d.	Pounds of coal burned per ton mile ($b/a \times 2{,}000$)	0.21	.....
e.	Watt-hr. per ton mile at locomotive $\left(\frac{c \times 1{,}000}{a}\right)$	.....	24.8
f.	Cost of coal per ton	$2.25	.....
g.	Cost of power per kw-hr. at locomotive from Table I, cents	.....	1.285
h.	Cost of coal per ton mile ($d \times f \times 100/2{,}000$), cents	0.024	.....
i.	Cost of electricity per ton mile ($e \times g \div 1{,}000$), cents	.....	0.032
j.	Capital cost of locomotives and motor cars	$2,873,000	$3,237,000
k.	Interest on capital at 5 per cent ($j \times 5/100$)	$143,650	$161,850
l.	Capital charge per ton mile (k/a), cents	0.004	0.005
m.	Stores, maintenance and repairs to rolling stock	$1,115,000	$641,000
n.	Stores, maintenance and repairs per ton mile (m/a), cents	0.029	0.020
o.	Wages of engine men, train crews, etc.	$935,800	$636,400
p.	Wages of engine men, train crews, etc., per ton mile (o/a), cents	0.025	0.020
q.	Engine house expenses	$100,000	$12,700
r.	Engine house expenses per ton mile (q/a), cents	0.003	0.001
s.	Total operating cost per ton mile, cents	0.085	0.078

penses are so much less than with steam traction that there is a difference in the final figures of 0.007 cent per ton mile, or 8¼ per cent, in favor of electrical working. As fewer ton miles per annum are necessary with electric traction, the total saving is much greater than at first appears. It can readily be found by multiplying the final figures by the respective ton miles and subtracting one from the other, and will be found to be about $755,000, or some 23 per cent. The object of the table is, however, not to show the total saving but the relative operating expenses per ton mile, and these in such a manner that the relation between the various items can be readily compared. Mr. Kahler in his paper shows a total saving by the substitution of electric traction in this case of $940,000, but excluding the saving due to less wear and tear of permanent way and making due allowances for interest on capital expenditure and for

depreciation, his result will be found to agree with the above.

In conclusion, the writer would suggest that, apart from the statistical value of the figures in the above tables, the reduction of all expenses incidental to the generation and distribution of power to the trains to a single figure for the cost of electricity per unit delivered at the locomotive is a method which will appeal strongly to steam railroad engineers and will enable electrification propositions to be expressed and analyzed in a much more convincing manner than they have been hitherto.

DECISION OF SUPREME COURT IN MINNESOTA RATE CASES

The right of the states to regulate intrastate traffic by fixing reasonable rates for railroad transportation on interstate railroads within their borders was upheld on June 9 by the Supreme Court of the United States in the Minnesota rate cases. At the same time the court laid down important principles governing the valuation of railroad property for rate-making purposes.

The Supreme Court held that the authority of Congress to regulate interstate commerce is plenary, that its complete control is not to be thwarted by the commingling of interstate and intrastate operations, and that the states can in no guise impose a direct burden upon interstate commerce. With these limitations, however, it was declared that there remains to the states, until Congress acts, a wide range for the permissible exercise of power appropriate to their territorial jurisdiction, although interstate commerce may be affected. Within this range the states are empowered to regulate intrastate commerce, so long as they do not impose a direct burden upon or interrupt the free flow of interstate commerce, or interfere with the regulations for the control of interstate commerce prescribed by Congress, and so long as the rates fixed are not in themselves unreasonable or confiscatory. But it must be remembered that in this field of close relationship between interstate and intrastate commerce, the states are restricted as follows: "The paramount authority of Congress enables it to intervene at its discretion for the complete and effective government of that which has been committed to its care, and for this purpose and to this extent, in response to a conviction of national need, to displace local laws by substituting laws of its own."

One of the most interesting features of the decision was its treatment of the alleged confiscation of the railroads' properties and their valuation as a basis for rate making. Justice Hughes in his decision criticised the lower court's theory of arriving at a fair value by finding the "reproduction cost new," and he utterly disregarded the claims of the roads for a high valuation for their properties on the ground of the peculiarly important public uses to which they were put. The lower court was held to be in error in adding 30 per cent to the normal value of the land at the terminals and 200 per cent outside the terminals in arriving at the fair value. It was not right, said Justice Hughes, to include in the value more than the market value of similar and adjacent property, and neither the continuity of right-of-way should be considered nor its "use" for railroad purposes, nor even the assertion that under condemnation the railroad would have to pay more than the market prices. The decision went on to say:

"The conditions or ownership of the property and the amounts which would have to be paid in acquiring the right-of-way, supposing the railroad to be removed, are wholly beyond reach of any process of rational determination. The cost-of-reproduction method is of service in ascertaining the present value of the plant, when it is reasonably applied, and when the cost of reproducing the property may be ascertained with a proper degree of certainty. But it does not justify the acceptance of results which depend upon mere conjecture.

"The question is whether, in determining the fair present value of the property of the railroad company as a basis of its charges to the public, it is entitled to a valuation of its right-of-way not only in excess of the amount invested in it but also in excess of the market value of contiguous and similarly situated property. It is clear that in ascertaining the present value we are not limited to the consideration of the amount of the actual investment. If that has been reckless or improvident, losses may be sustained which the community does not underwrite. As the company may not be protected in its actual investment, if the status of its property be plainly less, so the making of a just return for the use of the property involves the recognition of its fair value if it be more than its cost.

"In order to determine the reasonableness of the return allowed by the rate-making power, it is not admissible to attribute to the property owned by the carriers a speculative increment of value over the amount invested in it and beyond the value of similar property owned by others, solely by reason of the fact that it is used in the public service.

"Assuming that the company is entitled to a reasonable share in the general prosperity of the communities which it serves, and thus to attribute to its property an increase in value, still the increase so allowed, apart from any improvements it may make, cannot properly extend beyond the fair average of the normal market value of land in the vicinity having a similar character. Otherwise we enter the realm of mere conjecture. We therefore hold that it was error to base the estimates of value of the right-of-way, yards and terminals upon the so-called 'railway status' of the property. The company would certainly have no ground of complaint if it were allowed a value for these lands equal to the fair average market value of similar land in the vicinity, without additions by the use of multipliers or otherwise to cover hypothetical outlays. The allowances made for a conjectural cost of acquisition and consequential damages must be disapproved; and, in this view, we also think it was an error to add to the amount taken as the present value of the lands the further sums, calculated on that value, which were embraced in the items of 'engineering superintendence, legal expenses, contingencies, and interest during construction.'"

The Supreme Court did not discuss what in general would be an adequate return upon money invested. The annual return of the Northern Pacific Railway under the attacked rates was 6.021 per cent, of the Great Northern Railway 4.14 per cent, on the valuation as presented in each case by the railroad. The charge of confiscation set up by these roads was overthrown because of the erroneous system of valuation used and sanctioned by the lower court. The value of the property being less than the amount estimated, the returns upon a correct valuation would show a greater percentage. A different view was taken in the case of the Minneapolis & St. Louis Railroad, owing to the narrow margin on which it was running, from 4.4 per cent down to 3.5 per cent in different years. Its valuation also was criticised, but it was stated that the margin of differences that might arise from a more correct valuation was so small that an enforcement of the low rates against this road would probably result in confiscation. The decree of the lower court was therefore sustained as to this road, with the single amendment that should the circumstances of the road improve the Attorney-General of Minnesota or the Railroad and Warehouse Commission could ask the lower court for a new decree enforcing the low rates.

A company has been formed in Constantinople under the title of the Société Ottomane des Chemins de Fer Métropolitain de Constantinople for the purpose of working the concession granted for the construction and operation of an underground network of railways in Constantinople.

Convention of the Railway Master Mechanics' Association at Atlantic City

The Account of the Proceedings Includes an Abstract of a Paper on "Maintenance of Electric Equipment"—The Exhibits This Year Were of Unusual Interest.

The twenty-sixth annual convention of the American Railway Master Mechanics' Association was held at Atlantic City, N. J., on June 11-13, and this year it preceded the annual convention of the Master Car Builders' Association. At the convention there were reports from two standing committees and thirteen special committees, besides four individual papers. Of these papers and reports only one related directly to electric traction. It was entitled "Maintenance of Electric Equipment" and was read by C. H. Quereau, superintendent of electrical equipment at New York of the New York Central Lines.

Mr. Quereau's paper was largely a discussion of the conditions presented to a superintendent of rolling stock whose experience had been entirely along steam railroad lines and who was required to take charge of the electrical equipment of an electrified steam railroad. He said that when he was asked to take this position on the New York Central his first impulse was to decline because of lack of electrical knowledge, but he was assured by the head of the railway department of an important manufacturer of electrical apparatus that at least 75 per cent of the necessary training was supplied by experience in mechanical lines. He found that this statement was conservative and that at least 90 per cent of the problems of maintenance to be solved could be worked out by a good master mechanic with very limited electrical knowledge, provided he had experience in the motive power department of a steam railroad. Some knowledge of electricity for such men was necessary, but it needed to be very elementary and practical rather than theoretical, and he believed it could be acquired in such a short time that the advantages of using men for the maintenance of electrical equipment who had already a knowledge of steam railway motive-power equipment very decidedly outweighed the disadvantages due to a lack of extended knowledge in electrical apparatus.

Mr. Quereau gave definitions of some of the common terms in electrical engineering, such as "volt," "ampere," "watt," watt-hour," etc., and of the terms "series" and "series parallel." In conclusion he said:

"The statement is occasionally made that an electric is a simpler machine than a steam locomotive. If this refers to ease of handling and operating or matters requiring the attention of the engine crew, such as injectors, steam pressure and water level, there is no possible doubt the statement is correct, but if it refers to the mechanical simplicity or number of adjustable or moving parts that must be inspected and kept in proper relation, the steam locomotive is very much the simpler. There is, however, this fundamental difference favoring the electric machine, that the moving parts of the control are of very light weight, easily accessible for inspection and repairs and not subjected to nearly as great wear as are the corresponding parts of a steam locomotive.

"It will, no doubt, interest motive-power men to know that the shop arrangement and tools for maintaining electric equipment are not essentially different from those they are accustomed to in repairing steam locomotives, except, of course, that the electric locomotive has no boiler or tender and it is necessary to provide facilities for rewinding armatures and field coils.

"The steam motive-power man will no doubt be much surprised when told that the electric locomotive requires no shopping for a general overhauling, except for a general painting. This is made possible by having a stock of spare parts, permitting the removal of a defective part from a locomotive, the substitution of a repaired part and releasing the engine, the defective apparatus being repaired at leisure. For instance, a set of driving wheels needing tire turning is replaced by an extra set in good condition, this operation requiring not more than five hours with adequate drop pit facilities. Air compressors, controllers and contactors can be handled in the same way.

"The steam locomotive cannot be maintained on this plan, as the boring of cylinders and resetting flues make it necessary to shop the engine, withdrawing it from service for a considerable length of time.

"It is quite possible that the foregoing statements of personal experience and opinions will not prove as convincing as the records made by an electric equipment maintenance department organized by and largely consisting of men whose earlier experience and training were obtained in the motive-power department of steam railroads. Common sense will conclude there can be no particular mystery or unusual danger in maintaining electric locomotives when the records for the year 1912, after five years' service, show a cost of less than 4 cents per mile and an average of 48,271 miles per train detention due to electrical apparatus, with a banner record of 249,423 miles (equivalent to ten times around the world) without a train detention due to the electrical equipment."

EXHIBITS

At the convention of the American Railway Master Mechanics' Association and the American Master Car Builders' Association, which was opened June 11 at Young's Pier in Atlantic City, the exhibits of the manufacturers have proved to be of great interest to all of the visitors. The space occupied by the exhibitors reached a total of about 88,000 sq. ft., establishing the highest figures in the history of the associations and even exceeding the space devoted to exhibits at the last American Electric Railway Association convention to be held in Atlantic City, that of 1911, by over 10 per cent. To provide the necessary additional area beyond that used last year an extension was built upon the annex on the west side of the main building which is generally devoted to exhibits of heavy machinery, but notwithstanding this practically all of the available space was occupied on the Pier between the Board Walk and the Grecian Villa in which the convention sessions were held.

As in the exhibits of last year's convention, one of the most noticeable things was the evidence of progress in truck design toward simplicity on the one hand and toward flexibility on the other. The solid cast-steel truck side, which in one case was even cast integral with the journal boxes, was again generally in evidence. Not all of the trucks shown provided rigid alignment between the truck sides, and in one case neither transoms nor spring planks attached to the truck sides were used. The desirability of this arrangement is in large part limited to use with cars comprising trailing loads. For use under motor cars its value would be questionable, on account of its dependence upon wheel-flange action to keep it square, although its advantages in simplicity are obvious.

Another truck of the same general type had the springs taken out from under the truck bolster and moved outside

of the columns, the load from the bolster being transmitted to the springs through a pair of equalizer bars, one inside and one outside of the truck side. The object of this radical innovation is primarily to increase the permissible length, or rather height, of spring and thus to provide easier riding qualities. The arrangement also permits a great increase in the depth of the bolster ends, a serious consideration with cars of great capacity, as the bolster can be extended down into the space formerly occupied by the springs on top of the spring plank. In the same exhibit a variable-load brake was shown.

Flexibility was attained in another design by having the truck sides rotate on a fulcrum at each end of the transoms and each journal box rotate on a fulcrum at the end of each cast-steel truck side, thus permitting the wheels to move with perfect freedom in vertical planes but absolutely prohibiting any sidewise or twisting motion. Still another example of the desire for flexibility in truck design was shown by the roller-bearing devices for permitting sidewise as well as swiveling motion for the truck. A fairly well known four-point bearing was exhibited which consists of two sets of rollers at each end of the body bolster, one arranged to permit a forward and back or swiveling motion between truck and body bolster and the other arranged to permit transverse motion of the body bolster. No center bearing is provided except as a guide or center about which the truck can turn, as the roller bearings raise the car as it shifts from center line or tangent and thus tend to keep it in alignment. A multiple-roll side bearing of another type which had run 1,000,000 miles was also exhibited, together with a side bearing of the single roll type. The latter worked as a standard roller bearing within the ordinary limits of curvature, but beyond these the roller rotated on a pin, thus permitting an unlimited degree of swiveling for the truck without the necessity for a roller guide of unusual length.

The commercial possibilities of flexible steel conduit or steel-armored hose were indicated by several very complete exhibits, a valuable addition to the more recently developed means conducive to safety. The automatic oil-handling machinery was also in evidence, including exhibits of a waste saturating tank and a special black-iron tank for signal oil provided for the reason that galvanized-iron receptacles injuriously affect the quality of that oil.

One of the most ingenious devices shown was a hand wrench which automatically separated its jaws and slipped around a nut when pulled in one direction, but which also automatically closed its jaws and gripped the nut when pulled in the other direction. The scheme involves the use of three pieces, of which one was a handle having one end formed into teeth. Two jaws were provided, one swiveling on a pin at the toothed end of the handle and the other sliding upon the first jaw but having a rack on it which engaged the teeth in the handle. When the jaws were swiveled in one direction on the pin the relative movement of the teeth on the handle and on the one jaw caused the latter to move relative to the other jaw and to close the jaws together. When swiveled in the other direction the relative motion was reversed and the jaws opened. In operation, by placing the wrench on the nut and pulling on the handle the handle swiveled on the pin relative to the jaws, closed them and turned the nut, but by reversing the pressure and pushing on the handle the jaws opened and slipped around the nut until the direction of pressure was again reversed, when the jaws would again grip the nut and turn it. Another device along these lines was a lock washer which was held in place by three triangular teeth which were flattened out and pressed into the bolt thread when the nut was set up on top of the washer.

A radical novelty in block signal apparatus was shown. This consisted of acetylene lights which took the place of the standard oil or electric lamps used for illuminating the colored glass lenses on semaphore arms to give light indications. The acetylene light, however, was arranged to give a series of flashes instead of a continuous illumination, the flash occurring once each second and lasting for about one-tenth of that period. This intermittent light, used to a great extent in marine signals for buoys and lighthouses, was claimed to have for railway work a vastly increased arrestive effect and also to possess distinctive features which would avoid confusion with house or station lights. The standard equipment, such as has been used in a number of trial installations on steam railroads, provides a reservoir of 270 cu. ft. capacity, containing acetylene at 150 lb. pressure sufficient to supply the light for nine months night and day. The intermittent effect is obtained by keeping a tiny acetylene pilot light burning continuously at the main burner, which is supplied with the charges of acetylene whenever the gas pressure builds up over a diaphragm connected to a permanently magnetized lever and valve in sufficient amount to overcome the magnetic attraction. When the charge escapes to the burner the consequent reduction in pressure over the diaphragm permits the lever to be pulled up and the valve stays closed until the gas pressure again builds up, pushes down the diaphragm and opens the valve. The cycle requires about one second for completion, but may be varied as desired by changing the rate of flow from the main reservoir.

In the machinery section are two especially novel tools, one being a broaching machine which draws through the blank a long tool fitted with a large number of cutting edges ground to a particular shape, thus cutting square, irregular or oval holes or keyways as desired. By revolving the broach spiral keyways may be cut. A horizontal boring mill fitted with a vertical milling head which is exhibited is a good example of the tendency toward the development of machine tools capable of general rather than specific use, and a shaper for woodworking is shown in which the cutting is facilitated by imparting a rising and falling motion to the spindle.

The out-door exhibit on Mississippi Avenue is, as it has always been in past years, of especial interest, although its extent is not so great as it has been in past years. Among the exhibits on this track is the 2400-volt locomotive described in last week's issue of the Electric Railway Journal. This is, by the way, the only locomotive exhibited, no steam machines being shown. A standard box car with corrugated ¼-in. steel ends is also shown. This has been in regular service for three years, and the stiffening effect of the solid squares of steel is evident through the absence of any signs of racking in the posts and carlines.

The tendency toward the elimination of wood as a material for car construction was shown by two exhibits of seats and seat cushions made throughout of steel with the exception of the seat arms and the rattan and plush covering. Even the foot rests under the back of the seats were composed of steel tubing. A welcome feature found in several types of seat was a ticket holder of plate brass introduced beneath the strips on the seat backs.

Two thermostats for automatically regulating car temperatures were shown, and both of these were stated to be well past the experimental stage. These as well as the exhibits of the mercury-arc rectifier attracted a great deal of attention, the latter being shown at work converting about 30 kw of single-phase power into the direct-current form.

The Saxon government has bought several large brown-coal fields in the neighborhood of Leipzig with a view to the eventual electrification of the State Railways, but such an electrification on a large scale is not contemplated for the near future. The substitution of electric power for steam on some of the smaller lines in the kingdom is under consideration.

Joint Meeting of British and French Electrical Engineers in Paris

Abstracts of Papers and Discussions on Heavy Electric Traction and High-Tension D. C. Transmission Are Presented

The joint meeting of the Institution of Electrical Engineers and the Société Internationale des Électriciens was held in Paris beginning May 21 at the invitation of the latter society. Six papers on electric traction by French authors were read and discussed. Among the other papers was one on high-tension d.c. transmission. The following is an abstract of the account published in the May 29 issue of the London *Electrical Engineering*.

HIGH-TENSION DIRECT-CURRENT RAILWAYS

L. Gratzmuller dealt first with station apparatus for the high-tension d.c. system. When the power station is far from the railway three-phase generation is the obvious solution, but to keep down the weight of the turbo-alternators a frequency greater than twenty-five cycles is desirable unless rotary converters are to be used in the substations. If the station is so near the track that there is no need for a higher transmission pressure than 1500 volts and reciprocating engines or water turbines are used, it is possible to get satisfactorily 1500 volts from a single commutator, and machines with two windings and two commutators can be used to give a higher pressure. With steam turbines he prefers to generate alternating current and to transform it. The mercury converter can be used whatever may be the frequency, and mercury converter apparatus of a capacity up to 300 kw already exists. For high pressures its efficiency is nearly unity.

With regard to overhead conductors, 3000 volts pressure would probably be the safe limit for some time to come, but since 500 amp at this pressure furnishes 1500 kw, it would seem that powerful locomotives must use a third-rail. As to motors, with the same internal diameter, length of iron and weight of windings, it should be possible to obtain the same torque in normal working, whether the motor is wound as a d.c. or a three-phase induction motor. Although the single-phase motor is heavier, the difference is not so great as was formerly assumed, the difference being only 15 per cent and not $1 \div \sqrt{2}$.

A pressure of 1200 volts per motor is easily practicable when multiple units are employed, and 1500 volts can be used for locomotives. Unfortunately, with small motors these voltages will often require two turns per coil; series winding will naturally be used. A locomotive of 2000 hp at 3000 volts can thus be constructed with two motors in series or with motors having two commutators. The current required will then be approximately 500 amp. The use of aluminum for the rotors appears very suitable, and the increase in electrical resistance can be largely compensated for by the increase in peripheral speed for the same centrifugal force. Owing, also, to the recent improvement in gear cutting, reduction gear can be used with side rods, as with the Lötschberg locomotives of Switzerland. This increase in peripheral speed, coupled with forced ventilation, will enable the weight of the motors to be reduced by about 50 per cent. Auxiliary fans or water-cooling are not justified; each rotor should act as its own fan and produce a current of air which would enter near the shaft through a bearing and pass through the center of the commutator and the iron stampings of the rotor. The commutator might also be provided with vanes. For the control, any of the well-known systems can be employed, but if two motors are used, each for one-half of the total pressure and connected in series, the chances are that slipping may occur and cause an undue pressure to come on one motor.

The advantages of d.c. are principally the large starting torque, good commutation and light cars. The disadvantages are the use of an exposed high-tension rotating part, particularly dangerous in damp localities, the use of a commutator and the control of the large currents necessary when a large amount of power is required.

SINGLE-PHASE RAILWAYS

Marius Latour contributed the second paper, which was devoted chiefly to a consideration of series and repulsion motors. The motors should be mounted on springs to avoid dangerous resonance effects, such as arise at certain speeds with mechanical transmission, in so far as these arise from fluctuations in the torque. In addition to the mean rotation of the motor, there is an oscillatory movement which is liable to produce a leading wattless emf in the armature. He then referred to the extensive tests which had been carried out by the Midi Railway, France. In the repulsion motor at speeds above synchronism the transverse field increases in strength, the iron losses increase and commutation becomes unsatisfactory, until at $\sqrt{2}$ synchronous speed, commutation is worse than that of the series motor. The compensated repulsion motor, on the other hand, works at approximately unity power factor, because commutator motors with short-circuited brushes have no inductance at synchronous speed and negative inductance above that speed, even when supplied with simple alternating current. As indicated by the name, the other two types have an additional winding perpendicular to the brush axis connected up so as to give commutating fields. Mathematical investigation of these motors shows that the commutator should run at a high peripheral speed for which gearing is necessary. At a frequency of fifteen cycles the repulsion-type motors are heavy, and the efficiency does not improve with lower frequency, whereas with series motors it approaches more nearly that of a d.c. machine. With regard to commutation, the narrower the auxiliary poles the smaller the losses. This necessitates a small rotor tooth-pitch. Thus a large number of poles, high speeds and small air-gaps are required. At a frequency of fifteen cycles commutation losses could be reduced to 0.25 per cent.

ELECTRIFICATION OF THE MIDI RAILWAY

Mr. Jullian described the electrification of the Midi Railway, to which reference has been made in the Oct. 7, 1911, July 6, 1912, Jan. 4, 1913, and May 3, 1913, issues of the Electric Railway Journal. Some of the track is standard gage and some meter gage. When the proposed electrifications are completed there will be 386 miles of electrified line, of which 203 miles are now in operation. It is also proposed to electrify the line from Perpignan to Villefranche in the eastern Pyrénées. The lines to be constructed in the Pyrénées have steep grades, chiefly between 1.5 per cent and 3.2 per cent, and the mean practicable speed is about 37.2 m.p.h. Current at 12,000 volts, sixteen cycles, is used throughout. It is generated at 6000 volts single-phase and transmitted at 60,000 volts to five substations. It was found in equating the extra cost of the single-phase generators over three-phase against the reduced cost for single-phase switch-gear and transmission lines that the advantage is on the side of single-phase. In the experimental line from Villefranche to Vernet-les-Bains six types of overhead equipment have been established. Four of these belong to the simple catenary type, one to the double catenary and one to the rigid type. The spans are 328 ft., 197 ft. or 164 ft., and the longer sections have compensating arrangements. It was found that on the lines com-

prising fairly numerous curves of a radius between 1148 ft. and 2624 ft. and operated over by trains at speeds of from about 47 m.p.h. to 50 m.p.h. but not exceeding 55.8 m.p.h. the choice should be the plain uncompensated catenary with spans of between 164 ft. and 197 ft. and with pull-offs on the curves when necessary. The catenary cable should in this case invariably be anchored to the insulator at each bracket. Poles of reinforced concrete are too expensive and too heavy for existing lines, but those composed of old rails are very suitable for single-track lines. Lattice poles must be used, however, for double track. The high-tension transmission lines, generally two in parallel, are of aluminum, with most of the insulators of glass and the rest of porcelain. The overhead-line cost on the track already electrified is $6,240 per mile of single track, using "rail" poles, and $6,880 per mile of double track. Tests are still in progress with locomotives and motor cars. Girousse apparatus has been adopted to protect the telegraph lines from disturbances. To avoid telephone trouble, the State is about to replace ordinary insulators by others of greater insulation resistance, to transpose the two transmission lines every 984 ft. to 1312 ft., and to insert transformers between the lines and the receiving apparatus to eliminate the risk of shocks.

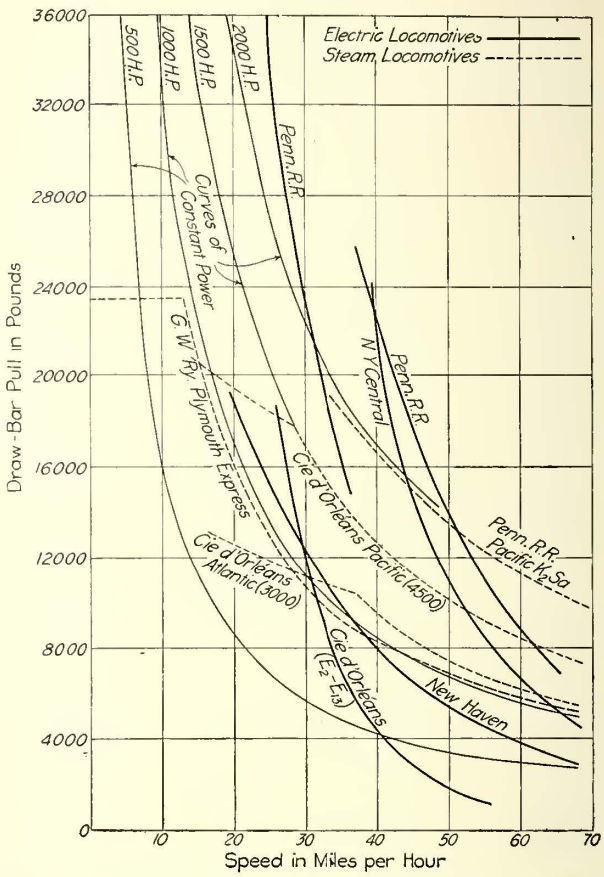
THE PARIS SUBURBAN SYSTEM OF THE WESTERN STATE RAILWAYS

A. N. Mazen gave some data of the Western State Railway which operates some 1640 trains per day in and out of Paris. Electrification was necessary, owing to the congestion caused by the mixture of suburban and long-distance traffic and the rapid increase of both. Electrification would also hasten the increase of traffic. Thus the electrified line from the Invalides to Versailles has shown traffic increases of from 12 per cent to 13 per cent per annum, while the other steam lines show increases of barely 2 per cent or 3 per cent. The author said the d.c. 650-volt, third-rail system was adopted in preference to single-phase or a higher d.c. pressure because of the lighter weight of equipment, the avoidance of trouble with overhead lines and of interference with telephone circuits, etc. The same system is also used for all the existing heavy electric traction schemes in Paris. The under-contact third-rail weighs 152 lb. per yard. The standard motor cars, operated singly and in trains, can carry 100 passengers including "straphangers." Electric baggage trains are also to be operated. The construction and working of the two power stations at Moulineux and Bezons has just been intrusted to an industrial syndicate. These stations contain 5000-kw turbines and when the installations are complete will have a capacity of about 60,000 kw and will furnish about 100,000,000 kw-hr. per annum. Under the sliding scale of charges adopted, energy will be sold to the State at about 1 cent per kw-hr.

PRACTICE IN THE UNITED STATES

H. Parodi sketched the differences between American and Continental conditions, emphasizing particularly the greater rate of increase of traffic in the United States and the reasons why, with the longer distances and heavier trains, merchandise could be carried in America at a lower rate than in Europe. The relation between traffic and expenses which must exist to make electrification remunerative was considered mathematically, and he concluded that the passenger traffic of the New York, New Haven & Hartford Railroad, which is quite exceptional, would almost justify a general electrification of the lines of that company, but that was not the case with the New York Central and the Pennsylvania Railroads. Curves given by Mr. Parodi of the drawbar pull of different classes of steam and electric locomotives are reproduced. He said that the electric locomotives named were really constructed to develop their maximum power at about 37.2 m.p.h., corresponding to a suburban service. In the United States there are no d.c. or single-phase locomotives which are as powerful at their maximum running speed as the Simplon Tunnel locomotives, which develop a drawbar pull of 13,200 lb. at 43.4 m.p.h., and the new Simplon locomotives, which will develop 3000 hp at the same speed. The Italian State Railways, also using three-phase equipment, have ordered ten locomotives able to develop 2000 hp-2400 hp at 62 m.p.h.

While locomotives with a series characteristic are suitable for suburban conditions, something more approaching a shunt characteristic is required for trunk-line service. In this respect three-phase locomotives would be far superior to the others, as their weight would be considerably less, being something like 66 lb. per hp, while the lightest American single-phase locomotive weighs 132 lb. per hp. In the United States the question is what drive to adopt for locomotives capable of hauling express trains. Three radically different methods have been employed there, namely, connecting rods, a direct drive and a drive through gear and a hollow shaft. For high speeds the first seems to be preferred.



Curves Showing the Drawbar Pull of Different Classes of Steam and Electric Locomotives

DISCUSSION

Roger T. Smith said that for suburban lines the engineering problem of electrification had been solved and merely the commercial problem remained. In the case of hilly districts there was a critical grade above which electric driving would always pay. In spite of the work which had been done in Italy, he thought that either the d.c. or single-phase system was better than three-phase, owing to the series characteristic torque, and for speeds up to 31 m.p.h. they were better than steam for the same reason. In England the North Eastern Railway was now building a very high-tension direct-current line, and a 3500-volt line would be started in England soon. To the curve of tractive effort in Mr. Parodi's paper he had added another (shown dotted in the illustration), giving the result of a test with a dynamometer car on a 4-6-0 type of locomotive drawing a passenger train from London to Plymouth (226½ miles) without a stop, at an average speed of 54

m.p.h. The train weighed 405 tons, of which the locomotive accounted for 117 tons (namely, 28 per cent). At 70 m.p.h. the drawbar hp was 730, and no electric locomotive had yet been built which could give this drawbar effort at such a speed. For general purposes, however, the actual strength of the drawbar was the limiting factor—it was limited to 12 tons, corresponding to a train weighing 2500 tons to 3000 tons. There were in Great Britain some 500,000 private freight cars not under the supervision of or made by the railway companies. They represented a capital of some $300,000,000, and their draft gear could not be relied upon to stand more than 12 tons.

Mr. Latour said that there had been much discussion on the question of frequency in single-phase traction, but as the contact surface of the commutator depended on the frequency, there was no doubt that the cost of maintenance of a twenty-five-cycle system was nearly double that of a fifteen-cycle system. When fifteen cycles was employed for three-phase operation nobody had anything against it. This low frequency also diminished telephone disturbances. The employment of auxiliary poles in single-phase motors introduced no complication. It was, of course, admitted that the single-phase system resulted in heavier locomotives, but one must not forget that single-phase was introduced to give the advantage of a single contact wire carrying current at high tension. He touched briefly, but without being very sanguine, on the ultimate possibility of employing a rotary converter on a locomotive so that the advantage of high-tension single-phase at high frequency with a d.c. motor for driving would be obtained. He also referred to the mercury rectifier.

Mr. Gratzmuller agreed that the main objections to the single-phase system were the greater weight and the increase in the surfaces of commutation. He believed that the repulsion motor might now be ruled out of court and that the field was left to the series compensated motor. The disadvantage of single-phase over high-tension d.c. amounted to only 15 per cent. The use of resistances to diminish the emf between short-circuited segments of the commutator was correct, for by their means the size of the commutator could be enormously reduced. If the resistances were placed in supplementary slots leading out of the main slots and not in the main slots themselves, a satisfactory arrangement was secured without increasing the size of the armature at all. Returning to the question of contact surface at the commutator, Mr. Gratzmuller said that the same surface as with ordinary d.c. motors would be attained; in fact, a 420-volt Westinghouse single-phase motor already built had a contact surface of the same area as a 500-volt d.c. motor.

Mr. Mazen said that the French railway system, taken as a whole, might be considered as a network of squares, each side of which was from 9.3 miles to 31 miles long. It was recognized that the present policy for the railways was to obtain their current from central stations and not to generate it themselves. The current offered to them was the one which was most useful for general purposes, namely three-phase at fifty cycles. They had practically no option but to place substations at the junctions of the network of squares, and they had come to the conclusion that single-phase working would not be so suitable for their conditions as third-rail d.c.

HIGH-TENSION D.C. TRANSMISSION

On Thursday a paper on "Power Transmission on the Thury System," by J. S. Highfield, was discussed. The paper is similar to one which Mr. Highfield had written earlier that was abstracted in the ELECTRIC RAILWAY JOURNAL for July 6, 1913. The author pointed out that it is easy to meet an increasing load by starting up new stations on the same line and that this can be done without increasing the maximum line pressure by placing additional stations at proper points. The difficulties of running stations in parallel are thus avoided, and the uniform section of cable renders the series system more flexible in this respect than the parallel. Another advantage is that difficulties due to cable capacity and inductance are eliminated, and as a higher pressure can be used with direct current than with alternating current the energy can be transmitted to a greater distance. The cost of an overhead three-phase line at even the same pressure is greater than that of a series d.c. line, and for transmitting up to, say, 30,000 kw not more than four wires will be required, working two in parallel, instead of six wires for a similar three-phase line. There would thus be some saving in insulators, and in most cases the weight of copper would also be less, as the regulation need not be so close and the loss can be calculated purely on a commercial basis without reference to technical difficulties.

Mr. Highfield considered that the maximum size of a generator on the high-tension d.c. system may be taken as 1200 kw to 1500 kw, so that to make up a large power unit it is necessary to couple two or more generators to a single prime mover. Line losses would usually be higher than with the constant-pressure system, and the a.c. system also has the advantage as regards the cost of the substations, except in those cases in which the frequency of the transmission line is different from that required in the distributing circuits. In his case, where a load of about 700 kw had to be supplied at various points in a scattered district involving a length of approximately 100 miles by underground mains, and in which the cost of energy was comparatively small, the series system was the only one commercially possible.

In the discussion on Mr. Highfield's paper, Mr. Thury admitted that the applications of the high-tension d.c. system were limited. Constant potential remained as the system for distribution, and a.c. transmission suited this in most cases. The series system came in for very long-distance transmission and when underground cables were desirable. An overhead line was dear and its maintenance expensive when pressures were high. For distribution the series system was limited to cases in which there were only a few consumers of large size. It also entailed problems to be solved which would be impossible with alternating current; for instance, in crossing a small stretch of sea it had been adopted because the cable makers would give a guarantee only in the case of single cable. Tests at Lyons and also in England showed that d.c. cables absorbed a negligible amount of energy. At Lyons it was found that a cable of only 3 mm (0.12 in.) thickness of insulation would stand 300,000 volts. As to the limiting size of generator, he had recently planned to use a 5000-kw machine with two armatures.

In reply to a question as to whether there had been electrolytic troubles owing to the ground return, Mr. Highfield said that they had been working in this manner for four months continuously and there had been no interference with the track signaling on the Great Western Railway. Mr. Thury added that on the St. Maurice and Lausanne system the iron grounding plates which were used should theoretically have been destroyed by electrolysis in less than two months but they worked as well after a year as they did on the first day, owing to the formation of a protective film of oxide of iron. No electrolysis on pipes had been noticed, but he admitted that the possibility of electrolysis should be considered in any plans.

Mr. Smith pointed out that 1200 kw, the largest size of unit mentioned by Mr. Highfield, was about the power needed for an average-size freight train and this would be a suitable unit for substation motor-generators on a railway system. Mr. Highfield's ground-return current, he said, had been flowing for months under the Great Western Railway, where ground returns were used for signaling and where telephones were worked at a pressure of only 2 volts, but no trouble had been experienced. He was impressed by the simplicity of the substation arrangements.

Final Testimony and Arguments in the Cleveland Case

Depreciation in the Value of the Property of the Company Shown by Tables Submitted by Henry J. Davies—Operating Expenses per Car Mile, per Passenger and per Ride—Other Testimony and Oral Arguments of Counsel

The hearing before the board of arbitration in the Cleveland Railway case was resumed on June 3 and continued until June 6, when it was concluded. The principal testimony offered was that of Henry J. Davies, secretary and treasurer of the company, who submitted tables bearing on the question of the value of the property. After the completion of the case of the company the only witness introduced on behalf of the city was Carl H. Nau, accountant for the city street railroad commissioner. After the testimony was finished Mayor Baker, representing the city, and H. J. Crawford, counsel of the company, made oral arguments before the board. When these were made the hearing was concluded. Written briefs will be submitted by counsel for both sides. Abstracts of the final testimony and oral arguments in the case follow:

MR. CRECELIUS ON THE POWER EQUIPMENT

Lawrence P. Crecelius, superintendent of power Cleveland Railway, took the stand again on June 3 and presented Table I, as published herewith, showing the money expended in betterments and maintenance of power plants, battery plants, overhead lines and return circuits.

Mr. Crecelius, referring to the column in the exhibit headed "Percentage of Reproduction," said that the total of the maintenance and betterment expenditures, divided by the reproduction value of the property, gave the percentage of the reproduction value that was put back into the property in the way of maintenance and betterments. He gave the details of various changes in his department which involved deductions in the property account. Specifying, he gave the reproduction values of the items and the lower values fixed upon them in the Tayler valuation.

In answer to a question from H. J. Crawford, counsel for the company, Mr. Crecelius said that, including the additions and betterments, the book value of the electrical equipment on March 1, 1913, was less than it was on Jan. 1, 1910. Independent of the question of book value, the judgment of Mr. Crecelius was that the property was not in as good condition in 1913 as in 1910.

Mr. du Pont asked the witness a question about the value of the power department as an operating department now. Mr. Crecelius said that, when the additions and betterments were taken into account, the department was more valuable as an operating department than it was in 1910. The application of the depreciation rates showed, however, that the value of the plant in money was less.

Mr. du Pont said that the value of the property as an operating unit was more than the figures would indicate, and that would necessarily show that the rates of depreciation were too high.

Mr. Duffy stated that the rates used were definite rates applied to fix the valuation that was incorporated in the franchise as the value to be recognized. Mr. Duffy then asked Mr. Crecelius if he took the purchased power into consideration in judging the efficiency of the department. The witness said that he did. The company had been getting approximately one-third of its power from the Cleveland Electric Illuminating Company.

Mr. Crawford said that the rates of depreciation used in the calculations were not theoretical and that they had not been so regarded in the past. They had been extremely practical and were used in the calculations which led to a reduction in the stock of the company from 100 per cent to 55 per cent.

Mr. du Pont said that perhaps he could explain the situation. There was a very peculiar depreciation on power. Horace E. Andrews and he had agreed on the valuation of the power plant one year previous to the determination of the value for the present ordinance. They did not reappraise the property when the values were determined for the present ordinance but corrected their figures according to the reduction in the price of material. The former appraisal had been made when copper was at a high price. The price had dropped from about 24 cents to 14 cents per pound and the value of the copper in the generators was reduced accordingly.

Mr. Crawford said that there was a figure of $50,000 in the figures covering the cost of some material purchased in 1908 which looked unusual. He would like to have it looked up, and if it was not correct he wanted the arbitrators to know it.

Judge Killits asked how the efficiency of the power department compared on Nov. 1, 1912, and March 1, 1910.

Mr. Crecelius asked whether the question referred to efficiency in the cost of production. When Judge Killits answered that he had in mind the amount of work done by the department, Mr. Crecelius said that the efficiency was improved now. It was very much improved after Nov. 1, 1912, when the substations were started. Answering further questions from Judge Killits, Mr. Crecelius said that before any current was received from the Cleveland Electric Illuminating Company the power situation was getting pretty uncertain. The voltage was low in the outskirts of the city and there was a lot of trouble from other complications that arose in the distribution of heavy-tension current for long distances. Motor cars could be operated, but they could not carry trail cars.

ADDITIONAL TESTIMONY OF MR. DAVIES

Henry J. Davies, secretary and treasurer Cleveland Railway, took the stand again on the afternoon of June 3 and presented tables of valuation which he had made from the books of the property of the company as of March 1, 1910, and also as of March 1, 1913. The first table in the series presented by Mr. Davies showed the valuation of $18,909,252 placed by Judge Tayler upon all the physical property of the company in existence Jan. 1, 1908, under the several classifications of the appraisal that had been made in the spring of 1908 by Mayor Johnson and F. H. Goff. Another table showed the reproduction value of $24,155,410 for all the property shown in the first table on the same date. The reproduction value of the physical property of the Cleveland Electric Railway Company, which was the name of the present company before it absorbed the various lines, the Forest City Railway Company and the Low Fare Railway Company as appraised by Mr. Goff and Mr. Johnson in April, 1908, was ascertained as of Jan. 1, 1908, by the determination from the Goff-Johnson schedules of the details of the valuation of the several classifications of property, the percentages of remaining value and of depreciation. To the reproduction value of the property of the Cleveland Electric Railway Company in a new condition, thus ascertained, there were added overhead charges or allowances of Judge Tayler and his valuation of the property of the Forest City and the Low Fare railway companies. Judge Tayler added to the valuation agreed upon by Mr. Goff and Mr. Johnson certain percentages for specific overhead charges and certain other percentages

for general overhead charges. These percentages were set forth in a pamphlet which Mr. Davies gave to the arbitrators.

In the tables which Mr. Davies made for this arbitration he omitted two items shown in the tables referred to in the pamphlet, namely, the items of "stores" and "other items." The figures that he made were based on the valuation of the other items of physical property, or a total value

TABLE I—MONEY EXPENDED IN BETTERMENTS AND MAINTENANCE OF POWER PLANTS, BATTERY PLANTS, OVERHEAD LINES AND RETURN CIRCUITS

Year	Track Mileage	Maintenance	Betterments	Totals	Percentage of Reproduction
1908	236.590	$178,971	$77,511	$256,492	4.05
1909	258.428	149,226	36,958	186,184	2.90
1910	272.696	*200,595	93,071	293,666	4.55
1911	288.904	125,165	26,077	151,242	2.36
1912	290.727	103,278	148,643	251,921	3.92
1913	293.398	to date	to date	to date	to date

*Two months, January and February, under receivers in which $40,466.96 was charged to maintenance.

as fixed by Judge Tayler of $18,909,252 instead of $19,317,456 as shown in the table in the Tayler valuation pamphlet. In order to ascertain the present value of the property as well as the present value of all replacements of that property and all additions to it, it was necessary to consider, among other things, the depreciation in its value, from whatever cause the depreciation might come. It was necessary to account for the property that went out of use in the period between Jan. 1, 1908, and March 1, 1913, the date to

TABLE II—RATIO OF DEPRECIATED VALUE OF PROPERTY ON JAN. 1, 1913, TO COST, COMPARED WITH RATIO OF DEPRECIATED VALUE AS FIXED BY JUDGE TAYLER TO REPRODUCTION VALUE

	Jan. 1, 1908 Per Cent	March 1, 1910 Per Cent	March 1, 1913 Per Cent
Track	74.96	66.45	55.11
Pavement	79.55	68.23	55.54
Cars	77.81	54.40	59.79
Land	100.00	104.22	101.28
Buildings	82.85	64.20	71.74
Overhead construction, Return circuit	89.25	83.70	77.75
Power stations	69.99	57.59	45.20
Storage batteries	84.12	75.66	66.18
Shop machinery	97.78	69.12	77.56
Miscellaneous rolling stock	66.91	57.93	42.34
	78.28	65.23	59.85

which he had brought his figures, and to take that property out at its reproduction value.

In another table Mr. Davies showed the amount in dollars and cents of property that had disappeared or gone out of use since Jan. 1, 1908, whether by reason of sale or replacement by other property or permanent abandonment. The total at March 1, 1913, was $1,943,424.

TABLE III—DEPRECIATION PER REVENUE CAR MILE

	Jan. 1, 1908, to March 1, 1910 Cents	March 1, 1910, to March 1, 1913 Cents	Jan. 1, 1908, to March 1, 1913 Cents
Track	1.55	1.34	1.42
Pavement	0.58	0.49	0.52
Cars	1.03	0.97	0.99
Land	....	....	....
Buildings	0.14	0.12	0.12
Overhead construction, Return circuit	0.18	0.16	0.17
Power stations	0.89	0.75	0.81
Storage batteries	0.11	0.09	0.10
Shop machinery	0.03	0.03	0.03
Miscellaneous rolling stock	0.06	0.05	0.05
	4.57	4.00	4.21

Mr. Davies showed in another table the reproduction value or cost new of the original property, that is to say the property in existence remaining after deduction of the value of the property that went out of use and before deduction of depreciation. Starting with the value of $24,155,410 on Jan. 1, 1908, this table showed a value of $23,687,370 on March 1, 1910, and of $22,211,986 on March 1, 1913.

In several of the tables following, Mr. Davies showed the depreciation in value of the property appraised by Mr. Johnson and Mr. Goff, and later by Judge Tayler. One of these tables showed the depreciation on the entire property. This amounted to $2,303,670 for the period from Jan. 1, 1908, to March 1, 1910, and to $3,189,697 from March 1, 1910, to March 1, 1913, or a total of $5,493,367. Another of the tables showed the depreciation in the value of the property that went out of use between the date of the first appraisal and March 1, 1913. From Jan. 1, 1908, to March 1, 1910, the amount was $42,094 and from March 1, 1910, to March 1, 1913, it was $229,378, making a total of $271,472 for the full period. One of the tables showed the depreciation in the value of the property appraised by Judge Tayler (less the depreciation in the value of property replaced or abandoned) at the rates of valuation used by him in his valuation, which were the same as those used by

TABLE IV—RATIO OF PRESENT VALUE OF PROPERTY TO COST OF REPRODUCTION OF ENTIRE PROPERTY

Cost of original property			$24,155,410
Less cost of abandoned property			1,943,424
Remainder			$22,211,986
Cost of additions			2,615,752
Cost of renewals			2,122,459
Total reproduction value of entire property			$26,950,197
Tayler valuation of original property			$18,909,252
Less cost of abandoned property			1,943,424
Remainder			$16,965,828
Cost of additions			2,615,752
Cost of renewals			2,122,458
Total capital value of physical property			$21,704,038
Depreciation on original property	$5,493,367		
Less depreciation on scrap value of original property from Jan. 1, 1908, to March 1, 1913, five years and two months, at, say, 5 per cent per year	587,912	$4,905,455	
Depreciation on cost of additions and renewals	$458,685		
Less depreciation on scrap value of additions and renewals for one-half of period from Jan. 1, 1908, to March 1, 1913, two years and seven months, at, say, 5 per cent per year	59,319	399,366	
Total		$5,304,821	
Less depreciation on property abandoned	$271,473		
Plus depreciation on scrap value of property gone out of use for the period during which it was in use, say one-half of five years and two months, at 5 per cent per year	24,979	296,452	$5,008,369
Depreciated or present value of all physical property March 1, 1913			$16,695,669

Mayor Johnson and Mr. Goff in their valuation, viz., 5 per cent on track, pavement, rolling stock, power stations and their equipment, storage batteries and shop machinery, and 2½ per cent on other buildings and on power-distribution system and return circuit. From Jan. 1, 1908, to March 1, 1910, the amount was $2,261,576 and from March 1, 1910, to March 1, 1913, it was $2,960,318, making a total of $5,221,894.

The next table showed the reproduction value or cost new of the original property, less the depreciation in the value of that property. The final figure on the whole property for March 1, 1913, was $18,662,043. The ensuing table showed Judge Tayler's valuation of the original property remaining after deduction of the depreciation. The final figure as of March 1, 1913, was $11,743,933.

In the next table Mr. Davies showed the costs of the additions to the property in the several classifications. From Jan. 1, 1908, to March 1, 1910, these amounted to $519,842, and from March 1, 1910, to March 1, 1913, to $2,095,910, making a total of $2,615,752. The following table in the series showed the amount expended for property that took the place of other property that had been worn out or was discarded for other reasons. It was the cost of renewals, $438,266 from Jan. 1, 1908, to March 1, 1910, and $1,639,192 from March 1, 1910, to March 1, 1913, or a total of $2,122,458. Mr. Davies also combined the figures in the two tables last mentioned. Depreciation was

figured on the additions at the same rates that were used in determination of the depreciation on the original property, not from Jan. 1, 1908, but from the date at which the property was added. The total depreciation on these items for the full period was $218,625. Similarly depreciation was computed on the renewals. This amounted to $240,060. The total of these two calculations was then shown, $458,685.

The next table showed the present value of the additions and renewals after deduction of the depreciation thereon. The value of these items as of March 1, 1910, was $944,808, and as of March 1, 1913, it was $4,279,525.

Mr. Davies then gave the reproduction value of the original property and of additions and renewals. On Jan. 1, 1908, the value in this table was $24,155,410; on March 1, 1910, it was $24,690,478, and on March 1, 1913, it was $26,950,197. The depreciation in the value of the original property and of additions and renewals was $5,680,579 on March 1, 1913.

The depreciated or present value of the original property and all additions and renewals was $18,909,252 on Jan. 1, 1908; $17,124,444 on March 1, 1910, and $16,023,458 on March 1, 1913.

Table II, published herewith, shows the ratio of the depreciated value of the property on Jan. 1, 1913, to cost compared with the ratios of the depreciated value, as fixed by Judge Tayler, to reproduction value.

The revenue car miles run, with trail-car mileage figured at 60 per cent of the motor-car mileage in each year, was as follows: In 1908, 22,928,059; in 1909, 24,074,834; in two months of 1910, 3,796,020; in ten months of 1910, 22,271,366; in 1911, 28,086,854; in 1912, 29,109,201; in two months of 1913, 4,594,926; total for the full period, 134,861,260.

Table III, published herewith, shows the depreciation per revenue car mile.

One table showed the depreciation on storage batteries calculated at 8 per cent instead of at 5 per cent. Perhaps that should have been 8⅓ per cent, but Mr. Davies had figured it at 8 instead of 5 per cent, the figure that was used in a previous table, and that made a difference in the amount of depreciation of $81,000. The depreciation at 5 per cent amounted to $135,073.

Another calculation gave the basis for the calculation of depreciation of scrap value which should be deducted from the depreciation shown in the tables submitted. Mr. Davies assumed the value of scrap at 10 per cent of the cost of property.

Table IV, published herewith, shows the ratio of the present value of the property to the cost of reproduction of the entire property. This gave a depreciated or present value for all the physical property as of March 1, 1913, of $16,695,669. This calculation disregarded an item of property sold and not replaced amounting to $57,350, on which depreciation should not have been included in the depreciation tables, and disregarded also the items of additional depreciation on storage batteries, which should have been included in the depreciation table. The latter item more than offsets the former and the inclusion of both would not materially affect the results. From these figures the ratio of depreciated or present value of the property, $16,695,669, to the total cost of reproduction of the entire property, $26,950,197, appeared to be 61.95 per cent. The ratio of the Tayler value to the reproduction value, Jan. 1, 1908, was about 78 per cent. There appeared, therefore to have been a depreciation of the difference between 78 per cent and 62 per cent. Mr. Davies thought that the percentage of depreciation which had been applied in the determination of these figures was conservative.

Mayor Baker went through a long period of cross-examination of the witness, seeking to show that replacement of parts of the property would continue from time to time so as to keep the plant in operating condition with the result that at the end of a fixed period of years the property would still be in as efficient working condition as at the present time. He discussed a car as a specific instance.

Mr. Duffy asked Mr. Davies if it was not a fact that in practice at the end of twenty years or some other time in the life of the car it reached such a condition that it could not be repaired any more. The witness said that that was so and that there might be depreciation on the car from another cause. It might become obsolete.

Mr. du Pont asked whether, assuming that obsolescence was omitted, the witness claimed that if any part of a railroad system was replaced piece by piece it could be kept in as good condition as it was originally. The witness said

Table V—Operating Expenses

	12 Months 1909	10 Months 1910	12 Months 1911	12 Months 1912	3 Months 1913
Per ride (cents)					
Power:					
Wages	0.06605	0.05729	0.04989	0.04681	0.04279
Fuel	0.13331	0.12260	0.11446	0.10933	0.08410
Power purchased	.....	0.00038	0.00074	0.00606	0.06625
Other expenses	0.02123	0.01986	0.01674	0.01540	0.01484
Total	0.22059	0.20013	0.18183	0.17760	0.20798
Transportation:					
Wages, c. and m	0.66789	0.70823	0.71640	0.68055	0.62705
Wages, other	0.15879	0.13002	0.13406	0.12109	0.12194
Cleaning and sand	0.01474	.....	.....	.....	.....
Snow and ice	0.00241	.....	.....	.....	.....
Other expenses	0.02150	0.04599	0.04691	0.04564	0.06242
Total	0.86533	0.88424	0.89737	0.84728	0.81141
General:					
Officers and clerks	0.04461	0.04292	0.04129	0.04288	0.04537
Legal expenses	0.01974	0.00757	0.00394	0.00210	0.00207
Damages	0.09863	0.08990	0.08575	0.08111	0.07747
Insurance	0.01346	0.01514	0.02061	0.01881	0.01866
Stores	0.01167	0.01126	0.00852	0.00861	0.00814
Rent of tracks	0.00460	0.00861	0.01086	0.00828	0.00762
Rent of equipment	.....	0.01106	0.01021	0.00956	0.00873
Commissioner	0.03547	0.02573	0.02011	0.02434	0.02585
Other expenses	.....	0.01456	0.01296	0.01533	0.01550
Total	0.22818	0.22675	0.21425	0.21102	0.20941
Grand total	1.31410	1.31112	1.29345	1.23590	1.22880
Per fare (cents)					
Power:					
Wages	0.08861	0.07633	0.06877	0.06583	0.06002
Fuel	0.17884	0.16337	0.15778	0.15377	0.11797
Power purchased	.....	0.00051	0.00102	0.00852	0.09294
Other expenses	0.02848	0.02646	0.02307	0.02167	0.02082
Total	0.29593	0.26667	0.25064	0.24979	0.29175
Transportation:					
Wages, c. and m	0.89598	0.94369	0.98752	0.95714	0.87960
Wages, other	0.21302	0.17324	0.18480	0.17031	0.17105
Cleaning and sand	0.01978	.....	.....	.....	.....
Snow and ice	0.00324	.....	.....	.....	.....
Other expenses	0.02884	0.06128	0.06467	0.06418	0.08757
Total	1.16086	1.17821	1.23699	1.19163	1.13822
General:					
Officers and clerks	0.05985	0.05719	0.05691	0.06031	0.06364
Legal expenses	0.02648	0.01008	0.00544	0.00296	0.00291
Damages	0.13231	0.11979	0.11820	0.11408	0.10867
Insurance	0.01806	0.02017	0.02841	0.02646	0.02618
Stores	0.01566	0.01501	0.01175	0.01210	0.01142
Rent of tracks	0.00617	0.01147	0.01498	0.01165	0.01068
Rent of equipment	.....	0.01474	0.01407	0.01344	0.01224
Commissioner	.....	0.01940	0.01786	0.02156	0.02175
Other expenses	0.04758	0.03429	0.02772	0.03423	0.03626
Total	0.30611	0.30214	0.29534	0.29679	0.29375
Grand total	1.76290	1.74702	1.78297	1.73821	1.72372
Per car mile (cents)					
Power:					
Wages	0.53660	0.50978	0.46547	0.46164	0.44183
Fuel	1.08295	1.09101	1.06784	1.07830	0.86840
Power purchased	.....	0.00342	0.00691	0.05975	0.68418
Other expenses	0.17246	0.17673	0.15613	0.15193	0.15326
Total	1.79201	1.78094	1.69635	1.75162	2.14767
Transportation:					
Wages, c. and m	5.42569	6.30236	6.68363	6.71191	6.47503
Wages, other	1.28993	1.15698	1.25073	1.19427	1.25918
Cleaning and sand	0.11976	.....	.....	.....	.....
Snow and ice	0.01961	.....	.....	.....	.....
Other expenses	0.17465	0.40927	0.43768	0.45007	0.64461
Total	7.02964	7.86861	8.37204	8.35625	8.37882
General:					
Officers and clerks	0.36242	0.38194	0.38520	0.42290	0.46848
Legal expenses	0.16032	0.06735	0.03680	0.02074	0.02141
Damages	0.80121	0.80000	0.80000	0.80000	0.80000
Insurance	0.10938	0.13470	0.19226	0.18551	0.19270
Stores	0.09480	0.10021	0.07954	0.08487	0.08406
Rent of tracks	0.03737	0.07658	0.10135	0.08169	0.07862
Rent of equipment	.....	0.09845	0.09522	0.09427	0.09013
Commissioner	.....	0.12957	0.12090	0.15121	0.16012
Other expenses	0.28814	0.22899	0.18761	0.24003	0.26692
Total	1.85364	2.01779	1.99888	2.08122	2.16242
Grand total	10.67529	11.66734	12.06727	12.18909	12.68891

that he did not think it was possible to replace a car piece by piece and keep it going for twenty years.

Mr. du Pont asked if the company, except as the result of a collision, had ever discarded a car that was worn out so that it could not be operated for another year. Mr. Davies said that the company had discarded cars at times when other types of cars were adopted.

During the cross-examination of Mayor Baker on June 4 Mr. Davies said that he had tried to find errors in the

TABLE VI—OPERATING EXPENSES PER CAR MILE (CENTS)

	12 Months 1903	12 Months 1904	12 Months 1905	12 Months 1906	12 Months 1907
Maintenance	....	4.38	5.31	6.90	6.35
Power plant	1.63	1.40	1.25	1.48	1.54
Cars	5.97	5.88	5.89	6.18	6.24
Transportation	....	7.28	7.14	7.66	7.78
General	1.62	1.91	1.74	2.07	2.02
Total	13.05	13.57	14.19	16.63	16.15

basis on which he made up the figures and that if there were any errors he would help to work them out. If any error existed, it was in the inclusion of depreciation on additions to property. As the ordinance had been construed the company had felt that it was not entitled to any reserve to make up the depreciation on property added from new capital, because while new capital might be issued for the entire cost of the addition, and for that only, the ordinance seemed to indicate that the company might maintain the addition in a condition equal to 70 per cent of its cost, and therefore the reserve did not seem to provide for depreciation on this particular property.

Table V shows the operating expenses per ride, per fare and per car mile from 1909 to 1913.

Table VI shows the car-mile operating expenses from 1903 to 1907.

Gross earnings per car mile have been as follows: In 1903, 22.38 cents; in 1904, 23.60 cents; in 1905, 24.28 cents; in 1906, 25.37 cents; in 1907, 23.17 cents; in 1908, 22.10 cents; in 1909, 26.36 cents; in 1910 (ten months), 23.29 cents; in 1911, 22.67 cents; in 1912, 22.84 cents.

SERVICE AND CAR-MILE RESULTS

During the afternoon session on June 4, Mr. Davies explained that part of the increase in car-mile expense in 1912 as compared with 1909 was due to the increase in the wages of conductors and motormen. That amounted to 1.3 cent per car mile. Part of the increase in general expenses was due to the appointment of a city street railroad commissioner, and the expense of his office was about 0.15 cent per car mile. Another factor affecting the results was that population and the number of passengers tended to increase faster than the means of transportation increased. If the expense of transportation or the operating expenses of the company were the same in one year as in the earlier years, and there was an increase in the number of car miles, the expense per car mile would be less. If there was an increase in business at a given rate per cent, and an increase in service or car miles at a lower rate per cent, the expenses per car mile might show an increase, while the expenses of operation per fare or per passenger or per ride would be reduced. If by increasing its operating expenses per car mile the company was enabled to increase its earnings per car mile in a larger proportion, it seemed to Mr. Davies that it was to the credit of the management and the commissioner who supervised the management. Mr. Davies also pointed out that the earnings per car mile were as large in 1912 as they were in 1903, notwithstanding the very large reduction of fare. Part of that was accounted for by the fact that the service measured in car miles had not increased in equal pace with the increase in the number of fares or the number of passengers carried. In reference to the increases in cost of officers' and clerks' salaries, Mr. Crawford brought out the fact that the requirements of the Tayler ordinance involved more clerical hire than was necessary before.

Mr. Davies then said that, accepting Mayor Baker's estimate that the population of Cleveland was 700,000, there had been an increase of 25 per cent in population since 1910. The number of fares in March, 1913, compared with March, 1910, showed an increase of nearly 32 per cent. The increase in the number of rides in March, 1913, over the number of March, 1910, was 41 per cent, while the increase in service measured in car miles was 16.35 per cent.

TESTIMONY OF CARL H. NAU

Carl H. Nau was introduced as a witness for the city. Since Jan. 1, 1912, the firm of which he is a member has been auditor for the city street railroad commissioner. Mr. Nau presented a number of tables and stated that the status of the interest fund strictly under the ordinance at March 1, 1913, would be $796,920. He had made an estimate of the amount of money which would be made by the company in the last fifteen years of the grant, based on the assumption that the number of passengers would increase at the rate of 6 per cent compounded annually, with an increase in the car miles at the rate of 5 per cent compounded annually. He then took the number of revenue fares thus accumulated and multiplied them by 4.15 cents, the maximum rate of fare chargeable during the last fifteen years under the ordinance. He multiplied the assumed number of car miles run by 24.04 cents. This figure allowed 12½ cents per car mile for operation, an average of 5 cents per car mile for maintenance and the amount per car mile that the interest and taxes now called for. The calculation showed a total income from passengers at the maximum rate of fare of $289,311,210 during the fifteen years from 1920 to 1934. There would be accumulated surpluses extending from something over $228,000 in the first year to over $9,000,000 in the last year. Accumulating all of them and not adding interest on the accumulation but merely the sum of the accumulations together gave a total of $83,226,858.

Mr. Baker asked what increase in the capital value would be necessary to carry passengers at the rate assumed in that period.

Mr. Nau said that the largest estimate he had ever heard made was that at the end of this fifteen years the capital value of the company might be $50,000,000. At present the capital value is $26,000,000.

Mr. Duffy asked if the $26,000,000 was not almost $4 of capital for every $1 of earnings. The earnings in 1912 were something less than $7,000,000. Was it not reasonable to suppose that in order to earn any sum there must be capital corresponding, or the company would not have the facilities with which to earn the amount? Mr. Nau said that the earnings for the last year of the fifteen-year period would be $28,000,000 according to the table.

Mr. Duffy said that if the earnings continued at the rate of $10 per capita per annum, the population necessary in Cleveland at the end of the fifteen-year period to contribute $28,000,000 of operating revenue would be 2,800,000.

OTHER TESTIMONY

At the morning session on June 5 Mr. Baker read an agreed statement of facts with regard to one of the questions submitted by the city affecting the surplus of old companies, which stood on Jan. 1, 1913, on the balance sheet at $323,304. This amount was the balance remaining of the balances which were brought over from the old company when the Cleveland Railway Company books were opened about March 1, 1910. It represented the difference between the assets ascertained at that date and the known liabilities at the same date, plus the capital value as fixed by Judge Tayler. There were, however, certain assets and liabilities having their origin prior to March 1, 1910, which had not been ascertained, and this account was left open to take care of future bookkeeping adjustments necessary to be made af-

ter such additional assets and liabilities existing March 1, 1910, had been finally determined. There had been charged against this balance payments made on account of the final liquidation of old injury and damage suits and other expenses and claims which antedated March 1, 1910 but had not been settled at that date. There were still pending certain liabilities and old injury and damage suits, tax claims, etc., which might have to be paid at some future date, and such payments would then be charged against this balance. If, after a final determination of all pending claims and liabilities of every kind antedating March 1, 1910, the account showed a credit balance, the credit balance would represent the excess of assets over liabilities plus the capital value as determined in the ordinance, and if the account showed a debit balance after all liabilities as of March 1, 1910, had been liquidated, then the debit balance would represent a deficiency between the assets and all liabilities, plus the capital value as of March 1, 1910. The city and the company therefore agreed, as disposing of this question, that on March 1, 1916, or as soon thereafter as all cases then pending against the company involving taxes or claims having their origin prior to March 1, 1910, shall have been finally determined, the balance then remaining, whether debit or credit, shall be written off by writing up or down the book value of the property of the company without affecting the capital value as defined by the ordinance.

Taking up another of the questions, Mr. Baker said that when the settlement was finally made under the Tayler ordinance $189,300 stock of the Cleveland Railway Company was among the assets in the hands of the receivers of the Municipal Traction Company. This was due to the fact that the latter company had been buying and selling stock of the Cleveland Railway Company. This stock was turned over by the receivers to the Cleveland Railway, and by that company was placed in the hands of Horace E. Andrews as trustee. Dividends had been paid regularly on the stock, and when the company had sold additional stock and had offered it at par to existing shareholders, Mr. Andrews as trustee had taken advantage of the option and bought additional stock, paying for it out of the dividends. Mr. Andrews, therefore, held as trustee the original sum and the accruals thereon. The question before the arbitrators was whether the original sum should be regarded as part of the general property of the company, and if so should the stock be sold and the proceeds used in improvement of the property without additions to capital value, and should the earnings of the original principal sum of $189,300 go to the interest fund as general earnings of the company, or if not disposed of in this manner, how should the principal and interest be disposed of?

Mr. Davies was recalled to the stand on the afternoon of June 5.

Mr. Baker said that since March 1, 1910, the company had expended in betterments and additions to the property a large sum out of capital account. Had there been any charge in those betterments for general overhead or general expenses?

Mr. Davies said that had not been the practice.

Mr. Crecelius, speaking about this point, said that the wages of employees working strictly on betterments were charged to capital. No salaries of engineers, purchasing agents, auditors or general officers had been charged to capital account under these circumstances, but all were paid as expenses.

FINAL ORAL ARGUMENTS

When the arbitrators met on the morning of June 6 Mr. Crawford referred briefly to some of the minor questions involved before beginning his discussion of the principal matters of controversy. He said that the question as to the amount in the interest fund as of April 1, 1913, would be determined automatically by the decision of the arbitrators on the other questions. He understood it to be Mr. Baker's desire that the disposition of the surplus of old companies, although settled by agreement between the city and the company, be included in the award of the arbitrators. Mr. Crawford said that the framers of the ordinance agreed that the company should be secured in its investment and in a fair and fixed rate of return, and that the city should have the best street railroad transportation at cost consistent with the security of the property and the certainty of a fixed return thereon and no more. The purpose was in effect to maintain the integrity of the property at all hazards so long as it could be maintained within the maximum rate of fare. If any contention of the city impaired or reasonably threatened to impair the integrity of the property or the certainty of a fixed return, it must be rejected. When the meaning and intention of the parties in drawing the contract was ascertained, there was only one other question. Was it a legal intention? If it was, then nothing was left to the board to do but to enforce the contract.

Mr. Crawford argued that in considering the matter of the operating expense allowance the arbitrators must always keep in mind the fact that the company had no control over the quantity or quality of the service furnished. That was under the absolute control of the city all the while. The company had shown that it actually cost it to render the service which the city had exacted of it 12.19 cents per car mile for the last year. There had been no claim or suspicion that the road had not been well and efficiently and economically managed. The city had had the service, it had cost more under economical management than the ordinance allowance, and the company simply asked to be reimbursed in accordance with the provisions of the ordinance which said that the city was entitled to transportation at cost. It was idle to say that the framers of the ordinance could attempt to set in advance a limitation upon the cost. They made an allowance which was the best estimate that they could get on the subject.

Mr. Crawford went into the history of the ordinance, saying that it was drawn at the end of the most bitter ten years' conflict in the history of the world between a municipality and a public service corporation. When the Tayler ordinance was drawn neither side was willing to trust the other. The device of a board of arbitration was then arranged. The city had previously approved of a construction of the ordinance which permitted the company to increase the operating expense allowance to make good a deficit.

In referring to the matter of the reserve funds, Mr. Crawford called the attention of the arbitrators to the section of the ordinance which said that the purpose was to secure to the company unimpaired its capital value. The position of the company was that it could not keep its capital value unimpaired unless it took from the operating revenues of each year a sufficient amount to meet the expenses of that year. There could be no surplus until every liability of the year was either paid or provided for. It was just as much to the interest of the city as to the interest of the company to collect from the car riders of each year the cost of the operation of the system in that year. There was nothing alarming in the size of the accident fund, but if it should grow to alarming proportions the stockholders would not get it, the money would be the property of the company. If the arbitrators thought the amount was too high they could reduce it. He did not care to what point they reduced it, so long as they gave the company what they thought would be enough. The matter of the insurance reserve, Mr. Crawford said, was of comparatively small moment, except as it involved a question of principle. The fund was the property of the company, not of the stockholders.

Mr. Crawford then took up the subject of the present allowance for the maintenance, renewal and depreciation expense. He referred to the expenditures of the company and said that no suggstion had been made that any part of this sum had been spent improperly. In addition to the current expenditures the ordinance contemplated that there

should be a reserve to take care of the depreciation that everybody knew would ensue in spite of the ordinary maintenance of the property. Mr. Crawford argued that the $800,000 for the disused and scrapped power equipment should be written off. To allow any part of that amount to stand on the asset side of the balance sheet would be misleading, because there would be nothing to represent it.

Judge Killits asked if in this particular case the Cleveland Electric Illuminating Company contract would be regarded as an asset of the company, varying in value according to the number of years it had to run.

Mr. Crawford said that if it was distinctly established that the contract had a value, then it might be so regarded to that extent, but it had been suggested that the company could produce power cheaper than it could get it under the contract if it would make certain expenditures. There was no evidence of the value of the contract as an asset, and it would be upon the city to show that. The company showed that the power plant had been scrapped at $800,000 and the burden would be upon the city to show that there was some other asset that had taken its place. All that the company had from the Illuminating company was the privilege of taking the power and paying for it. It paid the Illuminating company the cost of the power, so that it was not an asset.

Mr. Crawford said that when the property was valued in connection with the Tayler ordinance, it was not valued as an operating system but at the cost of reproduction less depreciation. If the city valued the property again it would apply the same rule or some different rule of depreciation. If the city was to make another valuation to-day it would confront the company with the depreciation of the property at 5 per cent per annum. To offset the maintenance and depreciation charges the company had had an allowance of 5 cents per car mile, but approximately 3 cents of that had been used in ordinary maintenance and the remainder had actually gone into the property by way of renewal, and still there was no provision for arresting the depreciation. As a private property the company set aside 6¼ cents per car mile in 1908; in 1905, 5.32 cents; in 1906, 6.81 cents, and in 1907, 6.38 cents.

The company also asked an allowance to make up the overdraft of the operating expense fund. That could be distributed over such a period of time as the arbitrators thought proper. The deficit in the maintenance fund, however, ought to be made up immediately. The charge of $800,0000 for the power equipment that was to be displaced should be taken into account in the consideration of this point. The continued success of the Tayler plan was dependent upon the prosperity of the company. To enable it to finance economically it must keep its stock above par and make the improvements that the city required. In Mr. Crawford's opinion the changes in the allowance should be so gradual as to cause as little as possible disturbance in the rate of fare, if any at all. Judge Killits asked what disturbance in the rate of fare the allowances would create if they were awarded at this time. Mr. Crawford said he did not know, but he thought that all that would be necessary would be to put on 1 cent for a transfer. On the undisputed testimony there was $500,000 in the interest fund.

Judge Killits asked if there was anything that would prevent taking some of the $500,000 in the interest fund to make the deficits good. Mr. Crawford thought a strict construction of the ordinance would prohibit that. He thought he spoke for the officers of the company when he said they were not particular about any method. The company did not care what rate of fare was charged so long as it could maintain the property unimpaired and get its 6 per cent.

Mr. Duffy asked if he was to understand Mr. Crawford to say that in his judgment the amount could be transferred from the interest fund. Mr. Crawford said that that was only his hasty conclusion. Mr. Duffy said that the board would recommend in its decision a satisfactory way of making up the deficit.

Mr. Crawford said that Mr. Stanley suggested that of course it could be done by ordinance. Mr. Davies had made the suggestion, which Mr. Crawford thought was a very excellent one, that this could be done under the ordinance by dating the allowance back. There was nothing in the ordinance to prevent dating back the allowance.

ARGUMENT OF MR. BAKER

Mr. Baker then made his argument on behalf of the city. He said he could not help but feel that the decision that the board made involved the failure or success of the ordinance. Mr. Baker said that the city of Cleveland kept its eye on the status of the interest fund. That was the only thing affecting the rate of fare which interested the people of Cleveland. If there had been any complaint on the part of the company that an increase of operating expenses per car mile was the result of any requirement made by the city, proof of it would have been produced by the company in this arbitration.

Mr. Baker said that it did not really matter whether the sum designed to provide for depreciation was in money or in property. The city contended that the ordinance provision that the company should be enabled to make good any deficit meant that if in the administration of the funds the company found that there was likely to be need for more money than the then existing allowance would produce, it might ask the city to agree to an increase in the allowance. In addition, it was easily thinkable that sudden and unexpected emergency matters might arise which would cause a need for an increase in one or the other of the funds. In the presence of a difficulty the company would have to act, and when such an emergency had been met in a prompt, efficient and economical way, then it would be entirely proper for the company to go to the city and ask for an increase in the allowance. The company brought in statements made up from its books showing that it had expended more money than the allowances would produce. There was not a scintilla of proof to show the necessity for all of the expenditures.

Judge Killits asked: "Except as to the increase of wages?"

Mr. Baker said that the city was not making any complaint about the increase of wages, but it was admitted that no assent was received from the city for the increase. He did not criticise that because he did not think it was the business of the city. He thought that the company had the right to pay its operators whatever it chose to pay them so long as it did not come to the city and ask the city to increase the allowance. If the company paid too much and still kept within the allowance, the street railroad commissioner could object. Mr. Baker contended that if unusual conditions developed, they afforded the best sort of reason for immediately going to the Council and asking an increase in the maintenance or the operating expense allowance. The fact that the rate of fare was variable instead of inflexible showed that it was intended as a reservoir to take up the shock of sudden need instead of spreading it over a number of years.

Taking up the question arising from the proposed scrapping of the power equipment of the company, Mr. Baker said that he thought the arbitrators had no control over the method to be adopted by the company in charging the amount against the maintenance and renewal fund. He thought that the city had the right to say when this amount should be charged off, but if this should be determined otherwise it seemed to him that it ought to be distributed over a period of years. If the company could spend any excess over the allowance, then it was idle for the city to put limits in the ordinance. He thought that the arbitrators would be obliged to find that the limits were absolute. He had no particular interest in a further reduction of fare at this time. He did not believe the people of Cleveland

wanted the fare reduced. He thought they would rather keep the fare at the place it now is for a little while and let any revenues accruing from that source go into the further betterment of the property.

Mr. Baker did not believe the arbitrators would find that they had any right to take a penny out of the interest fund to pay either of the deficits, but he thought that the city had the right to agree that the deficits should be wiped out of the interest fund, and he should recommend to the Council, and he felt quite certain that the Council would act favorably upon the recommendation, that the company be authorized to straighten up its books by taking out of the interest fund, when it should have been restated in accordance with the rules as he believed the character of the determination of the arbitrators would require, enough to straighten up the maintenance, depreciation and renewal account, and also to straighten up the operating allowance so that from this date there would be a clear balance sheet. If the arbitrators should decide that it seemed wiser to make the operating allowance 12 cents per car mile than to leave it at 11½ cents, then the city should not have any complaint on that score. It would not prejudicially affect the interest fund in the way of affecting the rate of fare. Mr. Baker believed that 11¾ cents would be enough, but he had started out with the proposition that the figure might be put at 12 cents, and that would probably be wise. The increase in wages of motormen and conductors seemed to run the car mile expense up about 1 cent per car mile. The schedule speed had been increased, and with the increase of power it was possible to make faster time, and by the adoption of alternate stops and other devices more miles were run in the same number of hours by the platform employees, so that the car mile cost of motormen's and conductors' wages was showing a tendency to decrease, and those who had been watching from the side of the city believed that the limit of economy in this direction had not yet been reached.

Mr. Baker felt that there should be no increase above 5 cents in the maintenance allowance, and that probably if the city were to undertake to revalue the property as it was valued at the time of the Goff-Johnson valuation, it would be in a position to claim a substantial reduction in the 5 cents per car mile allowance rather than an increase, but it did not desire to make that request.

Mr. Baker said that in the preparation for the arbitration it had been necessary for the city street railroad commissioner's office to have an unusual amount of service from the firm employed as accountants in that office, and he hoped that the board would allow the city to present the extra expense that had been incurred on that account so that provision might be made for it.

The hearing was thereupon concluded.

METHOD OF CHECKING CREWS REPORTING FOR DUTY AT DALLAS, TEX.

The operating department of the Dallas Electric Corporation, which controls the street railway companies operating in Dallas, Tex., has adopted a clever method of checking the crews reporting for duty. All trainmen are permitted to select their runs every three months on a seniority basis, and all crews, both regular and extra, are required to report for duty ten minutes before they are due to take their runs. To obtain an accurate check on the report time of each crew, a regular and extra run assignment board has been installed in each carhouse. This board shows the various lines and runs as well as the crews assigned to them. In the column adjacent to one showing the line and run numbers two holes appear opposite the different runs and under a heading marked "motorman" and another heading marked "conductor."

Whenever a regular man reports for duty he inserts a white plug in the proper column opposite his run number. In case a trainman fails to appear ten minutes before he is due to take out his car, the car starter inserts a red plug in the proper position in the run assignment board, which indicates that an extra man has been assigned. If the regular man arrives before his car is started and can offer a satisfactory excuse to the car starter, he is permitted to go on duty. A brass plug inserted in the board indicates to the motorman or conductor that he is wanted at the office. The advantage of this system is that the number of crews having reported for duty at any time may be checked at a glance, and as a result the men are more punctual in reporting for their runs.

EQUIPMENT COMMITTEE MEETING AT PITTSBURGH

A meeting of the American Electric Railway Engineering Association committee on equipment was held at the Fort Pitt Hotel, Pittsburgh, Pa., on Thursday, June 5. The members present were F. R. Phillips, chairman, Pittsburgh; E. W. Holst, Boston; W. R. McRae, Toronto; J. P. Barnes, Syracuse, and J. M. Bosenbury, Peoria. J. M. Larned, Pittsburgh, who is chairman of the committee on way matters, was also present to discuss the fitting between the proposed standard rail and wheel.

The first subject considered was that of specifications for steel wheels. The sub-committee had outlined a program which had not been entirely completed, but this program was acceptable to the committee and the sub-committee was instructed to report finally by July 1. One valuable novelty of this report will be a series of gages for checking all important classes of wheel tolerances, such as contour, flange tread, eccentricity, plane and tape. Mr. Larned then submitted drawings of the proposed girder rail standard which met with the approval of the committee.

The sub-committee on self-propelled cars made a statement of progress as additional data are being secured for inclusion in its final report.

The report of the sub-committee on wires and cables was next presented. In addition to two specifications covering flexible wire with 20 per cent Para rubber content for car wiring, the report contained the substance of many interesting answers which had been received to questions on car wiring. This report will present the specifications as tentative.

Following a discussion on the location of cable cleats under double-truck cars, the committee considered the question of air-brake hose specifications. The sub-committee stated that this problem was also before the Master Car Builders' and Air Brake associations. The committee then read the Master Car Builders' new specifications, which will come up for discussion at their June convention this year. The final report of this sub-committee will include a résumé of the papers and discussions on this subject as read at the latest meetings of the two associations named, but in view of the novelty of the subject only tentative specifications will be submitted to the convention.

The report of the sub-committee on revision of brakeshoe standards related to defining the gage line in the standard flanged brakeshoes as affecting the construction of brakebeams, to the comparatively rapid wear of the ends of brakeheads, to variations from the standard of the Central Electric Railway Association in over-all length and tread tape, to errors in dimensions, etc. The report was accompanied by sketches of the shoes if revised as proposed. After making some changes, this report was adopted. One change proposed is that the brakeshoe drawings be revised in their entirety so that all dimensions will be indicated from a base line, which base line shall have a definite relation to the gage line of the wheel.

The chairman was instructed to write letters of good cheer to L. M. Clark, Indianapolis, and R. N. Hemming, Anderson, who were unable to attend the meeting because of the recent flood conditions in their properties.

Programs of New York and American Associations

The Latest Particulars Are Presented of the Programs at the Next Annual Meetings of the New York State and American Electric Railway Associations, to Be Held During June and October Respectively

As already announced, the annual convention of the New York Electric Railway Association will be held at Brighton Beach, N. Y., this year on June 24 and 25. Technical sessions will be held on the morning and afternoon of Tuesday, June 24, and on the morning of Wednesday, June 25. A list of the papers to be presented follows:

"Construction of Timetables and Schedules," by J. J. Dempsey, superintendent of transportation New York Consoildated Railroad Company, Brooklyn.

"Maximum Traction Trucks Versus M. C. B. Trucks for City and Suburban Service," by H. A. Benedict, mechanical engineer Public Service Railway, Newark, N. J.

"Operating Economies," by J. S. Doyle, superintendent of car equipment Interborough Rapid Transit Company; W. G. Gove, superintendent of equipment Brooklyn Rapid Transit Company, and J. S. McWhirter, superintendent of car equipment Third Avenue Railway, New York.

"Freight and Express Business on Electric Railways," by Frank Walsh, superintendent Electric Express Company, Schenectady.

"The Corresponding Location of Trolley Wires on Curves and Proper Location of Overhead Frogs," by J. H. Barnard, engineer The J. G. White Management Corporation, New York.

"Relations Which Should Exist Between the Railway Companies and Their Employees," by N. W. Bolen, superintendent of transportation Public Service Railway Company, Newark.

"Standard Methods for the Mechanical Department," by John Sibbald, master mechanic Fonda, Johnstown & Gloversville Railroad Company, Gloversville.

Question box:

(1) What success has been experienced in mounting both motors on the rear truck of a single-end passenger car? Has any trouble developed on account of the wheels of the front truck derailing during snowstorms?

(2) Has it been found to be of any considerable value to have a steel wire which is grounded at short intervals carried on top of the pole line that is carrying a high-tension transmission line through a country that is subject to frequent electrical disturbances?

(3) What, if any, publicity work is desirable when contemplating any radical change in operating conditions, especially when the local public is not inclined to accept new ideas without protest?

(4) What are the comparative values of leather and rattan coverings for seats in interurban cars?

(5) What is considered the best method of keeping trainmen on scheduled headway?

(6) Should the operating department or the mechanical department be held responsible for the work of cleaning cars? Which is the best plan and why?

(7) What is the minimum number of car movements per hour to make economical or practical the use of an automatic electric track switch?

(8) What method do you employ for obtaining and computing individual city car mileage?

(9) Do you find that creosoted ties affect the growth of weeds on roadbed? If so, state results after a period of years.

(10) Has spar varnish ever been used on cars as a paint preservative? Would not an application twice a year lengthen the life of the paint?

(11) Which method should be followed with cars equipped with maximum traction trucks—should pony wheels be inside or outside? Which method gives the best tractive effort?

(12) What is a fair maintenance cost per mile of line for the distribution system, including in this the return circuits?

(13) From an accounting standpoint, what is the proper method of keeping time of trainmen and checking same?

ENTERTAINMENT

An attractive entertainment program has been arranged. On Monday evening at 9 p. m. those in attendance will visit Steeplechase Park. On Tuesday at 2 p. m. an automobile trip will be provided for the ladies. They will return to the hotel at 4 p. m., when there will be a tea dance. The banquet will occur at the hotel at 8 p. m. on Tuesday, and it is promised that the dancing after the banquet will be more pleasing than is usual in summer weather owing to the proximity of the ocean.

On Wednesday, after the adjournment of the convention, there will be a shore dinner at Tappen's roadhouse at Sheepshead Bay.

THE BANQUET

A list of excellent speakers has been arranged for the banquet which will take place on Tuesday evening, and it promises to be one of the best ever held by the association. The speakers will include two public service commissioners, Hon. Edward E. McCall, of the First District commission, and the Hon. Martin S. Decker, of the Second District commission, also General George H. Harries, president American Electric Railway Association; Theodore P. Shonts, president Interborough Rapid Transit Company; Colonel T. S. Williams, president Brooklyn Rapid Transit Company, and Howard MacSherry, attorney Public Service Corporation of New Jersey.

COMMITTEES

Three committees have been in charge of the meeting as follows: Program committee—W. H. Collins (chairman), J. K. Choate, H. N. Latey and H. C. Donecker. Committee on arrangements—J. H. Pardee (chairman), C. R. Ellicott, J. K. Choate, Frank Hedley, C. C. Castle, Stuart Wilder, S. W. Trawick and J. J. Dempsey. Committee on entertainment—J. P. Barnes (chairman), C. R. Ellicott, Robert M. Colt, J. Stanley Moore, C. E. Barry and H. N. Ransom.

Secretary Dietz of the association announces that the Brooklyn Rapid Transit Company has recently joined the association and will, of course, be well represented at the meeting. A large attendance is also expected from the other member companies of the association as well as from some of the large companies in neighboring states like New Jersey and Connecticut.

HOTEL ACCOMMODATIONS AND EXHIBITS

Applications for hotel accommodations should be made to H. J. Hanf, manager Brighton Beach Hotel, Brighton Beach, N. Y. All sessions are to be held at this hotel. It is further announced that the hotel management has made especially attractive rates for the delegates to the convention.

No general provisions will be made for an exhibit of appliances and apparatus by allied members, but any such exhibits will be welcome, and arrangements for space can be made directly with the manager of the Brighton Beach Hotel.

PROGRAM OF ATLANTIC CITY CONVENTION

The American Electric Railway Association has announced the subjects for discussion at its convention in Atlantic City on Oct. 13-17. The topics were selected by a subjects committee, consisting of J. D. Mortimer, chairman; Calvert Townley, E. C. Foster and Martin Schreiber, and are as follows:

"Valuation."

"Relations of Carriers to the Development of the Territory They Serve."

"The Relief of City Congestion by the Construction of Subways and Viaducts."

"Electric Railway Securities from the Investor's Viewpoint."

"Present Tendency of Public Utility Laws and Regulations."

"Profit Sharing with Employees."

The names of the speakers who are to treat these subjects have not yet been made public, but a tentative list has been agreed upon and announcement will be made as soon as definite arrangements have been made.

MEETING HALLS

The meeting halls have been assigned to the different associations. The American and Transportation & Traffic associations will meet in the Greek Temple, which is near the end of the Pier and has been enlarged during the past year. A new meeting hall has been constructed for the engineers not far from the Greek Temple and a little farther out on the Pier. The Claims Association and the Accountants' Association will meet on the second floor of the entrance hall. From this arrangement it will be seen that all the meetings will be held on the Pier this year.

The association has announced the membership of the transportation committee which will have charge of the selection of the special trains to the convention. W. O. Wood, Long Island City, is general chairman.

The names of the gentlemen who are chairmen of the committees in charge of the transportation from different sections of the country follow:

New England, M. C. Brush, Boston.

New York State, exclusive of New York City, W. H. Collins, Gloversville, and B. E. Tilton, Syracuse.

New York City, Joseph K. Choate, New York.

Philadelphia and vicinity, H. J. Crowley, Philadelphia, Pa.

Middle Atlantic States (Delaware, Maryland, Virginia and District of Columbia), C. B. Buchanan, Richmond, Va.

Central Electric Railway Association (Indiana, Ohio, Michigan and western Pennsylvania), R. I. Todd, Indianapolis, Ind.

Chicago (northern Illinois and Wisconsin), E. C. Faber, Wheaton, Ill.

Central Northwest (Minnesota, South and North Dakota and Iowa), Horace Lowry, Minneapolis, Minn.

St. Louis, Kansas City and Southern Illinois, Richard McCulloch, St. Louis, Mo.

Southwest (Texas, Oklahoma and Louisiana), D. A. Hegarty, New Orleans, La.

West (Colorado, Utah, Nebraska, Kansas), John A. Beeler, Denver, Col.

California, W. R. Alberger, Oakland, Cal.

Northwest, A. W. Leonard, Seattle, Wash.

Canada, Patrick Dubee, Montreal.

Southeast, E. C. Deal, Augusta, Ga.

In this connection, the association will not issue any bulletins this year in regard to the arrangements at the convention, but instead will print this information in the pages of its monthly publication.

EXHIBIT COMMITTEE

The Manufacturers' Association announces that the following have been appointed members of the exhibit committee for 1913:

E. H. Baker, vice-president in charge of exhibits, New York.

H. G. McConnaughy, director of exhibits, New York.

George Arnold, Cleveland, Ohio.

L. R. Ashhurst, Jr., Philadelphia, Pa.

S. A. Bullock, Philadelphia, Pa.

S. J. Cotsworth, Philadelphia, Pa.

F. H. Gale, Schenectady, N. Y.

L. E. Gould, New York.

N. M. Hench, Pittsburgh, Pa.

William M. Henderson, Steelton, Pa.

T. W. Illingworth, Philadelphia, Pa.

S. G. Johnson, New York.

F. D. Killion, New York.

J. R. McFarlin, Philadelphia, Pa.

J. C. McQuiston, East Pittsburgh, Pa.

John F. Ohmer, Dayton, Ohio.

J. W. Perry, New York.

A. L. Price, Mansfield, Ohio.

F. W. Sargent, Mahwah, N. J.

L. H. Snyder, Jersey City, N. J.

Charles H. Thomas, Franklin, Pa.

S. M. Wilson, Philadelphia, Pa.

CHANGES ON THE PIER

As already published in this paper, the conditions on Young's Pier have been improved, and an extension has been built to Machinery Hall. There will be no outside booths this year or booths not under cover, and Aquarium Court will not be utilized for exhibits. The Hotel Men's Annex has been roofed over permanently with the exception of a small space running through the center which will be covered with canvas for light and air or in such a way that there will be no danger from rain. While there is not much opportunity in the way of special decorations for the building, an attempt will be made to have each room laid out to the best advantage. The main building will be arranged along lines similar to those of previous years, with the registration booth and some of the larger exhibits in the lobby.

W. Berry, Carnegie Steel Company, chairman of the finance committee, is organizing that committee, but the names of the members are not yet available for publication.

POWER COSTS AT WORCESTER CONSOLIDATED PLANT

In connection with a report recently prepared by George T. Delaney, inspector, for City Solicitor E. H. Vaughan, of Worcester, Mass., on operating conditions upon the Worcester Consolidated Street Railway, data are presented on the cost of power production at the company's generating plant at Millbury. The Millbury plant is the most modern street railway generating station in central Massachusetts and at present contains four Edgeworth 820-hp boilers with Murphy stokers, two 300-kw, 600-volt direct-current generators driven by horizontal compound condensing engines, and a 5000-kw steam-turbo unit, supplying the Worcester system through step-up transformers and two 13,000-volt lines carried on steel towers to a 3000-kw substation at Madison Square, Worcester, 6.5 miles distant. The operating steam pressure is 185 lb. The cost of operation taken from the station log on Feb. 18, 1913, was as follows:

Labor:	
Two machinists	$5.00
Three engineers	14.30
Three laborers	6.00
Three helpers	4.50
Six firemen	12.00
Three water tenders	6.75
Three coal laborers	5.25
Total labor cost	$53.80
Total cost of fuel and supplies	337.72
Total cost of manufacture	$391.52
Total cost of manufacture per kw-hr	0.67
Kw-hr. output	57,448

NORFOLK & WESTERN ELECTRIFICATION PLANS

The plans for the electrification of the Norfolk & Western Railway, which are being prepared by Gibbs & Hill as designing and constructing engineers, call for the unusual condition of handling coal trains only, passenger trains being handled through the electric zone by steam locomotives. As outlined in a preliminary account in the ELECTRIC RAILWAY JOURNAL for May 3, 1913, page 800, the electrified section constitutes practically a separate gathering division for the coal traffic from the Pocahontas region, comprising about 30 route miles. The heavy coal business originates west of the summit and is in large part hauled eastward over grades of from 1.5 per cent to 2 per cent. The coal trains originating on the division are at present filled out generally to a weight of 3250 tons from the various workings along the line and hauled over the grades at a speed of about 7½ m.p.h. by three Mallet engines, one at the head end of the train and two pushing. The Mallet engine equipment is used locally on this division, and under electric operation these engines will be displaced by electric locomotives, allowing the Mallets to be used on the other regular divisions of the road.

It is not the intention at present to conduct the through merchandise freight or passenger service by electricity, the electric service being confined to traffic designated as "tonnage trains" originating on the electrified section. These tonnage trains of 3250 tons will be electrically operated by head engines and pushers at a speed of about 13 miles per hour up the heaviest grades. The number of trains handled up the grade will be about twenty per day, comprising a daily tonnage of 65,000, but the design of electrical equipment will be such that this tonnage can be progressively increased in the future as the occasion requires.

Electric power will be generated in a steam power house to be erected by the company at Bluestone, which is on the line of the railway, about one-third the way from Bluefield to Vivian. This power house will have an installed capacity at present of 24,000 kw. All work is to be completed for service in the summer of 1914.

INDIANA BLOCK SIGNALS

Details of the contracts with the Union Switch & Signal Company for the installation of block signals on some of the Indiana interurban lines as reported in the ELECTRIC RAILWAY JOURNAL for May 10, 1913, page 843, have been announced. It is stated that the installation from Gary to South Bend, Ind., on the Chicago, Lake Shore & South Bend Railway, comprising 55 miles of single track, has twenty passing sidings and is to be protected by eighty one-arm semaphore signals of the style "B" type. The installation from siding No. 6 to siding No. 20, on the Indianapolis, Columbus & Southern Traction Company's line, covering approximately 24 miles of single track, will use semaphore signals at passing sidings and light signals for the intermediate signals, making a total of twenty-six style "B" one-arm semaphore signals and twenty-six light signals.

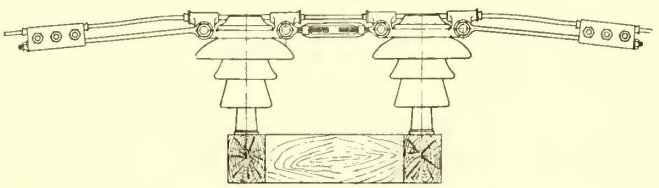
The section from Sellersburg to Watson Junction, on the Louisville & Northern Railway & Lighting Company's line, covering 3½ miles of single track, has two passing sidings to be protected by four semaphore signals of the style "B" type and four light signals. The semaphore signals will be placed at passing sidings, and light signals will be used as intermediate signals. From the Michigan City limits to the Laporte carhouse on the Chicago, South Bend & Northern Indiana Railway, covering 9½ miles of single track, with five passing sidings, the line will be protected by twenty style "B" one-arm semaphore signals.

All of the railways mentioned employ direct-current propulsion, with the exception of the Chicago, Lake Shore & South Bend Railway, where twenty-cycle alternating current is used. Summed up, the signaling for the four railways covers about 92 miles of single track, with forty passing sidings and with 160 signals, of which 130 are of the style "B" semaphore type and thirty of the light-signal type.

SAFETY CLAMPS FOR LINE CROSSINGS

Recognizing the necessity of protecting transmission, telephone and telegraph lines from other lines which may cross over or under them, the Clark Electric & Manufacturing Company, New York, N. Y., has developed individual insulator clamps and clamping sets to afford safety at crossings for all types of straight and angle overhead work. Clamps of copper composition of high tensile strength are used with bare copper conductor and clamps of galvanized or sherardized malleable iron with steel or aluminum conductor, to avoid all chance for electrolytic action between metals electrically dissimilar.

It was recognized at the outset that the insulator clamps to be most effective should be so fastened to the insulator heads that they could not possibly become detached from them. Cemented caps were discarded as being unsafe and likely to work loose. The clamping set shown in the accompanying illustration was specified by the Pennsylvania Railroad for potentials in excess of 2500 volts. The clamps extend well beyond the insulators, directly under the line, so that should arcs arise they will form between the clamp and the ground rather than from the line. Heavy bushings



Overhead Clamping Set

also protect the conductor at the insulators. If the conductor should fuse at the insulator, the extension clamps, which are held to the main insulator clamps by steel eyebolts, will still hold the line in place. The insulator clamps are all made extra heavy to provide a high factor of safety in excess of the ultimate strength of the conductor and are provided with large heat-radiating surfaces. Usually turnbuckles fasten the clamps together although flat steel connecting members are often used. A clamping set has also been developed for use with strain insulators.

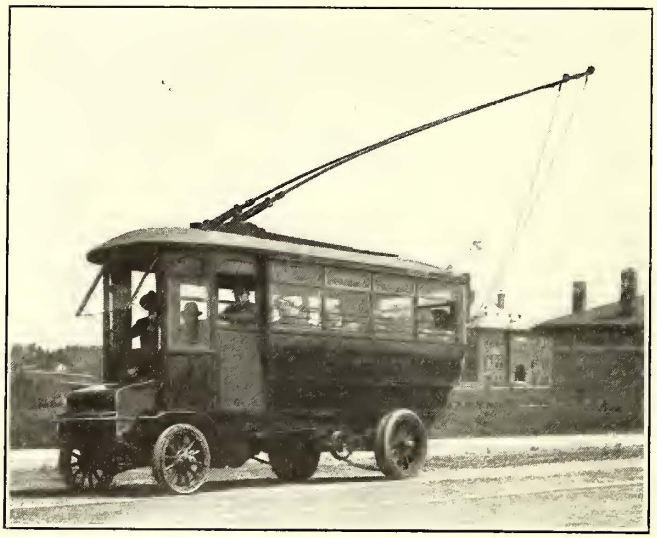
Tests have been made which show that if the line used with the clamping sets either for more or less than 2500 volts is cut on the insulator head, directly between the two clamping members of an insulator clamp, the conductor may be broken without pulling through the clamp. Although the line is protected from arcs, no members are brought out at right angles to the line to extend beyond the insulators, as is sometimes recommended at present. The use of these pieces is considered unnecessary and, in fact, rather a menace than otherwise. It is held to be much better to use insulators of suitable length rather than to take any chances with arcs.

The Cleveland, Southwestern & Columbus Railway is making a number of improvements in its power plant at Elyria, Ohio, involving a total expenditure of $125,000. The previous capacity of the plant was 4000 kw. A G.E. 5000-kw horizontal turbine has been installed, making the total present capacity of the plant 9000 kw. About July 1 the company will begin to use natural gas for fuel at this plant. The transformers are now in the basement of the building, but a new transformer room, 35 ft. x 65 ft. in size, has been built, and the equipment will be moved into this addition.

TRACKLESS TROLLEY BUS AT MERRILL, WIS.

A single trackless trolley bus has been put in operation in Merrill, Wis., by the Merrill Railway & Lighting Company. The bus seats eighteen passengers and is equipped with a 500-volt, 15-hp series motor. A five-step railway-type controller anl standard resistances are used.

The car is of the one-man, pay-as-you-enter type and operates over a route of about 1 mile, connecting at one



Trackless Trolley Car at Merrill, Wis.

end with the regular street railway cars of the company. The company plans to extend the bus system to other parts of the city and also to build one or two suburban extensions. The trackless trolley system was used instead of the ordinary car on rails for several reasons. One was that in the mile of route the line crossed three steam railroad tracks and passed over one long bridge. With a street railway franchise, the company would have been obliged to keep the bridge in repair, as well as the roadway between the tracks and for 1 ft. outside. This expense was saved as well as the expense of installing and maintaining three steam railroad crossings. Altogether the company estimates that it made a saving of $70,000 in track, exclusive of repairs and depreciation, and that it is also saving about $400 a year in power. The bus does not hold as many passengers as an electric car, but is amply sufficient for the present traffic.

The single motor drives the two rear wheels by means of a universal shaft and bevel gear, connected with a jack shaft with differential gear, the jack shaft being connected with the rear wheels by chains, the method of connection being very similar to that of an ordinary automobile. Solid rubber tires are used. Connection is made to the two overhead trolley wires by means of two separate trolley poles with swiveled harps and bases. The poles are extra long to give a lateral freedom of movement of 10 ft. to 12 ft. on both sides of the trolley wire. This prevents interference with the bus from other street traffic. The two trolley wires used by the bus are fed from the two trolley wires of the local railway system, which is equipped with a complete metallic circuit. The operating expenses per car mile are estimated as follows: Management, salaries and wages, 3.2 cents; electric power, 4.85 cents per watt-hour, or 1.6 cents; tire renewals, 3.4 cents; maintenance, 1.8 cents—or a total of 10 cents per car mile.

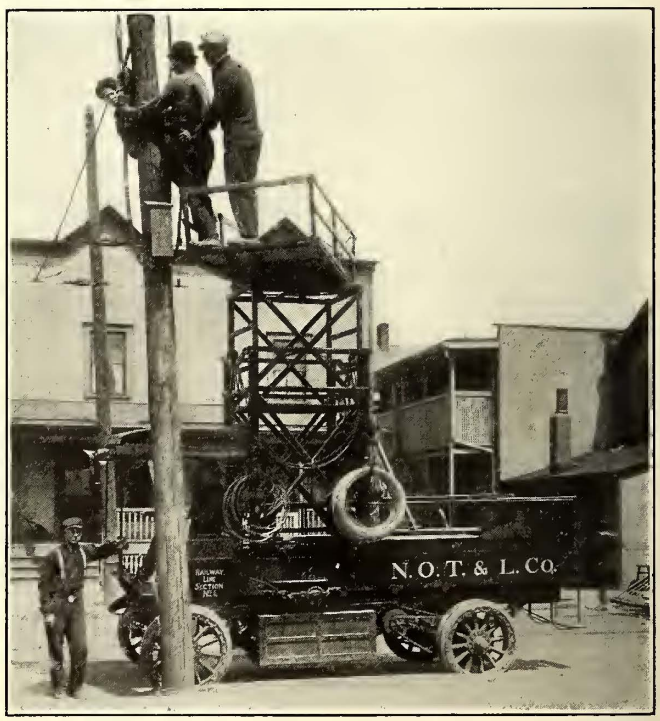
The main dimensions of the bus are: Length over all, 18 ft. 6 in.; width, 6 ft.; height in passenger compartment, 6 ft. 8 in. The weight empty is about 3 tons. The bus was supplied by the Field Electric Bus Company, New York, manufacturer of the storage battery buses using Edison batteries and running in Chicago.

ELECTRIC TRUCKS FOR NORTHERN OHIO TRACTION & LIGHT COMPANY

The Northern Ohio Traction & Light Company, Akron, Ohio, purchased some time ago from the Baker Motor Vehicle Company, Cleveland, Ohio, one tower wagon and a 1-ton and a 2-ton line truck of the storage battery type. These trucks have been stationed in Akron and replace two two-horse wagons, but the railway company states that since installing the trucks it has increased construction work fully 100 per cent. The company expects the trucks to take care of all new construction for some time to come as they are not by any means running to capacity even with the present doubled work. The operating radius of each of the trucks is 65 miles on a single battery charge, but the batteries have not been exhausted since their installation. Although Akron and the surrounding country are very hilly, the average daily run has been from 30 to 35 miles. One of the special duties of the trucks in construction work has been to pull and stretch cables over cross-arms.

The equipment of each truck includes a battery of forty-two cells, a series-wound motor having 300 per cent overload capacity, a Renold silent chain from the motor to jack shaft and two roller chains from jack shaft to rear wheels; also regular and emergency brakes. The tower wagon has a body of 144 in. x 60 in. with 14-in. sides. It is equipped with a McCardell tower which stands 12 ft. from the ground when lowered and 17 ft. 9 in. when raised. A 24-in. railing incloses the platform. The tool boxes are so arranged that there are seats for ten men when the truck is completely loaded. The 1-ton line truck has a body of 108 in. x 56 in. and has 12-in. sides. The 2-ton line truck has a body of 144 in. x 60 in. and has 14-in. sides.

A special feature in the equipment of these trucks is a



Electric Tower Wagon with Tower Raised

lamp socket under the driver's seat where a lamp cord can be plugged in, thus affording a light that can be carried up onto the poles by linemen when working at night. The trucks are garaged in a storage shed belonging to the railway company and they are charged from an exciter dynamo in the power plant so that the cost of charging current is a small item.

News of Electric Railways

Decision by Wisconsin Supreme Court in Milwaukee Fare Case

The Supreme Court of the State of Wisconsin has dismissed the complaint of The Milwaukee Electric Railway & Light Company against the decision of the lower court in the case involving the ticket rate of fare within the city of Milwaukee fixed by the order of the Railroad Commission of Wisconsin. The opinion of Chief Justice Winslow says in part:

"The power to fix rates and tolls to be charged by public utilities is one of the attributes of sovereignty. With us this great power is vested in the Legislature, and when the Legislature speaks upon the subject its voice is controlling and supreme, unless indeed some constitutional guaranty is invaded. (Madison vs. M. G. & E. Co., 129 Wis., 249.) A century ago this great power was of little practical importance, and very seldom used. The progress of science and invention, combined with the tremendous growth of congested urban areas, has made the great mass of the people absolutely dependent upon the great public utilities of the time. Modern business and modern life could not go on without them. We must catalog our public utilities and try to imagine how we would get along without them if we would realize our dependence upon them; only by so doing can we appreciate the supreme importance of the rate-making power and the necessity of keeping that power intact in the hands of the Legislature; if it be not so kept the opportunities for abuse are numerous. Clearly the Legislature should not part with the power even for a limited time, except upon the most potent and convincing considerations.

"No presumption can be indulged that it has parted with the power, nor will doubtful words be construed as having that effect. He who asserts that the State has surrendered any part of its sovereign power even temporarily in his favor must prove the fact by the most convincing evidence. The presumptions, if any there be, must run the other way. If it were to be admitted for the purposes of argument that the Legislature could by express language authorize municipal authorities to make contracts with public utilities fixing rates which should exist for definite periods in the future and be beyond legislative control during these periods (a proposition concerning which we intimate no opinion), the question here is whether such express language is to be found in Section 1862.

"This State has adopted an eminently just and wise policy in dealing with the matter of rates and tolls. By the Railroad Commission legislation it has laid down the general rule that every rate must be reasonable, and has left it to a commission of experts to determine, after full investigation, the reasonable rate, and apply it. It is believed that this board passes on these questions with judicial fairness after the most careful and searching investigation of the conditions, and with a single eye to the attainment of a fair result. So long as these provisions of law remain in force, and are allowed to control the situation, all danger of immature, hasty or vindictive changes in rates is practically eliminated. On the other hand, the citizen is protected from unreasonable and excessive fares; the capitalist and investor is assured a reasonable and fair return upon his investment. No door is open for any serious injustice.

"The view which is here taken of the meaning and effect of the provisions of Section 1862 renders unnecessary any consideration of the question whether the ordinances in question are subject to alteration or repeal under Section 1 of Article II of the constitution, which authorizes the enactment of general laws for the formation of corporations without banking powers, and forbids the creation of corporations by special act except in certain instances, and reserves the right to alter or repeal at any time all such general laws or special acts.

"The proposition decided in this case is that Section 1862 does not empower municipal authorities to make any contract with a street railway fixing rates of fare so that they may not be changed by the Legislature, or through a legislative agency in the manner provided by law."

J. D. Mortimer, president and general manager of The Milwaukee Electric Railway & Light Company, is quoted as follows:

"The case just decided by the Supreme Court of Wisconsin involved the right of the city of Milwaukee to enter into an agreement for a term of years with The Milwaukee Electric Railway & Light Company providing for a rate of fare to be charged for street railway service. The absence of judicial decisions in this State interpreting the statutes on which this question depended inevitably gave rise to honest differences of opinion. The decision by the Supreme Court does not mean that the coupons which have been and are being sold with tickets are immediately good for rides. Time must elapse for the entry of an order by the lower court, and in the meantime the company will determine on action to be taken with respect to a further test of the binding nature of the franchise provisions."

Offer of Jamestown Companies Rejected by the Employees

Frank W. Stevens, Jamestown, N. Y., formerly a member of the Public Service Commission of the Second District of New York, is at the head of a citizens' mediation committee that has undertaken to bring about an adjustment of the differences between the officers of the Jamestown Street Railway and the Chautauqua Traction Company, Jamestown, and the employees of these companies. As a result of the appeal of this committee to the companies A. N. Broadhead, president of both companies, addressed a letter in part as follows to Mr. Stevens recently:

"I am willing for the general good of the city that the differences between the company and its employees be decided by a committee of citizens composed as follows: Five men selected by them from among the former employees of the railway companies, five citizens selected by the management of the railway companies, the ten men so selected to act with the committee of fire recently appointed by the Common Council of Jamestown, of which you are chairman. The questions to be decided by this committee shall include all matters of difference between the employees and the companies except the recognition of the union. It is distinctly understood that such men as have remained faithfully in the employ of the companies shall retain their present positions. Until the decision of such committee the street railways are to be operated as fully as possible without the employment of additional help. The decision of a majority of the whole committee shall be binding on all parties in interest."

Mr. Stevens and the other members of the committee of which he is chairman in turn addressed a communication to the public referring to the letter from Mr. Broadhead in which they said that it would take considerable time to submit the proposition of Mr. Broadhead to the men and have them act on it. They suggested that it would be well to have the cars operated at night in the meantime. This communication was concluded in part as follows:

"We ask all persons whatsoever to refrain from any and all acts of violence or interference with the street cars while this proposition is being considered and also, in view of the probability that the differences may be adjusted in some manner, refrain from all interferences and assist in every way in straightening out the differences that are now before the public."

The employees have replied in part as follows through their representative:

"The proposition submitted to us is not arbitration, it is annihilation. We are unalterably opposed to a large number of members upon the board of arbitration; it has been fully demonstrated that the best results to both interested parties are obtained when the number is small, say three or five, as there is less likelihood of delay resulting from disputed views among the members. I am instructed, therefore, to submit as a counter proposition the following:

"First.—All men employed by the company on April

21 and up to May 1, 1913, to be reinstated in their former positions without discrimination, and with full seniority rights.

"Second.—All other matters in dispute to be submitted to a temporary board of arbitration, to be composed as follows: One representative of the company to be chosen by it; one representative of the association to be chosen by the employees; these two to select a third man, and these three parties shall constitute the board of arbitration. In the event of the said representatives failing to agree upon a third man within forty-eight hours, Frank W. Stevens shall then become the third arbitrator. The decision of the board to be final and binding upon both parties involved for a period of one year from June 1, 1913."

Mayor Marx of Detroit in Cleveland

Mayor Oscar Marx of Detroit, Mich., his personal counsel, Allan H. Frazer, and Police Commissioner John Gillispie, inspected the street railway system at Cleveland, Ohio, on June 5, and conferred with Street Railway Commissioner Peter Witt of the latter city. Neither Mayor Marx nor Mr. Witt would consent to be quoted in regard to the subjects discussed, but Mr. Witt did state that he urged municipal ownership. On his return to Detroit Mayor Marx announced that he has a plan of procedure that will accomplish his purpose, but he declined to say anything more about it.

The forenoon of June 3 was given over to the consideration of the street railway section of the proposed new charter for Detroit before the charter commission. Attorney Lawson said that the language of the Verdier act is so plain that 2 per cent of the city's assessed valuation could be issued in bonds for the purchase of the property, even if the charter is silent on the subject, provided authority to acquire the property has been obtained. The attorneys, however, agreed that it would not be wise to provide for the issuance of bonds without regard to the city's bonding limit, so the phrase in the section relating to this subject was changed to read "in addition to bonds issued for the general indebtedness." It was also decided that the interest rate and the time of maturity should be made sufficiently flexible to meet market conditions rather than to offer the bonds at less than par. The amount of the bond issue will be left to the street railway commission to decide in order that the members of the commission may be able to handle the matter as seems best to them. This feature of the charter cannot be finally approved until the Supreme Court passes upon the validity of the Verdier act. This decision may not be rendered until fall.

Report on Geary Street Municipal Railway, San Francisco

Mayor Rolph of San Francisco, Cal., has prepared a financial statement and forecast of the Geary Street Municipal Railway of which the following is an abstract:

"The total sum available for the construction of the Geary Street road from the ferry to the beach is $2,022,341, of which $2,341 was premium paid upon bonds. Of this amount it is estimated that $353,708 will be returned to the fund unexpended, leaving an actual cost of the completed municipal road of $1,668,633.

"In January the expenses equaled 56.31 per cent of the receipts; in February they were 56.18 per cent; in March 58.14 per cent; in April 52.86 per cent. This proportion is larger than the normal will be when the road is in operation from the ferry to the beach, as the road now must bear practically the same overhead charges as when the line will be completed. In April the excess of receipts over expenditures was $10,385.

"Before the road began to operate $125,147 was paid in interest on bonds, and this, in accordance with an Interstate Commerce Commission ruling, is charged against capital and not against interest, the commission requiring that interest on all bonds during the construction be included as part of the capital expenditure. While $1,668,633 is the complete cost of the road as now estimated, $1,700,000 may be taken as a round figure on the safe side. The interest to be charged on that amount at 4½ per cent is $76,500 a year. This amounts to $6,375 per month.

"Depreciation is a matter difficult to determine absolutely. Bion J. Arnold has fixed 2½ per cent as a proper proportion to be charged against the total for depreciation. Taking this average, we may start from the very first year with 2½ per cent of $1,278,252, which equals $28,760 per year for depreciation. That sum is larger than need be at the present time.

"It is certain that the depreciation will increase with the life of the road, but after 1915 the interest charge will decrease as part of the principal is paid off. Therefore the decrease in interest can be added to the depreciation account without increasing the total of charges against the road. If the decreased interest be added each year to depreciation, it will bring up the percentage of depreciation to 3.2 per cent in 1917, 4.3 per cent in 1920 and 5.3 per cent ten years hence. By this arrangement an entirely adequate sum would be provided for replacements as they become necessary. This makes a charge for depreciation of $2,396 per month to be added to the $6,375 per month to be charged for interest on the total investment. The total of these two amounts is $8,771.

"After 1915 the interest will gradually recede as the capital is paid off. By 1920 the interest will have been reduced to $49,230 per year, or $4,102 per month, as against $6,375 at this time. By 1927, when the principal United Railroads franchises will expire, the outstanding bonds will have been reduced to $387,000 of the original $1,700,000 cost. The Geary road is paying its way now by meeting operating and maintenance expenses, interest on its bonds and depreciation. It is not paying a sinking fund, the first payment of which is not due for two years, but it is assured of enough earning power to meet this charge for a reduction of its principal when it falls due."

Public Utility Bill in Effect in West Virginia

Senate bill No. 31 passed by the Legislature of West Virginia last February has recently gone into effect in that State. This bill provides for a public service commission to consist of four members who shall be appointed by the Governor by and with the consent and advice of the Senate for a term of eight years with a salary of $6,000 per annum. Any commissioner may be removed by the Governor after due investigation for incompetency, neglect of duty. gross immorality or malfeasance in office. Not more than two members of the commission may belong to the same political party and one member must be a lawyer of not less than ten years' experience at the bar. No person while in the employ of or holding any official relation to a public service corporation subject to the provisions of the act, or holding any stocks or bonds thereof, and who is pecuniarily interested therein, is eligible to the office of commissioner.

The jurisdiction of the act extends to and includes: (a) common carriers, railroads, street railroads, sleeping-car companies, freight lines, car companies, toll bridges and ferries; (b) telegraph and telephone companies and pipe lines for the transportation of oil, gas and water; (c) gas companies, electric lighting plants and municipalities furnishing gas or electricity for lighting, heating or power purposes; (d) hydroelectric companies for the generation and transmission of light, heat or power and water companies, and (e) all persons, associations, corporations and agencies employed or engaged in any of the businesses before mentioned.

The words "public service corporation" as used in the act include all persons, associations of persons, firms, corporations, municipalities and agencies engaged or employed in any business before enumerated or in any other public service business whether above enumerated or not, whether incorporated or not. Every person, firm or corporation engaged in the public service business must perform such service in a reasonable, safe and sufficient manner. All charges, tolls, fares and rates must be just and reasonable. The commission is to have power to change any intrastate rate, charge or toll which is unjust or unreasonable and may prescribe such rate, charge or toll as would be just and reasonable and change or prohibit any practice or device or method of service in order to prevent undue discrimination or favoritism between persons, localities or classes of freight, provided that the commission does not reduce any rate. toll or charge within ten years after the completion of

the railroad or plant to be used below a point which would prevent such public service corporation, person, persons or firm from making a net earning of 8 per cent per annum on the cost of construction and equipment of the same.

No change is to be made in the rates, fares or charges, or joint rates, fares or charges which have been filed and published by any public service corporation or by any person or corporation under the purview of this act, except after thirty days' notice to the commission and to the public, which must plainly state the changes proposed to be made in the schedule then in force and the time when the changed rates, fares or charges are to go into effect. The proposed changes must be shown by printing new schedules and are to be plainly indicated upon the schedules in force at the time.

The commission also receives power to ascertain the quantity, healthfulness and quality of the water or quality and quantity of gas or electricity supplied by such persons, firms or corporations, and examine the methods employed, and also power to order such improvements as will best promote the public interests and preserve the public health.

The commission receives definite instruction to collect full and complete information concerning the value of the property owned and controlled by any person or corporation subject to the act as of April 1 each year and to tabulate in statistical form and furnish the same to the Board of Public Works on or before June 1 each year, which information shall be used by this board in fixing the value of a property for assessment purposes.

All public service corporations subject to the act must pay a special license fee in addition to those already required by law. This fee is to be fixed by the auditor upon each corporation according to the value of its property based on the last assessment and is to be apportioned among public service corporations upon the basis of such valuations so as to produce a revenue of $60,000 a year, which will be used for the purpose of meeting the expenses of the commission.

A violator of this act for the first time is guilty of a misdemeanor and upon conviction is to be fined not more than $1,000 or to be confined in jail not more than one year, or both. For the second offense the fine is not less than $200 nor more than $2,000, and the jail punishment not less than thirty days or more than one year or both, while for the third offense the fine is raised to not less than $500 nor more than $5,000, and in addition to the fine the guilty party must spend not less than three months nor more than one year in jail.

Decision by Supreme Court in Omaha Bridge Case

A decision handed down on June 9, 1913, by the United States Supreme Court in the case of the Omaha & Council Bluffs Railway & Bridge Company, Omaha, Neb., has nullified the ruling of the Interstate Commerce Commission in regard to fares between Omaha and Council Bluffs. The court decided that the Omaha line was not a railroad coming within the purview of the interstate commerce act, and that the commission had no authority over it. The opinion by the court says:

"On the argument of the appeal in this court the sole question discussed was whether the provisions of the commerce act as to railroads applied to street railways, the appellant relying among other things on the fact that during the discussion in the Senate the author of the bill and the chairman of the Senate committee to which it had been referred said that the bill is not intended to affect the stage coach, the street railway, the telegraph lines, the canal boat or the vessel employed in the inland or coasting trade, even though they may be engaged in interstate commerce, because it is not deemed practicable or necessary to cover such a multitude of subjects."

The Commerce Court held that points brought out during debate are not controlling in interpreting an act after it is passed and the Supreme Court concurred in this view. Nevertheless, it found in the act itself material out of which it built up a distinction between an interstate railroad and a local street railway, even though the street railway crosses a state line. The statute applies in terms, stated the court, only to railroads. State decisions heretofore have been even divided on the point which the court adjudicated.

"If the scope of the act is such as to show that both classes of companies were within the legislative contemplation," the court explains, "then the word railroad will include street railroads. On the other hand, if the act was aimed at railroads proper, then street railroads are excluded from the province of the statute. Applying this universally accepted rule of construing the word, it is to be noted that ordinary railroads are constructed on the company's own property. The tracks extend from town to town and are usually connected with other railroads, which themselves are further connected with others so that freight may be shipped without breaking bulk across the continent. Such railroads are channels of interstate commerce.

"Street railroads, on the other hand, are local, are laid in streets as aids to street traffic and for the use of a single community, even though that community be divided by state lines or under different municipal control. When these street railroads carry passengers across a state line they are, of course, engaged in interstate commerce, but not the commerce which Congress had in mind when legislating in 1887. Street railroads transport passengers from street to street, from ward to ward, from city to suburbs, but the commerce to which Congress referred was that carried out by railroads engaged in handling passengers and freight 'between states,' 'between states and territories,' and 'between the United States and foreign countries.'"

The court declared, in seeking to make more clear its distinction, that all of the provisions of the act to regulate commerce refer to railroads, but that very few of them refer to street railways; for instance, a street railway could not post its tariffs in depots, stations or offices, "as required by the act."

The court then distinguished between street railways and interurban railways. The latter have developed since the commerce act was passed, but the court declared that it is not called upon to pass upon the status of interurbans, thus allowing the belief that interurban lines carrying freight and actually competing with steam lines might come under the control of the Interstate Commerce Commission.

New Road Placed in Operation in Connecticut.—The Bridgeport & Danbury Electric Railway has been completed and placed in operation between Bridgeport and Long Hill, Conn.

Vote on Extension of Municipal Railroad in San Francisco.—The electors of San Francisco, Cal., will vote on July 1, 1913, on the proposal to issue $3,500,000 of bonds to provide funds to finance the proposed extension of the Geary Street Municipal Railway.

Progress of Arbitration in Cincinnati.—The first question taken up by the arbitrators who are considering the differences between the Cincinnati Traction Company and its employees was the reason for the discharge of motormen and conductors between March 15, 1913, and May 9, 1913.

New Minnesota Road Placed in Operation.—The Minneapolis Northern Suburban Railway has been completed and placed in operation between Minneapolis and Anoka, Minn. The line extends through Camden Place, Fridley and Coon Rapids to Anoka. It is 18 miles long. Five trains are being operated each way daily.

Halifax Strike Terminated.—The strike of the employees of the Halifax (N. S.) Electric Tramway was terminated on May 20, 1913, the men accepting the offer which the company made of 21 cents, 22 cents and 23 cents an hour according to length of service. The company is said to have agreed to take all the men back to work.

Bill to Increase Power of I. C. C.—A bill to give the Interstate Commerce Commission control over all issues of stocks by railroads or other common carriers was introduced in the Senate on June 10, 1913, by Senator Lewis, of Illinois. It would require railroads to make a satisfactory showing of value to justify any increases in issue of securities.

Petition for Vote on Provisions of Colorado Utility Law.—A petition is being circulated in Denver to secure the reference to a vote of the people in November, 1914, of two

sections of the public utilities bill passed by the Legislature of Colorado last winter. These two sections affect only the issue of stocks, notes and bonds by utilities companies and the selling or buying of one company to or by another.

Injunction Secured by Pennsylvania & Ohio Railway.—The Pennsylvania & Ohio Railway, Ashtabula, Ohio, has secured an injunction against the city of Conneaut, Ohio, restraining the municipality from annulling the road's franchise because certain changes asked by the city had not been made. The city is also restrained from preventing the company crossing the tracks of the Lake Shore Railroad.

Municipal Ownership Under Consideration in Superior.—The Mayor and the commissioners of Superior, Wis., have under consideration the advisability of exercising under the new Wisconsin law their right to take over the property of the Superior Rapid Transit Company under condemnation proceedings. The stock of the Superior Rapid Transit Company is controlled by the Duluth-Superior Traction Company.

Strike in Port Arthur Ended.—The strike of the employees of the Fort William & Port Arthur Electric Railway has flattened out. The road is a municipal line operated by commissioners appointed by the officers of both cities. The men violated their agreement by going on strike before the contract which they had with the officers of the road had expired. The public refused to countenance the strike.

Hearing on Uniform Rules for Interlocking Plants.—The third hearing on the proposed rules for the maintenance and construction of interlocking plants in Indiana, Illinois, Wisconsin and Minnesota was held at Madison, Wis., on June 12, 1913, to permit the engineers of the four commissions represented to present their revised rules to meet the objections raised by the steam and electric railway signal engineers.

Judge Gary on the Price of Rails.—At the continuation of the suit for the dissolution of the United States Steel Corporation on June 3, 1913, Elbert H. Gary, chairman of the board of directors, said in regard to the price of steel rails: "The basic price of $28 has continued largely because the Steel Corporation refused to advance it. We have taken our position and the others have been obliged to follow, notwithstanding that the cost of manufacture has materially increased."

Minnesota Public Utility Committee Meets.—The first meeting by the House special committee on public utilities, named after Governor Adolph O. Eberhart of Minnesota had announced that he would call a special session of the Legislature to consider this subject, was held at St. Paul on June 3, 1913. The members of the committee will try to ascertain what demand there is for such legislation in Minnesota and how such laws are working in states where commissions have been created. W. I. Nolan, Minneapolis, Minn., is chairman of the committee.

Public Service Commissioners Appointed in West Virginia.—The names of the members of the Public Service Commission appointed by the Governor of West Virginia on May 31, 1913, follow: V. L. Highland, chairman, Clarksburg, W. Va.; Charles H. Bronson, Huntington, W. Va.; Howard N. Ogden, Fairmont, W. Va., and Wade C. Kilmer, Martinsburg, W. Va. All the members of the commission will have their office at Charleston, W. Va. A digest of the provisions of the bill creating the commission is published elsewhere in this issue of the Electric Railway Journal.

Newspaper Publicity Law Constitutional.—The Supreme Court on June 10, 1913, upheld the constitutionality of the newspaper publicity law, enacted as a part of the postal appropriation act of 1912. The particular section attacked was the one which would bar every newspaper and periodical from the second-class privileges of the mails unless the editors or owners filed with the postal authorities semi-annual sworn statements giving the names of the editors, owners, stockholders, and bondholders and the average daily circulation, and thereafter immediately published the statement.

The Disposition of the Commerce Court.—President Wilson has advised Senator-elect Broussard and Assistant Attorney-General Dennison, who consulted him recently in regard to the continuance of the Commerce Court after July 1, 1913, to get into touch with Chairman Fitzgerald of the appropriations committee, Chairman Adamson of the committee on interstate and foreign commerce, Judge Clayton of the committee on the judiciary and Representative Sims. As matters now stand Congress has neither abolished the court nor made any provision for the payment of expenses of the body after July 1, 1913.

Approval of Equipment for New Subway Lines in New York Urged.—At a hearing recently before the Public Service Commission of the First District of New York William G. Gove, superintendent of equipment of the Brooklyn (N. Y.) Rapid Transit Company, urged the commission to approve plans for the type of cars submitted by the company for use on the lines which it will operate under the terms of the dual subway contract. Mr. Gove said that deliveries of equipment could not be secured in less than six months after the contracts were let. The type of car which the company is urging the commission to approve was described and illustrated in the Electric Railway Journal of Dec. 30, 1911, page 1322.

Bill to Amend Erdman Act.—An amendment to the Erdman act was introduced in the Senate at Washington on June 10, 1913, by Senator Newlands. It is designed to enlarge the board of arbitration to six members. The law now provides three. A commissioner of mediation and conciliation would be created, who, with two other government officials to be appointed by the President, with the ratification of the Senate, would constitute a board of mediation and conciliation. The board would name disinterested arbitrators to act with arbitrators chosen by employers and employees. The proposed amendment relies upon voluntary arbitration. It covers only controversies arising between interstate railroads and their trainmen.

Attitude of New York Commission to Complaints.—Chairman Edward E. McCall of the Public Service Commission of the First District of New York is reported to have said at a recent meeting of the South Brooklyn Board of Trade: "It is an incalculable aid to us when a real body, a representative one, presents a complaint or makes a request. The commission is gratified and extends a hearty invitation to you to come to it with what concerns you. We have no other way of keeping in touch with the various localities. We are always glad to receive members of delegations who present their subject in an intelligent manner and avoid abuse of public officers. Let them confine themselves to the subject they came to represent. We guarantee them respectful treatment. The hour of the blackguard has gone."

United Railways, St. Louis, Protests Against Assessment.—The United Railways, St. Louis, Mo., has asked the State Board of Equalization to decrease its assessment from $21,991,028 to $16,500,000. The company in requesting the reduction said: "Some of our franchises will soon expire. The Jefferson Avenue franchise expired last year, and the Baden expires next year. Now, if not extended, as we contend, by the central ordinance, this means a big reduction of franchise values. Our stocks and bonds are worth less on the market than last year. We are paying no dividends on our preferred stock, the net earnings going to betterments. The gross earnings of the company last year were $12,063,000, and our net earnings $1,285,000. We paid in taxes last year $710,000, and if we must still pay the mill tax that would increase the amount to $981,974."

Differences Between Company and Men Settled in Asheville.—Reference was made in the Electric Railway Journal of May 10, 1913, page 863, to the settlement of the strike of the employees of the Asheville Power & Lgiht Company, Asheville, N. C., on the basis of a small increase in wages. A question having arisen in regard to the interpretation of the new agreement, the matter was referred to a committee of ten citizens and has been adjusted satisfactorily by the members of this committee. The terms of the agreement as interpreted by this committee have not been made public, but the following statement was issued in regard to the successful termination of the negotiations: "The misunderstanding in regard to the wages to be paid some of the men has been settled to the satisfaction of the company, the employees and the committee appointed by the mass meeting of the citizens and the board of trade."

Charter Commission Controversy in Cincinnati.—A controversy has developed in Cincinnati over the campaign for the election of members of the charter commission. Walter A. Knight, president of the Federated Improvement Associations, supports a plan that will allow the people to decide certain points for themselves, while Herbert S. Bigelow, member of the last House of Representatives, is making municipal ownership the paramount issue. Mr. Knight invited all labor organizations to send delegates to conferences to be held by his faction, and at a meeting of the Labor Council recently, at which he and Mr. Bigelow both presented their views, organized labor appeared to be about equally divided on the issues. Mr. Knight is supported by many organizations in his view that the operation of public utilities under the supervision of the city would be more satisfactory and economical than municipal ownership under present conditions.

Officers of Canadian Electric Railway Association.—The following officers were re-elected by the Canadian Street Railway Association at the annual meeting held at Hamilton, Ont., May 28 to May 31, 1913: President, Patrick Dubee, secretary-treasurer of the Montreal (Que.) Tramways; vice-president, C. B. King, manager of the London (Ont.) Street Railway; secretary-treasurer, Acton Burrows, Toronto; assistant secretary, A. A. Burrows, Toronto. The executive committee consists of the president and vice-president and James Anderson, general manager of the Sandwich, Windsor & Amherstburg Railway, Windsor, Ont.; E. P. Coleman, general manager of the Dominion Power & Transmission Company, Hamilton, Ont.; James D. Fraser, director and secretary-treasurer of the Ottawa (Ont.) Electric Railway; H. M. Hopper, general manager of the St. John (N. B.) Railway; Wilson Phillips, superintendent of the Winnipeg (Man.) Electric Railway, Winnipeg; Albert Eastman, general manager of the Windsor, Essex & Lake Shore Railway, Kingsville, Ont.

Extension of Loop Platforms Considered in Chicago.—A sub-committee of the local transportation committee of the City Council of Chicago, Ill., considered on June 6, 1913, the subject of proposed extensions in the loop platforms of the elevated lines. The members of the sub-committee demanded a definite promise from the elevated railways that the companies would use subways when constructed by the city and would pay an agreed rental therefor. The sub-committee decided that it would not proceed further with the negotiations for extension of the loop platforms until assurance on this point was received from the companies. W. G. Beale, representing the elevated companies, said that this proposition would involve further delay, but that he believed the roads would accept an ordinance specifying certain subway routes and stipulating the rental to be paid for their use. The sub-committee finally referred to question of subway routes to the Harbor and Subway Commission, the Board of Supervising Engineers, the city law department and the companies with the idea that a satisfactory agreement could be reached by conference between these interests.

Municipal Ownership Negotiations in Toronto.—Comptroller McCarthy of Toronto, Ont., said recently: "The city will not enter into the proposed deal to purchase the street railway and electric light properties unless it embraces every electric light and power company within the city." The city's letter embracing the offer of the municipality for the purchase of the properties subject to indorsement by the ratepayers was addressed to the companies on June 7. After the companies have answered the letter the valuation experts will proceed with their work. The valuation experts who have been named by the board of control to value the property of the Toronto Railway and the Toronto Electric Light Company are Bion J. Arnold, Chicago, who compiled the traffic report for the city some time ago; J. W. Moyes, Toronto, Ont., who was associated with Mr. Arnold in his former work, and A. W. Ross, consulting engineer for the Toronto Hydroelectric System. The appointments which have been made to this board by the board of control remain to be ratified by the City Council. An understanding has been reached by which the city will operate the cars of the radial railway within the city limits if the purchase of the properties within the city shall be consummated.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

CONNECTICUT

According to Governor Baldwin of Connecticut, the session of the Legislature in that State which has just come to a close "will long be remembered in the history of Connecticut for its work in framing and enacting a workmen's compensation act." The Governor says that this measure is a carefully considered statute well calculated to attain its declared object and wisely planned with respect to the classes of employers and employees which come within the scope of its operation. The bulk of the bills passed during the session was smaller than that of the previous session. Ranking among the important measures is the fifty-five-hour law for women and minors. Among the bills which were passed of interest to the electric railways were the following: Extending the time for the construction of the Canaan & Berkshire Tramway; authorizing the Westchester Northern Railroad to operate a line from White Plains to Danbury as an extension of the New York, Westchester & Boston Railroad; amending the charter of the Attawaugan Street Railway and authorizing an extension of the lines of the company; extending the time for the construction of the Meriden, Middletown & Guilford Electric Railway; incorporating the Stafford & Monson Street Railway; amending the charter of the New London & East Lyme Street Railway by permitting an extension of the line through the town of Old Lyme; amending the charter of the Shore Line Electric Railway as to the sale of electricity; extending the time for the construction of the Windsorville & East Hartford Electric Railway.

ILLINOIS

The House on June 6 made the Dunne administration public utilities bill a special order for June 10. An amendment offered by Representative Browne on June 10 was adopted which exempts interurban railways from the operation of the proposed law. Elevated roads are not exempt. Representative Burns, Chicago, sought to have re-incorporated the section requiring utility companies to obey the orders and requests of city utility commissions. This had been stricken out in the committee, but a motion to reinstate it was tabled. Representative Browne sought to have stricken out the section conferring upon cities the right to name city utility commissions. The utility bill as well as the semi-monthly pay day bill have been made administration measures and will have priority in consideration.

The Senate has passed the Forst bill providing that in case of the failure of a common carrier to settle a claim for damages within sixty days attorney's fees may be recovered when damages are awarded in court.

The Gorman bill providing for the sale of liquor on buffet and dining cars has been defeated in the House.

MASSACHUSETTS

The bill providing for electric railway development in western Massachusetts through the acquisition of the Springfield, Worcester and adjacent systems by the New York, New Haven & Hartford Railroad has been vetoed by Governor Foss. In the memorandum accompanying his veto the Governor said:

"This act is the last of a series of measures conceived in the interest of the New York, New Haven & Hartford Railroad by which it has been sought to break down the established laws and policy of this Commonwealth. It has been skilfully drafted in such manner as to legalize unlawful acts hitherto committed by the railroad companies, without giving any satisfactory assurance that the transportation facilities needed in Western Massachusetts will ever be provided."

The Governor is considering the so-called "nine hours in eleven bill." The Washburn railroad bill to increase the powers of the Railroad Commission and confer on the railroads increased facilities for the disposal of securities was vetoed by the Governor on June 12, 1913. On the same day the House passed the western Massachusetts bill over the Governor's veto.

The Senate and House hope to adjourn the present sitting within another week. An act has been passed providing that all street cars operated in the State, whether for passenger or freight service, shall be equipped with an emer-

gency lifting jack and such other emergency tools as may be approved by the Railroad Commission. Among the bills killed recently are the following: A bill to authorize the Railroad Commission to compel street railways to operate cars over routes the franchise for which has been previously granted; a bill to require the equipment of all street cars with both air and hand brakes and setting a minimum seating capacity of forty persons for all street cars; a bill to prohibit the use of prepayment cars in the State; a bill to grant half fares to students of business colleges and normal schools and a bill to provide for State ownership of street and elevated railways.

NEW YORK

Governor Sulzer has approved an act to amend the tax law in relation to the tax imposed on transfers of stock. In cases where shares or certificates of stock are issued without a designated monetary or par value, the stock transfer tax is to be at the rate of 2 cents for each share of stock. Also there must be filed in the office of the State Comptroller a certificate executed by every person, firm, company, association or corporation engaged in making sales, agreements to sell, deliveries or transfers of shares of stock and giving the true or real full name or names of the persons conducting the same with their post office addresses.

WISCONSIN

Senate bill 44, relating to the liability of street railways for injuries, has been referred to the judiciary committee by the Senate. Passage was recommended recently by the same committee, with two members dissenting. A bill has been introduced in the Senate making minor changes in the assessment of taxes against railroads, street railways and electric light companies. It was introduced by the judiciary committee. The joint resolution to adjourn from June 12 to Jan. 13, 1913. passed by the Senate, has been refused concurrence by the House. The Legislature will probably continue its session for several weeks.

PROGRAM OF ASSOCIATION MEETING

Central Electric Railway Association

The following program of papers has been announced for the meeting of the Central Electric Railway Association which is to be held on board the steamer *St. Ignace* on June 26 and 27, 1913:

JUNE 26, 1913, 9 A. M.

Paper, "Recent Development in Car Control," by F. E. Wynne, of the engineering department Westinghouse Electric & Manufacturing Company.

Paper, "Car Ventilation," by H. E. Lavelle, representative Automatic Ventilator Company.

Paper, "The Claims Department," by E. F. Schneider, general manager of the Cleveland, Southwestern & Columbus Railway.

JUNE 27, 1913. 9 A. M.

Paper, "The Duty of the Manufacturer in the Electric Railway Field," by J. H. Drew, president of the Drew Electric & Manufacturing Company.

Paper, "Physical Valuation," by Robert B. Rifenberick, consulting engineer of the Detroit (Mich.) United Railway.

As previously stated in the Electric Railway Journal, the D. & C. steamship *St. Ignace* has been chartered for the exclusive use of the association members and families. The steamer will leave the dock at the foot of Madison Street, Toledo, Ohio, at 3 p. m. sharp, on June 25, 1913. and will return to the same place at the corresponding hour on June 27, 1913. The fare from Toledo for the round trip, including stateroom berth and meals, will be $12 per person. Reservations can be made by applying to L. J. Drake, Jr., 410 Traction Terminal Building, Indianapolis, Ind.. chairman of the hotel and arrangement committee. All reservations must be accompanied by remittance and the name and address of person or persons desiring accommodations, so as to comply with marine regulations. No applications received by mail after June 21 can be acted upon. Applicants at the boat on June 25 will have space asisgned them if any is left.

Financial and Corporate

Stock and Money Markets

June 11, 1913.

The opening quotations on the New York Stock Exchange to-day showed substantial overnight advances in many cases, but after the first hour the market yielded and a new low level for the year was established in some of the leading issues. The general level of quotations, however, did not reach as low a figure as on Tuesday. Rates in the money market to-day were: Call, 1½@2¾ per cent; sixty days, 4@4¼ per cent; ninety days, 4¾@5 per cent; four months, 5¼@5½ per cent; five and six months, 5½@6 per cent.

Trading in Philadelphia followed closely the trend of the market in New York. The market opened strong, but extreme weakness ruled at the close.

The Chicago market to-day was narrow and weak. The bond market was extremely dull.

In the Boston market to-day there were few investment buying orders. The supply of stocks was large and at the close the tone was weak.

The trading in the Baltimore market to-day was very restricted. Only six issues were dealt in. There was little demand for bonds.

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

	June 3	June 11
American Brake Shoe & Foundry (common)	90	89
American Brake Shoe & Foundry (preferred)	129½	128
American Cities Company (common)	37¼	34
American Cities Company (preferred)	69½	68⅜
American Light & Traction Company (common)	370	345
American Light & Traction Company (preferred)	106	106
American Railways Company	39	37½
Aurora, Elgin & Chicago Railroad (common)	41½	38
Aurora, Elgin & Chicago Railroad (preferred)	84	82
Boston Elevated Railway	90	86
Boston Suburban Electric Companies (common)	7½	a7½
Boston Suburban Electric Companies (preferred)	*66	*66
Boston & Worcester Electric Companies (common)	a8	a8
Boston & Worcester Electric Companies (preferred)	43	40
Brooklyn Rapid Transit Company	89⅞	84⅜
Capital Traction Company, Washington	120	120⅛
Chicago City Railway	*150	150
Chicago Elevated Railways (common)	*25	24½
Chicago Elevated Railways (preferred)	*87	75
Chicago Railways, ptcptg., ctf. 1	92	91
Chicago Railways, ptcptg., ctf. 2	20	18½
Chicago Railways, ptcptg., ctf. 3	7	6½
Chicago Railways, ptcptg., ctf. 4	3	2¾
Cincinnati Street Railway	112	104½
Cleveland Railway	103¾	103
Cleveland, Southwestern & Columbus Ry. (common)	*5¼	6
Cleveland, Southwestern & Columbus Ry. (preferred)	*28¼	29
Columbus Railway & Light Company	18	18
Columbus Railway (common)	69½	a69½
Columbus Railway (preferred)	83	83
Denver & Northwestern Railway	109	107
Detroit United Railway	70	70
General Electric Company	..	130
Georgia Railway & Electric Company (common)	117	116
Georgia Railway & Electric Company (preferred	84	83½
Interborough Metropolitan Company (common)	13⅝	12¾
Interborough Metropolitan Company (preferred)	47½	46½
International Traction Company (common)	40	30
International Traction Company (preferred)	95	a95
Kansas City Railway & Light Company (common)	20	18
Kansas City Railway & Light Company (preferred)	40	36
Lake Shore Electric Railway (common)	*9	6
Lake Shore Electric Railway (1st preferred)	*91	a92
Lake Shore Electric Railway (2d preferred)	*25	a25
Manhattan Railway	127	126
Massachusetts Electric Companies (common)	14	13
Massachusetts Electric Companies (preferred)	72	68
Milwaukee Electric Railway & Light Co. (preferred)	*100	100
Norfolk Railway & Light Company	26½	25
North American Company	68¼	63
Northern Ohio Light & Traction Company (common)	80	a80
Northern Ohio Light & Traction Company (preferred)	105	a105
Philadelphia Company, Pittsburgh (common)	41	37
Philadelphia Company, Pittsburgh (preferred)	40	40
Philadelphia Rapid Transit Company	23½	20½
Portland Railway, Light & Power Company	*67½	62
Public Service Corporation	114	112
Third Avenue Railway, New York	30	28½
Toledo Railways & Light Company	a12	2
Twin City Rapid Transit Co., Minneapolis (common)	103	101½
Union Traction Company of Indiana (common)	*7½	4½
Union Traction Company of Indiana (1st preferred)	*82	80
Union Traction Company of Indiana (2d preferred)	*32	30
United Rys. & Electric Company (Baltimore)	26¾	24
United Rys. Inv. Company (common)	21	17
United Rys. Inv. Company (preferred)	42	30
Virginia Railway & Power Company (common)	50	50
Virginia Railway & Power Company (preferred)	92	90
Washington Ry. & Electric Company (common)	89	84
Washington Ry. & Electric Company (preferred)	89	87⅜
West End Street Railway, Boston (common)	71½	71
West End Street Railway, Boston (preferred)	88	88
Westinghouse Elec. & Mfg. Company	60	54
Westinghouse Elec. & Mfg. Company (1st preferred)	110	111

*Last sale. a Asked.

ANNUAL REPORTS

Washington Railway & Electric Company

The earnings of the Washington Railway & Electric Company, Washington, D. C., for the year ended Dec. 31, 1912, as compared with those of the previous year, are as follows:

	1911	1912
Gross earnings from operation	$4,336,519	$4,648,328
Miscellaneous income	16,152	13,233
Gross income	$4,352,671	$4,661,561
Operating expenses (including taxes)	2,410,203	2,528,224
Gross income, less operating expenses and taxes	$1,942,468	$2,133,337
Fixed charges:		
Interest	$1,077,667	$1,087,336
Miscellaneous	13,893	20,271
Total	$1,091,560	$1,107,607
Surplus	$850,908	$1,025,730
Percentage of operating expenses, including taxes, to gross earnings	55.57	54.39

Clarence P. King, president, says in part:

"The expenditures by the railway companies for additions, extensions and new equipment chargeable to construction account amounted to $422,538. This was reduced by credits from the retirement of cars, destruction by fire of Thirteenth and D Streets carhouse and contents, abandonment of tracks and other items, amounting to $244,500, leaving the net charge to construction account $178,037. This is exclusive of considerable amounts not yet due on contracts for cars and electrical equipment. The expenditures by the Potomac Electric Power Company for additions, extensions and new equipment amounted to $641,419. This amount was reduced by credits from the sale or the dismantlement of equipment to the extent of $107,373, leaving a net charge to be carried to the construction account of $534,046.

"The Washington Railway & Electric Company issued during the year $399,000 of additional consolidated mortgage 4 per cent bonds, $250,000 being issued in exchange for a similar amount of Brightwood Railway first mortgage 6 per cent bonds maturing on Oct. 1, 1912, and $149,000 being issued for extensions, betterments and improvements. Of the bonds above issued $313,000 were sold during the year.

"This mortgage provided that bonds to the amount of $1,500,000 should be issued from time to time only to pay the actual costs of extensions, betterments and improvements. These bonds have now been entirely issued so that the mortgage is closed, with the exception of bonds to be issued from time to time in exchange for bonds covered by prior liens.

"The Potomac Electric Power Company issued during the year $638,000 of consolidated mortgage 5 per cent bonds for extensions, betterments and improvements, of which $381,000 were sold and the proceeds used for the purposes of the company. This mortgage provided that bonds to the amount of $4,379,000 should be issued from time to time only to pay the actual cost of extensions, betterments and improvements. Of these bonds all but $271,000 have now been issued.

"As provided in the act of Congress approved on June 5, 1900, consolidation was effected during the year with the Anacostia & Potomac River Railroad and the Brightwood Railway, thereby adding 37.78 miles single track to the mileage actually owned by the Washington Railway & Electric Company.

"During the year the Washington Railway & Electric Company made a transfer of its entire interest in the Great Falls Power Company to the Potomac Electric Power Company.

"The year's requirements for the sinking fund of the Potomac Electric Power Company amounted to $84,700. This sum was deducted from surplus earnings and invested partly in consolidated mortgage 5 per cent bonds of the Potomac Electric Power Company and partly in consolidated mortgage 4 per cent bonds of the Washington Railway & Electric Company. The amount now invested in the sinking fund is $326,538.

"The Washington & Rockville Railway receivership was terminated by order of the court in October, 1912, and the property returned to its stockholders. The company (with the approval of the Public Service Commission of Maryland) refunded its debts by issuing $100,000 of new first mortgage 5 per cent bonds, out of a total authorized issue of $250,000, and increased its capital stock in the amount of $200,000, making a total sum now issued and outstanding of $250,000.

"This settlement caused a material scaling of the liabilities of the Rockville Company, with the result that the Washington Railway & Electric Company charged to profit and loss the sum of $50,192.

"The Maryland Legislature has enacted a law restoring to the company the four-zone method of fares, instead of the three-zone method prevailing in 1911.

"The railway companies carried 83,961,241 passengers during the year, of which 20,424,051 were free transfers. The average fare was 4.305 cents per pay passenger carried. The average fare was 3.221 cents per passenger carried, including transfers.

"On Dec. 31, 1912, the records of the Potomac Electric Power Company showed a total of 19,447 customers for the year, or an increase over the previous period of 3235.

"The companies have continued liberal expenditures out of earnings for the maintenance and upkeep of their properties. The amount disbursed or set aside for maintenance of railway and lighting equipment, including way and structures for the past five years, is as follows: For 1908, $512,266; for 1909, $630,901; for 1910, $669,631; for 1911, $657,379; for 1912, $674,928; or a total of $3,145,105.

"In addition to the maintenance charges as above set forth, profit and loss account has been charged during the year with $65,574 as depreciation on equipment. This is in accord with the policy adopted in 1909, since which time there has been charged off as depreciation on equipment the sum of $245,574.

"In general, the work of the track and roadway department has been the most significant for several years, due largely to special track work renewals and the improved method of repairing rail joints by means of an electrically operated, reciprocating rail grinder. The first mentioned includes complete renewal of special track layouts at five different intersections on our underground trolley system, the most important being at Ninth and G Streets. This work cost $40,000 and is the most complicated and expensive piece of special work in Washington. Partial renewals and repairs were made to special track layouts in sixty-nine localities; renewals were made to curve wheel rails at fourteen points and nine different sections of straight track were brought to line and surface.

"Among the many improvements was the installation of automatic electric switches at twelve important intersections, doing away with switchmen at those points and effecting a substantial saving, as did also the abandonment of two switching towers at the Capitol and Union Station Plaza.

"On the overhead trolley system special track work was renewed at several localities, straight track raised to line and surface and trolley wire renewed where necessary. The rail bond efficiency for return circuits on suburban lines is being improved each year. The double track on Fourth Street, Northeast, between T Street and Rhode Island Avenue, a distance of about 1300 ft., was reconstructed.

"Repairs to pavement, macadamizing track space on the Brightwood division, together with a general improvement of the line on Upshur Street from Georgia Avenue to Soldiers' Home Gate, were completed.

"On the suburban lines improvements were made during the year in the form of the installation of fourteen waiting stations and 150 lights and the renewal of approximately 23,000 cross ties and 362 trolley poles.

"In addition to the regular routine work of the shops, the mechanical department assembled and put in service during the year fifty new fourteen-bench open cars, thirty-one new center-entrance cars and one snow sweeper; converted two cars from 'pay-as-you-enter' to 'pay-within' type; rebuilt nine cars for suburban service; painted and varnished 150 cars and rebuilt fifty motors damaged by fire. New transfer tables for the better movement of cars were added to two carhouses."

Questions of Chicago Railways Protective Association Answered by Company

In a letter dated May 21, 1913, to the registered holders of participation certificates, Series 1, Series 2 and Series 3, under the participation certificate agreement dated as of Aug. 1, 1907, Henry A. Blair, chairman of the board of directors of the Chicago (Ill.) Railways, has answered various questions propounded to the officials of the company by the Protective Association that were not covered in the annual report of the company, mention of which was made in the Electric Railway Journal of May 3, 1913, page 829. No report was made concerning salaries, for it was thought that members of the association would not know the duties of the officers or what reasonable compensation would be, and such information would only be the source of useless attack. In answer to the question regarding the consolidation of the offices of president and chairman of the board of directors, it was stated that these offices were utterly dissimilar and that the union would effect no economies. The criticism in regard to maintaining the offices in the Borland Block was met with the statement that this floor space even with its own North Side building is barely sufficient for all needs. The company was asked what the trustees of the stock had done for the company and the stockholders, but the reply was made that the company was not a party to the participation certificate agreement and had not the slightest control over the trustees. Their office was provided for and required in the plan of reorganization of the company and was created, and their duties and rights, both as trustees and as depositaries prescribed, by the participation certificate agreement to which every holder of a participation certificate is a party; and they themselves should be approached for any information concerning their acts.

One of the points against which most of the attack has been directed is in connection with the advertising contract of the company, for it is claimed that the Chicago Railways receives only $100,000 for advertising while the Chicago City Railway receives more and has only two-thirds as many cars. The reply states that this price is based on a contract for $39,000 in existence when in 1906 the Chicago Union Traction System was taken over by the Chicago Railways. The report continues:

"A controversy concerning this contract resulted in a new agreement for the sum of $63,000 per year, covering advertising privileges in cars owned, controlled or operated upon the lines then owned by the Chicago Railways, but expressly excepting all lines that might be thereafter acquired or controlled by the company through purchase or consolidation. Therefore, when on Dec. 27, 1910, the company obtained by purchase through foreclosure sale that part of the system of the Chicago Consolidated Traction Company within the city of Chicago, a new contract had to be made. The management insisted that it should receive for its advertising privileges a price which would be in excess of that received by the Chicago City Railway, for the Chicago City Railway had less mileage and fewer cars than the Chicago Railways. To these claims the contractor replied that relatively the Chicago City Railway's territory was better per mile than that of the Chicago Railways, that the amount paid to the Chicago City Railway was in any event in excess of the value of the privileges granted, that the advertising company having the contract with the Chicago City Railway had actually been losing money under that contract and that it did not propose to enter into a contract with the Chicago Railways which in like manner would result in actual loss. The sum of $100,000 per annum was finally agreed upon as representing the full fair value of the advertising privileges for the term of the contract.

"The company having the advertising contract with the Chicago Railways is Barron G. Collier, Inc., with its principal offices in the Flatiron Building, New York City, N. Y. We are authorized by the Barron G. Collier Company, Inc., to state that the foregoing is an absolutely correct statement of the facts and to extend to each certificate holder an invitation to call upon or write to the representatives of that company at the above address for any details respecting this matter."

In answer to the question as to why the rehabilitation bonds could not be sold by the company instead of through bonds, Mr. Blair said:

"This proposition is impracticable. The ordinance requirements as to rehabilitation and re-equipment were and are such as to require large sums of money, extending into the millions, to be expended in each year. Under the terms of the trust deed securing the rehabilitation bonds, bonds cannot be issued except against work actually done and materials actually furnished and certified to by the Board of Supervising Engineers under the ordinance. The company has had no working capital and it has been and is impossible, therefore, to furnish the labor and materials required in rehabilitation and re-equipment and provide the means therefor out of current funds; and as bonds have not been and are not available, it has been necessary to make arrangements with bankers whereby interim certificates calling for bonds in the future could be sold and the proceeds applied to the furnishing of labor and materials, and whereby the bonds when obtainable could be used to retire such interim certificates.

"A public offering of the bonds by the company, without enlisting the active co-operation and support of the bankers, would have placed the Chicago Railways, with its tremendous financial requirements, at the mercy of the comparatively small number of investors in and around Chicago, who would have, under those circumstances, bought the bonds. Most of the bonds were really sold in outside markets, $28,000,000 out of $49,000,000 in New York, Boston and abroad, and this was due to the active work, international prestige and distributing capacity of the bankers concerned."

Resale of Chicago & Milwaukee Electric Railroad Ordered

The order for the resale of the property of the Chicago & Milwaukee Electric Railroad, Chicago, Ill., has been confirmed by Judge Francis E. Baker in the United States Court of Appeals. The opinion sustains Federal Judge K. M. Landis in rejecting the bid of the reorganization committee and holding the property worth at least $2,600,000. Sales of the properties were held at Waukegan and Racine on Sept. 25, 1912. The Illinois sale resulted in a bid by the reorganization committee of Wisconsin and Illinois bondholders, composed of George M. Reynolds, Ernest Hammill, John R. Thompson, R. Floyd Clinch, E. A. Shedd and others, of $1,650,000. The Wisconsin sale resulted in a like bid of $1,600,000. The legality of the sale was contested, the objectors maintaining that the road should have brought at least $4,500,000. Judge Landis held that the bid was inadequate. The opinion of Judge Baker, which was concurred in by Judges Seaman and Carpenter, in part says:

"'In this case the sale was set aside because of suppression of competition that resulted in one inadequate bid. If there was no stifling of intending bidders the sale should have been confirmed; but a bid for 50 or 60 per cent of the after-option value of property offered at public sale is not shockingly inadequate. By offering to raise their bid appellants, in our judgment, did not waive their right to insist that they had not chilled the sale. Their conduct was not a confession of wrongdoing, not even, as we regard it, an admission of the inadequacy of their first bid, but amounted at most to only this: that if the objections were withdrawn and the resale confirmed, they would pay into the court for the appellee and other non-depositing bondholders their part of the increase rather than have the estate suffer the expense and loss by delay from resale.'"

Chicago (Ill.) City Railway.—The Illinois Supreme Court has denied a re-hearing to Clarence H. Venner, New York, in the case which he brought against the Chicago City Railway. Mr. Venner sought a writ to enjoin the merger of the Chicago City Railway and other street railways in Chicago.

Denver (Col.) City Tramway.—The Denver City Tramway has increased the number of its directors from nine to thirteen. The additional directors are A. V. Hunter, president of the First National Bank, Denver; George C. Clark, of Clark, Dodge & Company, New York, N. Y.; Horace W. Bennett, of Bennett & Myers, Denver, and Claude K. Boettcher, of the firm of Boettcher, Porter &

Company, Denver. The bonds of the Denver & Northwestern Railway, which has abandoned its transportation business through the sale of its Leyden and Golden lines to the Denver City Tramway, are to be exchanged for sinking fund bonds of the latter (of which $6,300,000 are reserved for the purpose) at 105, the premium to be paid either in cash or in scrip at the option of the directors. The Denver & Northwestern Railway will continue for the present merely as a holding company, but in case all its bonds are exchanged it will go out of existence and its stock will be exchanged for shares in the Denver City Tramway.

Interborough-Metropolitan Company, New York, N. Y.—By a recent decision the Federal District Court has thrown out the two suits brought by the Continental Securities Company, with which Clarence Venner is identified, against the Interborough-Metropolitan Company and a number of other traction corporations. The court held that not only had the plaintiff no technical right to sue, but that the merger of which it complained was legal. The court said: "The Metropolitan had exhausted the possibilities of surface transportation, and with its enormous fixed charges could not earn dividends, but subways were new and of unknown capacity, both as money raisers and money earners. It was a bold and ingenious move for the Metropolitan to put forward as a possible addition to its system connecting subways." J. P. Morgan & Company, New York, N. Y., announce that they are prepared to exchange new first and refunding mortgage 5 per cent gold bonds of the Interborough Rapid Transit Company for the old forty-five-year mortgage 5 per cent bonds of the company which have been drawn for redemption on Nov. 1, 1913. The exchange may be made on a basis of 98 and interest for the new bonds and 105 and interest for the old. The first and refunding bonds are dated Jan. 1, 1913, and are due Jan. 1, 1966. They may be redeemed at 110 and interest on any interest day in any amount from the sinking fund or by the company at its option, either as a whole or in blocks of not less than $500,000. Coupon or registered bonds are interchangeable.

Lehigh Valley Transit Company, Allentown, Pa.—Refunding and improvement mortgage 5 per cent gold bonds of the Lehigh Valley Transit Company, in denominations of $1,000 and $500, are being offered by Edward B. Smith & Company, Philadelphia. They are due in 1960, but callable at 105 and interest until 1920 and at 110 and interest thereafter. These bonds are a mortgage on about 160 miles of electric railway, power plant, shops and equipment, subject to $5,311,000 of underlying bonds, and are further secured by stock of the controlled electric light and power companies serving Allentown, Bethlehem, South Bethlehem and various towns in the Lehigh Valley district. These bonds are followed by $5,000,000 of preferred stock, upon which dividend payments began in 1911, and by $3,000,000 of common stock.

New York State Railways, Rochester, N. Y.—Edward B. Smith & Company, Philadelphia, Pa., are offering for sale first consolidated mortgage 4½ per cent bonds, Series A, of the New York State Railways, due 1962, but redeemable after Nov. 1, 1913, at 105 and interest, with coupons, registerable as to principal. These bonds are secured by a direct lien on the electric railway system of 585 miles controlled by the New York Central & Hudson River Railroad and serving a territory with 900,000 population, including Rochester, Syracuse, Utica and Schenectady. Excepting for a few minor extensions under fifty-year franchises, the operating companies have perpetual rights. The bonds are a direct lien, subject to underlying bonds whose retirement is provided for in the mortgage, on all the properties and franchises of the system.

Public Service Corporation of New Jersey, Newark, N. J.—The Board of Public Utility Commissioners of New Jersey concludes as follows an opinion which it handed down recently: "In the judgment of this board the Public Service Corporation of New Jersey is not prohibited by Chapter 18 of the Laws of 1913 from subscribing for and taking its pro rata allotment of the issue of the capital stock of the Public Service Gas Company, which is hereby approved." The Public Service Corporation prior to February, 1913, the date on which Chapter 18 of the Laws of 1913 became effective, acquired, and on that day held, substantially all of the then outstanding shares of capital stock of the Public Service Gas Company.

Republic Railway & Light Company, Youngstown, Ohio.—Proceeds of the $600,000 of 5 per cent notes recently sold by the Republic Railway & Light Company will be used to reimburse the treasury of the company for advances made to subsidiary companies on account of miscellaneous betterments and improvements made on properties of subsidiaries and to retire floating debts incurred by these subsidiaries on account of such betterments. The notes are part of an authorized issue of $5,000,000 made in April, 1912, of which $2,000,000 was issued last year for the construction of a central generating station, the acquisition of new properties, improvements to properties and to retire other notes, as reported in the ELECTRIC RAILWAY JOURNAL of April 20, 1912.

Southern Pacific Company, San Francisco, Cal.—The Southern Pacific Company, which controls several electric railways in California, has applied to the Railroad Commission of that State for authority to issue $30,000,000 of two-year 5 per cent collateral trust notes. The notes are to be dated June 1, 1913, and will be due June 1, 1915. They will be subject to redemption at par with interest on June 1, 1913, and Dec. 1, 1914, upon thirty days' notice. As collateral the Southern Pacific proposes to place in trust approved securities now in its treasury, including issues of the Pacific Electric Railway and of the Northwestern Pacific Railway of California. The petition states that the Southern Pacific Company estimates its capital requirements for the year 1913 at $48,526,000. It asks for authority to issue $30,000,000 in notes and states that it will supply the balance out of its surplus earnings. Of this total amount, $9,775,000 is to be devoted to additions to the facilities of the Pacific system's lines, including the proprietary companies of the Southern Pacific, and the item includes new lines, extension of existing lines, continuation of construction work, improvements in and additions to electric lines and other constructions.

United Properties Company, Oakland, Cal.—The committee in charge of the financial affairs of F. M. Smith has extended from May 25 to July 1, 1913, the time for depositing the notes, etc., made or guaranteed by him, with the Mercantile Trust Company, San Francisco, the choice of which depositary was noted in the ELECTRIC RAILWAY JOURNAL of May 31, 1913. The committee states that the larger banks in San Francisco and Oakland have given their approval to the work undertaken by the trustees. The collateral held by each creditor, it is stated, will follow the notes to the end, and there will be no pooling of assets to the detriment of the better secured creditors.

Western Ohio Railway, Lima, Ohio.—The Western Ohio Railway has been authorized by the Public Service Commission of Ohio to issue its second preferred capital stock of the par value of $50,000 at not less than 80, the proceeds to be paid to the Western Ohio Railroad, the lessee of its property and railway, in partial reimbursement for the moneys, now aggregating $141,932, expended by the lessee for the construction of additions, extensions and improvements to the railway and property of the Western Ohio Railway since July 1, 1910.

Dividends Declared

Arkansas Valley Railway, Light & Power Company, Pueblo, Col., quarterly, 1¾ per cent, preferred.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis., quarterly, 1¾ per cent, preferred; quarterly, 2 per cent, common.

Continental Passenger Railway, Philadelphia, Pa., $3.

Indianapolis (Ind.) Street Railway, 3 per cent.

Lake Shore Electric Railway, Cleveland, Ohio, quarterly, 1½ per cent, first preferred.

Manila Electric Railroad & Lighting Corporation, Manila, P. I., quarterly, 1¾ per cent.

New York State Railways, Rochester, N. Y., quarterly, 1¼ per cent, preferred; quarterly, 1½ per cent, common.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., quarterly, 1¼ per cent, preferred.

Toronto (Ont.) Railway, quarterly, 2 per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

ATLANTIC SHORE RAILWAY, SANFORD, MAINE

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1 mo.	April	'13	$23,639	$22,155	$1,484	$615	$869
1 "	"	'12	26,078	21,887	4,191	582	3,609

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, MAINE

1 mo.	April	'13	$57,448	*$27,554	$29,894	$17,131	$12,763
1 "	"	'12	51,492	*24,655	26,837	16,492	10,345
12 "	"	'13	730,006	*330,171	399,835	203,590	196,245
12 "	"	'12	631,572	*292,039	339,533	170,364	169,169

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

1 mo.	April	'13	$92,389	*$55,488	$36,901	$24,277	$12,624
1 "	"	'12	81,280	*47,236	33,972	21,508	12,464
12 "	"	'13	1,114,520	*671,582	442,947	277,122	165,825
12 "	"	'12	973,366	*576,167	397,199	248,002	149,197

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

1 mo.	April	'13	$545,577	*$308,824	$236,753	$140,868	$95,885
1 "	"	'12	490,119	*285,632	204,487	120,911	83,576
12 "	"	'13	6,658,634	*3,814,047	2,844,587	1,604,174	1,240,413
12 "	"	'12	5,752,364	*3,326,198	2,427,166	1,321,472	1,105,694

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, MAINE

1 mo.	April	'13	$167,748	*$95,553	$69,195	$56,872	$12,323
1 "	"	'12	156,756	*93,807	62,949	52,718	10,231
12 "	"	'13	2,189,830	*1,219,612	970,218	665,760	304,458
12 "	"	'12	2,058,270	*1,262,903	795,367	588,682	206,685

EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

1 mo.	April	'13	$204,769	*$117,010	$87,759	$48,844	$38,915
1 "	"	'12	179,744	*104,779	74,965	47,962	27,003
12 "	"	'13	2,528,522	*1,401,849	1,126,673	582,908	343,765
12 "	"	'12	2,323,951	*1,285,591	1,038,360	558,059	480.301

GRAND RAPIDS (MICH.) RAILWAY

1 mo.	April	'13	$100,108	*$60,308	$39,800	$15,010	$24,790
1 "	"	'12	94,339	*55,191	39,148	14,515	24,633
12 "	"	'13	1,254,600	*717,747	536,853	176,224	360,629
12 "	"	'12	1,197,830	*674,404	523,426	177,693	345.733

LEHIGH VALLEY TRANSIT COMPANY, ALLENTOWN, PA.

1 mo.	April	'13	$124,493	$64,675	$59,817	$45,818	$13,999
1 "	"	'12	110,209	55,038	55,172	41,615	13,557
12 "	"	'13	1,619,396	692,107	927,288	526,906	400,382
12 "	"	'12	1,411,297	624,849	786,448	472,409	314,039

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, MAINE

1 mo.	April	'13	$49,274	*$32,424	$16,850	$14,659	$2,191
1 "	"	'12	45,045	*29,515	15,530	14,446	1,084
12 "	"	'13	641,473	*393,033	248,440	173,508	74,932
12 "	"	'12	602,692	*376,861	225,832	171,170	54,662

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

1 mo.	April	'13	$176,036	*$103,929	$72,107	$37,653	$34,454
1 "	"	'12	168,976	*101,158	67,818	35,161	32,657
12 "	"	'13	2,119,585	*1,213,839	905,746	444,526	461,220
12 "	"	'12	1,996,106	*1,153,206	842,900	410,656	432,244

PORTLAND (MAINE) RAILROAD

1 mo.	April	'13	$74,793	*$58,209	$16,584	$10,298	$6,286
1 "	"	'12	70 472	*54,386	16,092	10,206	5,586
12 "	"	'13	1,001,573	*702,603	298,970	123,472	175,498
12 "	"	'12	968,238	*718,808	249,430	115,115	134,315

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

1 mo.	April	'13	$546,231	*$273,458	$272,773	$161,730	$111,043
1 "	"	'12	532,762	*277,700	254,862	167,108	87,754
12 "	"	'13	6,691,264	*3,291,334	3,399,930	1,815,505	1,584,425
12 "	"	'12	6,430,429	*3,176,630	3,253,799	1,592,519	1,661,208

ST. JOSEPH RAILWAY, LIGHT, HEAT & POWER COMPANY, ST. JOSEPH, MO.

1 mo.	April	'13	$97,718	*$55,192	$42,526	$19,829	$22,697
1 "	"	'12	90,423	*53,248	37,175	19,541	17,634
12 "	"	'13	1,205,438	*680,077	525,361	237,735	287,626
12 "	"	'12	1,131,727	*686,057	445,670	232,551	213,119

UNION RAILWAY, GAS & ELECTRIC COMPANY, ROCKFORD, ILL.

1 mo.	April	'13	$363,898	*$213,776	$150,122	$100,570	$49,552
1 "	"	'12	279,725	*171,187	108,548	69,147	39,401
12 "	"	'13	4,344,031	*2,495,338	1,848,693	1,082,505	765,188
12 "	"	'12	3,368,445	*1,947,832	1,420,613	776,417	644,196

TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.

1 mo.	April	'13	$697,429	$350,659	$346,770	$144,804	$201,966
1 "	"	'12	631,462	325,787	305,674	143,079	162,595
4 "	"	'13	2,733,883	1,446,037	1,387,846	583,280	704,566
4 "	"	'12	2.543,073	1,380,848	1,162,225	569,317	592,908

*Includes taxes.

Traffic and Transportation

Employees' Publication in Milwaukee

The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has begun the publication of *Rail and Wire* in the interest of its employees. The first issue is dated June, 1913. The foreword says that the magazine has been established "as an aid to the general ends of maintaining a homogeneous working organization and better performing the duties imposed upon us by the nature of our business." The paper is 6 in. wide by 9 in. high. There are twenty-four pages and cover. The leading article, "Welfare Work," is contributed by Bert Hall, in charge of the welfare department of the company. Mr. Hall tells briefly about the work of the department and recites a number of cases that have arisen in families where the welfare department has been able to give assistance. During the year ended March 1, 1913, loans totaling $13,764 were made to employees in amounts ranging from $10 to $100. Mr. Hall says that the employees and their families should understand that "the welfare department is prepared to give assistance in solving serious problems * * * which employees cannot master themselves without loss of time or loss through the expense to which they would be put if they attempted to solve them alone and without assistance." There are several pages of current news from the various departments of the company. Under the heading "Transportation" there appears an illustrated biography of Peter Bell, superintendent, who is referred to as the Nestor of the service, he having been with the company continuously since March 10, 1881. On the first left-hand page of the publication proper there is a half-tone reproduction of a portrait of J. D. Mortimer, president and general manager of the company.

Re-routing in Philadelphia

The Philadelphia (Pa.) Rapid Transit Company issued under date of June 4, 1913, Co-operative Bulletin No. 17, which contains the details of the second step in the re-routing plan for the surface lines of the company. The changes which are noted in the bulletin are largely of local interest. As a foreword the company says in part:

"The object of all the changes under the re-routing plan is to increase materially the rush-hour capacity of the tracks in the downtown business district and permit the company to give adequate service during the coming winter and insure the greatest convenience to the greatest number. The importance of providing the patrons of the several lines with the most direct routes to and from the business district is evident. To the home builder the distance from the business district is in minutes, not in miles. The Stotesbury management acknowledges the uniform forbearance and consideration shown by the public in meeting the changes thus far undertaken. The company recognizes that a certain degree of inconvenience must temporarily attend any re-routing of cars, and it bespeaks the continued good-will and co-operation of the public in this effort to route the cars by the quickest and most direct routes, and thus build up a perfect system of transportation. The changes which are being made will not only provide the increased capacity required to give adequate service during the coming winter but will permit the expansion necessary to care for the future growth of those districts that can be served satisfactorily by surface railway transportation."

Restoring Service in Rock Island

The Tri-City Railway, whose carhouse in Rock Island, Ill., was destroyed by fire on the morning of June 1, 1913, as noted in the Electric Railway Journal of June 7, 1913, page 1033, succeeded in re-establishing regular service on June 1, and while the cars which are being operated are not up to its standard, the company was on June 5 operating on regular schedule and had about a dozen extra cars for rush hour and park business. The company has placed orders for additional cars and will have sixty pay-as-you-enter cars in service in the Tri-cities before the end of August. The contracts for the car bodies were awarded to the American

Car Company and the St. Louis Car Company. The motors will be furnished by the Westinghouse Electric & Manufacturing Company and the air brakes by the General Electric Company. The loss sustained by the company from the fire is more than covered by the insurance, as on an estimated loss of $300,000 insurance to the amount of $355,000 was carried.

Increase in Wages in Portland, Ore.

Franklin T. Griffith, the newly elected president of the Portland Railway, Light & Power Company, Portland, Ore., announced an increase recently of 1 cent an hour in the wages of all men employed on the city and the interurban lines of the company effective from June 1, 1913. The present schedule as paid by the company to its employees in the train service and to which 1 cent will be added is as follows:

	City	Interurban
First six months	$0.24	$0.24
Second six months	.25	.25
Second year	.26	.27
Third year	.27	.28½
Fourth year	.28	.30
Fifth year	.29	.31½
After	.30	.33½

Fare Complaint Dismissed by California Commission.—The Railroad Commission of California has dismissed the petition of William R. Bowker, who complained that the commutation rates of the San Diego (Cal.) Electric Railroad between Coronado and San Diego were excessive.

Free Excursions for Poor Children.—Theodore P. Shonts, president of the Interborough Rapid Transit Company, New York, N. Y., has renewed the company's offer of last summer to transport free of charge indigent children and their mothers to and from Bronx Park and Van Cortlandt Park during the summer months.

No More Smoking on Cars in Victoria.—The British Columbia Electric Railway, Vancouver, B. C., issued an order recently that no more smoking be allowed on its city cars in Victoria and that parcels be carried no longer except when in charge of a passenger. Smoking has been prohibited on cars in Vancouver for some time.

Inquiry Into Service in Camden.—The Board of Public Utility Commissioners of New Jersey has ordered an inquiry into the service furnished by the Public Service Railway on its lines which are operated to and from the ferries at the foot of Federal Street, Camden. The first hearing will be held at the court house in Camden on July 9, 1913.

Safety Campaign Proposed in Ontario.—Chairman McIntyre of the Ontario Railway & Municipal Board and Commissioner Ingram are arranging a conference with the Board of Education of Toronto, the Board of Trade of that city, the Toronto Railway and the Motor League to consider the subject of conducting an educational safety campaign in the schools throughout the Province.

Decision in Oregon Fare Case.—The validity of the Oregon Railroad Commission's orders requiring the Portland Railway, Light & Power Company, Portland, Ore., to reduce its fares from Portland to Milwaukie, a suburb, to 5 cents, and to give passengers to and from that point the same transfer privileges as accorded passengers from Lentz, was upheld by the Supreme Court of Washington on June 10, 1913. The reduction ordered from the Oak Grove district was also upheld.

Handling Freight in Oklahoma City.—The Oklahoma (Okla.) Railway is preparing to handle freight in all classes on its interurban line between Oklahoma City and El Reno. A team track and a freight depot are being installed on the terminal property at Oklahoma City and freight facilities are being provided at the different stations along the interurban line. Freight service will begin about June 15 and special freight cars will be put in operation to handle this class of traffic. Heretofore only express packages have been handled on the interurban line.

New Agreement with Employees in New Orleans.—The New Orleans Railway & Light Company, New Orleans, La., through Hugh McCloskey, president and general manager, has signed a five-year agreement with its platform employees dating from July 1, 1913, with the following scale of wages: For the first three years ending June 30, 1916, 24 cents an hour; from July 1, 1916, to July 1, 1917, 24¼ cents an hour; from July 1, 1917, to July 1, 1918, 24½ cents an hour. The scale of wages paid on the agreement that expires on July 1, 1913, was 23¼ cents an hour.

Washington Transfer Law to Be Enforced.—A decision to enforce the provisions of the act of Congress approved on Aug. 24, 1912, requiring the exchange of transfers between the electric railway lines and the herdic line of the Metropolitan Coach Company at Fifteenth Street and Pennsylvania Avenue and Fifteenth Street and New York Avenue, Washington, was reached on June 2, 1913, by the Public Service Commission of Washington, D. C., following a public hearing. Attorneys for the Washington Railway & Electric Company and the Capital Traction Company denied that the commission had jurisdiction in the matter.

Increase in Wages in Indianapolis.—The Terre Haute, Indianapolis & Eastern Traction Company and the Indianapolis Traction & Terminal Company voluntarily increased the wages of all motormen and conductors on June 1, 1913. Employees of both systems are paid in accordance with the length of service. Under the new rate the interurban trainmen will receive from 21 cents to 30 cents an hour, and the city railway men from 20 cents to 25 cents per hour, instead of the old rates of 20 cents to 28 cents and 19 cents to 24 cents respectively. These increases will probably aggregate an additional expense to the companies of approximately $70,000 a year.

Results in Accident Prevention Campaign in Philadelphia.—Statistics compiled by the Philadelphia (Pa.) Rapid Transit Company show that as a result of the accident prevention crusade inaugurated by it to safeguard children the number of accidents in the last ten months has been reduced 30 per cent. The company plans to extend the safety crusade by having an experienced lecturer visit the schools and talk on the dangers of street play in sections traversed by trolley cars. Periodical fifteen-minute cautionary talks are being given by teachers in the public schools on the dangers of playing in the streets. These talks are made particularly forcible by the aid of pictures displayed on the blackboards in the classrooms.

Hearing in Regard to Transfers in Brooklyn.—The Public Service Commission for the First District of New York has ordered a hearing to be held on June 19 to inquire whether the exchange of transfers shall be ordered between the Coney Island & Brooklyn Railroad and certain intersecting lines of the Brooklyn Rapid Transit System. There is now pending before the commission the application of the Coney Island & Gravesend Railway, one of the Brooklyn Rapid Transit companies, to purchase the stock of the Coney Island & Brooklyn Railroad. At the hearings on this application the commission was asked by certain civic associations to order the exchange of transfers before granting permission for the purchase of the stock. The commission decided to make a separate proceeding of the transfer matter.

Service Improvements in Atlanta.—As a result of the inquiry which it conducted into service in Atlanta, Ga., the Railroad Commission of Georgia has ordered the Georgia Railway & Power Company to improve service on ten routes during the morning and afternoon rush hours and make a monthly report showing passengers handled during those hours, the number of cars operated and the number of seats in those cars. The report of the commission, as explained by C. M. Candler, chairman, carries two separate and distinct changes in the service. One is that which was suggested to the commission by President Arkwright, and the other is ordered by the commission. P. S. Arkwright, president of the company, in concluding his letter to Mr. Candler in regard to the improvements, said: "In considering the suggestions you have made as to increasing the service I want you to understand that we approach them in the spirit of meeting your suggestions. It may seem out of place for me to say that we desire to do what you want us to do, inasmuch as the commission has the power, of course, to compel us to do what it deems proper without regard to our wishes or desires, but I say it in order that you may know that we have not considered your suggestions with the view of combating them but from the standpoint of agreeing with them."

Personal Mention

Mr. J. G. Baukat has resigned as superintendent of equipment of the Lehigh Valley Transit Company, Allentown, Pa.

Mr. Robert C. Brown, managing director of the Mexico (Mex.) Tramways, has been elected vice-president of the company.

Mr. Chester Michaels has been appointed inspector of transportation for the Galesburg & Kewanee Electric Railway, Kewanee, Ill.

Mr. F. H. Brooks has resigned as general superintendent, purchasing agent and chief engineer of the Lincoln (Neb.) Traction Company.

Mr. F. B. Flahive has been appointed assistant treasurer of the Paducah Traction Company and the Paducah Light & Power Company, Paducah, Ky., to succeed Mr. J. H. Bissell.

Mr. E. Dana Durand, former director of the United States Census, has accepted the position of director of the bureau of research in agricultural economics at the Minnesota Agricultural College.

Mr. George S. Cameron, who has been general manager of the Stockton Terminal & Eastern Railroad, Stockton, Cal., has been appointed manager of the San Joaquin Valley Electric Railway, Stockton, Cal., to succeed Mr. Morris L. Brackett, resigned.

Mr. G. A. King has been appointed assistant superintendent of the Plank Road shops of the Public Service Railway, Newark, N. J., to succeed Mr. E. A. Palmer, who has been appointed master mechanic of the Central division of the company.

Mr. J. H. Bissell, for the last seventeen months assistant treasurer of the Paducah Traction Company and the Paducah Light & Power Company, Paducah, Ky., has been appointed assistant treasurer of the Mississippi River Power Company at Keokuk, Ia.

Mr. Elmer E. Strong, who has been superintendent of transportation of the New York State Railways, Syracuse lines, has been appointed superintendent of transportation of the New York State Railways, Rochester lines, to succeed Mr. W. C. Callaghan.

Mr. R. R. Smith has been appointed purchasing agent of the Indianapolis Traction & Terminal Company, Indianapolis, Ind., to succeed Mr. T. D. Sheerin, who has accepted a position as manager of the bond department of the Fletcher Trust & Savings Company, Indianapolis, Ind.

Mr. D. J. Haren has been appointed general superintendent of the Syracuse & Suburban Railroad, Syracuse, N. Y., in charge of track, power and transportation under Mr. J. P. Barnes. Mr. Haren was formerly superintendent and master mechanic of the Hornell (N. Y.) Traction Company.

Mr. C. B. Graves, formerly third vice-president and general manager of the Manila Electric Railroad & Light Company, Manila, P. I., has been appointed general manager of the Mexico (Mex.) Tramways to succeed Mr. Harro Harrsen, who has been elected managing director of the company.

Mr. E. A. Palmer, who has been assistant superintendent of the Plank Road shops of the Public Service Railway, Newark, N. J., has been appointed master mechanic of the Central division of the company to succeed Mr. J. R. Case, who has been appointed master mechanic of the Essex division.

Mr. Samuel Riddle, traffic manager of the Louisville (Ky.) Railway, was recently elected to membership in the Louisville Rotary Club, representing the electric railway interests of the city. Election to this organization is highly esteemed, inasmuch as only one representative of each line of business is eligible.

Mr. Harmon Bell has resigned as counsel of the San Francisco-Oakland Terminal Railways, Oakland, Cal. Mr. Bell served that company and its predecessor, the Oakland Traction Consolidated, for fifteen years. He will hereafter devote himself entirely to the interest of Bell, Bell & Smith, attorneys, of which firm he is a member.

Mr. Harro Harrsen, general manager of the Mexico (Mex.) Tramways, has been elected managing director of the company to succeed Mr. R. C. Brown, who has been elected vice-president of the company. Mr. Harrsen is also managing director of the Pachuca Light & Power Company and the Mexican Steel & Chemical Company.

Mr. J. R. Case, master mechanic of the Central division of the Public Service Railway, Newark, N. J., has been appointed master mechanic of the Essex division of the company to succeed Mr. T. H. Shaughnessy, whose appointment as assistant superintendent of equipment of the Chicago (Ill.) Railways was noted in the Electric Railway Journal of June 7, 1913.

Mr. George A. Valentine has been appointed chief inspector of the New York State Railways, Syracuse lines, a new position with that company. Mr. Valentine was formerly dispatcher for the Oneida Railway with headquarters in the Terminal Building in Clinton Square. He was born on a farm in Oswego County in 1876 and entered the employ of the Syracuse Rapid Transit Railway as a motorman on June 20, 1898. He was appointed dispatcher of the Oneida line on Nov. 6, 1909.

Mr. C. H. Baker has been appointed mechanical engineer of the Public Service Electric Company, Newark, N. J. Mr. Baker was graduated from Lawrence Scientific School in 1902 and since then has been identified with Westinghouse, Church, Kerr & Company, New York, N. Y., as construction engineer, the Brooklyn (N. Y.) Rapid Transit Company as power station inspecting engineer, the New York, New Haven & Hartford Railroad as assistant chief engineer of its Cos Cob plant, and the Hoosac Tunnel power station of the Boston & Maine Railroad and the Berkshire Street Railroad as chief engineer.

Mr. Anderson G. Moore, commercial manager of the Insull properties in Indiana, whose offices are in New Albany, Ind., has been appointed chairman of the publicity committee in charge of the arrangements for the centennial celebration to be held in New Albany from Oct. 12 to Oct. 16, 1913. The company with which Mr. Moore is connected is establishing a precedent for public service corporations in the extent to which it takes part in general "boosting" work in the cities in which it owns properties, and in New Albany, where it owns the electric railways and the gas and electric light and power plants, the company has been especially active in civic betterment work.

Mr. Henry Branson has been appointed superintendent of equipment of the Lehigh Valley Transit Company, Allentown, Pa., to succeed Mr. J. G. Baukat, resigned. Mr. Branson was formerly superintendent of rolling stock and equipment of the Philadelphia (Pa.) Rapid Transit Company, with which he was connected for seventeen years. He was a carhouse foreman of the Philadelphia Rapid Transit Company for six years, and for four years was in charge of the shops of the company on Fifth and Sixth Streets, Philadelphia. In December, 1909, he was appointed to succeed Mr. Fred H. Lincoln as assistant general manager of the company, with the title of superintendent of rolling stock and equipment.

Mr. W. N. Gorenflo, general manager of the Gulfport & Mississippi Coast Traction Company, Gulfport, Miss., who was recently elected president of the Mississippi Electrical Association, was born in Biloxi, Miss., in 1877. He was graduated from the public schools in that city and entered the Mississippi Agricultural & Mechanical College at Starkville, completing the mechanical course in 1899. He entered the oyster-canning business and later became assistant cashier of the Bank of Biloxi. He helped organize the Biloxi Electric Railway & Power Company in 1903 and became the first secretary and manager of the company. In 1905 the property of the Biloxi Electric Railway & Power Company was sold to the Gulfport & Mississippi Coast Traction Company and in the following year Mr. Gorenflo was made general superintendent of the system. In January, 1911, he was promoted to the position of general manager.

Mr. R. H. Crozier, whose appointment as assistant general passenger agent of the Spokane, Portland & Seattle Railway, Oregon Electric Railway, Oregon Trunk Railway

and United Railways, with headquarters at Portland, Ore., was noted recently in the ELECTRIC RAILWAY JOURNAL, has been connected with railway work for more than sixteen years. For thirteen years he was with the passenger department of the Chicago, Burlington & Quincy Railroad, and for more than three years he has been with the Spokane, Portland & Seattle Railway and associated lines. During his connection with the Chicago, Burlington & Quincy Railway he served in various positions in the general offices at Chicago, St. Louis and St. Paul and as traveling passenger agent at Kansas City and division passenger agent at St. Joseph. From Jan. 1, 1910, until April 10, 1913, Mr. Crozier was advertising agent of the Spokane, Portland & Seattle Railway, Oregon Trunk Railway and United Railways, Portland. He also served in a similar capacity with the Oregon Electric Railway from July, 1910, until April 10, 1913.

Mr. Thomas N. McCarter, president of the Public Service Corporation of New Jersey, Newark, N. J., had tendered to him a testimonial dinner on the evening of June 2, 1913, at Delmonico's in New York by the directors of the company in celebration of the tenth anniversary of its organization. Mr. Walton Clark, one of the directors, acted as toastmaster. Mr. Frank Bergen, counsel of the company, on behalf of the officers and directors presented Mr. McCarter with a punch bowl, which was concealed during the dinner under an imitation birthday cake in which ten candles had been stuck. Mr. McCarter expressed his appreciation of the gift and then reviewed the history of the company briefly. He said that since June 2, 1902, more than $75,000,000 had been spent in improvements to the properties which are controlled by the company. Among the officers and directors of the company not previously mentioned who were present were Messrs. George J. Roberts, J. J. Burleigh, A. R. Kuser, E. W. Hine, Thomas Dolan, J. Horace Harding, P. S. Young, M. R. Boylan, H. V. Drown, John L. O'Toole, R. E. Danforth and Newton W. Bolen.

Mr. William E. Holstock has been appointed superintendent of transportation of the New York State Railways, Syracuse lines, to succeed Mr. Elmer E. Strong, who has become superintendent of transportation of the New York State Railways, Rochester lines. Mr. Holstock was formerly assistant superintendent of transportation of the New York State Railways, Syracuse lines. Mr. Holstock began his railroad career with the Saginaw (Mich.) Street Railway in 1881 as a horse car conductor and remained in the service of that company until 1889. He was appointed to the People's Railroad, Syracuse, in 1889 in charge of the horse car stables. When the new South Salina Street station was built in Syracuse Mr. Holstock was placed in charge of that station as foreman and served in that capacity until 1905. He was then promoted to the position of general foreman, in which capacity he continued until March 18, 1912, when he was promoted to the office of assistant superintendent of transportation. His advancement from the post of assistant superintendent of transportation to superintendent of transportation of the Syracuse lines was made effective from June 4.

Mr. J. H. Miller, whose appointment as general passenger agent of the Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., was noted in the ELECTRIC RAILWAY JOURNAL of June 7, 1913, began his railway career in 1905 as night ticket agent for the Rock Island System at Washington, Ia. He next entered newspaper work as a reporter, but returned to the Rock Island System as night ticket agent at Washington in 1906. In the spring of 1907 he became ticket agent, cashier and bill clerk of the Rock Island System at Columbus Junction, Ia. Later in the year he was appointed ticket agent for the company at Eldon, Ia., and in July, 1908, was appointed assistant city passenger agent for the Rock Island System at St. Joseph, Mo. He continued in the last mentioned capacity until September, 1912, when he was made acting city passenger agent. Upon the return of the city passenger agent in December, 1912, Mr. Miller was made chief rate clerk in the general passenger office of the Rock Island at Topeka, Kan., under Mr. J. A. Stewart, general passenger agent, and remained in that capacity until he was appointed to the Kansas City, Clay County & St. Joseph Railway. Mr. Miller is twenty-five years old.

Mr. Edward M. Raver resigned as superintendent of transportation of the Michigan United Traction Company, with offices at Battle Creek, Mich., on May 31, 1913, to become superintendent of transportation of the Lincoln (Neb.) Traction Company. Mr. Raver began his electric railway career in 1892 as a motorman with the Fort Wayne & Northern Indiana Traction Company in Logansport, Ind. He was made road officer of that company in 1902 and a short time later his jurisdiction was extended over the interurban division from Logansport to Wabash, Ind. In October, 1904, Mr. Raver was appointed division superintendent of the Fort Wayne & Wabash Valley Traction Company's lines between Logansport, Peru and Wabash, and in May, 1907, he was transferred to the Fort Wayne city division as superintendent, in which capacity he remained until April, 1911, when he resigned to accept the position of city superintendent at Jackson, Mich., with the Michigan United Railways, now the Michigan United Traction Company. In April, 1912, Mr. Raver was appointed superintendent of transportation of the lines of the Michigan United Traction Company.

Mr. Thomas Finigan has resigned as purchasing agent of the United Railroads, San Francisco, Cal., to accept the vice-presidency of Pierson, Roeding & Company, San Francisco, representatives for manufacturers of street railway supplies, with branches in Los Angeles, Cal., Portland, Ore., and Seattle, Wash. Mr. Finigan entered the employ of the Consolidated Traction Company, Newark, N. J., now the Public Service Corporation, in 1898 and was advanced rapidly to the position of assistant master mechanic. He resigned from the company to become associated with the mechanical department of the United Railroads, San Francisco, in 1903. He has since remained continuously in the employ of that company. He took entire charge of the commissary department created by the United Railroads to meet the unusual conditions arising from the earthquake and fire of 1906 and the strike of 1907, when the company fed and cared for more than 2000 employees. In the latter part of 1907 he was appointed purchasing agent of the company. Mr. Finigan is well known in the electric railway field. He has served on various committees of the American Electric Railway Association and is acting secretary for the recently organized Pacific Coast Electric Railway Association. Although Mr. Finigan has had no previous experience in the commercial end of the electric railway business, he has the advantage of fifteen years' knowledge of materials, a wide acquaintanceship and a genial personality. Before he severed his connections with the United Railroads the officials of that company tendered a farewell dinner to Mr. Finigan. In accepting the vice-presidency of Pierson, Roeding & Company, Mr. Finigan succeeds Mr. Safford K. Colby, who, as previously mentioned in the ELECTRIC RAILWAY JOURNAL, has been elected one of the vice-presidents of the firm of Allen & Peck, Inc. Mr. Colby continues as a director of Pierson, Roeding & Company.

Thomas Finigan

OBITUARY

George Hoeger, superintendent of the Schuylkill Valley Traction Company and general manager of the Montgomery Transit Company, Norristown, Pa., is dead. Mr. Hoeger was born in Germany in 1860. His first experience in railway work was gained in Milwaukee, Wis., in the horse car days. Some nineteen years ago he became electrician of the Roxborough, Chestnut Hill & Norristown Railway under Mr. J. C. Lugar. He was appointed general manager, superintendent and electrician of the Schuylkill Valley Traction Company when that company took the Roxborough, Chestnut Hill & Norristown Railway over under lease of 1902.

Construction News

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

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

RECENT INCORPORATIONS

***Springfield & Central Illinois Railway, Springfield, Ill.**—Incorporated in Illinois to build an electric railway from a point south of Springfield to connect with the main line of the Terre Haute, Springfield & St. Louis Railway. Capital stock, $5,000. Incorporators: George W. White, Alfred L. Lynch, N. E. McMillan, and W. C. Neubauer, East St. Louis, and William Larberg, C. P. Johnson, W. D. Owens, Isaac Smith and A. C. Skillman, St. Louis.

***Cushing (Okla.) Railroad.**—Application for a charter has been made by this company to build a 12-mile electric railway from Cushing to Drumwright. Incorporators: Paul Arbon and C. R. Perry, Tulsa, and T. J. Hughes, J. H Bellis and R. C. Jones, Cushing.

***Guadalupe Traction Company, Seguin, Tex.**—Chartered in Texas to build an electric railway between Austin and San Antonio. Capital stock, $100,000. Incorporators: W. B. Dunlap and Walter J. Crawford, Beaumont; E. W. Brown, Orange; J. M. Abbott and J. M. Abbott, Jr., Seguin.

FRANCHISES

Corona, Cal.—The Pacific Electric Railway, Los Angeles, has received a franchise in Corona. The company has also received permission to construct a double-track line along San Pedro Street between Aliso Street and Ninth Street in Los Angeles.

Glendale, Cal.—The Board of Trustees has been asked to grant a fifty-year franchise for an electric railway in Glendale.

Santa Monica, Cal.—The Pacific Electric Railway has received a twenty-year franchise in Santa Monica.

Atlanta, Ga.—The Georgia Railway & Power Company has asked the Council for a franchise to double-track Ivy Street, Atlanta. The company has received a franchise in Clarkston for its extension from Atlanta to Stone Mountain.

Augusta, Ga.—The Atlanta & Carolina Railway has asked the Council for a franchise in Augusta. This line will connect Atlanta, Augusta and Athens.

Freeport, Ill.—The Freeport Railway & Light Company has received permission from the Council to remove its tracks on Gund Avenue and Hancock Avenue in the city of Freeport.

Springfield, Ill.—The Springfield Traction Company has asked the Commissioners for a franchise in Vigo County, Ind.

Taylorville, Ill.—Mayor Walter M. Provine, Taylorville, has again vetoed the franchise granted by the Council to the Decatur, Sullivan & Mattoon Transit Company on the ground that the term of fifty years is too long. [E. R. J., May 31, '13.]

Terre Haute, Ind.—The County Commissioners have granted a fifty-year franchise to the Springfield & Central Illinois Traction Company to cross the highways of the county. [E. R. J., May 24, '13.]

Humboldt City, Kan.—The Union Traction Company, Independence, has received a franchise from the Council in Humboldt City.

Portland, Maine.—The Cumberland County Power & Light Company has received a franchise over certain streets in Portland.

Templeton, Mass.—The Northern Massachusetts Street Railway has received a franchise for a connection with the lines of the Boston & Albany Railroad at Templeton Station.

***Brownstown, Mich.**—The citizens of Brownstown have voted to grant a franchise to the Arthur J. Greenway Company, Detroit, for right-of-way through Brownstown. This is part of a plan to build an electric railway to connect Rockwood, Flat Rock, Dundee, Brownstown and Adrian.

St. Louis, Mo.—The St. Louis & Jennings Railway has received a fifty-year franchise from the County Court from Florissant Avenue and Jennings Road to Melrose Avenue, St. Louis.

Medford, Ore.—S. S. Bullis & Sons, New York, have taken over a franchise for an interurban line to be constructed in the Rogue River Valley. The franchise was originally granted to the Minney Company, Oakland, Cal., later transferred to Col. F. B. Waite, Sutherland, Ore., and still later turned over to the city of Medford. The new owners will immediately begin building the line from the heart of the business district of Medford to Siskiyou Heights. Later the railway will be extended from Medford south to Phoenix, Talent and Ashland, thence north to Central Point. The company has petitioned the County Court for a right-of-way over several of the county highways.

Portland, Ore.—The Clackamas Southern Railway has asked the Council for a franchise in Portland. This line will connect Oregon City with the Molalla Valley in Clackamas County. A. E. Clark is interested. [E. R. J., April 16, '10.]

Hazel Dell, Pa.—The Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, has received a ninety-nine year franchise in Hazel Dell. Work will soon be begun by the company on its line from Ellwood City to Beaver Falls.

Chattanooga, Tenn.—The Chattanooga Railway & Light Company has received a franchise over Seventh Street in Chattanooga.

Chattanooga, Tenn.—The Eastern Tennessee Traction Company has received a franchise from the James County Court to build its lines in James County. This 30-mile line will connect Chattanooga and Cleveland. L. M. Coleman is interested. [E. J. R., May 24, '13.]

El Paso, Tex.—The El Paso Electric Railway has asked for a franchise over certain streets to the eastern city limits in El Paso.

Salt Lake City, Utah.—The Salt Lake & Ogden Electric Railway has received a franchise over certain streets in Salt Lake City.

Huntington, W. Va.—The Ohio Valley Electric Railway has asked for a franchise to double-track its lines on Third Avenue and Fourth Avenue and to build an extension to Ritter Park in Huntington.

Madison, Wis.—The Chicago & Wisconsin Valley Street Railway has notified the Council that it is willing to complete a railway from Pinckney Street to the east side of Madison, with a fifteen-minute schedule, within sixty days, or to complete the entire city system. If the city wishes to delay the construction of the city line for another year, the company will build lines to Portage and Prairie du Sac this year and after finishing the city line will extend the railway to Janesville.

Milwaukee, Wis.—The Milwaukee Electric Railway & Light Company has asked for a franchise on State Street to Thirty-fifth Street and on Howell Avenue from Russell Avenue to the city limits in Milwaukee.

TRACK AND ROADWAY

Little Rock Railway & Electric Company, Little Rock, Ark.—Plans and specifications have been completed and bids are being asked by this company for grading its extension to Biddle.

Pacific Electric Railway. Los Angeles, Cal.—Work will soon be begun by this company on a short line between Los Angeles and Pasadena, which will cut the running time fifteen minutes.

Pacific Electric Railway, Los Angeles, Cal.—This company plans to lay 5 miles of new track at Riverside.

Crescent City Railway, Riverside, Cal.—Work has been begun by this company on its line between Bloomington and Rialto.

***San Francisco, Cal.**—The Board of Works has been directed by the Board of Supervisors to file plans and estimates of the cost of a system of municipal electric railways from the Embarcadero to terminals at the Exposition grounds and the Presidio; also over certain streets and avenues in San Francisco.

San José & Santa Clara Electric Railroad, San José, Cal.—Work has been begun by this company on the extension in Santa Clara to the railroad station.

***Washington, D. C.**—The Public Utilities Commission has been asked to approve plans for the construction of an electric railway between Anacostia, Suitland and Bradbury Heights.

Albany (Ga.) Transit Company.—Material has been ordered by this company for the extension of its Madison Street line west for about 1 mile in Albany.

Lewiston-Clarkston Valley Railway, Lewiston, Idaho.—It is stated that this company has completed its financial arrangements and will begin the construction of its line at once. Material for 18 miles of track has been ordered from the General Electric Company. F. L. Sturm, president. [E. R. J., May 24, '13.]

Northwestern Elevated Railroad, Chicago, Ill.—Plans are being considered by this company to extend its lines to Wilmette.

Danville, Crescent & Kankakee Traction Company, Crescent City, Ill.—This company has secured right-of-way from Kankakee to Cissna Park, 40 miles, and will begin grading about Aug. 1 on its line to connect Kankakee, Le Rable, Crescent City, Woodworth, Cissna Park, Rankins, Ellis, Potomac, Jamesburg and Danville. The power station and repair shops will be located at Crescent City. Capital stock authorized, $250,000. Officers: E. E. Meyer, Crescent City, president; Jules Lemenager, Ashkum, vice-president; G. H. Clark, Crescent City, secretary, and W. R. Nightingale, Crescent City, treasurer. [E. R. J., Aug. 21, '09.]

Peoria, Canton & Galesburg Railroad, Peoria, Ill.—This company announces that steps will be taken soon to increase its capital stock from $5,000 to $2,500,000. W. T. Irwin, Peoria, president.

Fort Wayne & Northwestern Railroad, Fort Wayne, Ind.—It is stated that this company plans to build a line from Huntertown to Churubusco in the near future.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.—Work will be begun at once by this company removing its tracks from Glen Miller Park and building its extension into Belleview.

Keokuk & Columbus Junction Transit Company, Keokuk, Ia.—Surveys have been made by this company on its 89-mile electric railway between Columbus Junction, Keokuk, West Point, New London, Winfield and Donnellson. It has not been determined when construction will be begun. T. A. Craig, Keokuk, secretary. [E. R. J., Feb. 13, '09.]

Arkansas Valley Interurban Railway, Wichita, Kan.—Work will be begun at once by this company on the extension north from Newton to Bethel College, 2 miles. A part of the plant for the extension includes a $12,000 concrete bridge, the expense of which is to be borne jointly by the company, the city and the county.

Owensboro (Ky.) City Railway.—Plans are being made by this company to extend its line on Breckenridge Street, Owensboro, to the Elmwood cemetery.

Kentucky Southwestern Electric Railway, Light & Power Company, Paducah, Ky.—This company has awarded the contract for the construction of the first division of its line from Paducah to Murray, via Mayfield. Work will be begun Aug. 1.

Paducah (Ky.) Traction Company.—This company is making improvements to its lines. Heavier rails are being laid on Jefferson Street from Fountain Avenue to the city limits. Track repairs have also been made on the West Broadway line from Eleventh Street to Fountain Avenue in Paducah.

Orleans-Kenner Electric Railway, New Orleans, La.—Preliminary arrangements are being made by this company to build its electric railway between New Orleans, Kenner and Hanson City. A. Smith Bowman, New Orleans, is interested. [E. R. J., Feb. 8, '13.]

Sandy Springs Railway, Kensington, Md.—Grading is being done by this company for a 1-mile extension in Kensington.

Bay State Street Railway, Boston, Mass.—This company has been asked to consider plans to extend its Highland Circuit line from Rock Avenue and Hollingsworth Street to connect with its present line at Hollingsworth Street in Lynn.

Berkshire Street Railway, Pittsfield, Mass.—This company and the Council have reached an agreement on the Wahconah Street double-track improvements. This will be sent to the railroad commissioners for approval so that work may be begun as soon as possible.

Worcester (Mass.) Consolidated Street Railway.—Plans are being made by this company to lay 1 mile of new track from Southbridge to Brimfield.

***Minneapolis, Minn.**—Plans are being considered to build another suburban electric railway between Minneapolis and St. Cloud. E. G. Potter, Minneapolis, is interested.

***Riverhead, N. Y.**—Plans are being considered to build a 30-mile railway to connect Riverhead, Aquebogue, Jamesport, Laurel, Mattituck, Cutchogue, Peconic, Southold, Greenport, East Marion, Orient and Orient Point. Among those interested are Edward B. Eaton and W. S. Davis, Hartford, Conn.; H. B. Howell and Dwight Corwin, Riverhead.

New York State Railways, Rochester, N. Y.—Work has been begun by this company relaying its tracks on Onondaga Street to the city limits. Work will soon be begun double-tracking its James Street line from Sedgwick to the city limits.

***Waynesville, N. C.**—Plans are being considered to build an electric railway to connect Waynesville, Canton, Clyde, Hazelwood, Bellwood and Woodrow. Among those interested are Alden Howell and John P. Swift, Waynesville.

Stark Electric Railroad, Alliance, Ohio.—Work on this company's line to Akron will be begun as soon as the extension from Alliance to Cleveland via Ravenna has been completed.

Poland Street Railway, Youngstown, Ohio.—This company, which plans to build an electric railway between Poland and Youngstown, has mortgaged its property, consisting of the right-of-way, for $200,000 to defray the cost of construction. The mortgage is to secure bonds of which the Union Trust Company, Pittsburgh, is trustee. John Harrington, Poland, is interested. [E. R. J., Jan. 27, '12.]

Kansas-Oklahoma Traction Company, Nowata, Okla.—Preliminary surveys are being made by this company for a line from Winfield via Arkansas City, Blackwell and Tonkawa to Perry. Clyde A. King, Coffeyville, is interested. [E. R. J., May 10, '13.]

Lake Erie & Northern Railway, Brantford, Ont.—Work has been begun by this company on its line between Galt, Brantford and Port Dover.

Oregon Electric Railway, Portland, Ore.—Preliminary surveys are being made by this company for a line from Forest Grove to Gale Creek and eventually to Tillamook.

Oregon Short Line Railway, Portland, Ore.—According to reports this company contemplates electrifying its entire system in southern Idaho from Pocatello to Huntington.

Altoona & Logan Valley Electric Railway, Altoona, Pa.—Plans are being made by this company to begin work on its extension from Twenty-second Street and Pleasant Valley to the Altoona Driving Park in Altoona.

West Side Electric Street Railway, Charleroi, Pa.—Grading has been begun by this company on the Charleroi end of its line, together with grading in the center of the proposed line to Bentleyville and on the Bentleyville end. The company is doing the grading on both ends of the line and the Parsons Construction Company, Brownsville, is engaged in the work at the center.

Schuylkill County Railway, Harrisburg, Pa.—This company and its subsidiary, the Shenandoah & Wiggins Railway, which have just been chartered, announce that work will be begun at once on the first section of the line between Frackville and Pottsville. A spur will be built from Shenandoah to Fountain Springs. [E. R. J., May 31, '13.]

Renova & Gleasonton Street Railway, Renova, Pa.—This company states that it has no definite plans as to

when work will be begun on its 6-mile electric railway between Renova and Gleasonton via Farwell and North Bend. W. B. Reilley, Renova, treasurer. [E. R. J., Jan. 22, '10.]

Moose Jaw Electric Railway, Moose Jaw, Sask.—This company plans to extend its line through Boulevard Heights and Parkdale Boulevard in Moose Jaw.

***North Anderson Development Company, Anderson, S. C.**—Work will be begun at once by this company on its interurban railway between North Anderson and Anderson.

Greenville, Spartanburg & Anderson Railway, Greenville, S. C.—Plans are being considered by this company to make Atlanta its southern terminus.

***Chattanooga, Tenn.**—J. W. Adams, Chattanooga, and associates are considering plans to build an electric railway from Chattanooga to Dalton.

Memphis (Tenn.) Street Railway.—Plans are being made by this company for an extension on Lane Avenue in Memphis from Claybrook Street to Evergreen Street.

Corpus Christi Street & Interurban Railway, Corpus Christi, Tex.—During the next thirty days this company plans to build 2 miles of new track with 72-lb. T-rails with continuous joints and 10-in. compression bond.

Dallas Eastern Interurban Railway, Dallas, Tex.—Surveys are being made by this company from Dallas to Glen Rose, via Cement City, Grand Prairie, Webb, Mansfield, Venus, Alvarado, Keene and Cleburne. E. P. Turner, promoter. [E. R. J., May 10. '13.]

Blue Ridge Interurban Railway, Greenville, Tex.—It is reported that this company has placed in operation its 5-mile line between Westminster and Anna. Grading is being done between Westminster and Blue Ridge, 7 miles. It is planned ultimately to extend this line to Greenville. A. R. Nicholson, Greenville, is interested. [E. R. J., April 5. '13.]

Lynchburg Traction & Light Company, Lynchburg, Va.—Work has been begun by this company on the extension from the city line in Rivermont to the Peakland property.

Virginia Railway & Power Company, Richmond, Va.—Work has been begun by this company on its Hull Street line out the New Road to the Broad Rock Road in Richmond.

Gray's Harbor Railway & Light Company, Aberdeen, Wash.—This company plans to spend $30,000 on improvements to its lines in Aberdeen.

Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va.—Plans are being made by this company to extend its lines to McConnellsville, Ohio, in the near future.

Wheeling (W. Va.) Traction Company.—This company plans to extend its double track at McMechen to the lower section of the city during the summer.

SHOPS AND BUILDINGS

Tri-City Railway & Light Company, Davenport, Ia.—This company has secured an option on property at Second Street and Perry Street in Davenport on which it plans to build a new interurban station and an office building.

Cape Breton Electric Company, Sydney, N. S.—This company is building an addition to its carhouse in Sydney, increasing its capacity about 50 per cent.

Oregon Electric Railway, Portland, Ore.—It is reported that this company will receive bids for the construction of a $50,000 depot in the near future.

Greenville, Spartanburg & Anderson, Greenville, S. C.—Plans have been completed by this company for a new depot at Greers, S. C. The company has awarded a contract for a new combination passenger and freight depot to the Wilkinson-Moffitt Construction Company, Durham. The cost is estimated to be $15,000.

Nashville-Gallatin Interurban Railway, Nashville, Tenn.—Announcement has been made that the Fidelity Securities Company has purchased property at Union Street and Second Avenue in Nashville, and will build passenger and freight terminal stations for the Nashville-Gallatin Interurban Railway. H. H. Mayberry is president of both companies.

Northern Texas Traction Company, Fort Worth, Tex.—Plans are being made by this company to build a new terminal building at Jackson Street and Browder Street in Dallas. The structure will be nine stories high, the train sheds 200 ft. x 270 ft. and of terra-cotta and brick construction.

Salt Lake & Ogden Electric Railway, Salt Lake City, Utah.—This company has received permission to change its terminal from its present location on Third West Street to a central point in the uptown district of Salt Lake City.

Monongahela Valley Traction Company, Fairmont, W. Va.—This company has awarded a contract to the Richards Construction Company, Clarksburg, for the construction of a new combination brick substation and passenger station at Janelew.

POWER HOUSES AND SUBSTATIONS

Chicago (Ill.) Railways.—This company will add to its substation equipment three 4000-kw rotary converters with 600-kva reactances and three 4200-kva air-blast transformers with three 20,000-cu. ft. blower sets and switchboard apparatus. All three units have been ordered from the General Electric Company.

Fort Wayne & Springfield Electric Railway, Decatur, Ind.—During the next thirty days this company will award contracts for a new 50-hp electric motor and pumps for a gravel pit.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.—During the next few weeks this company expects to purchase three 500-kva, 2300-44,000-volt step-up transformers.

Washington, Baltimore & Annapolis Electric Company, Baltimore, Md.—This company has placed an order with the General Electric Company for new substation equipment consisting of two 360-kw and one 120-kw, two-unit, two-bearing frequency changer set, three 200-kva and one 100-kva transformer and switchboard apparatus.

Providence & Fall River Street Railway, Swansea Center, Mass.—This company will install a 300-kw rotary converter, three 100-kva transformers and switchboard in one of its substations. The apparatus has been ordered from the General Electric Company.

Twin City Rapid Transit Company, Minneapolis, Minn.—New substations are under construction by this company and brick stacks in all plants are being replaced by self-supporting steel stacks to increase the plant capacity. The company is installing two 3000-kw rotary converter units in the Snelling Avenue substation at University Avenue and Snelling Avenue, St. Paul. A new substation is building in the vicinity of Hennepin Avenue and Lake Street, Minneapolis. This station will complete a line of substations for South Minneapolis lines.

Belt Line Railway Corporation, New York City, N. Y.—This company has placed an order with the General Electric Company for two 200-kw rotary converter charging sets and six 85-kva transformers.

Toledo Railway & Light Company, Toledo, Ohio.—This company has placed an order with the General Electric Company for a 12,500-kw Curtis turbo-generator.

Philadelphia (Pa.) Rapid Transit Company.—Plans are being prepared by this company to build a new substation at its Thirteenth Street and Miffin Street carhouse in Philadelphia. The structure will be 96 ft. x 54 ft.

Corpus Christi Street & Interurban Railway, Corpus Christi, Tex.—During the next few weeks this company will purchase one 150-kw generator and four-valve engine suitable for same and a switchboard.

Dallas Electric Light & Power Company, Dallas, Tex.—This company will add to its substation equipment a 1000-kw three-bearing motor-generator set. The apparatus has been ordered from the General Electric Company.

Southern Traction Company, Dallas, Tex.—Work has been begun by this company on its new substation on North Waco Street in Hillsboro. The structure is 40 ft. x 50 ft. and of brick construction. The remainder of the lot on which this substation is to be constructed will contain tracks and sheds and an express and baggage station. All of the buildings will be of brick.

Manufactures and Supplies

ROLLING STOCK

Louisville (Ky.) Railway is in the market for ten new cars.

Calgary Street Railway, Calgary, Alta., Can., is in the market for six cars.

Halifax (N. S.) Electric Tramway is in the market for six closed street cars.

Cleveland (Ohio) Railway is in the market for fifty center-entrance cars.

Salt Lake & Ogden Railway, Salt Lake City, Utah, it is reported, will purchase additional cars.

Great Falls (Mont.) Street Railways has ordered four double-truck cars from The J. G. Brill Company.

Detroit (Mich.) United Railway is reported as expecting to purchase from ten to twenty steel interurban cars.

Charlotte (N. C.) Electric Railway has placed an order with the Southern Car Company to rebuild sixteen of its cars.

Panama (Panama) Railway has ordered fifteen storage battery cars from the Federal Storage Battery Car Company.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., is building thirty new cars at its Cold Springs shops.

Asheville Power & Light Company, Asheville, N. C., has purchased six 20-ft. 8-in. semi-convertible cars from The J. G. Brill Company.

Toledo Railways & Light Company, Toledo, Ohio, has ordered thirty cars from the McGuire-Cummings Manufacturing Company.

United Traction Company, Albany, N. Y., has ordered twelve pay-within cars from the Cincinnati Car Company, through W. R. Kerschner, New York.

Greenville, Spartanburg & Anderson Railway, Charlotte, N. C., has ordered six 60-ton, 1500-volt electric locomotives from the General Electric Company.

Oakland, Antioch & Eastern Railway, Oakland, Cal., has ordered four 56-ft. 8-in. combination passenger, smoking and baggage cars from the Cincinnati Car Company.

Meridian Light & Railway Company, Meridian, Miss., has ordered two 20-ft. 8-in. pay-as-you-enter cars, mounted on Brill 21-E trucks, from the American Car Company.

Hagerstown & Frederick Railway, Hagerstown, Md., has ordered seven 34-ft. 6-in. semi-convertible combination passenger-baggage-smoking cars from The J. G. Brill Company.

Kalamazoo-Grand Rapids Electric Railway, Kalamazoo, Mich., has placed an order with the St. Louis Car Company for seven 66-ft. 10-in. all-steel limited cars, ten 52-ft. steel local cars and four steel express cars.

Brooklyn (N. Y.) Rapid Transit Company is urging the Public Service Commission to approve plans for the type of cars submitted by the company for use on the lines which it will operate under the terms of the dual subway contract.

Tri-City Railway, Davenport, Ia., noted in the ELECTRIC RAILWAY JOURNAL of June 7, 1913, as expecting to purchase sixty city cars, has ordered thirty cars from the St. Louis Car Company, and thirty-five from the American Car Company.

Chicago (Ill.) Railways has completed plans and specifications for 200 semi-steel cars. It has decided to build 100 of them in its own shops and will purchase the other 100. In general the cars will be all-steel underframe with plate girder sides up to the belt rail. The bodies are designed for double-end operation and are to be 32 ft. 5 in. long with two 8-ft. platforms, making the over-all dimensions 48 ft. 5 in. The cars will seat forty-eight passengers within the car body and five slat seats will be provided on the platform. The body will be mounted on maximum traction trucks. The weight of the cars complete is estimated at 37,000 lb. each.

Tri-City Railway, Davenport, Ia., has specified the following details for the thirty pay-as-you-enter closed cars now being built by the St. Louis Car Company:

Bolster centers, length, 19 ft. 2 in.	Couplers ..... Tomlinson
Length of body .... 30 ft. 8 in.	Curtain fixtures .. Cur. S. Co.
Length over vestibule, 43 ft. 8 in.	Curtain material .. Pantasote
Width over sills ... 8 ft. 3⅝ in.	Destination signs, Elec. Serv. Sup.
Width over all ..... 8 ft. 6 in.	Fenders ..... Providence
Height, rail to sills ..... 31 in.	Gongs ..... St. L.
Sill to trolley base .. 8 ft. 7 in.	Hand brakes ..... St. L.
Body ..... composite	Headlights ..... U.S.
Interior trim. polished bronze	Journal boxes .... Symington
Headlining ..... agasote	Registers ..... International
Roof ..... monitor	Sanders ..... Keystone
Underframe ..... composite	Sash fixtures ..... Edwards
Axles ..... hammered steel	Seats ..... H. & K.
Bumpers ..... 6 x ⅜-in. plate	Step treads ..... Universal
Car trimmings ..... St. L.	Trolley catchers or retrievers ..... Keystone
Conduits and junction boxes, St. L.	Trucks ..... St. L.
	Wheels ..... 33-in. chilled

San Antonio (Tex.) Traction Company, noted in the ELECTRIC RAILWAY JOURNAL of March 29, 1913, as having ordered ten closed prepayment cars from the American Car Company, has specified the following details for these cars:

Seating capacity 40	Curtain material ... Pantasote
Bolster centers, length, 17 ft. 4 in.	Destination signs ..... Hunter
Length of body ... 28 ft. 10 in.	Gears and pinions ..... G.E.
Length over vestibule, 41 ft. 4 in.	Gongs ..... Brill
Width over sills .... 8 ft. 0 in.	Hand brakes ..... American
Height, rail to sills ..... 32 in.	Headlights .... Crouse-Hinds
Sill to trolley base. 9 ft. 1½ in.	Journal boxes ..... Brill
Body ..... wood	Motors, 4 G.E. 200 outside-hung
Interior trim .. polished brass	Paint ..... American
Headlining ..... agasote	Sanders ..... American
Roof ..... plain arch	Sash fixtures ..... Edwards
Underframe ..... composite	Seats ..... Brill
Air brakes ..... West.	Seating material .. cherry slat
Axles ..... Brill	Springs ..... Brill
Bumpers ..... American	Trolley retrievers, Trolley S. Co.
Cables ..... G. E.	Trolley base ..... G.E.
Car trimmings ..... Brill	Trucks ..... Brill 27-G-1
Control ..... G.E. K-28	Ventilators .... Brill exhaust
Couplers ..... American	Wheelguards ..... H-B
Curtain fixtures .. Cur. S. Co.	Wheels .... St. L. Car W. Co.

TRADE NOTES

E. W. Clark & Company, Philadelphia, Pa., have opened an office in suites 311 and 313, The Rookery, Chicago, Ill.

The J. G. Brill Company, Philadelphia, Pa., has received an order from the Dallas (Tex.) Consolidated Electric Street Railway for twenty-six 39-E trucks.

Southern Car Company, High Point, N. C., has elected A. H. Sisson its vice-president and treasurer. Mr. Sisson was formerly connected with Forsyth Brothers, Chicago, Ill.

Universal Safety Tread Company, Boston, Mass., has received an order for safety treads, to be used on the thirty new cars of the Tri-City Railway, Davenport, Ia., which are now being built by the St. Louis Car Company.

Safety Car Heating & Lighting Company, New York, N. Y., has elected A. C. Moore vice-president of the company with offices in Chicago, Ill. Mr. Moore, who was formerly general manager of the company, will have charge of the entire Western business.

Pyrene Manufacturing Company, New York, N. Y., has received recent orders for its fire extinguishers from the Berkshire Street Railway, Pittsfield, Mass., the Duquesne (Pa.) Light Company and the Edison Electric Illuminating Company, New York, N. Y.

Railway Utility Company, Chicago, Ill., has received the orders for ventilators from the New York (N. Y.) Railways for the 175 cars now being built by the St. Louis Car Company and for the forty-five storage battery cars being built by the American Car & Foundry Company.

American Veneer Company, Hoboken, N. J., has announced the resumption of business at its new location. The new plant, being four times the former capacity, will have vastly increased facilities for handling orders promptly and effectively. The company has also acquired the large plant of Joel H. Woodman and has added the business of this concern to its present activities.

Electric Service Supplies Company, Philadelphia, Pa., has opened an office in the Oliver Building, Pittsburgh, Pa., under the supervision of R. D. Brown of that city. The company also states that it has recently received orders for the automatic trolley guard from the American Railways, Philadelphia, Pa.; the Illinois Traction System, Peoria, Ill., and the Trenton, Bristol & Philadelphia Street Railway, Philadelphia, Pa.

Canadian General Electric Company, Ltd., Toronto, Ont., which owns and controls as subsidiary companies the Canada Foundry Company and the more recently acquired Canadian Allis-Chalmers Company, Ltd., has decided to consolidate the selling organizations of the two latter companies and conduct the selling organizations of both companies under the name of the Canadian Allis-Chalmers Company, Ltd.

Pierson, Roeding & Company, San Francisco, Cal., announce the election of Thomas Finigan as vice-president of the company to succeed Safford K. Colby, resigned. As previously noted in the Electric Railway Journal, Mr. Colby has been elected one of the vice-presidents of the firm of Allen & Peck, Inc. Mr. Colby continues as a director of Pierson, Roeding & Company. A portrait and a biography of Mr. Finigan are published elsewhere in this issue.

Lord Manufacturing Company, Brooklyn, N. Y., is placing on the market a so-called drive type of hydroground for lightning arrester ground. The advantage in this type over the Lord disk hydroground consists in the convenience and ease with which it may be placed in the ground. In shape it is a metal sheath 1½ in. in diameter, 2½ ft. in length, or with a 4-ft. extension, making an over-all length of 6½ ft. It is equipped with a sharpened point at the lower end and a malleable iron driving cap at the top. The sheath is highly perforated so that the hydroscopic body or element has large contact surface. Though the sheath is affected by electrolysis the element is not, and thus with age the hydroground improves, as more surface is brought into contact with the soil.

General Electric Company, Schenectady, N. Y., has received equipment orders from the following railways: Springfield (Mass.) Street Railway, six GE-80-A, 40-hp four-motor equipments and nine GE-87-A 60-hp two-motor equipments; Worcester (Mass.) Consolidated Street Railway, fifteen GE-87-A 60-hp two-motor equipments; Gary & Interurban Railway, Gary, Ind., four GE-226 45-hp four-motor equipments; Twin City Rapid Transit Company, Minneapolis, Minn., fifty-three GE-203 50-hp four-motor equipments, with straight-air-brake equipments and CP-25 compressors; Union Electric Company, Dubuque, Ia., six GE-203 50-hp two-motor equipments, with straight-air-brake equipments and CP-25 compressors; San Diego (Cal.) Electric Railway, thirty-five GE-201 60-hp two-motor equipments, with straight-air-brake equipments and CP-25 compressors, and the Tidewater Southern Railway, Stockton, Cal., three GE-201 60-hp four-motor equipments.

J. P. Devine Company, Buffalo, N. Y., has recently completed its new plant in East Buffalo. The plant has been erected on three acres of land conveniently located along the Erie Railroad. The main building is 220 ft. x 90 ft., constructed of brick with a concrete foundation. In this building all of the heavy machine tools, milling machines, lathes and boring mills are set on solid concrete foundation. A 20-ton Chisholm & Moore electric traveling crane is installed for quick handling of heavy material. The boiler shop, testing room, transformer room, laboratory and power plant are in another new building adjoining the main building. The administration building, in which are the main offices of the company, has also been removed to this location. The extensive increase in business and the constantly increasing size of units of the drying and impregnating apparatus manufactured by the company have made the construction of this new plant necessary.

Ohmer Fare Register Company, Dayton, Ohio, has, as an expression of appreciation of the remarkable record established by the conductors of the Portland Railway, Light & Power Company, Portland, Ore., after one year's experience with the recording system of the company and to lend encouragement to make their efforts worth while during the current year, offered cash prizes for the year ending Dec. 31, 1913. These prizes are: to the division making the highest average for the year, $100; to the division making the next highest average, $75, and to the division making the third highest average, $25. These prizes will be paid at the completion of the records for the year. The disposition of the prize money will be submitted to the vote of the conductors of the divisions, the only restrictions being that it must be applied to the purchase of something for the club rooms so that all may participate in the benefits. A year ago Mr. Ohmer, president of the company, made a similar offer to the conductors of the Denver (Col.) City Tramway. The winning division finished with a record of 96.57 per cent for the year.

ADVERTISING LITERATURE

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has issued a folder on its type PG porcelain strain insulators.

Railway & Industrial Engineering Company, Pittsburgh, Pa., has issued a pamphlet illustrating and describing how Horn type apparatus is being used.

Industrial Works, Bay City, Mich., have issued Bulletins Nos. 210 and 211, illustrating and describing "Pile Drivers, Crane Pile Drivers and Steam Hammers" and "Locomotive Cranes," respectively.

Automatic Flagman Company, Los Angeles, Cal., has issued Bulletin No. 3, describing its signals and containing views of several signals that have recently been installed on different railways.

Esterline Company, Indianapolis, Ind., has issued a small folder describing its "Golden Glow" headlights for railway service and also containing several illustrations of the headlights, both for roof and dash mounting.

American Brass Company, Ansonia, Conn., has issued an attractive pamphlet on Tobin bronze, illustrating and describing some of its many uses. The pamphlet also contains numerous testimonials from companies that have used this bronze.

National Quality Lamp Division of the General Electric Company, Cleveland, Ohio, has issued in pamphlet form the article read before the National Electric Light Association at its thirty-sixth convention held at Chicago, June 2-6, 1903, on "The Relation of the Incandescent Lamp to Lighting Service," by Robert E. Campbell and M. D. Cooper.

Pyrene Manufacturing Company, New York, N. Y., has issued a small booklet on its "Pyrene" fire extinguisher for electric service. The booklet contains a number of illustrations of railway tests in which arcs of high voltage have been extinguished by its use. It also contains much interesting information in reference to the application of the extinguishers.

J. G. White & Company, Inc., New York, N. Y., have reprinted in attractive pamphlet form the address "Some Mistaken Popular Notions Concerning Public Service Corporations" delivered by Frederick Strauss, of J. N. Seligman & Company, at the midyear meeting of the American Electric Railway Association held in New York in January, 1913. Mr. Strauss is a director of J. G. White & Company, Inc., and was a member of the Railroad Securities Commission appointed by President Taft.

Electric Service Supplies Company, Philadelphia, Pa., has issued the 1913 edition of its catalog on protected rail bonds and appliances. The seventy-two-page book covers the subject of rail bonding in its every phase. It is well illustrated, and besides showing the several types of rail bond, it illustrates clearly the value of proper installation, the importance of accurate testing apparatus and the use of bond compressors. The section of the catalog describing and illustrating the methods of installing rail bonds enters into the subject in detail and shows graphically the importance of assuring a perfect moisture-proof contact with the rail.