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### The Milwaukee Hearing

Considerable progress has been made in the hearing before the Wisconsin Railroad Commission upon the demand of the city of Milwaukee that the Milwaukee Electric Railway & Light Company reduce its fares. The latest contribution to this crusade is the testimony offered to the commission by the accountant for the city, who had made an examination of the company's accounts to prove his case. As similar insistent demands for low fares may arise in other cities an abstract of the testimony is pre-

sented in another part of this issue. One of the contentions of the city accountant was that the company had charged too much to its depreciation, accident and fire insurance reserve accounts, although he commended in the highest terms the accounting system of the company, which he said "was entitled to the greatest praise." The reply of the company to these claims, as well as in support of its demand that it is entitled to recognition of the amount invested in the property, irrespective of the replacement value of the present plant, will not be presented until the next hearing in September. It is safe to say, however, that the testimony when it is given will be a complete justification of the broad policy of fortifying the company in every way against contingencies of the future. The entire trend of practice, approved by such authorities as the Massachusetts Railroad Commission, is now toward the increase of fares, not their decrease, and in view of the very liberal rates now given in Milwaukee, it would be prima facie a step in the wrong direction to make any reduction.

### Hearing on Classification of Accounts

It will be apparent from the report published in this issue of the hearing on the tentative accounting system by the New York Public Service Commission, First District, that little progress was made in the consideration of the classification submitted. As a hearing will be held by the commissions of the First and Second Districts at Albany on Aug. 4, the accounting officers will have another opportunity to present criticisms. It is true that the time allowed for consideration of the scheme of accounts is short, and that the situation is thereby made burdensome for accountants who are at work on annual reports for the fiscal year ended June 30; but the adoption of a standard classification of accounts is so important that no other business should be allowed to interfere until final action has been taken by the commissions. It will be much easier to present arguments before the classification is promulgated under the authority conferred by the law than afterward. If the classification should be ordered as tentatively published no changes would be possible before Jan. 1, 1909, whereas objections that are raised now might effect modifications in the classification which it is intended to adopt for the last half of 1908. If the scheme of accounts embodied no details different from those which have been followed by electric railways in the past, there would be no especial reason why companies should give the time of officials at no inconsiderable expense in order to contribute to the discussion on this subject, but as many changes from past practice are contemplated, the railways of the State should be represented with practical unanimity at the next hearing.

### Excursion Rates

It is almost an axiom in the mercantile and manufacturing business that the larger the volume of the sales or articles produced the larger the profits. This is largely because economics can be introduced as trade increases. The work can be better subdivided and systematized so that there is less lost time, or to use an electrical term, the load factor of each individual or department is increased. In the transportation business the situation is somewhat different. An increase of business, if it is so constant as to afford fairly regular use of the equipment, is a good thing, but if it is intermittent or if it occurs on the peak of the regular load, it may be very expensive. This is what happens with most of the excursion trade.

For many years the steam railroad companies have made a practice of selling excursion tickets at reduced fares for week-end trips and on other special occasions. The custom is more prevalent abroad than in this country, but even here it is very general and for this reason has presumably proved profitable. But this need not be accepted as a guide in the management of electric transportation enterprises. The facilities of the steam railroads for taking care of this class of business are entirely different from those which prevail on the electric lines. The bulk of the steam railroad traffic comes from the haulage of freight, which, with the regular passenger business, shows a cessation at these times. The encouragement of traffic by special rates therefore tends to distribute evenly the load over the road and equipment and thus increase the load factor of the entire week.

Theoretically an electric railway should charge higher fares on Saturdays, Sundays and holidays than at other times. On these days the passenger traffic is naturally larger than on other days. Moreover, it is much more expensive for an electric line to provide extra equipment for peak service than it is on a steam railroad. An electric car and its equivalent in power station apparatus, if used only once a week, have practically seven times the interest charge than if employed every day. The "obsolescence" charge, of which we are hearing so much at present, is just as large as if the equipment was in continuous use, and the depreciation charge, at least on the rolling stock, is almost as great as if the cars were in regular service. Again it is impossible, as every manager knows, to secure reliable and experienced employees when they can be given work only a few hours every seven days or so, and casualties are the inevitable result. Finally, as shown in the Brooklyn hearings, it has been demonstrated that the long-haul excursion traffic drives away the more profitable short-haul traffic, so that with more crowded cars there is actually a considerable decrease in the receipts per car mile compared with the local cars. All in all, it is far from the correct business policy to offer low fares to assist in raising the peak of the load.

We have referred to the plan of charging higher fares at such times. In a number of German cities, as in Berlin, this policy is followed, and according to the testimony of the foreign managers has proved entirely satisfactory. It has been adopted in only two cities in this country so far as we know, namely, in Brooklyn by the Coney Island & Brooklyn Railroad Company and in Rochester, N. Y. The

former case is hardly an exception because the company has already notified the Public Service Commission that the week day rate is not profitable and has stated that it will be discontinued. In Rochester, however, the plan has recently been put in operation. The increase charged on the long lines on Saturdays, Sundays and holidays is approximately 10 per cent, and no objections have developed as a result. None should because the plan is dictated by sound business considerations which should appear evident upon consideration.

### Switchboard Contacts

Current carrying contacts on switchboards should receive careful periodic attention. This is especially true when fairly large currents are handled through the board. Considerable heat loss may be due to contacts not perfectly planed or to loose or dirty contacts. This applies, of course, both to switch and circuit breaker contacts, as well as to the permanent connections back of the board.

A connection or contact which is in very bad condition will usually give evidence of the fact by undue heating, although if the load is intermittent a contact may be quite inefficient without developing excessive heat. At times, however, it may be difficult to locate the bad contact definitely by the heat developed if several contacts in series are so close together that the heat from the bad one is transmitted to all. The best method of locating the bad contact and of determining the relative condition of contacts is to take readings of the voltage drop across the contacts with a millivoltmeter.

In a plant where a new 6000-amp circuit breaker had just been installed it was found to heat abnormally from the first. After complaint had been made of the operation of the circuit breaker an engineer found the permanent contacts back of the switchboard to be in very bad condition. The copper straps connecting the circuit-breaker stud to the ammeter shunt had been driven into place with a hammer, which upset the edges of the straps so that a thin piece of writing paper could be slipped under the contact nuts on one side. One of the four parallel straps had been left entirely off in order to hurry the job of installation, thus overloading the remaining three. The consequent overheating of these straps and the stud had been conducted through the stud to the circuit breaker, which, as it was the new member and the one which evidenced the heating at the front of the board, received the blame.

Later this same circuit breaker again began to become quite hot. As no change had been made in its connections, a millivoltmeter was brought into service. Readings around permanent contacts back of the board showed 1 to 2 millivolts average. Between the laminated contact of the breaker and one stud plate, 8 millivolts drop was found, while between the laminated contact and the other stud plate the drop was about 120 millivolts. The two contacts of the laminated main switch in series with the breaker showed 3 and 7 millivolts drop, all of the readings being with the average current of 3000 amp. The excessive drop of 120 millivolts was found to be due to dirty contacts, and this not only caused the excessive heating, but was the occasion of a constant heat loss averaging 360 watts, or about one-half of an electrical horse-power. Rigid in-

structions regarding cleaning of laminated contacts before closing such switches and circuit breakers not only saved that particular breaker, but in connection with an investigation and overhauling of other fixed and movable contacts on the switchboard is now saving that company an average of about 15 kw. This, it is true, is not a large item, but it amounts to the wages of a fireman, and certainly was worth the trouble occasioned by the investigation.

As was illustrated by the case referred to above, poor contacts back of the board may be due to hurry and consequent carelessness in making changes in the short time usually allotted to such work in an operating plant. After such changes are made, the drop across those connections that have been disturbed, i. e., the resistance, should be measured and, if found excessive, remedied immediately. Great care should be exercised in keeping switch and circuit breaker contacts, especially the laminated ones, clean and to a plane surface. As circuit breakers are in series with a switch and the switch is generally more easily accessible, it is good practice to leave the circuit breaker closed, except when the circuit is opened. Then it should be closed even if the circuit is to remain open. The circuit-breaker contacts will thus be kept clean and bright and the switch will serve to keep the circuit open.

Permanent contacts at the back of direct-current switchboards will generally remain good unless disturbed, except where there is a great deal of vibration. On alternating-current boards, where large currents are handled, nuts are more likely to work loose and consequently should receive more frequent attention.

### Another Decision on Transfers

For a long time the rulings of the courts, certainly in the East, were in the direction of extending the use of transfers, but now a turn seems to have been made. It is notable, and perhaps more than a coincidence, that three times within the same number of months, court decisions limiting the use of transfers have been recorded in these columns. Two of these were in New York State and related particularly to the metropolitan situation; the third and latest to be recorded is from Louisiana. The case was that of the Shreveport Traction Company vs. the City of Shreveport et al., in which the plaintiff attempted to secure an injunction to prevent the defendant from executing an ordinance requiring the issue of universal transfers on its system. The case was decided on June 22 in the Supreme Court of Louisiana, the highest tribunal in that State, and an application for a rehearing was denied June 29 by the same court.

The case hinged upon the question whether a franchise was a contract. The city did not deny that it had granted to the railway company three 50-year franchises, one in 1897, one in 1903 and one in 1904, in which the company was permitted to charge 5-cent fares with certain lower fares for school children. But the city claimed that these franchises were subject to the clause in the city charter which read as follows:

The Council shall have the power to pass such ordinances as are necessary to regulate the government of carts, drays, wagons and other vehicles, freight, locomotive, passenger and street cars.

This clause, it was claimed by the city, limited the fran-

chises granted by the early councils and gave any later council the authority to fix the street railway rates from time to time as necessity and justice might require. In other words, the right to regulate included the right to require the issue of transfers and no previous council had any authority to barter away this privilege. It is refreshing to know that the company did not put in as a defense that its business would have to be done at a loss in case the court held that transfers should be issued. It stood fairly and squarely on the claim that it had a contract, that a franchise was a contract and that the city had received a consideration in this contract, a consideration which is usually taken as ample for a franchise, that is, the improvement to the city itself. It is also satisfactory to know that this contention was upheld by the court.

The presiding justice considered the subject from two points of view: One was to define the "regulation" granted to the Council by the charter and the other was to define a contract. The former, in the opinion of the court, related simply to "such restrictions as may be necessary to protect the public from harm; it does not mean the least confiscation of any right or anything that will affect the revenues of the grantee." Another explanation showed that the court meant that the charter right signified the opportunity to regulate the speed of the cars and the motive power, but not fares. The subject of the contractual character of the franchises was discussed at considerable length in the decision. The court did not attempt to decide whether the Legislature, directly or through a railroad commission, could or could not regulate common carriers and their charges, but stated that it did not find "a single decision holding directly or expressly that the essentials of a contract may be changed or modified by the municipality in matter of revenue, as relates to a franchise stated in express terms." Louisiana cases and those of other States were quoted to sustain these points, but special emphasis was laid on the case of *Detroit vs. Detroit*, 116 U. S. 307. In summing up the points brought out in this case, the Louisiana judge remarked: "We are led to state that while it is true that one generation should be careful not to fasten burdens without ample consideration on succeeding generations, none the less, when it is manifest that there is valid consideration extending far into the future the grant may be made."

In the plea for the rehearing the court still further amplified its reasons for reaching the very just conclusion already mentioned. "There is no express legislation in this State authorizing municipalities to establish rates for street railroads by contract or agreement," the court says, "but such power necessarily flows from the statutory prohibition that no railroad shall be constructed through the streets of any incorporated city without the consent of the municipal council thereof. If a municipality has the power to grant a franchise on conditions, it necessarily must have the power to enter into an agreement binding upon both parties." This is common sense. A contract binding upon one party to it and not on the other is unthinkable. In the concluding words of the court: "The contrary theory would leave the street car company at the mercy of every successive council and would render the construction of street car lines impracticable as a business investment."

### An Improvement That Is a Betterment

The New York Public Service Commission, First District, has ordered the Interborough Rapid Transit Company to equip, as an experiment, 16 cars on its subway division with the additional side doors recommended by B. J. Arnold. The commission does not include in its order any instructions to the company regarding the account to which the cost of making these changes should be charged. Although the benefits from the change, if the experiment proves successful, will accrue to the public as much as to the company, the expense of the improvement will, of course, be met by the railway.

The amount of the expenditure which will be involved in this improvement has been variously estimated by the engineers for the commission and the company. Mr. Arnold computed the cost of making the alterations at \$2,000 for each of the 350 steel cars and \$1,500 for each of the composite cars of the subway division, making a total cost of \$1,450,000. The engineers of the company estimated the total cost at \$1,800,000. The order of the commission does not prescribe whether the steel or composite cars shall be used in this experiment. If it be assumed for argument that the additional doors are to be installed on 16 steel cars, the total cost, based on the estimate of the engineer of the commission, would be \$32,000.

The outlay of money involved in making the improvement could be charged in the accounts of the company either as an operating expense or as an addition to the capital investment in the plant. That the ultimate expense may be so large as to compel serious consideration of the matter is sufficiently plain from the foregoing figures. There can be no authority for assuming what the commission would decide in a particular case; but, reasoning from all the information that is obtainable at the present time, it is consistent to believe the commission would hold that an expenditure made in carrying out an order of this precise nature is a proper charge to capital account. It will be recognized that the sum could not with propriety be placed in operating expenses because it is a distinct addition to property investment, and furthermore, that the improvement was not made on the initiative of the company, but against its protest and wholly on the order of the State authorities. Since the cost is not properly chargeable to the operating accounts it must be treated through the capital accounts. Under the tentative classification of accounts issued by the New York Public Service Commissions for street and electric railways, capital is divisible into original capital, additions, betterments, renewals and replacements. Additional side doors would naturally be called betterments. The commissions define betterments as including the "enlargement or improvement of existing structures, facilities and equipment."

It may therefore be assumed that whether the amount involved is large, as it would be if the change had been ordered for all the cars operated in the subway, or relatively small, as it is for 16 cars, it will be added to the property account and will thereafter constitute a fixed charge on which interest will have to be earned annually. The situation with respect to these cars appears tolerably plain in the light of the new classification of accounts, and it has an important bearing on other work in which the

commission is engaged. The commission has undertaken a valuation of the surface street railways of New York City, and, as a preliminary step, has asked for inventories of the property. During the time that the surface railway companies have been in operation they have made many changes in their equipment, apparatus and other tangible investments which are comparable with those just ordered by the commission for the subway cars of the Interborough Rapid Transit Company. While such improvements were not specifically ordered by a public service regulating body, they were made with exactly the same end in view which the Public Service Commission had in mind when it directed the installation of additional doors on 16 subway cars. The improvements naturally involved some destruction in apparatus and equipment; but if the changes which they denoted had not been made the inadequacy and antiquity of the service generally would be intolerable to the public. The substitution of the cable for horse-power, and the replacement of the cable by electricity, were improvements of substantially this character.

Changes of a radical nature, on surface as well as on subway properties, necessitate some destruction of value. After a car has been built at, say, \$20,000, and additional doors are added at a cost of, say, \$2,000, the actual investment in the car would be \$22,000. If a car should be appraised under the circumstances in an effort to ascertain a figure of value for a public service regulating body, would the valuing engineers allow the total investment or would they base their inventory upon the cost of building the car new with the additional doors, arriving by this means at an estimated value of somewhat less than \$22,000? The only practical answer seems to be that it is necessary to accept the total investment which has reasonably been made in the property.

### Graphical Records in Railway Work

Graphical records are becoming more widely used in the field of electric railway operation. So far the designing and manufacturing engineers have been the principal users of this most forceful way of exhibiting information. The commercial members of the electric railway industry appreciating that statistics, from their very nature, are not attractive reading to any but interested students, have been quick to grasp the value of data exhibited pictorially. We find a large number of curves, diagrams and plottings in the advertising matter distributed by the sales offices of the electrical manufacturers. The reason for this is not far to seek. Should these sellers of machinery exclude the presentation of comparisons by means of curves from their publications descriptive of products for sale among electric railways there would be required to convey the same meaning a considerable amount of tabulated quantities. Such tabulations, of course, are quite necessary in particular instances, but wherever the same information can be shown in curves it is much more acceptable for purposes of comparison. Not only do the manufacturing concerns so well utilize graphics as a method of presenting data to their constituents, but they also find the use of curves to be of inestimable value in keeping a close watch on their work of production.

If graphical methods of exhibiting information are of

recognized value in the manufacturing field there would seem to be no reason why the same principles could not be utilized effectively in electric railway work, and especially in repair shop practice, which, by its very nature, is largely composed of manufacturing details. But the use of graphics in the electric railway industry has a far larger application than repair shop practice alone. Some properties have effectively used graphical methods in such departments as power generation, roadbed construction, substation and storage battery operation, the presentation of accounting statistics, the study of power distribution and shop costs, the presentation of schedules and for observing the effects of maintenance work.

In many power stations the quantitative records kept are not utilized nearly so fully as they should be. In those plants to which this statement applies it usually will be found that the power station log comprises a mere set of figures showing the quantity of fuel, water and oil used each day, set opposite the total output of current and accompanied by current and voltage readings taken at regular intervals throughout the day. While this information may be as complete as the size of the plant will warrant, far greater advantages could be obtained from it if, throughout the day, curves were plotted showing the comparative relation of the various quantities recorded. The log sheets of several electric railway power stations now include as a part of each a cross-sectional space in which the various curves most valuable for immediate comparative purposes are plotted step by step as the meter and gage readings are taken. This scheme also is followed in substation practice where it is desirable to shift the loads between different stations and to make an accurate estimate of the current cost.

One power station log shows the hours of service of each boiler graphically by the use of horizontal lines extended from hour to hour. The hours run by each engine and turbine also are indicated by full and broken lines extended horizontally as the hourly readings are taken. As the total station load is read at hourly intervals a load curve is drawn on cross-sectioned log paper and accompanying this load curve are two other similarly drawn curves, one showing the boiler horse-power in service to meet the load requirements, and the other the engine rated horse-power in service. With these three curves, which naturally parallel each other, the engineer in charge can, at a glance, tell how much any particular class of his machinery may be overloaded and he can also be fully informed as to when it is desirable to start up or shut down any unit. A comparison of the gage and meter readings would not serve this purpose so well as do the curves.

Another company which operates a power plant supplying current for railway, lighting and power purposes, keeps a daily power station report which exhibits the number of hours each engine, exciter and boiler has been in service, and plots curves showing the power, railway and lighting loads as well as a total load curve. These curves become useful in studying such problems as the possible improvement of the load factor by the sale of power for commercial purposes or to other railway companies.

When a railway company purchases its power and obligates itself to pay a certain premium on power used above

a set load demand, it becomes almost necessary to plot curves of the actual load used at the purchaser's substations. There are now on the market curve-drawing instruments which satisfactorily perform this operation. In railway work where storage batteries are utilized to smooth the load curves on the generating units a graphic presentation of the total load and its complementary factors often will show where more careful regulation or better distribution would effect an appreciable saving.

Graphical methods are also becoming more widely used by those particularly interested in the revenues and expenditures of electric railways. We have seen some ingeniously prepared curves showing statistics extending over a considerable period which, if presented in bare figures, would require a tedious study to grasp fully. One electric railway presents the results of its operation in the annual report to its board of directors by the use of diagrams which show clearly the rates of increase and decrease and the inter-relation of various quantities. For example: One of the pages of this company's report presents two curves, one showing the gross receipts for some 12 years, and the other the operating expenses over the same period. With these two curves plotted on the same sheet it is interesting to note the inter-relation and the variation in the ratio existing between the two for the years included. The slope of each curve at any point of course is an accurate measure of the rate of increase or decrease at the time indicated by the ordinate through the point.

With all of these uses of graphical methods in the various electric railway departments as here enumerated, it would seem that the mechanical department could equally well receive the benefits which are derived from the keeping of graphical records. A number of roads have appreciated this fact and have used the method for studying various features of the maintenance and inspection problems. Charts are plotted by one company showing comparatively the number of loose wheels and tires each month for a considerable period of time, and similarly there are exhibited on other charts in numbers per million car-miles comparisons of defective armatures, commutators and motor bearings. The value of these graphical comparisons is readily apparent.

One of the larger metropolitan street railways has found it very desirable to plot curves showing the number of pull-ins per day at each car house in percentages of the total number of operable cars. By the aid of this chart it is possible to compare the character of the work of the men at the various car houses and note any deficiencies in the average results of the work. The fact that curve-drawing instruments are being purchased at a rapidly increasing rate for permanently recording meter values is another pertinent illustration of the value of charts and permanent progress records in engineering work.

Accepting the value of graphics as used in the broad engineering field it seems that there would be found on any electric railway property many measurements, from the amount of oil used in bearings to the time required for performing specified tasks, where data plotted from day to day and exhibited later to those responsible for the efficiency or cost of the work, would lead to the correction of weaknesses and the stoppage of existing losses.

## LONG INTERURBAN LINE IN TEXAS

On July 1 operation was commenced on the line of the Texas Traction Company. Several short articles have appeared in these pages upon this line, the longest in Texas. It extends from Dallas to Sherman, a distance of over 60 miles, and by its connections with the Northern Texas Traction Company at Dallas and the Denison & Sherman

of Plano and the H. & T. C. and T. & P. Railroads on the Dallas street railway system.

### BRIDGES AND TRESTLES

The company erected 12 steel structures for stream and railway crossings, including a girder span in the H. & T. C. Railroad, where the company's interurban line crosses under the steam railroad near the Dallas substation.

The largest of the bridges erected by the Texas Traction Company is a combined crossing of the Frisco Railroad and Choctaw Creek, between Sherman and Howe. This structure consists of a 45-ft. through plate girder over the Frisco Railroad and a 100-ft. deck truss over Choctaw Creek, connected by a steel viaduct 735 ft. long. Of the other 11 crossings, two are 100 ft. through trusses, with 50-ft. plate girders at one end; one is an 80-ft. pony truss with 50-ft. girders; three are 100-ft. through trusses, with trestle approaches; and the remaining five, which include the M., K. & T. Railroad overhead and H. & T. C. under-grade crossings, are plate girders 40 ft. to 60 ft. in length. All trusses are riveted and foundations of all spans are concrete. Wing abutments are used for all earth approaches, except at the H. & T. C. Railroad, where "U" abutments were required. Piers are used at all trestle approaches and for intermediate foundations.

Timber trestles are used for miscellaneous openings and for approaches to some of the bridges. The longest of this class is at the East Fork bridge, where the north trestle is 1876 ft. long and the south trestle 224 ft. long. The trestles are built principally on bois d'arc and oak piling, with 14 ft. bents, four piles per bent, 12-in. x 12-in. x 12-ft. caps and



Texas Traction Co.—Power Station

Railway in the latter city it affords opportunity for a through electric railway ride of over 100 miles. Built within the last year, the Texas Traction Company's line presents a good example of the latest type of direct-current interurban road.

### LOCATION

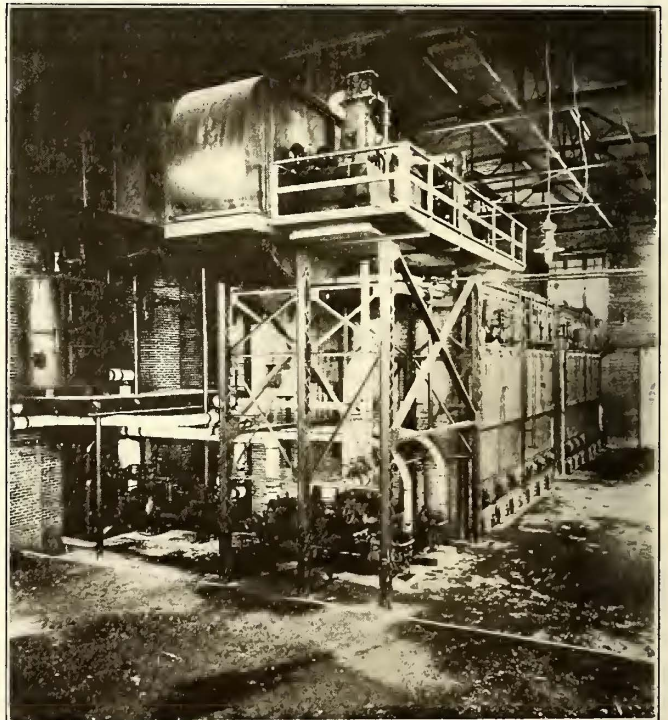
The road is located entirely on private right-of-way, except where it passes through the streets of cities and towns. The route is generally parallel to the Houston & Texas Central Railroad; in fact, the right-of-way adjoins this road for about one-half of the distance. The length of the interurban line, from its terminus in Sherman to the point of connection with the Dallas street railway system, is 62.55 miles, 9 miles of which are within municipal limits; the route covers an additional 2.45 miles on the Dallas system, making a total single trip distance of 66 miles. Sidings, including one-half mile of double-track in Dallas, amount to 1.3 miles, besides 1 mile of trackage at the car house and power station.

The right-of-way averages about 80 ft. in width, but varies according to requirements and local conditions, from 60 ft. to 250 ft. Park sites have been acquired at various points along the line for future development.

Turnouts are located at the car house, at each substation and along the line as required, the average distance between them being 4.62 miles; both stub-end and through sidings are used.

Curves through the country are generally either 2 deg. or 3 deg., the sharpest being 16 deg., occurring at an under-grade railroad crossing; the 50-ft. radius curves in the Dallas streets are the sharpest on the route. The longest tangent is 4.1 miles. Grades are generally within 1.5 per cent, a few being 2 per cent. The maximum is 4 per cent for 600 ft. in the streets of McKinney.

Grade crossings with main lines of other railroads are entirely avoided with the exception of the Cotton Belt (St. L. & S. W. Railway) crossing within the city limits



Texas Traction Co.—Boiler Room with Oil Feed

3-in. x 9-in. sway braces. The decking consists of four 8-in. x 16-in. stringers, 6-in. x 8-in. x 9-ft. ties, laid 14 in. centers and 6-in. x 8-in. guards.

### ROADWAY

A standard section of the road bed and overhead construction are shown in an accompanying diagram. No very deep cuts were encountered, although some were in rock.

A number of heavy earth fills were built, the highest being 17 ft. for a distance of 1000 ft.; the largest is at Rowlett Creek, containing 25,300 cu. yd.

The present ballast is of rock or gravel, which is found along the line. The road has not yet been permanently ballasted, except in some special locations, but is well surfaced throughout.

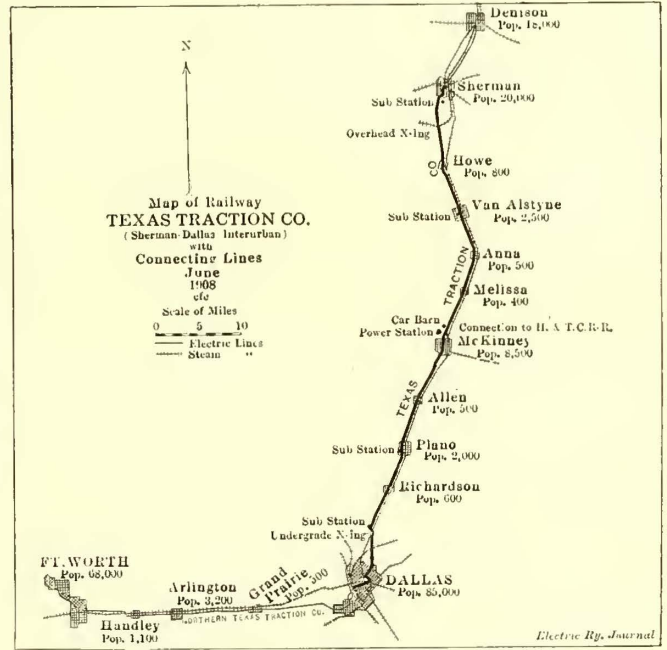
The track is laid with 80-lb. A. S. C. E. rail in 33-ft. lengths; this section is used throughout except in paved streets, for car house tracks and similar localities. For paved streets 7-in. 70-lb. T-rail is used, while 60-lb. A. S. C. E. rail is employed for the entrance tracks.

The rails are laid with suspended and broken joints and with 17 ties to the rail length. Fifty-six pound guard rails are used on all bridges and trestles, and on curves over 6 deg. These rails are elevated on curves to the height of the main rail by special cast-iron chock blocks, the two rails being bolted together through the block. Pressed-steel rail braces are used at switch points, and on curves of 6 deg. and over, every third tie on the outside rail and every sixth tie on the inside rail.

Switches are generally of the steam railroad standard, of the split-throw type, with No. 9 spring frogs. The stands are of medium height and equipped with lights, targets and locks. A few switches in the terminal cities

The bonds are No. 0000, 9 in. in length, of both the ribbon and cable types, and both compressed and pin terminals are used. Thirty-one solid bonds, spanning the splice plates, are used on the 7-in. T-rail. Both rails are bonded throughout, one bond per joint. No. 0000 crossbonds have been installed about 1000 ft. apart

The ties are 6 in. x 8 in. x 8 ft. About one-third are oak, the remainder are pine. Heart pine and oak ties were used



Texas Traction Co.—Map of System

untreated. Of the sap pine ties about one-half were treated by the Allardyce process. The others were dipped in boiling carbolineum for three minutes.

GENERAL PLAN OF ELECTRIFICATION

The railway is operated by direct current, with a trolley potential of 600 volts. The transmission circuit is three phase, 19,100 volts, 25 cycles.

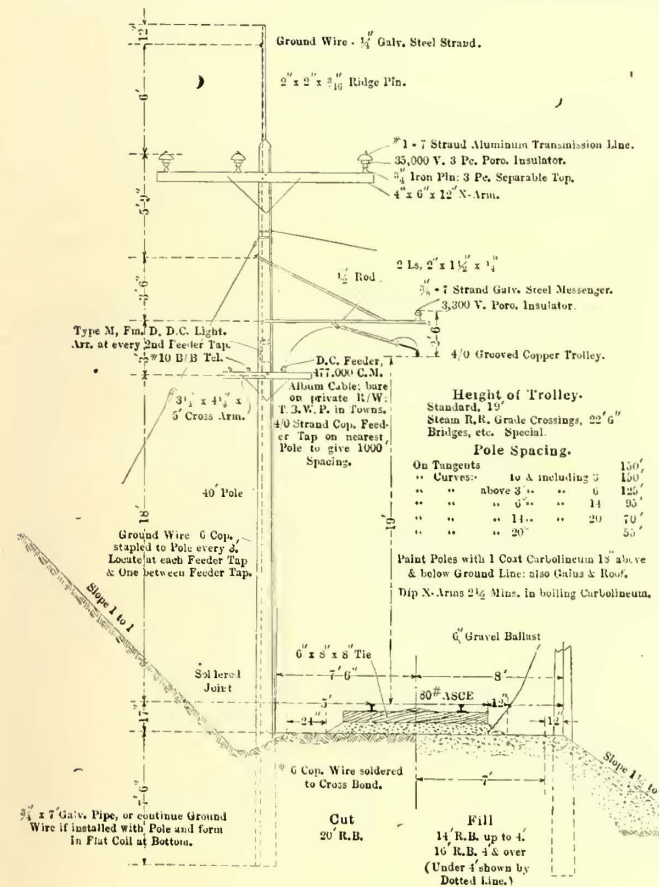
Power is supplied from a single generating station at McKinney, very nearly in the center of the line. One rotary converter is located in the power station and four substations are distributed along the line.

The power station contains, at present, two 1000-kw Curtis' turbine generating units; current is generated at 2200 volts, three-phase, and stepped up to 19,100, the busbar voltage. The generators and their respective banks of step-up transformers are permanently connected together, each

set acting as a unit and no current being used at generator voltage. The transformers in the generating station and all substations are delta-

connected on the high tension side, for operation at 19,100 volts, but may be changed to Y connection for 33,000 volts at any time, all insulation, both of apparatus and transmission line, having been provided for this voltage. The substation equipment in the generating station takes power from the busbars through step-down transformers.

The transmission line is in two independent divisions, one each way from the power station. Each division supplies two substations, and is sectionalized at the intermediate.



Texas Traction Company—Standard Section of Roadbed

are of the street railway tongue type. The lights are electric, the current being taken from the d. c. feeder. The wiring is substantially arranged in an iron conduit, running from the feeder, down the pole through a switch and fuse box, then under the track and up to the switch lamp. Three lamps in series are used; one in the switch lamp and two in the bottom of a box on the pole. This box has a glass front so arranged that the lamps illuminate the switch points.

Each substation contains at present one 300-kw rotary converter, with step-down transformers and other necessary equipment.

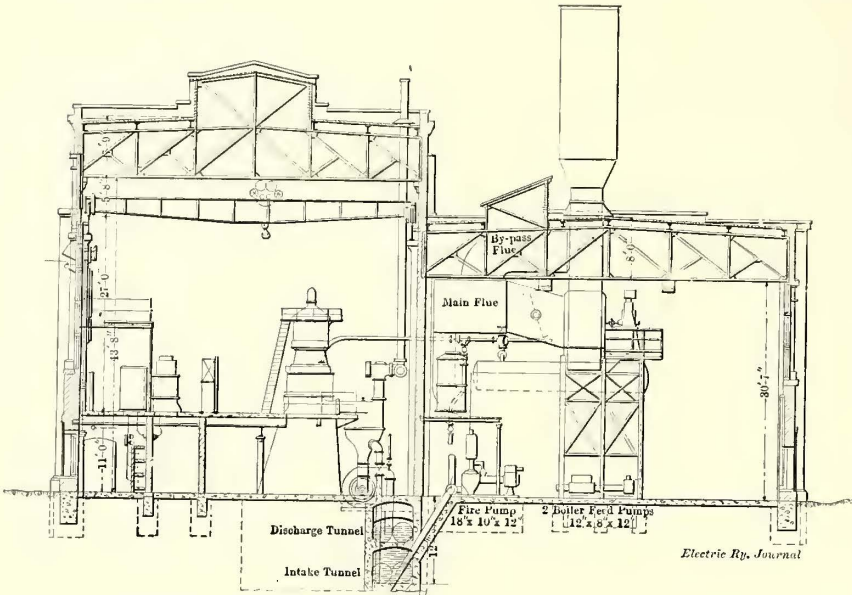
The direct-current feeder extends practically the entire length of the line. The trolley and feeder are continuous from end to end, through the substation switchboards. Sec-

Crude petroleum is used for fuel at present and a storage capacity of about 4000 bbl. is provided at the station. The supply is furnished by the Texas company through a branch from its Oklahoma pipe line, which runs about one mile west of the power station. A main storage tank 30 ft. in diameter by 30 ft. high, is located in one corner

of the power station property, and is filled at intervals from the pipe line. Two small tanks, each holding enough oil for about a day's run, are set underground near the plant, and are filled by gravity from the main tank. These small tanks furnish the daily supply for the station, and are connected so that one may be used while the other is being filled. A steam line is connected into the top of all tanks for use in case of fire. The main tank is also surrounded by a levee, for retaining the oil, in the event of a failure of the tank.

Oil is drawn from the ground tanks and forced to the burners by a small pumping set, consisting of duplicate duplex pumps, mounted on a heater, for warming the oil by exhaust steam, on its way to the burners. The pumps are provided with a regulator for holding constant pressure on the burners and are of the steam jet type, three to each boiler.

Feed water is supplied by a 6-in. bored well, 1218 ft. deep. The water thus obtained is free from the scale-forming impurities of the surface water, and leaves the boilers clean and bright. As jet condensers are used on the main turbines, the well assists in replenishing the condensing



Texas Traction Co.—General Cross Section of Power Station

tion insulators are placed in the trolley at the power station and each substation and the line may be sectionalized, when necessary, by the switches on the d.c. feeder panels.

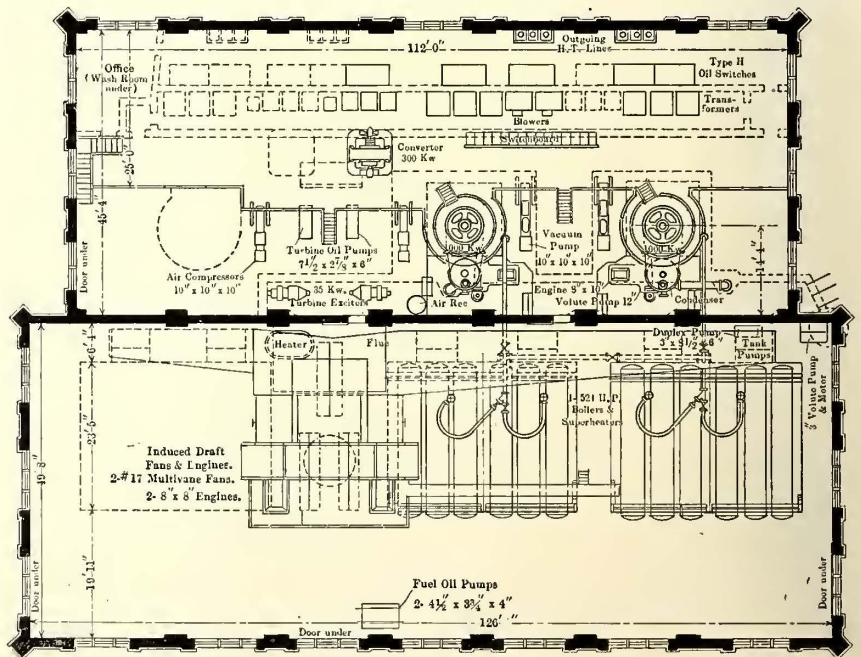
POWER STATION BUILDING

The power station has a capacity for three 1000-kw turbo-units and substation equipment, although it contains at present only two units of this size. It is a substantial brick structure of attractive design, whose concrete foundations rest on solid rock. The roof framing is of steel. There is an abundance of light and ventilation, and the lay-out renders all apparatus readily accessible. The turbine room is equipped with a 25-ton hand-power crane, furnished by the Whiting Foundry Equipment Company. A railway track enters one end of the turbine room for handling machinery.

At one side of the turbine room a concrete galley with steel framing has been constructed to carry all of the auxiliary electrical apparatus except the exciters. All wiring is in iron conduit imbedded in the concrete. The electric lighting of the building is supplied from the exciters.

BOILERS AND AUXILIARIES

The boilers are set in two batteries of two each. They are of the Babcock & Wilcox wroughtwater reservoir. The water stands in the well about 80 ft. steel header type and built for 200 lb. working pressure. Each boiler has three 42-in. drums and 252 4-in. tubes. The boilers are equipped with Foster superheaters, furnished by the Power Specialty Company. These superheaters are designed to give a 150 deg. Fahr. superheat.



Texas Traction Co.—General Plan of Power Station



to the open heater, water jackets, etc. A duplex steam pump is also provided for the same purpose, for use in starting, and as a reserve. The air compressors and duplex pump were supplied by the Platt Iron Works.

The boiler feed pumps are installed in duplicate, of the duplex, double plunger, outside packed type, with pot valves.

A Standard Underwriter pump, of 1000 gal. capacity per minute, is located in the boiler room, for general fire protection of the premises. Its water supply is taken from the lake through the condenser intake. The fire lines are connected to the piping from the roof tank, so that lake water may be used for boiler feeding in case of any failure of the well supply.

The feed water heater is of the open type, 2000 hp, and receives steam from all of the auxiliaries. The heater, fire pump and boiler feed pumps were furnished by the Platt Iron Works.

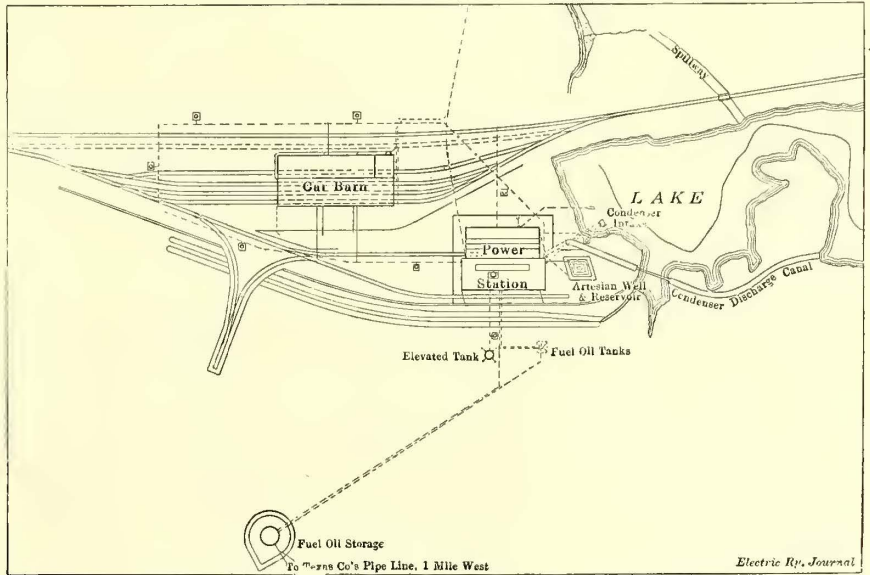
INDUCED DRAFT

The induced draft equipment consists of duplicate fans and engines, each set rated for 2000 boiler hp when burning bituminous slack or lignite. The stack is 8 ft. in diameter in the round section above the roof, and the top is 68 ft. 6 in. from the floor. The fans are not operated when burning oil, the stack draft being sufficient. However, as an oil burning plant must be prepared to burn coal in an emergency, the mechanical draft provides this reserve at a much lower first cost than a large slack. At the same time it

pressure. The induced draft equipment, including the stack, flues and uptakes, was furnished by the B. F. Sturtevant Company.

PIPING

The layout of the main steam piping is well shown by the drawings. Each battery of boilers is connected directly to the turbine opposite, and the two units connected by a



Texas Traction Co.—Plan of Station, Car House and Sidings

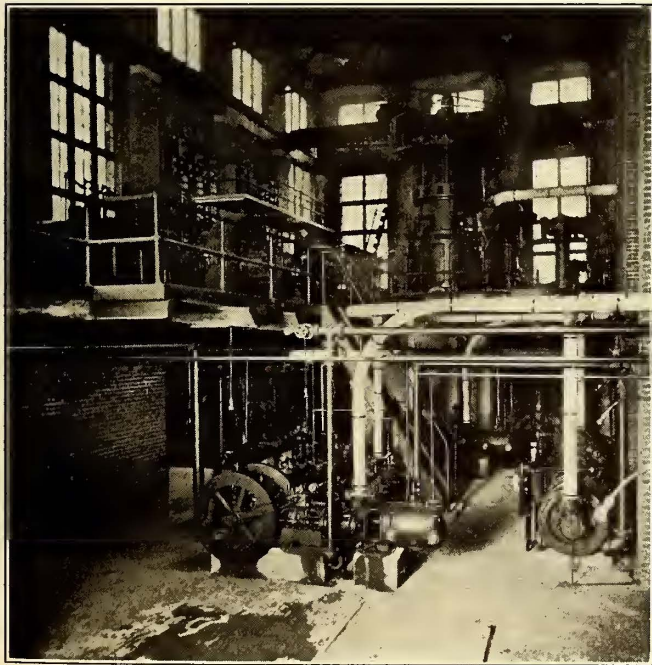
header. The auxiliary steam and exhaust headers are carried 9½ ft. above the floor, between the division wall and at the rear of the boilers. The 4 in. auxiliary steam header forms a loop over the fire pump, making easy connections to all of the apparatus in this space, and forming an expansion bend which would be necessary in extending to a future battery. This header is connected to the bottom of the 8-in. main header at each of the latter by a 4-in. offset bend. A drip pocket is placed under each of these connections and at the end of the auxiliary header, for the collection of water. Pockets are also provided at the connection to each turbine and each pocket is trapped separately to the heater. Ample provision is made for expansion and contraction, and for the use of superheated steam exclusively.

Every reciprocating machine, with the single exception of the Underwriter pump, is equipped with piston steam valves. Valves of the globe or angle pattern are used entirely on live steam lines. All flanges, fittings and valve bodies of 4 in. diameter and over are of cast steel. Non-return valves are placed at each superheater outlet. The joints in the 6 in. and 8 in. main piping are of the Crane lap type, with loose steel flanges. All lines are laid out for extension to future units. The live steam and hot water piping is covered with 85 per cent magnesia, furnished by the Philip Carey Company.

CONDENSERS

The condensers are of the Worthington jet type, with volute discharge pumps. They are rated for 27½ in. vacuum with condensing water at 80 deg. Fahr. Each volute pump is direct connected to an 8 in. x 10 in. Blake vertical engine; and a Worthington dry air pump, 10 in. x 10 in. x 10 in. forms a part of each equipment. The water is drawn from and discharges into the tunnels under the condensers, the piping being very short and simple.

The main floor of the station is 7½ ft. above the normal level of the lake and the water stands nearly to the roof of



Texas Traction Co.—Air Compressors, Exciters and Condenser, with Turbine in Background

is better adapted to the general conditions, if cheap coal or lignite should be used as regular fuel. The fans are of the multivane type. The engines are enclosed, self-oiling, and each is provided with a Foster regulator in the steam pipe, for varying the speed, according to the steam

the lower or intake tunnel. The intake in the lake consists of a concrete shaft, built on solid rock, and is provided with screens for the protection of the intake pipes, so arranged that the water is taken from near the bottom. The upper or discharge tunnel is turned into an open canal, which returns the water to the lake, about 700 ft. above the intake, measured along the channel of an old ravine. The lake has a surface area of about  $2\frac{1}{2}$  acres, and was formed by damming up a ravine which crossed the property.

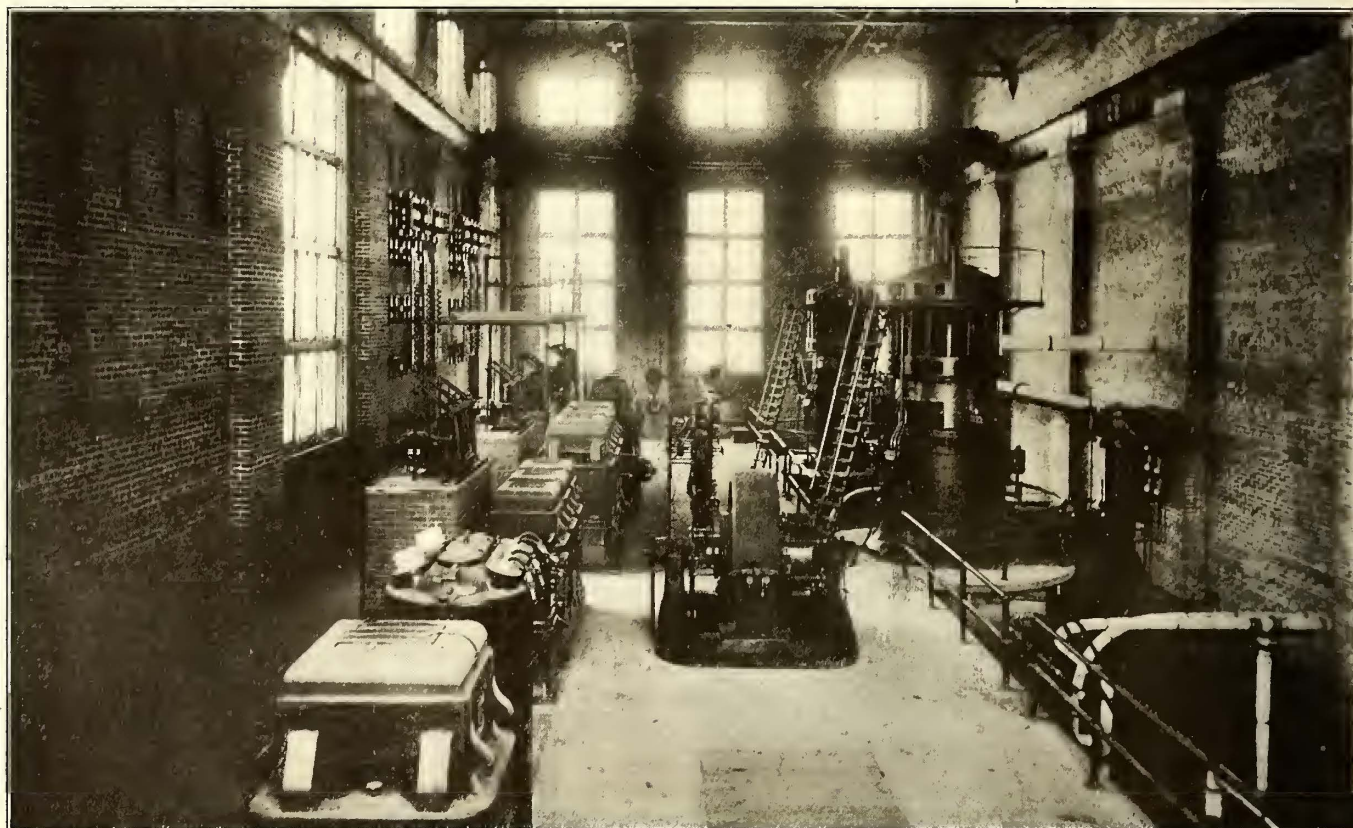
The discharge pipes of the condenser pumps are submerged in the upper tunnel and are arranged to hold 2 ft. of water at all times. The condensers are primed and started as follows: The valve in the air vent over the volute pump discharge is closed and with the pump turning at full speed the dry air pump is started, causing the water to run up the injection pipe into the condenser. As soon as water enters the condenser the pump will start to deliver,

through a baffle at about 225 lb. pressure and another branch supplies the upper bearings and valve mechanism through a reducing valve at 115 lb. pressure. The oil is pumped from and returned to a large storage tank under the gallery. This tank is equipped with cooling and filtering arrangements and by-passes are provided so that portions of the tank can be cleaned while the remainder is in service.

All supply piping to the turbines is of brass, all high pressure piping, valves, etc., being designed for 800 lb. working pressure. The steam supply to the oil pumps is taken from the top of the auxiliary header, to avoid possibility of momentary stoppage by water, in case of priming.

#### EXCITERS

The exciters are 35-kw horizontal Curtis turbine sets.



Texas Traction Co.—General View of Turbine Room

and the vent pipe is opened. A forced injection supplied from the roof tank is provided for use during priming, if steam should leak through the turbine throttle.

#### TURBINES

The turbines are of the Curtis, four-stage type rated at 1000 kw each and capable of 50 per cent overload for two hours. Their speed is 1500 r.p.m. The generators have bipolar fields, and deliver three-phase current at 2200 volts. The valves of the turbines are mechanically operated from the governor by oil pressure at 115 lb.

#### LUBRICATION

Oil for the turbines is supplied by two Worthington duplex outside-packed double-plunger pumps, each equipped with a Fisher pressure regulator and are set to hold about 350 lb. pressure on the oil header. A separate high pressure line is led from the pump header to each turbine. One branch of each of these lines supplies the step-bearing

The generators are compound wound and deliver 125 volts at 3600 r.p.m.

#### SWITCHBOARD

The switchboard consists of 16 slate panels, six of which are blank for future use. They are mounted on a pipe framework, which is self-supporting, without wall braces. The panels are of a uniform width of 16 in., 2 in. thick and 90 in. high, including sub-base. The board is equipped with all necessary instruments.

The oil switches are of the motor operated type, controlled by 125-volt direct current from the main board. There is a switch between the high tension busbars and each bank of transformers, as well as on each outgoing line.

#### TRANSFORMERS, CONVERTER, ARRESTERS, ETC.

The transformers in the generating station are air-cooled. Three 330-kw transformers are connected to each generator, and three 110-kw supply the converter. Two blower sets

are provided; one operated by induction motor, from the secondaries of the converter transformers, the other by direct current from the exciters. A spare transformer is kept on hand for the generators, also one of the oil-cooled type for the substations.

The rotary converters is a standard 300-kw, 600-volt, compound wound machine. It is started from the a.c. end, on transformer taps. An air-cooled reactance is connected between the transformers and the converter, the starting panel being mounted thereon.

High-tension lightning arresters are connected to each outgoing line, and are mounted in full view, on the front wall of the turbine room. A copper ground plate is buried in crushed charcoal in front of the station and an additional one is placed in the lake.

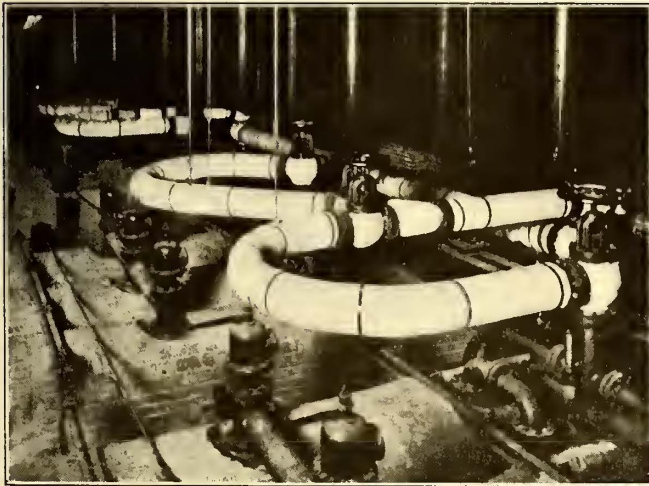
The high-tension bus compartment is located under the gallery and the longitudinal wire cells are of brick and concrete. The vertical barriers are 4 in. brick and extend entirely over

ment of the buildings, tracks, fire protection, etc., as they will appear when completed.

The yard and barn trackage amounts to about one mile,



Texas Traction Co.—Substation and Waiting Station at Plano



Texas Traction Co.—Piping and Main Flue Over Boilers

the passageway at the outgoing lines.

The high-tension line entrance hoods are of 5/8-in. asbestos boards, fastened with angles, and attached to iron supports embedded in the brickwork. Thomas No. 3025 disk insulators, with bushing and tube, are used wherever the high-tension lines pass through brick walls.

**POWER STATION CONTRACTORS**

The General Electric Company furnished and erected all of the electrical apparatus in the power station, substations and car equipments. A. M. Lockett & Co., Ltd., of New Orleans, La., furnished the boilers, condensers and fuel oil set, and were contractors for the piping. The Crane Company supplied practically all of the latter material.

**CAR HOUSE AND YARD**

The car house has not yet been finished, but the foundations have been started, and the work will be pushed to completion. The location is at the power station site. The plan shows the layout of the property, with

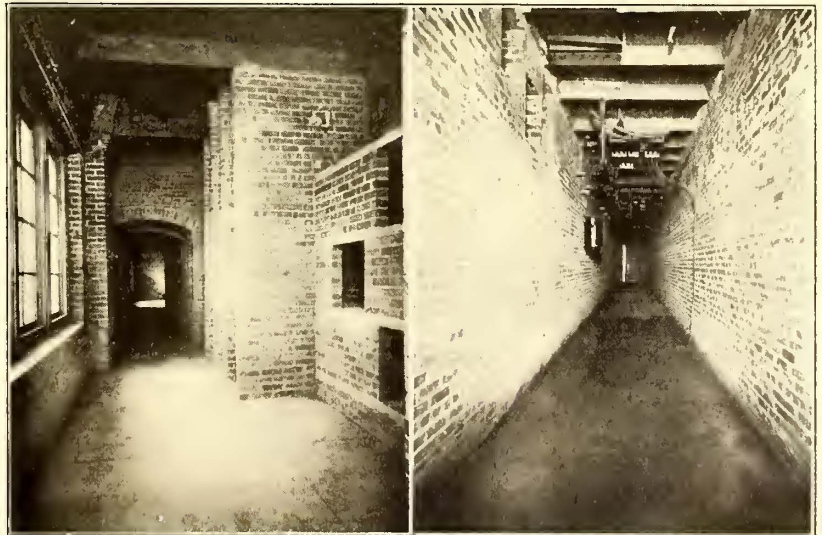
practically all of which is in place at present. As already stated, it is laid with 60-lb. A. S. C. E. rail.

The car house is to be of brick, 81 ft. x 183 ft. 6 in., divided by a fire wall, into two general divisions, car storage room and shop section. The latter will contain machine shop, blacksmith shop, repair pit for two cars, store room and offices; the office end will be two-story. An inspection pit will be provided in the storage room. Steel trusses will support the concrete roof and a complete shop equipment will be provided.

**SUBSTATIONS**

Substations are located near Sherman and Dallas, and in Plano and Van Alstyne, being at an average distance apart (including the power station) of 13.9 miles.

Each contains a 300-kw rotary converter equipment with space for a similar additional unit. The general arrangement of the apparatus is the same in all, and, together with the design of the buildings, is well shown by the illustra-



Texas Traction Co.—High Tension Bus Compartments and Air Chamber

The location on page 377 shows the arrange-

tions. The substation proper consists of a main operating room 28 ft. x 35 ft., and a lightning arrester room 7 ft. x 18 ft. 6 in. The terminal substations are located in the

country, and the high-tension lines enter the buildings at the rear of the arrester room. As the intermediates are in towns, towers are extended up over the arrester rooms for the entrance of these lines. The intermediates also have frame additions to the substation proper, providing waiting and baggage rooms, ticket office, etc.



Texas Traction Co.—Steam Construction Train for Erecting Aluminum High Tension Feeders

The converters and d.c. switchboard panels are the same as in the power station. The oil switches are hand operated from the a.c. panels. A switch is connected between the high-tension busbars and the step-down transformers in each station, and the intermediate stations contain an additional switch and panel to control the section of transmission line leading to the terminal. Oil switches are not used on the incoming lines, but when "dead," they may be disconnected from the busbars by knife switches at the lightning arresters. The wiring in the stations is all exposed, and supported by pole type insulators mounted on the walls and on pipe framework.

Each station contains three 110-kw, oil-cooled transformers and an oil-cooled reactance. The converters are started from the a.c. end, on transformer taps. Copper ground plates for the lightning arresters are buried in crushed charcoal at the rear of the buildings.

The company also has a portable substation for use in case of accident to a regular substation, or for assistance in times of concentrated traffic. It is equipped with a 300-kw converter and a 330-kw, three-phase, air-cooled step-down transformer, induction motor blower set, a.c. and d.c. switchboards and a high-tension oil switch. The car is constructed especially for the purpose. Doors are provided at the center and both ends on each side and the ends and portions of the roof are removable, thus making the apparatus easily accessible.

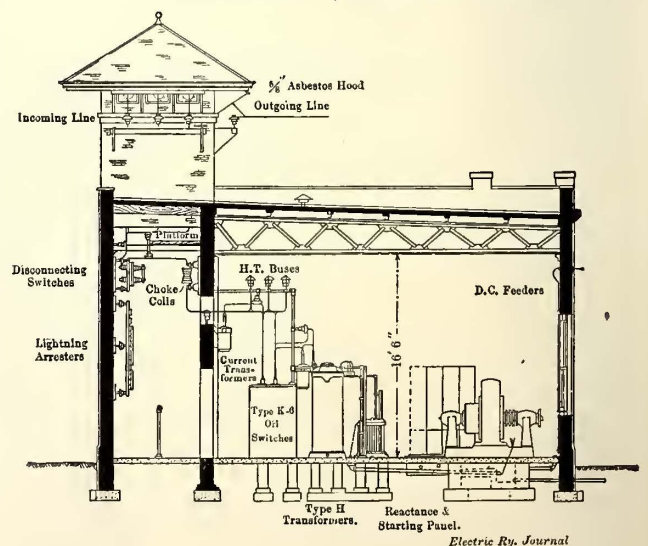
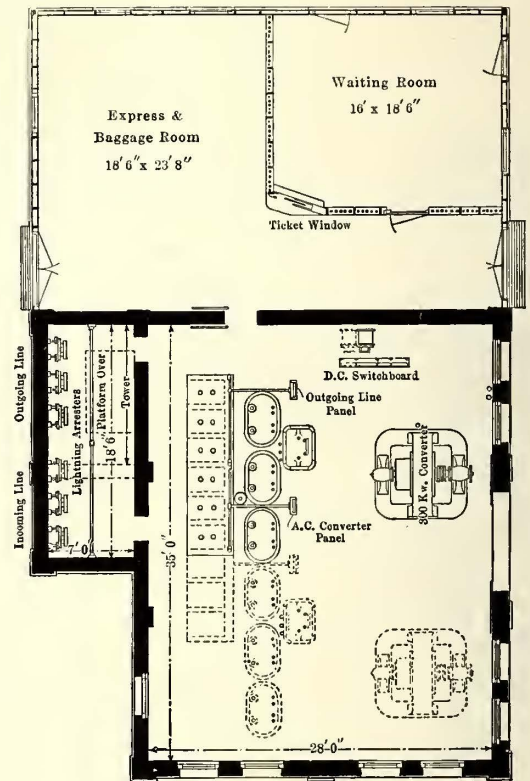
There is a siding at each substation upon which the portable substation may stand when required at that point.

OVERHEAD LINES

The transmission and trolley wires are carried on a single line of poles through the interurban districts, but span construction is generally used in the cities and towns.

The poles are of Idaho cedar. The standard pole length is 40 ft., with 7 in. tops, and the poles are set 7 ft. 6 in. in the ground. The length of the poles used in the towns varies, however, according to conditions, from 45 ft. to 70 ft. Extra long poles are also used at bridges and trestles. For span and pull-offs 30-ft. and 35-ft. poles are used.

The standard spacing for bracket poles on tangents and curves not exceeding 3 deg. is 150 ft. For greater curvature the spacing is reduced according to the degree of



Texas Traction Co.—Typical Intermediate Substation

curvature, being 55 ft. for a 20-deg. curve. The standard spacing for span work is 100 ft., but this distance is also reduced according with curvature.

Holes were excavated largely with dynamite, both in earth and in rock, much of the latter having been en-

countered. The holes were accurately staked out, for alignment and spacing; the poles are remarkably straight and round, and well set, and the line is substantially guyed.

The transmission wires are No. 1 stranded aluminum, equivalent to No. 3 copper, and are carried on a single cross-arm, 4 in. x 6 in. x 12 ft. The outside wires are 11 ft. and the two closer ones 4 ft. apart. The insulators are Ohio Brass Company's No. 6018, three-piece porcelain, designed for 35,000 volts working potential. The iron pins are Ohio Brass Company's No. 6066, three-piece, separable top, 3/4-in. bolt, malleable iron base. The iron thimbles are cemented in the insulators at the factory.

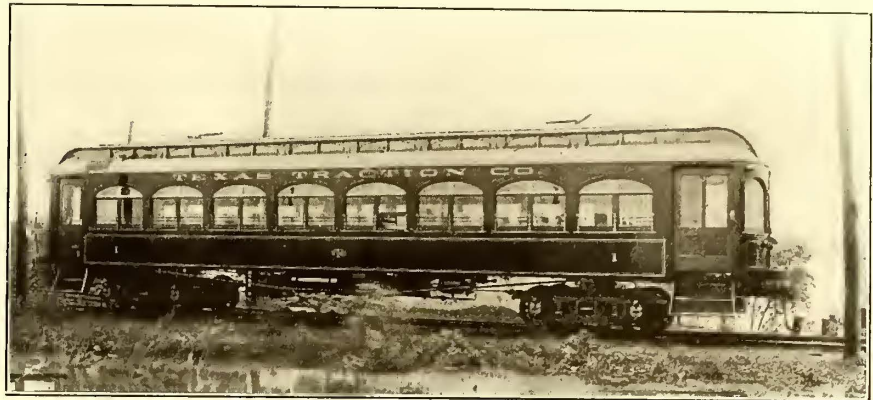
Joints in the transmission wires are made with an aluminum sleeve similar to a McIntire joint. The line is completely transposed once between substations by two half-transposition points which are located at one-third of the distance.

A continuous ground wire of 1/4-in. galvanized steel strand is carried over the transmission line for the entire length. Ground connections are made approximately 500 ft. apart by a No. 6 copper wire, stapled to the pole and soldered to a 3/4-in. galvanized pipe driven about 7 ft. in the ground. Cross-bonds are located approximately 1000 ft. apart and are generally opposite the poles. Every other ground is connected to the cross-bond, in addition to the pipe.

The trolley wire is of No. 000 grooved copper, with General Electric Company's three-point catenary suspension throughout, except in the terminal cities, where standard span construction is used. The standard trolley height is 19 ft. above the rails. In span work the messenger is suspended from the span wire by a special hanger. Steady braces are located at each feeder tap and one between taps on tangents, averaging about 500 ft. apart. They are also used on curves in connection with bridle pull-offs. Where the poles fall within a curve, pull-off poles are set on the opposite side. The trolley and messenger are anchored every half mile on tangents and at the ends of curves, and 9-in. wood strain insulators are used in all catenary wiring.

The feeder is of stranded aluminum, 477,000 circ. mil, or the equivalent of 300,000 circ. mil copper. It is bare through the country and provided with triple braid weather

Joints are made by a heavy aluminum sleeve, hydraulically pressed on the cable, a small compressor being always carried on the wire stringing train. Taps to the trolley average about 1000 ft. apart and are located at cross-bonds in the track. The taps are No. 0000 stranded copper,



Texas Traction Co.—Standard Car

soldered into an aluminum lug, which is clamped on the feeder cable. At the trolley they are soldered into the steady brace ears.

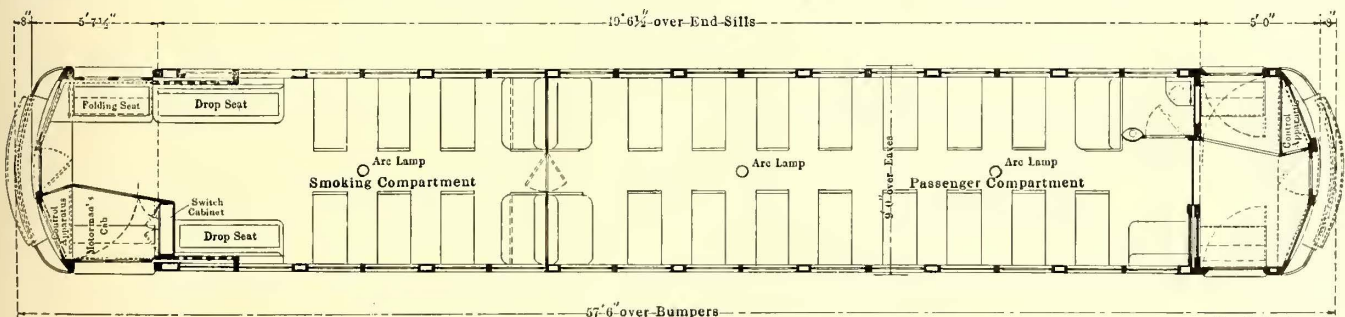
At the power station and substations 500,000 circ. mil copper cables are run out to supply the trolley wire with current.

Lightning arresters are located at every second feeder tap, or 2000 ft. apart, which brings them on the poles having the ground connections from the overhead wire, where this connection is made both to pipe and cross-bond. The arresters are G. E. type M, form D.

DISPATCHING SYSTEM

A complete telephone line is provided for dispatching and general operating communication. Stationary instruments are located at the power station, each substation, and at other important points, while portable telephones are carried on each car. The instruments and switchboard were furnished by the Western Electric Company. The dispatcher's office is at the center of the line, and is to be permanently located in the office quarters of the car house when that is finished.

At each siding which is not located where there is a stationary telephone, special connecting points are provided both for the main line and siding. These points are in reach of the motorman, when standing in the car door, and are reached by a light pole provided with contact



Texas Traction Co.—Plan of Standard Car

Electric Ry. Journal

proof insulation in towns. The feeders are supported on a 3 1/4-in. x 4 1/4-in. x 5-ft. cross-arm, which provides space for the telephone line and an additional feeder. On bracket construction the feeder is carried generally below the brackets, but in some cases above the span wires in towns.

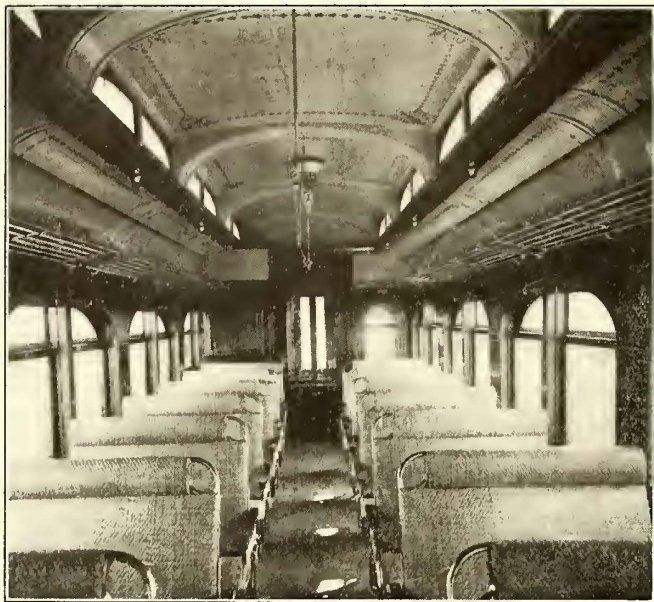
hooks and flexible leads. In emergencies, when the regular connecting points cannot be reached, the cord and pole may be extended so that the hooks can be placed over the telephone line, wherever the car may be.

The telephones used by the trainmen for such emer-

agencies and carried on the cars are of a very light pattern, in which the transmitter and receiver are rigidly connected together.

#### ROLLING STOCK

The principal rolling equipment at present consists of 10 passenger and two express cars and were supplied by the



Texas Traction Co.—Interior of Car

St. Louis Car Company. General data on these cars are given on this page.

The seats are reversible with high backs, rattan covered, and mahogany arm-rest.

The inside finish of the car is mahogany, decorated with inlay lines. The ceiling is "semi-Empire" of special design, and three-ply poplar veneer, painted and decorated. Silk curtains are used on spring rollers. Interior illumination is

#### MAIN DIMENSIONS AND DATA

Length over end sills, passenger.....	45 ft. 6½ in.
Length over bumpers, passenger.....	57 ft. 6 in.
Length over all, express.....	50 ft. 0 in.
Extreme width.....	9 ft. 0 in.
Trucks.....	St. Louis Car Company M. C. B.
Wheel base.....	6 ft. 6 in.
Truck centers.....	34 ft. 10½ in.
Wheels, Standard Steel Works, C. I. centers.....	36 ft.
Brakes.....	Inside hung, Peacock gear
Shortest radius curve.....	50 ft.
Motors.....	Four G. E. 73
Control, double end.....	Type M
Air brakes.....	G. E. emergency straight
Couplers.....	Washburn
Sanders, two.....	St. Louis, air operated
Heaters.....	Consolidated electric
Pilots, two.....	Steam railroad type
Headlights.....	General Electric Company arc
Signal lights.....	Electric, with storage battery
Color.....	Pullman green

provided by three arc lights and incandescents on the deck sill. Incandescent lamps are also used in the saloon and on the platform.

A motorman's cab is provided at each end and is arranged to fold over the control apparatus when not in use, as in elevated service.

Although the cars are equipped for double end operation, they are generally run as single end, as both terminals and the car house tracks provide Y's.

#### ORGANIZATION

The Texas Traction Company was chartered in 1906 and

has \$2,000,000 of common stock and \$1,000,000 preferred stock. The company has also issued \$2,000,000 5 per cent bonds. The president of the company is J. F. Strickland, of Dallas. Theodore Stebbins, formerly of the Columbus, London & Springfield Railway, is general manager. The engineering and construction of the line were carried out by the Fred A. Jones Company, of Dallas, Houston and New Orleans. The Stone & Webster Engineering Corporation represented the bondholders to check expenditures.

## CHANGING MOTOR LUBRICATION FROM GREASE TO OIL

BY A LUBRICATION EXPERT

The high cost of oil lubrication on the old type motors is not caused by dust or dirt, but because the motors are not equipped with proper oil cups to regulate the flow of oil to the bearings. In years past, grease was considered a proper lubricant for both motor and truck equipments largely because it could be so easily applied. No attention was paid to friction and the causes of the wear on armature shafts or bearings. On many roads the grease was permitted to remain outside exposed to all kinds of weather with very unsatisfactory results to the equipment. However, it has not taken long to demonstrate that oil properly applied on such motors will easily cut down truck and motor repairs by 50 per cent and that the cost of the oil itself can be made less than grease. In general, the higher cost of oil is due to the lack of proper oil houses, drip pans, oil cans and soaking tanks for the packing waste, and the use of felt feed because the motors have no oil cups. The loss from the last cause alone may amount to over 60 per cent, but can be eliminated by using any of the several oil cups which have been especially designed for the old motors.

Some little difficulty may be found in fitting the oil cups in the motor frame, as the grease openings vary from ¼ in. to ⅜ in. Hence several patterns may be required, as it is impracticable to cut the opening to fit the cup. One method used to keep the cup in place has been to drive wooden wedges around it and in another case a set screw was inserted in the side of the cup against the motor frame and secured with a lock nut. Those who do not care to use oil cups could fill the hole in the base of the cap or opening in the bottom of the motor frame with babbitt, drill a 3/16-in. hole and fill the opening with cotton waste well soaked in oil. This method is the next best to the automatic oil cup, but is very expensive as the oil flows constantly whether the car is running or not.

In rebabbiting split bearings, the sharp edge left by the mold should be cut back at least 3/16 in. so that it will not cut the oil off the shaft, but enough should be left on each end of the bearing to keep the oil from running over the edge of the box. Oil houses should be steam heated in the winter to prevent solidification of the oil. Once in the cup, the heat radiated from the motor will keep the oil warm enough to feed with perfect freedom. The unavoidable loss caused through a cold oil house exceeds the heating cost.

On July 13 the Chicago City Council approved the application of the Chicago & Oak Park Elevated Railroad to use its structure in Market Street as a stub-end passenger terminal. This approval was given on condition that the company should add five trains a day to its present schedule without substituting any of the stub-terminal trains for its present loop trains. The Council also passed an ordinance providing for the elevation of the Chicago & Oak Park Elevated Railroad's surface tracks in Austin, between Fifty-second Avenue and Austin Avenue, before Dec. 31, 1909.

## HEARING ON UNIFORM SYSTEM OF ACCOUNTS FOR NEW YORK RAILWAYS

A preliminary hearing on the proposed uniform system of accounts for street and electric railways in New York was held by the Public Service Commission, First District, in New York City on July 23. A joint hearing on the system of accounts will be held by the Commissions of the First and Second Districts at Albany, N. Y., on Aug. 4.

The hearing was conducted by Commissioner John E. Eustis. A. E. Mudge, of the Interborough Rapid Transit Company, was the first representative of the railways to be heard. He said that E. F. J. Gaynor, auditor of the company, would require at least 30 days to make an intelligent report on the subject.

Commissioner Eustis said, although another hearing would take place on Aug. 4, the commission would like to make some progress before that date, as the system of accounts was to be effective during the last six months of 1908. The business conducted by the companies at present should really be accounted for under the new classification, and for that reason the commission would like to make such progress as it could.

Joseph F. Keaney, representing the New York & Long Island Traction Company and the Long Island Electric Railway, said that copies of the classification had just been received by those companies.

A. C. Hume said that he represented the South Shore Traction Company and the Hudson & Long Island Traction Company. These are not operating companies, but have applied for franchises and were served with notices regarding the hearing. Mr. Hume said that he would like to have more time for consideration of the system.

Howard Abel, comptroller of the Brooklyn Rapid Transit System, stated that he received the classification on July 22, but had just scanned the pages and was not prepared to discuss the subject. From his cursory inspection he was satisfied that it would take considerable time to prepare to handle the accounts in accordance with the classification suggested by the commission. To prepare the necessary forms and books, he said, would require at least 60 days. The present was a very inopportune time for his consideration of the matter, Mr. Abel said, because the Brooklyn Rapid Transit Company is now closing its books for the fiscal year. He said that the classification was a radical change and that its adoption would mean an increase in the number of clerks and that much time would have to be given to instructing them. "It would be very much better," Mr. Abel said, "if time could be given to analyze the system and point out the objectionable features, if any, and time could be given also to prepare for the introduction of the system."

A. F. Weber, statistician for the First District Commission, in speaking of the fact that the Interstate Commerce Commission will establish a uniform system of accounts for electric railways, effective on Oct. 1, said that the Public Service Commissions' classifications of operating revenues, operating expenses and construction expenditures are, in the main, those agreed upon at various conferences held in Washington between representatives of the Interstate Commerce Commission, State Commissions and the companies, which, it is understood, the Interstate Commission will accept in its system.

Mr. Eustis took up the classification of car-miles, car-seat miles and car-hours. He inquired whether any criticisms were to be made regarding the unit car-seat miles.

A. B. Bierck, auditor of the Long Island Railroad and

subsidiary electric railways, said that he had no official record of the number of seats in cars. Commissioner Eustis said that in its investigations the commission allows 18 in. as an average seat. Mr. Bierck said that the accounting officers would have to be furnished with the dimensions of cars and make a record based on an allowance of 18 in. for each seat. Mr. Bierck did not think car seat miles would be an accurate statistical unit on some cars.

E. M. White, auditor of the Coney Island & Brooklyn Railroad, referring to the use of the phrase "the number of cars operated full time," asked whether full time meant 18 hours. Mr. Weber said that it might be well to define that clause more clearly. Mr. White said that years ago it was the general practice to consider an 18-hour car a full service car, but that the general use of cars now exceeded 18 hours per day. He knew of cases where all day cars are figured as 19 or 20-hour cars, and would like to know whether 18, 19 or 20 hours should be assumed.

Mr. Eustis thought that 18 hours was not enough, as most lines continue their service until 1 a. m., making more than 18 hours of service. W. J. Meyers, statistician for the Second District, said that it would be desirable to let each company make its own classification between full time and "trippers," and report accordingly. This suggestion was approved by Mr. Eustis.

Mr. Gaynor said that before the classification was adopted he would like to have an opportunity to consider it. At the suggestion of Mr. Eustis Mr. Gaynor read some of the paragraphs in this classification. After looking them over Mr. Gaynor said the classification seemed to call for unusual data. He said that the Interborough Rapid Transit Company does not operate any chartered cars. While it does carry mail on regular cars on the elevated division, no special cars are detailed for that purpose. Mr. Weber said it was the desire of the commission that the records in schedule C, the classification of car miles, car seat miles and car hours, be kept for the current half year. This seemed to him to be a simple matter, and he would like to have that schedule settled during the hearing.

Mr. White raised a question regarding "special passenger car miles," which were to be reckoned "from the time such cars leave the car house until they complete the trip." He said that sometimes a trip was designated from one point to another point, and that a round trip might not always be complete. He asked what the commission would consider a round trip, and said that the Coney Island & Brooklyn Railroad has round trips of, respectively, 20 miles and 3 miles, so that a "trip" does not mean anything definite.

Commissioner Eustis said that the clause could be made a little more explicit. The hearing was then adjourned.

In calling the hearing at Albany on Aug. 4 J. S. Kennedy, secretary of the Second District Commission, said:

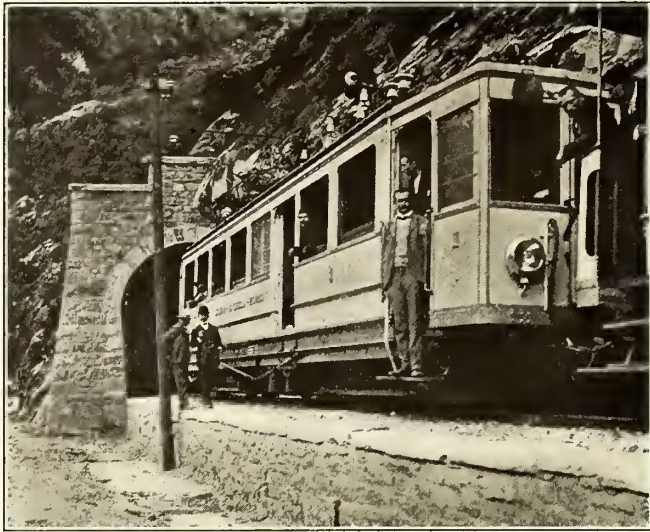
"This system is based largely upon, and is intended to be in harmony with, the system developed through various conferences between representatives of the Interstate Commerce Commission and various State commissions and representatives of various associations of officers of street and interurban electric railway corporations.

"This commission will hold a hearing at which it is desired that the various street and interurban electric railway corporations within the Second District shall appear and lay before the commission such considerations as they may desire to advance in connection with the proposed scheme of accounts, which, with such modifications, if any, as may be considered advisable, it is intended to make effective as of July 1, 1908."

### SINGLE-PHASE ROAD AT LOCARNO, SWITZERLAND

The attention which is being given to the overhead construction of single-phase lines makes any radical departure from the trolley wheel, bow or pantograph of interest. The first and third methods have been used on high-speed roads

slightly different way than on the Seebach-Wettingen line, which is part of the Federal railroad system of Switzerland, since the Locarno line is what would be called in America an interurban line and is adapted principally to passenger service with motor cars instead of locomotives. This condition has permitted the use of lighter overhead construc-

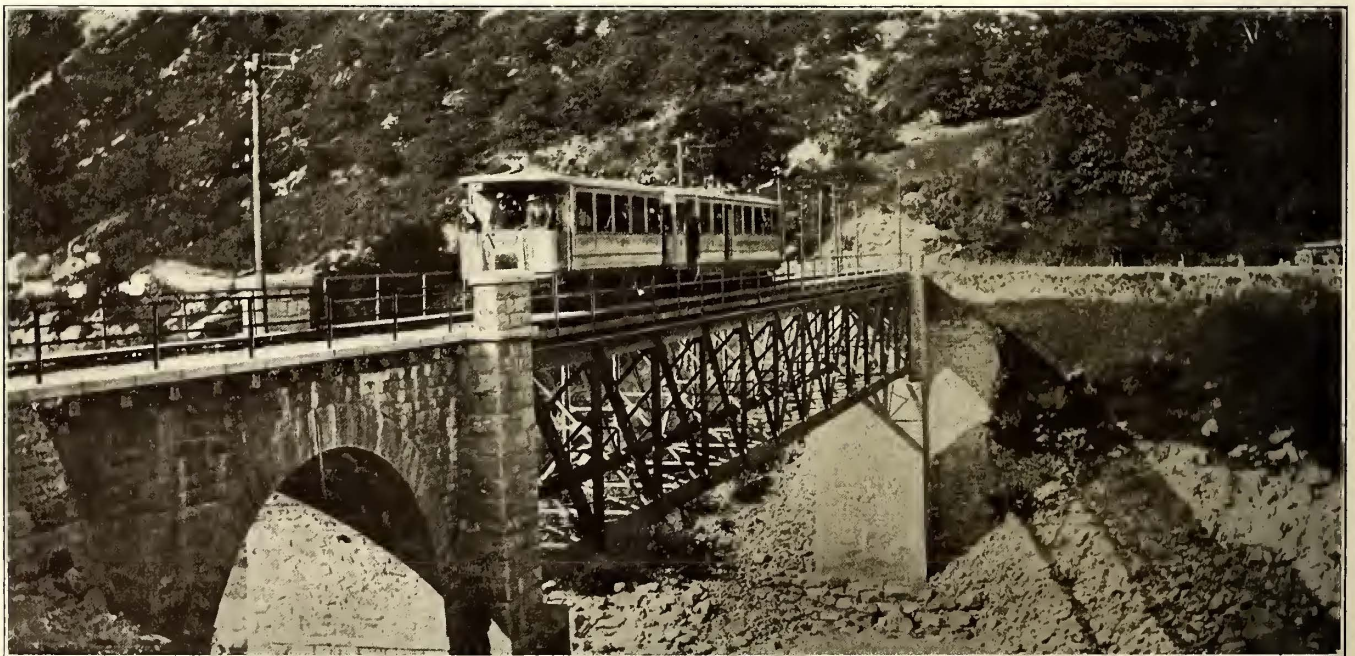


Locarno Single-Phase Line—Overhead Construction at Tunnel and at Turnout

in this country and the bow is favored by the German builders. Still a fourth method, the curved rod, flexibly supported so that it will move in a vertical plane at right angles to the axis of the car, has been developed by the Oerlikon Machine Works, of Switzerland. The general

tion and enabled the builders to work out a number of novel features. The line itself is also of interest.

Locarno is situated on Lake Maggiore, one of the beautiful group of lakes just south of the Alps, and not far from the southern termini of both the San Gottard and Simplon



Locarno Single-Phase Line—Bridge at Pontebrolla

form of this collector is familiar to readers of this paper through its use on the Seebach-Wettingen line in Switzerland. It has been employed for one and one-half years on this road and a short account of its service there appears elsewhere in this issue. It is interesting to learn in this connection that the rod collector has also been adopted for a new single-phase railway near Locarno recently equipped throughout by the Oerlikon Company. Opportunity has been afforded here to develop the system in a

tunnels. The Locarno-Pontebrolla-Bignasco Railway, the new single-phase railway, is narrow gage and connects the city of Locarno with the Vallemaggia, the second most important valley in the Canton of Tessin.

The route runs approximately north and south and the precipitous character of the mountains has necessitated a very expensive construction with many cuts and fills. The line has a total length of 27.232 km (17.02 miles) with grades as follows:



29.3 per cent on a 0 per cent grade.  
 36.2 per cent on a grade of less than 1 per cent.  
 15.1 per cent on a grade of between 1 and 2 per cent.  
 16.3 per cent on a grade of between 2 and 3 per cent.  
 3.1 per cent on a grade of  $3\frac{1}{3}$  per cent or more.

The line traverses four tunnels with a total length of 292 m (938 ft.); 65.3 per cent of the route is on tangent and 34.7 per cent is on curves. There are 25 bridges, one of which is illustrated on the opposite page. There are also 12 stations. The minimum distance between the latter is 910 m ( $\frac{1}{2}$  mile) and the maximum distance is 3441 m (2.5 miles).

The track is laid with rails weighing 22.7 kg per meter (45.4 lb. per yard) on ties spaced 15 to the rail length of 12 m (39 ft.). Single-phase current at 5000 volts and 20 cycles is used and is generated in the power station at Pontebrolla.

#### OVERHEAD CONSTRUCTION

The trolley wire is carried at a height of 4.1 m (14½ ft.) to 4.7 m (15 ft. 5 in.) in the country, 5.3 m (17 ft. 5 in.) at overhead crossings, about the same height at stations and 4.3 m (14 ft. 3 in.) above the rails in the tunnels. It is of copper, 50 mm<sup>2</sup> (100,000 circ. mils) in section, and is supported from span wires and bracket poles. It is not carried directly over the center of the track. On tangents it is usually located 50 cm (20 in.) or less off center, while on curves, it is set at the side of the track. The flexibility of the method of current collection permits this novel arrangement.



Locarno Single-Phase Line—Section Insulator and Breaker

At stations, to provide greater security, cross catenary construction is used to support the trolley wires.

The poles are of wood and the span wire insulators are attached to them by steel bands. In the open country bracket poles are used. Elsewhere span wires are employed.

#### HANGERS AND INSULATORS

The form of the collector, bearing as it does either at the side, above or underneath the trolley wire, requires a

novel type of hanger, which varies in form according to its location. For open country it is of U or L shape, as shown in the illustrations, while a braced T-shaped double hanger is employed at turnouts. The character and range of the current collector permits at turnouts, it might be noted, the use of one wire above another, instead of the frog. These hangers are of tubing and support the clips which hold the trolley wire.

In the tunnels still a different arrangement is employed.



Locarno Single-Phase Line—Tunnel

Here the clips are attached to a ring which is supported by short span wires from insulators set in the masonry.

The insulators themselves are the same as those used on the Seebach-Wettingen line. They are tested for 30,000 volts and are set so that they can turn on their pins.

#### OVERHEAD SECTIONS

The overhead line is divided into seven sections, which are separated from each other by horn circuit breakers which operate automatically or can be opened by hand. Each section is protected by lightning arresters against atmospheric discharges.

As on the Seebach-Wettingen line an auxiliary low-tension conductor is provided for assisting in opening the circuit breakers. It consists of galvanized-iron wire, 3 mm in diameter, and extends from terminus to terminus. It is also divided into seven sections by circuit breakers and is supported on low-tension insulators which are attached to the poles at a height of about 4.5 m (14 ft. 10 in.) above the ground. All of the supports of the high-tension insulators are connected to this conductor by means of a special device designed to indicate defects of insulation. The auxiliary wire is also connected in series with the winding of each of the line section breakers.

The device for detecting faults is composed of an insulated tube hermetically closed at each end by a metal cap. These two metal caps are connected in the interior of the tube by a copper wire. One of these caps is connected to the auxiliary wire, the other to the insulator pin or bracket. If even a few amperes pass through the device the copper wire in the interior of the tube melts. The air enclosed within the tube then expands from heat and blows off the caps. If, then, any insulator should be defective, current will pass from its support through the detecting apparatus to the auxiliary wire and thus open the line breaker. At

the same time the explosion of the tube leaves one of the metal caps fastened to the insulator and the other to the auxiliary wire so that any defective insulator can be easily located by the repair gang.

In case the trolley wire breaks, it is, of course, necessary to kill the voltage of that section. This is done automatically by means of a short wire wound around each insulator. When the trolley wire breaks, the tension is re-

Each car is equipped with four single-phase series motors of 40 hp each and is capable of drawing a train weighing 55 tons at the speed of 18 km (11 miles) per hour on a grade of 3 1/3 per cent, or at a speed of 30 km (19 miles) per hour on the level.

The motors are of the well-known Oerlikon type, in which both stator and rotor are fitted with compensating coils. The motors are tested to withstand a pressure of 1500 volts.

The controllers are provided with eight running positions with a separate reversing cylinder.

COLLECTORS

Each motor car carries three current collectors. One is a bow collector used only while on the city system in Locarno, the other two are the rod collectors, which are called antennæ in the Oerlikon system. They are connected in parallel and are used only on the high-voltage sections.

Each antenna is provided with a spiral spring which gives a constant pressure of about 3 kg (6.6 lb.) to the rod in all positions. The antennæ can be controlled from either platform by the motorman. The two

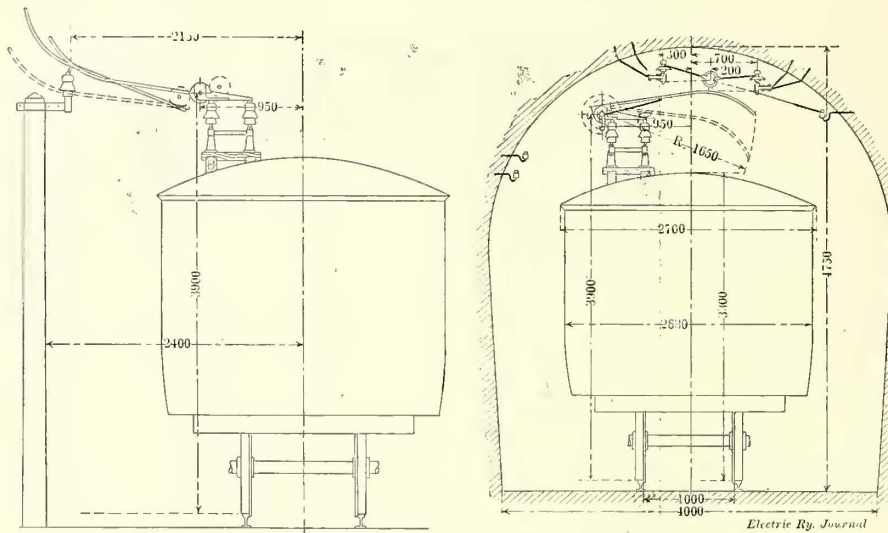
collectors are interlocked mechanically and are also interlocked with the door of the high-tension cabinet so that the latter cannot be opened when the collector is on the high-tension wire. Conversely, contact cannot be made with the trolley wire when the high-tension cabinet is open.

The rod itself is a steel tube covered with a brass sleeve which can easily be replaced when it wears out.

The bow is controlled by a cord in the baggage compartment and is also interlocked with the high-tension cabinet.

MOTOR CIRCUITS

The motor used differs from either of the two most commonly employed in the United States. Electromagnetically considered, it is of the inductively compensated series type. The rotor is practically the same as the armature of a direct-current series motor, the winding being directly con-



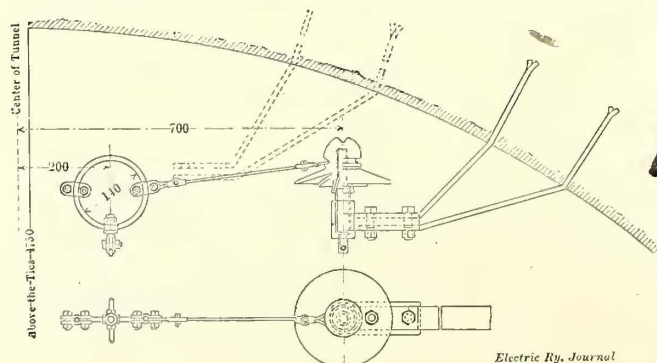
Locarno Single-Phase Line—Sections of Side and Tunnel Support

duced and the insulator or its bracket is given a twist so that the wire wound around the insulator is brought into contact with one or the other of two branches of a metal fork attached to the pole or bracket. This establishes a connection between the trolley wire and the auxiliary wire and thus opens the section breaker.

Two telephone wires for a complete metallic circuit are carried on the poles and are transposed at each suspension.

POWER STATION

Power is secured from the local hydro-electric light and power station at Pontebrolla. This station contains four 600-hp units, two generating, three-phase current for power and lighting and two single-phase generators for railway service. The latter are rated at 380 KVA, but can supply 450 KVA for two hours and 550 KVA for a short time. Current is generated at 5000 volts and is led directly to the



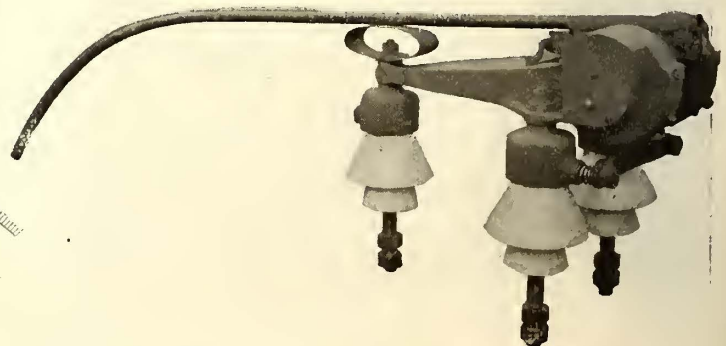
Locarno Single-Phase Line—Details of Tunnel Insulator and Rod Collector

line. The exciters are mounted from the same shaft as the generators.

CAR EQUIPMENT

The cars are operated at 800 volts a.c. in city service and each is equipped with an oil-cooled transformer of 90 KVA attached under the floor of the car. On low tension, the current passes directly to the secondary winding of the transformer which then acts as an auto-transformer.

connected to the commutator without the intervention of resistance leads. The stator is provided with three separate windings that perform different functions, namely, a main field winding *F*, a compensating winding *K*, and a commutating winding *H*, reference being had to the diagrams on page 387. Winding *F*, which is connected in series with the armature *A*, produces the active torque flux of the motor. Winding *K*, which is mechanically placed in induc-



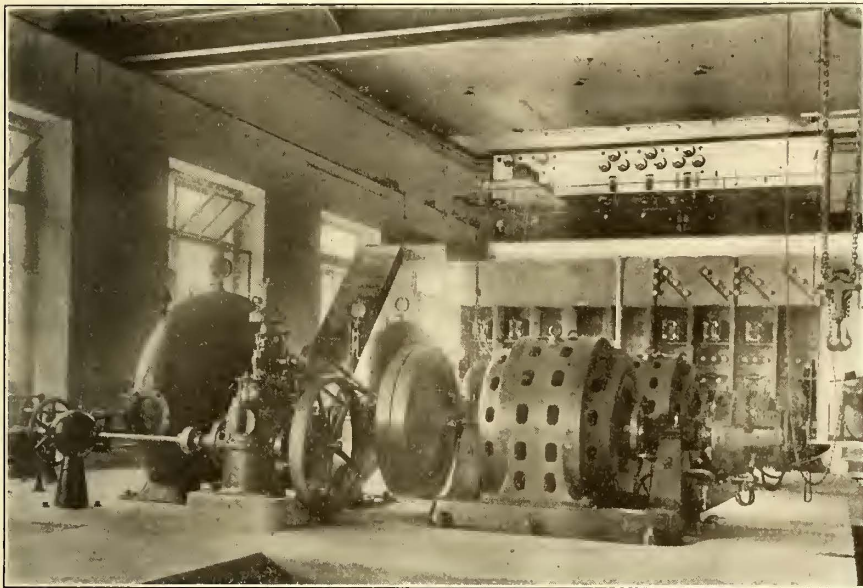
tive relation to the armature winding, but thoroughly insulated therefrom, serves for neutralizing the magnetomotive force of the armature current by reason of transformer action during alternating current operation, and thereby minimizes the reactance of the armature circuit. The winding *H*, which occupies only a small part of the circumference of the airgap, serves for producing a "commutation" flux of the proper value and

spectively. The series scheme is shown in the first diagram. The two next show the shunt connection in two forms, while the last indicates the combined series and shunt connection.

Referring to the first, it will be noted that a non-inductive resistor *W* is connected in parallel with the commutating winding *H*, which in turn is connected in series in the main motor circuit. It is evident that the current in the inductive winding *H* will lag greatly behind the e.m.f. across the terminals of this coil, while the current in the resistor *W* will be in time-phase with the same e.m.f.; then these two currents will be almost in time-quadrature. The main motor current, which is the vector sum of these two currents, will be nearly in time-phase with the current through the resistor *W* because the latter current is much greater than that in the winding *H*. Hence the current in the winding *H* is nearly in time-quadrature with the current in the winding *F*, and the fluxes produced by these two currents are likewise nearly in time-quadrature with each other, as desired.

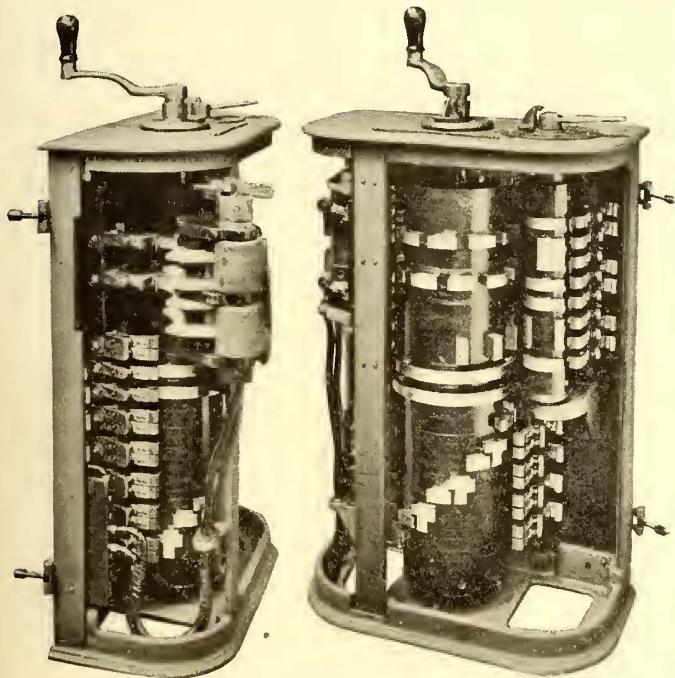
According to the scheme shown in the second diagram, an inductive coil *S* is connected in series with the coil *H*, the two-coil circuit being then joined in parallel with the armature.

Coils *S* and *H* being highly inductive, the current through them will be in time-quadrature with the e.m.f. across their terminals. The latter e.m.f. being in



Locarno Single-Phase Line—Power Station

time-phase position to cause to be generated in the coil under the brush by dynamo speed action an e.m.f. equal



Locarno Single-Phase Line—Controller, and Resistor, with Casings Removed

and opposite to that produced in the same coil by stationary transformer action of the main field flux.

A little consideration will show that the flux produced locally by the auxiliary commutating winding *H* should be in time-quadrature with the main field flux. The time-quadrature relation between these fluxes is secured by the use of one, or both, of two different schemes of connection which may be designated as the series and the shunt re-

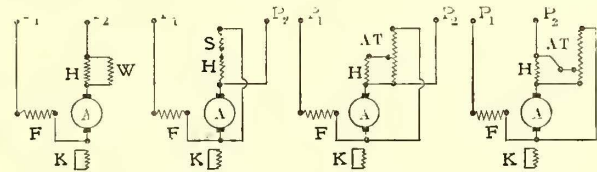
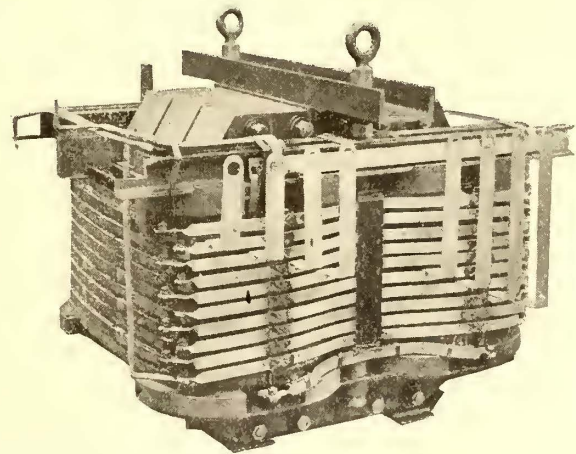


Diagram of Motor Connections



time-phase with the main field flux under speed conditions, the flux produced by the current in *H* will be nearly in time-quadrature with the main field flux, as desired.

In the third diagram is shown an auto-transformer *A T* connected across the armature circuit for obtaining a proportionately reduced e.m.f. for the commutation coil *H*. It is evident that, under speed conditions, the flux in *H* will be almost in time-quadrature with the main field flux, while

the value of the commutation flux can be varied by changing the ratio of the auto-transformer. The final diagram shows a scheme which permits of a certain amount of automatic variation of the e.m.f. across the coil *H* according to the current taken by the motor, the commutating coil *H* being joined in series—parallel with the armature circuit.

### ORGANIZATION OF ARKANSAS ASSOCIATION OF PUBLIC UTILITIES OPERATORS

The call issued for a meeting at Little Rock on July 17 and 18 of the operators of public utilities corporation of Arkansas received a general response from representatives of public service corporations throughout the State. The meeting resulted in the organization of the Arkansas Association of Public Utilities Operators.

The meeting was called to order by G. B. Harpole, general manager of the Batesville Water & Light Company, Batesville, Ark., in the banquet room of the Marion Hotel, and organization was effected by the election of the following officers:

President, D. A. Hegarty, general manager of the Little Rock Railway & Electric Company.

First vice-president, G. B. Harpole, general manager of the Batesville Water & Light Company.

Second vice-president, W. H. Walkut, Searcy Electric Light Company.

Third vice-president, J. M. Hewett, president of the Marianna Lighting Company.

Secretary, J. E. Cowles, superintendent of lighting, Hot Springs Light & Railway Company.

Treasurer, D. L. Ellis, general manager of the Camden Lighting & Power Company.

Executive committee, the president and secretary and the following: Edwin Hardin, superintendent of railways, Hot Springs Light & Railway Company; W. C. MacGuire, superintendent Wilson Water & Electric Company, Arkadelphia; S. A. Stearnes, general manager Home Water Company, Little Rock.

The purpose of the organization is the mutual benefit of the members, and the advancement and development of the public service corporations in Arkansas. It was pointed out that representatives of many companies attend the national conventions held by officials of the various classes of public utilities each year, get new ideas and put them into execution; the new association proposes to do in a measure for Arkansas corporations what the national associations do for public utility corporations throughout the country.

The membership of the association has been classified. Class A members are operators and executive officials of public service corporations. Only this class of members has a voice in the executive business of the organization. Class B is composed of salesmen representing supply and jobbing companies selling to the gas, electric and water utilities. Class C is composed of honorary members who, while they may not be directly identified with a public utility corporation, take an interest in such concerns. The constitution and by-laws adopted by the convention were prepared by a committee consisting of C. J. Griffith, superintendent of railways of the Little Rock Railway & Electric Company; G. B. Harpole, Batesville; Harry Lehman, secretary Hot Springs Water & Light Company; C. E. Coules, Hot Springs; Edwin Hardin, Hot Springs; D. L. Ellis, Camden, Ark.; J. M. Hewett, Marianna, Ark., and W. C. MacGuire, Arkadelphia.

Delegates were present representing 37 public service corporations in Arkansas and a vigorous campaign will be inaugurated to have every public service corporation in the State, exclusive of telephone and telegraph companies, join the association.

It was decided to hold the first annual convention Sept. 17 and 18 this year at Little Rock, and a committee was empowered to have papers prepared for discussion at the meeting. A legislative committee was formed to take up the question of having a bill prepared for presentation to the next Legislature, making it possible to prosecute for the theft of electric power, gas or water, and a bill in regard to barratry, making it an offense for attorneys to solicit suits against corporations. A vote of thanks was extended to the following representatives of manufacturers in attendance: A. O. Jennings, General Electric Company, Little Rock; J. D. Ramond, Wesco Supply Company, St. Louis; J. T. Herstine, Electric Supply Company, Memphis; G. B. Cameron, Western Electric Company, St. Louis; F. W. Greusel, Electric Appliance Company, Chicago; G. C. Knight, Ewing Merkle Company, St. Louis.

Delegates and their friends were the guests of the Little Rock Railway & Electric Company on a ride around the city, and at a baseball game of the Southern League. There was an installation of the Sons of Jove on the night of July 17.

### MEETING OF GENERAL MANAGERS' ASSOCIATION MACAFEE PROPERTIES

The general managers' association identified with the MacAfee electric railway interests held a meeting at the Ocean View Hotel, Norfolk, Va., July 7, 8 and 9. The following members were present: I. L. Oppenheimer, general superintendent of the Ohio River Electric Railway & Power Company, secretary of the association; E. C. Hathaway, general manager of the Norfolk & Portsmouth Traction Company; C. D. Emmons, general manager of the Fort Wayne & Wabash Valley Traction Company; J. B. Crawford, general manager of the Lexington & Interurban Railways; W. W. S. Butler, general manager of the Newport News & Old Point Railway & Electric Company; T. B. Gay, passenger agent of the Norfolk & Portsmouth Traction Company, and O. R. Bilbro, auditor of the Lexington Railway.

The morning session on July 7 was devoted to the consideration of bids and contracts submitted by manufacturers to furnish supplies for the syndicate properties. Some of these contracts were awarded, but others were deferred for further investigation and results of tests in process. A number of supply men were admitted to the meeting to confirm bids and fully explain the details and conditions of contracts submitted as well as the merits of their products.

On July 8 the meeting was called to order at 9:30 a. m. in the office of the Norfolk & Portsmouth Traction Company. In addition to the members noted there were present at this session T. H. Sawyer, of the Norfolk City Gas Company; Mr. Newman, passenger agent, and Mr. Crosby, master mechanic of the Newport News & Old Point Railway & Electric Company. Many contracts passed upon at the previous meeting were signed. Following the business session a visit was made by special car to the new power station of the Norfolk & Portsmouth Traction Company, after which the party went to Money Point to inspect and investigate a creosoting plant for ties and poles.

On July 9 the board reconvened in the office of the Norfolk & Portsmouth Traction Company at 11 a. m., conducting a routine of unfinished business and discussing and inspecting methods of accounting and shop practice. At 3 p. m. the board adjourned to meet in Philadelphia, Pa., the week of Oct. 12.

## REINFORCED CONCRETE CAR HOUSE FOR MUNICIPAL RAILWAYS OF NURNBERG

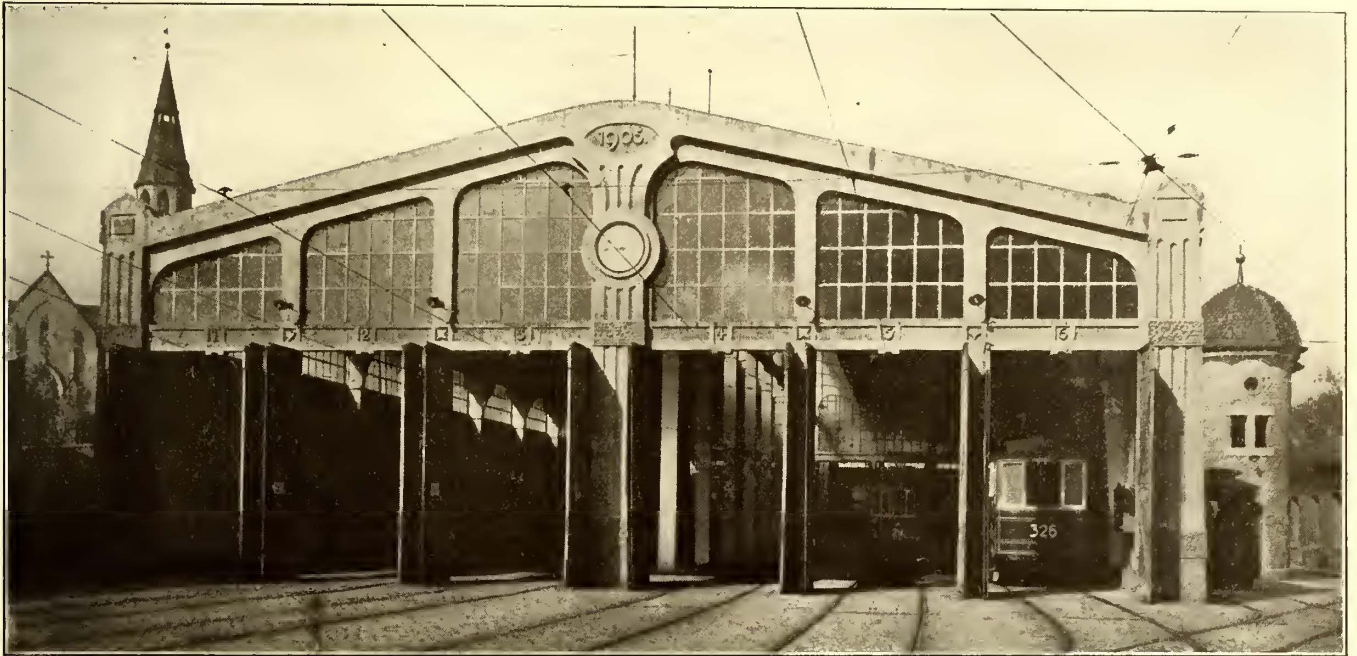
BY REINHOLD HERZOG, OPERATING ENGINEER OF THE NURNBERG-FURTHER STREET RAILWAY

One of the most interesting applications of reinforced concrete in electric railway work is afforded by the car house recently completed by the Municipal Street Railway of Nürnberg, Germany. Artistic and practical requirements have been blended so well in this structure that American railway engineers may be interested in an exposition of its principal features.

In the first place, the preliminary estimates for a car house of the capacity required, showed that the approximate cost, exclusive of foundations, would be 50 marks per square meter (about \$1.16 per sq. ft.) for either steel framing or reinforced concrete. The latter method was selected because it was held to have the following advantages: Greater resistance than steel against weathering

extra masonry. The reinforced roof girders located at intervals of 5.5 m. (17 ft. 2 in.) are carried clear across the car house, but are supported at the middle of the span by columns carried down the center of the car house. The roof also rests on short, longitudinal ribs, which are keyed into the main transverse girders. The skylight is of inverted V-form and extends for nearly the entire length of the building; additional lights also are installed along part of the walls between the pilasters. All lights are of wired glass.

The front and rear of the building are also of reinforced concrete. The reproduced view of the front of the car house is characteristic, and in particular shows the liberal provision for light in addition to that through the roof and sides. The glass framing is carried on a reinforced concrete beam carried over all the tracks. This beam also serves as a wind brace. The swinging track doors at both ends of the car house are of iron. A construction similar to that of the ends is used to isolate the steam heating plant at the rear.



German Concrete Car House—Facade

and consequent lower maintenance, particularly through the elimination of painting; better protection than galvanized iron sides against heat and cold; greater resistance to fire, and last, but not least, the possibility of imitating almost any artistic form, permitting the structure to harmonize with adjacent buildings.

The foundation work presented some difficulties, inasmuch as the site had formerly been used for a fishing pond and the made ground was of very uneven depth. In some cases it was necessary to drive piles through the sand and clay to a depth of 19 ft. The requirements of the city building department specified 2 kg per sq. cm. (0.34 lb. per sq. in.) as the greatest permissible weight on foundations.

The car house proper is 72.35 m. (237 ft. 6 in.) long and is divided into two three-track sections, each 10.4 m. (34 ft.) wide. The maximum height from the floor to the reinforced roof girders is 9.3 m. (30 ft. 6 in.). The general construction of the building is plainly shown in the illustrations of the exterior and interior. The side walls are of brick with reinforced concrete pilasters, which rest directly on a foundation stringer over the piling to eliminate

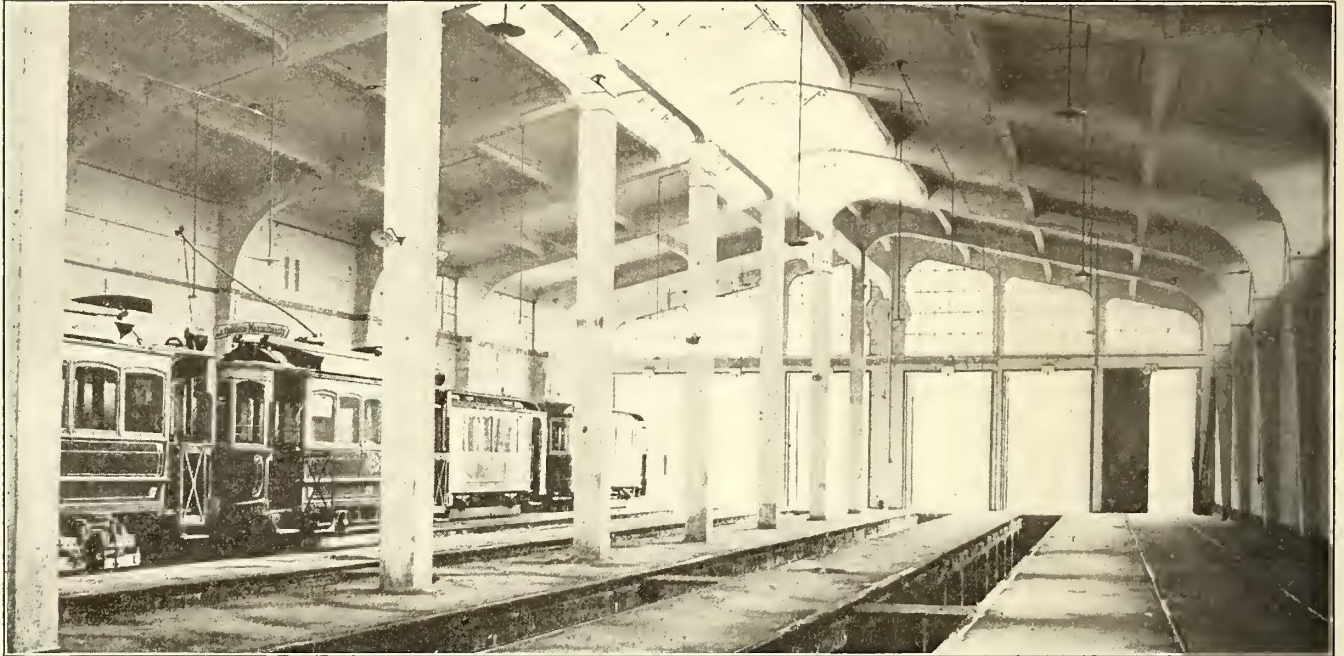
The rest of the car house is provided with open-type concrete pits 4 ft. 10 in. deep for all but the outermost tracks. The pit rails are clamped to concrete stringers carried by concrete posts. The load on the concrete flooring is carried by reinforced concrete plates resting directly on the soil. Concrete construction for the pits and devil strips was considered especially desirable from the standpoint of durability, but provision had to be made against dirt and the chemical action of dripping oils that might destroy the concrete. The floor plates therefore were placed in stamped concrete and afterward given a coating of cement mortar.

The concrete mixture used for the greater part of the work was made up of one part cement, three parts sand and three parts basaltic stone. The concrete mixture for the ribs between girders was in the proportion 1:2:2 to secure a material less likely to crumble. The roof, which is composed of reinforced concrete plates, was waterproofed by two coatings of cement mortar. Exposed surfaces requiring ornamental treatment or stuccos were covered with a mixture of one part cement to four parts of crushed

or powdered shells. After a brief hardening of this material it was treated like stone. The concrete work in the interior of the car house was painted with two coats of whitewash.

The heated portion of the car house is used principally

The splendid natural lighting of the house through the roof, sides and ends has been noted already. The artificial illumination is furnished by 150 incandescent lamps on the 550-volt railway circuit. The wiring is carried in iron-covered conduits and all necessary connections are made to



German Concrete Car House—View Looking Toward Entrance and Showing Side Lights

for car washing, but in cold weather cars are brought in over the pit extending into this section to have snow and ice thawed off the trucks.

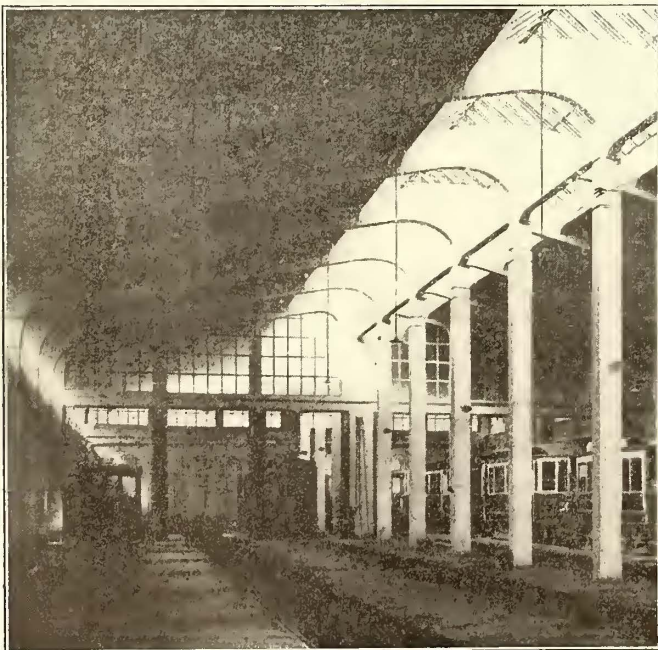
The small utilities building at the side of the car house is built entirely of brick. It has an underfloor passage to

woodwork placed in the concrete during construction. The pits have plugs for portable lamps. The extensions of the latter were formerly enclosed in a flexible metallic conduit, but this having been found impracticable, electrically and mechanically, the management has returned to the old-fashioned rubber tubing which wears out faster, but is more reliable in avoiding short circuits and is in other ways more agreeable to the men.

An interesting feature of the utilities building is the ample provisions for the comfort of the employees, these including bath rooms, wash rooms and private expanded metal lockers. The wash room has enameled basins with hot and cold water. The boiler room contains the equipment needed for heating part of the car house, the utilities rooms and furnishing a hot water supply. In addition to the storerooms, this building contains a sand-drying plant with an electrically driven screen passing up to 2 cubic meters (70.6 cu. ft.) of sand an hour. This installation has proved successful.

In conclusion, it may be added that the entire installation has given such satisfaction to the management that a similar car house will soon be erected by this street railway system.

The total cost of the car house, including foundations, drainage and heating, was 77 marks per square meter (\$1.78 per sq. ft.).



German Concrete Car House—Rear View of Interior Showing Partition for Enclosing Heated Portion

the car house, and as the pits are of the open type, workmen can go to and fro for their materials without climbing in and out, and can also use hand trucks to avoid carrying heavy parts. The shop is equipped with a hand crane to bring articles to and from this passage.

Quartermaster-General William B. Emery, of the Massachusetts Volunteer Militia, has contracted with the Boston & Worcester Street Railway for the construction of a spur track from the main line near the entrance to the State camp grounds to the State arsenal. The cost will be borne by the State and the track is to facilitate the carrying of supplies from the arsenal to any part of the State as may be needed in case of an emergency similar to the Chelsea fire.

## SOME NOVEL FEATURES OF THE SEEBACH-WETTINGEN SINGLE-PHASE LINE

For several years experiments have been carried on by the Oerlikon Company on the Seebach-Wettingen single-phase railroad, first with a Ward-Leonard type converter locomotive and then with 15,000-volt single-phase machine, as mentioned in previous issues of the *STREET RAILWAY JOURNAL*.<sup>\*</sup> The first experiments were carried on between Oerlikon and Seebach, and later on the main road as far as Affoltern. With the additional electrification of the main road, the Oerlikon system was extended to Regensdorf, where it joins the Siemens-Schuckert system, which runs to Wettingen.

The Oerlikon side trolley system is about 4 miles long, while the Siemens-Schuckert overhead catenary construction extends about 8 miles. There are at present two Oerlikon locomotives and one Siemens-Schuckert, all equipped with both styles of collectors. At Regensdorf the two trolley systems overlap for 1300 ft., so that changes from

of the track or some 8 ft. off center. The steel bridges carrying the catenaries are spaced from 165 ft. to 200 ft. apart.

The catenary is a single steel wire 0.25 in. in diameter, and the trolley is suspended from same 16.4 ft. above the track by steel wires 23 ft. apart.

The Siemens-Schuckert auxiliary or double catenary system is similar to that used on the Blankenese Ohlsdorf and other continental single-phase lines and the recently installed Heysham-Morecambe-Lancaster line of the Midland Railway, England.<sup>†</sup> The main catenary is a single steel cable and rests on the cast-iron caps of porcelain insulators in normal spans of 150 ft. to 160 ft. From the main catenary an auxiliary catenary of a steel wire is suspended by wires spaced 19.7 ft., the main trolley is hung from the auxiliary catenary by sliding clamps spaced 9 ft. to 10 ft. Along the main line the catenaries are hung from brackets on side poles, but at stations they are suspended from a pair of channels connected to wooden poles. There

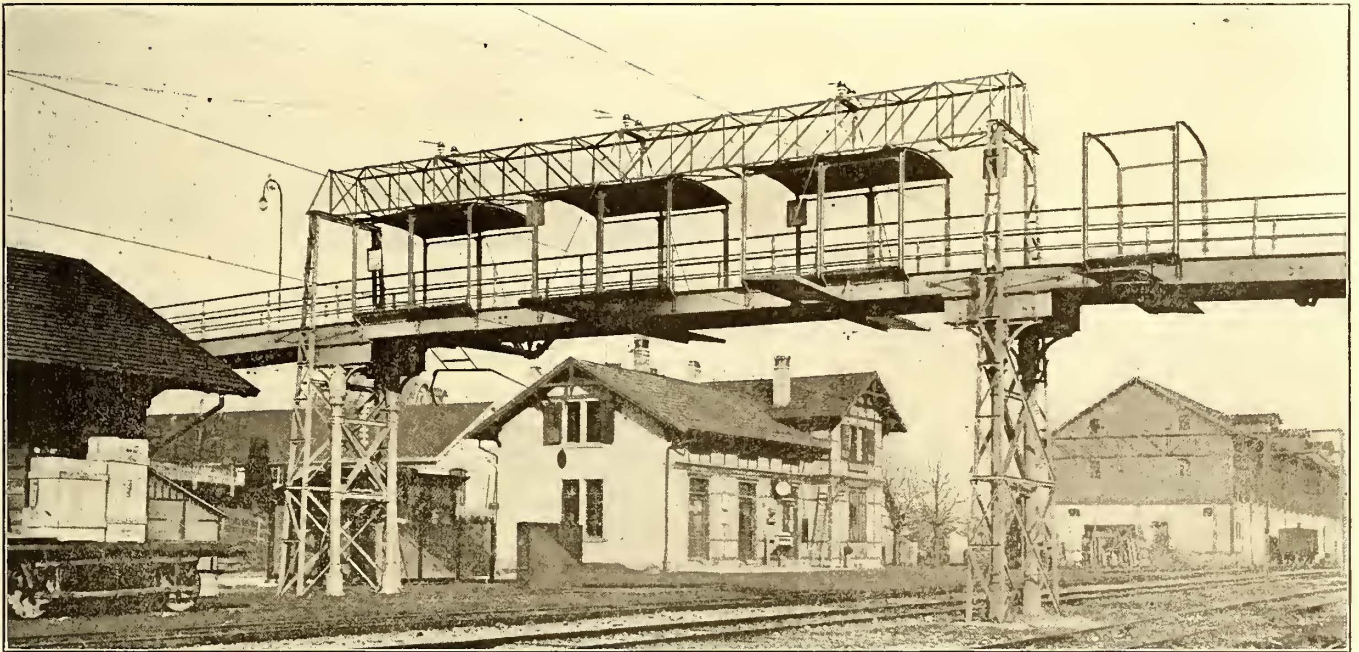


Fig. 1.—Seebach-Wettingen Single-Phase Line—Bridge for Circuit Breakers at Seebach

one system to the other can be made without interrupting the operation of the service.

For the greater part of its length the Oerlikon trolley system is carried by a semi-rigid construction from side poles, while at the Seebach station the bridge construction, as shown in Fig. 1, has been used. The bridge in the background is employed in regular construction, while that in the foreground has features for the protection of pedestrians over the already existing bridge. The structure carrying the catenary is built around the bridge, and beside the guard boards on the bottom of the bridge, there is a steel frame with a wire netting to prevent pedestrians from coming in contact with the high-tension lines. The structures beneath the catenaries are provided with roofs for further protection in case of accident. Only three of the four tracks are equipped with the catenary which hangs over the middle of the track, while the fourth has the trolley off to one side of the track. As is known, the Oerlikon rod collector can take current from a wire over the middle

are stations such as Wettingen where a single construction spans seven tracks.

The catenary construction is divided into sections about 1 mile long to take up expansion and keep the trolley wire taut. The end of each section is fastened to strain insulators and at the other the last insulator is connected to a chain from which is hung a 600-lb. weight, which through the sheave arrangement illustrated in Fig. 2, exerts a tension of 1200 lb. on the trolley.

Due to these divisions the ends of the trolley and catenary overlap 375 ft. and then lead to side poles. For a distance of 35 ft. to 45 ft. the catenaries are parallel and the trolleys are 5 in. apart. It will be recalled by readers of the earlier articles on this line that locomotive No. 1 was originally of the Ward Leonard type equipped with a converter and weighed 46.5 metric tons when a transformer was used for trolley potentials of over 6000 volts or 44 metric tons without the transformer on lower trolley voltages. Its tractive effort varied from 1320 lb. to 8800 lb. at speeds from 44 to 22½ m. p. h.

The original installation was operated at 50 cycles. As the trolley was running parallel to low-tension lines (tele-

<sup>\*</sup>See *STREET RAILWAY JOURNAL*, April 23, 1904, April 8, 1905, and Dec. 8, 1906.

<sup>†</sup>See *ELECTRIC RAILWAY JOURNAL*, July 4, 1908.

phone, telegraph) 50 cycles caused much disturbance, and it was decided to change the frequency to 15 cycles.

Locomotives Nos. 1 and 2 are each equipped with two 250-hp series motors placed between the axles of each truck. The normal speed is 650 r.p.m. with a maximum of 1000 r.p.m., the gearing ratio is 1:3.08, the drivers are 3.28 ft. in diameter, giving a speed of 36 m.p.h. Tests show that on grades of .08 per cent to 1 per cent, and with a load of 250 metric tons, a speed of 24 m.p.h. can be obtained; this speed may be maintained for short stretches on a grade of 1.2 per cent. Locomotive No. 1 after reconstruction weighs 40 tons, while locomotive No. 2 weighs 42 tons.

Locomotive No. 3 furnished by the Siemens-Schuckert Works has two six-wheel trucks, similar to those used by this company in the Marienfeld-Zossen high-speed tests. It is designed for a six-motor equipment, but at present only four fan-cooled motors are mounted. These have a capacity of 225 hp each, and are geared 1:3.72. There are two 500-kw oil-cooled transformers wound for 15,000/288 or 330 or 378-volt transformation. The high-tension winding of these transformers is of copper wire, while the low-tension winding is of flat copper strips wound on edge. Each of the three sections on the secondary side is divided into three steps for speed regulation. On the high tension side of each transformer is an automatic circuit breaker. There are two high-tension compartments, each containing the fuses and contactor switches for a single truck. The fuses and contactors are placed in separate tiers. The fluctuations in pressure in the transformer are balanced by equalizing coils. The contactors are operated under low-tension from taps on the secondary side, from which current also is drawn for light, heat, air, pump operation and the motor ventilators. The controllers are built for multiple unit control operation. The different collecting devices

has a tractive effort of 10,300 lb. for one hour, the maximum being 17,200 lb. With complete equipment the tractive effort is 15,600 lb. for one hour and the maximum tractive effort of this locomotive is 25,740 lb.

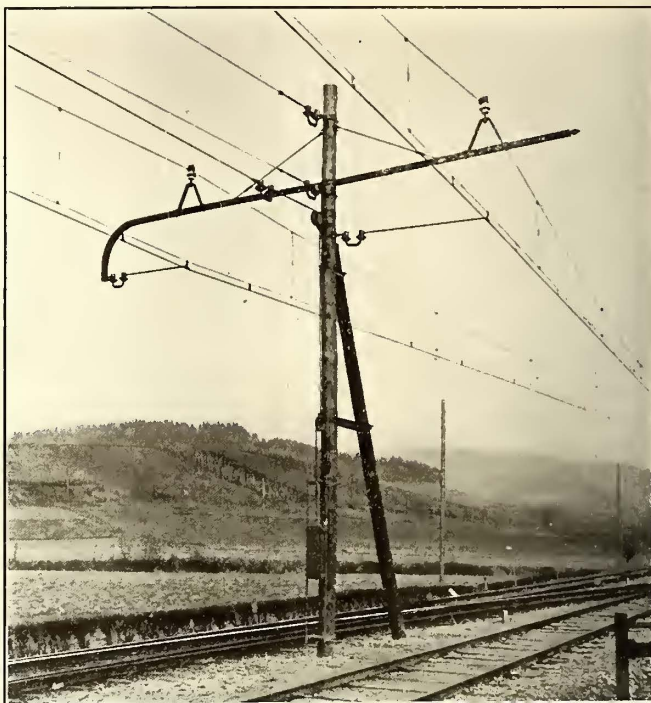


Fig. 2.—Seebach-Wettingen Single-Phase Line—Overhead Construction and Trolley Tension Device on Pole

The line is supplied with 15,000 volts at 15 cycles from a converter station which receives three-phase current at 210 volts, 50 cycles, from the power plant of the Oerlikon

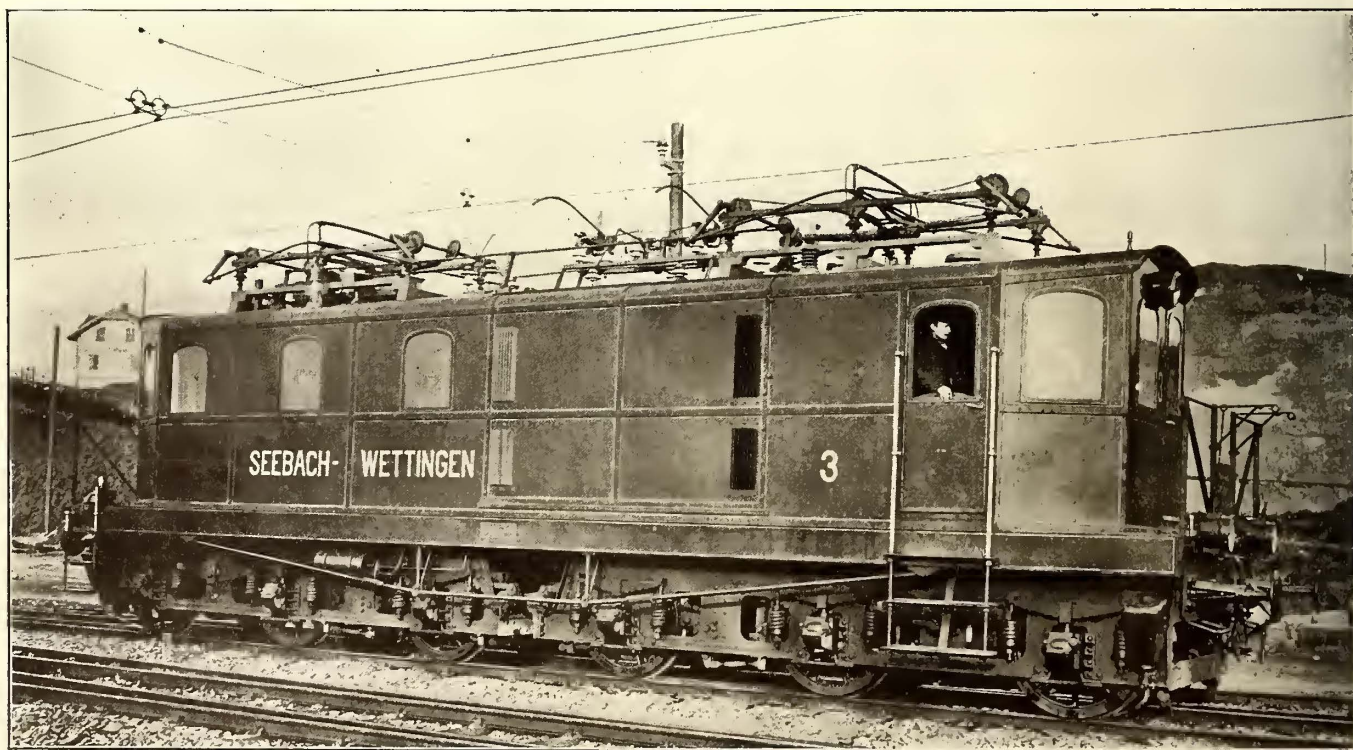


Fig. 3.—Seebach-Wettingen Single-Phase Line—Siemens-Schuckert Locomotive with Bow and Rod Collectors

can be raised and lowered while the locomotive is in motion. The weight of locomotive No. 3 when equipped with four motors is 68 metric tons, and with six-motor equipment 75 metric tons. In the former case the locomotive

Works. For this purpose an additional 700 kw, three-stage action steam was installed. The converter station has apparatus to receive three-phase current at 30,000 volts 50 cycles from an hydro-electric plant at Hochfelden.



### NEED FOR LIGHTER CARS

BY M. V. AYRES, ELECTRICAL ENGINEER, BOSTON & WORCESTER STREET RAILWAY

We have long been accustomed to hearing complaints about the inefficiency of the steam engine as a device for transforming the energy of coal into mechanical energy, and an immense amount of effort has been devoted in recent years to developing methods for getting a greater proportion of the energy of fuel into the form of useful work. Continuous attention is also being paid to increasing the efficiency of converting energy in electric railway service from one form to another, but at the point of use the demands for power are constantly increasing.

To accelerate a 150-lb. passenger to a speed of 30 m.p.h. requires 1.7 watt-hours. To carry him, say, one-half mile should consume no further energy, if friction could be eliminated.

To accelerate a car weighing 72,000 lb., with a load of 60 passengers weighing 9000 lb., to a speed of 30 m.p.h. and move it one-half mile will consume about 1420 watt-hours, not allowing for transmission losses. A comparison of this figure with 102 watt-hours, the theoretical energy to carry the 60 passengers, shows an efficiency of 7.2 per cent. By far the greater part of this waste of 92.8 per cent is due to the great dead weight of the car. About 820 watt-hours or 58 per cent of the total is consumed in accelerating the mass of the car. Something like 28 per cent is lost in the motors and rheostats, and the rest in bearing friction, track friction and wind friction. The gross amount lost in motors and rheostats would be reduced almost directly in proportion to the weight. Track friction and bearing friction would diminish not quite as fast as the weight but nearly so. Wind friction is the only item that would remain constant regardless of the car weight, and it is less than 10 per cent of the total.

An effort to reduce the power consumption in transportation service must apparently proceed along one or more of the following lines:

1. Improving efficiency of motors, including starting devices.
2. Reduction of bearing friction.
3. Reduction of track friction.
4. Reduction of wind friction.
5. Regenerative braking.
6. Reduction of car weight.

In the first four of these items but slight opportunities for improvement are possible.

Regenerative braking, under favorable conditions, would permit the saving of perhaps 25 per cent of the energy, but apparently at the expense of greater weight, which entails greater expenditure of energy during acceleration.

The reduction of car weight, on the other hand, would result at once in a large saving in energy without any corresponding disadvantages. In fact, the reduction in energy would be almost proportional to the reduction in car weight because the weight of the passengers is small compared with that of the car, with the rolling stock in common use. The weight of steam passenger cars, having no motors, averages about 1400 lb. per passenger seat. The weight of electric cars for heavy city and suburban and light interurban service, including full motive equipment, averages about 1200 lb. per passenger. This is for box and semi-convertible cars. Open cars are much lighter. Automobiles can be had as light as 250 lb. per passenger and motor cycles 150 lb.

It may be contended that the present forms of car construction, being the result of many years of gradual development, cannot be radically improved in the way of reducing weight, without making them dangerously weak. I cannot agree with such an argument. The present designs have been developed in almost entire disregard of weight, and without any appreciation of its importance. The recent movement toward the construction of steel cars in place of wood has brought out the surprising discovery that steel cars can be made of about the same weight per passenger as wooden cars, and a great deal stronger. Most of these cars, however, follow very closely the designs of the wooden cars and show little effort to reduce weight. It seems to me that the designs of a light car should proceed in accordance with the following principles:

The attempt to copy the appearance of standard designs should be abandoned, and the structure should be calculated as a special type of bridge truss, taking into account, of course, all determinable stresses. The monitor deck roof should be abandoned as inherently heavy, and the windows should not be allowed to interfere with the truss requirements.

The weight of materials which do not add to the truss strength should be reduced to a minimum. This applies especially to flooring, siding, and roofing.

All furniture and fittings should be especially designed for lightness.

Liberal use should be made of modern high strength alloy steel, so as to produce the lightest possible framework.

The trucks should receive special attention to combine strength with lightness. The axles should be hollow and of extra strong steel, and the wheels should be especially designed for the strains to which they will be subjected.

The motors should be specially designed for lightness and cooled by air blast.

The natural reply to the above program is that the expense would be prohibitive. This idea, however, is likely to be modified when we discover the saving in power cost to be effected.

On a certain interurban road with rather frequent stops, bad grades, and a 20 m.p.h. schedule, tests show a consumption at the car of very close to 100 watt-hours per ton mile, not including any heating. This road has cars which seat 60 passengers and weigh, equipped, 72,800 lb. As nearly as can be ascertained 100 watt-hours at the car mean 125 watt-hours at the busbars.

I have assumed that it should be possible to make a car of the same carrying capacity at one-half the weight. The train resistance per ton would be greater for the lighter car. I have assumed that this would increase the power consumption per ton by 10 per cent, which is a liberal allowance and implies a much greater percentage increase in train resistance. I assume that the car averages a load of 30 people at 150 lb. each, which is a liberal allowance, and that the car will run 150 miles per day, which is only 7½ hours per day at schedule speed.

On these assumptions the cost of power for one year is as follows:

72,800-lb. car:	
Total weight, loaded.....	38.65 tons
Miles run .....	54,700
Power at substation, 125 watt-hours per ton-mile, =	
264,000 kw-hours	
36,400-lb. car:	
Total weight, loaded.....	20.45 tons
Miles run .....	54,700
Power at substation, 137.5 watt-hours per ton-mile, =	
153,700 kw-hours	

At one cent per kw-hour the yearly cost of power for the heavy car would be \$2,640 and for the light car, \$1,537, or a saving of \$1,100 per year in favor of the lighter car. It would appear to be a good investment to pay \$11,000 extra per car to secure \$1,100 per year saving. The question then is, would \$11,000 extra permit the reduction in the weight of the car to 600 lb. per passenger seat? I believe a very great deal less money would do it. It should be easily possible to get the weight of cars for winter service and high speeds below 600 lb. per passenger, and I believe that after the first difficulties are overcome such cars will cost less than those now in use weighing twice as much.

Of course the saving to be effected will vary with different conditions. It will be greater with frequent stops and high schedule service, such as subway and elevated work. It will be greater with heavy grades than on level track. It will be least on very high speed work with few stops. But it will be great with every kind of electric passenger traffic, to say nothing of other branches of railroad work. I believe that more actual money saving can be effected by reducing the weight of cars than by any other change that can take place in the art of railroading. The case I have analyzed is not exceptional, but typical. The figures will vary; but almost any electric road, city, suburban or inter-urban, can cut its power expenses 40 per cent by reducing weight 50 per cent. At the same time track maintenance, brake shoe and wheel wear, and other items of expense will go down.

#### TRAMWAY ADDRESS BY SIR CLIFTON ROBINSON AT THE FRANCO-BRITISH EXHIBITION

At a meeting of the Tramway & Light Railways Association of Great Britain, held on July 9 at the Franco-British Exhibition in London, Sir Clifton Robinson, managing director of the London United Electric Tramways Company, delivered an interesting address entitled, "Tramways of the World." The earlier part of the address was largely of a historical nature, embracing a résumé of the pioneer electric railroading in the United States and Great Britain, in both of which countries the speaker had carried out important undertakings.

Speaking of British tramways generally, Sir Clifton said he saw no reason why they should not enjoy an indefinite period of financial prosperity, skilfully managed and conservatively financed, even though many of them groan under imposts of local authorities. Three points that handicap British street railways in comparison with other countries are the following:

The tramway cars are not permitted to travel fast enough, the average speed being less than 10 m.p.h.

The double-deck tramway car in general use causes much delay, particularly at stopping points. The adoption of this type of car is consequent upon the regulation enforced by the authorities that no car shall be licensed to carry any passenger for whom a seat is not provided.

Traffic could be handled more successfully on special occasions were the present licensing restrictions regarding passengers removed or amended.

British lines suffer also under many other minor disabilities; for instance, the licensing powers outside the metropolitan area (London) are vested in every little local authority through whose district the lines are laid. At the moment municipal bodies working tramways under perpetual tenure have an enviably open field before them, and they are working it zealously, but without the initiative, concentration and originality that characterize private en-

terprise. The civic phase of street railway construction and administration has been singularly barren of contributions to invention or to the understanding and conquest of scientific or traffic problems.

Speaking of the United States, which the speaker had recently visited, he referred among other matters to the absence of double-deck cars, the public finding top seats too hot in summer and too cold in winter, the higher speeds and possibly higher accident account than in England. Sir Clifton continued: "A considerable proportion of the American tramways are less prosperous financially than ours, but, so far as engineering and traffic management are concerned, the present-day American administrator deserves unbounded praise for his enterprise and almost consuming energy, and the various departments appear to be most elaborately and efficiently organized."

In discussing conditions in foreign countries, Sir Clifton said:

Australia has no extensive systems of mechanical tramways outside Melbourne and Sydney. The Melbourne cable tramways are worked by a company under arrangements with a joint board of municipalities. The Sydney tramways, mostly electric, are worked by a department of the state, and the voluminous reports issued are well known. Tramways in other towns are electric, except in Adelaide, where a large horse system has been taken over by the local authorities, and is now being extended and electrified. In New Zealand there are only a few tramway systems, mostly electric; they await further population in order to develop, but, in proportion to the existing population, they do a remarkably large business. The construction and equipment, both in Australia and New Zealand, are similar to those in England. The same remarks apply to South African tramways, which, unfortunately, are suffering from the trade depression there.

I was much struck during my recent journey with the development of electric tramways in Tokyo, Yokohama, Shanghai, Hong-Kong, Singapore, Colombo, etc. These follow western models; indeed, most of them have been built and equipped by British engineers. In Japan, however, they are run by native officials; but in China Europeans are in administrative command, as in those towns in India where tramways have been installed. The natives take well to the innovation. The cars are usually divided into two classes. The main obstacle to greater development in eastern cities is the narrowness of the streets. This is particularly noticeable in Tokyo, the capital of Japan. The city is a network of electric tramways, either in operation or proposed, though there are several important main arteries of traffic too narrow to admit even a single line of rails. The greatest possible impetus is given to the promotion of important lines of electric railways extending from Tokyo and connecting with the large, and in some cases far distant, provincial business centers.

As to the European Continent it is very difficult to draw any clear dividing line between electric railways and electric tramways, as there are so many interurban lines which may be regarded as partly the one and partly the other. Great numbers of light steam lines also exist, which may be classed either as railways or tramways. The ordinary railways are being extensively electrified in Italy and Switzerland, where water power for driving dynamos is abundant, and the same will soon be true of Sweden.

An instance of the adaptability and elasticity of the overhead trolley system is afforded by an extraordinary little trolley line in Russia which is equipped afresh and put into operation for five months of every year over the River Neva, at St. Petersburg. Climatic conditions are, in some other lands, comparatively even, though it is difficult for Englishmen to conceive it possible; and the Russian company is able to anticipate with certainty the freezing of the river. Sleepers and rails are laid down, poles put up, trolley wires run across, and a system  $1\frac{1}{2}$  route miles in extent is running electric cars over the delta of the river, until the approach of the warm season warns this enterprising company to dismantle the line until the following winter.

## MILWAUKEE FARE REDUCTION CASE

The Milwaukee Electric Railway & Light Company is engaged in resisting the demands of the City of Milwaukee for a reduction of fares. In a petition filed with the Wisconsin Railroad Commission in November, 1906, the city claims that the existing rate of fare, viz., 5 cents, six tickets for 25 cents and 25 tickets for \$1, with the privilege of one transfer within the city limits, "is exorbitant and excessive, and more than said fare is reasonably worth, and alleges on information and belief that a reasonable return upon the investment made by said railway company for said road in said city, aside from the expenses of management and operation can be made for a much smaller fare than is now charged by said railway company."

The city bases its claims on a report prepared by its expert accountant, taking the position that the railway company is earning an abnormal return on its investment, the amount of this investment being based on the value of the physical property. The value of the property at the end of the period under discussion was accepted by the city as it had been determined by a valuation staff acting for the State of Wisconsin. The railway company contends that it has actually put into the property an amount of money in excess of that shown by its property inventory and therefore it is entitled to earn a fair return on the total investment. The discussion as to whether an electric railway is entitled to earn a fair return on its total investment or only on a valuation of its physical property forms a most important part of this controversy.

To assume some figures: The Milwaukee company claims that if it has put approximately \$14,000,000 into its property, it has the right to earn a fair return on the actual cost of the property and not to be limited to earning a return on the present value, approximately \$7,000,000, as based on an inventory of the physical property.

On June 8, 9 and 10 at Milwaukee Halford E. Erickson, member of the Wisconsin Railroad Commission, heard a part of the testimony in this case consisting of the direct testimony and cross-examination, by the railway company's attorneys, of Edward E. Gore, certified public accountant. Mr. Gore had examined, as a foundation for the arguments of the City of Milwaukee in this case, the books of the Milwaukee Electric Railway & Light Company for a period of 10 years. It is understood that additional testimony will be presented by the city at the September hearing, at which time the railway company will present its side of the case and the arguments will be heard.

### TRANSCRIPT OF ACCOUNTS

As the result of an examination of the railway company's books Mr. Gore presented a report in which he adjusted the accounts for the reason, as would appear from his testimony, that he regarded the company's treatment of its accounts in some respects as improper, especially with respect to the "property account" and "reserves." The transcript of Mr. Gore's testimony and cross-examination is now available, and inasmuch as it contains information of particular interest and value to electric railway owners, managers and accounting officers, certain portions of it are here abstracted or paraphrased.

In describing his methods of making a transcript of the railway company's books, Mr. Gore said in part:

In arriving at what I believe to be the true condition, or a true statement of several accounts, notably property ac-

count and expense and earnings accounts, I have by adjustment eliminated items which I believed had no proper place there, and make a statement which I believe to be correct in accordance with the information which the books supply properly applied, and have labeled those schedules as adjusted. The adjustments are due to what I believe to be the requirements of sound accounting and necessary in order to arrive at a true conception of the conditions which the accounts attempt to set forth. \* \* \* I analyzed each and every account of the company for a period of 10 years; I investigated each charge and each credit that entered therein, considered the same, placed them where they properly belong and compiled from such analyses the statements which appear in the report. The report covered the investment accounts, all the expense accounts and earnings accounts of the company. The period, the accounts for which were examined, began Jan. 1, 1897, and ended Dec. 31, 1906.

Mr. Gore paid the following compliment to the accounting system of the Milwaukee Electric Railway & Light Company:

The system of accounting in use is a double-entry system, which is molded on the lines of the standard classification of street railway accounts, with some additions to that classification. The system is so laid out as to show in detail every expenditure made, all receipts of every kind and character and, in fact, it is so comprehensive as to constitute a complete detailed history of all financial transactions of the company. The accounting system is entitled to the greatest praise, both on account of the manner in which it is laid out and also the manner in which the details are carried out.

### PROPERTY ACCOUNT

I investigated the items going into the property account and determined to my satisfaction which were purely railway items, which were purely lighting items and which seemed to be for the common benefit of both departments. The latter property I classified as common and divided it later on the basis of 74 per cent to the railway and 26 per cent to the lighting department, this being determined by the proportion of the use of current as shown by the output for the year 1906. On Jan. 1, 1897, the property account was opened with a value of \$14,186,951.95, the balance brought forward from the former years.

The adjustment of items in the property account, as made by Mr. Gore, resulted in a total net deduction of \$3,082,000 made prior to Jan. 1, 1897, representing among other items the purchase price of various street railway and lighting properties, discount on bonds exchanged for properties and other reorganization expenses. On cross-examination, Mr. Gore said that many of these items had been eliminated because the raising of money was no affair of the city and that so far as the stockholders were concerned, the cost should be a charge against income. He also stated on cross-examination that even though the company had by due authority of law contracted obligations, it was not necessarily entitled to earn enough money to free itself of the obligations, but should have earnings enough to keep its property in such a condition as to offset its indebtedness and capital.

Some of the items eliminated by Mr. Gore from the property account were a charge of \$400,000 against the property which had been used for acquiring the stock of one of the underlying properties. He eliminated for the same reason an item of \$255,000, which was a discount on bonds exchanged for the underlying property.

In describing the method of handling the property account of the Milwaukee Electric Railway & Light Company, Mr. Gore said that for the years 1897, 1898 and 1899 charges to the property account were made direct in most cases, with the exception of the item of construction, which took up the original details of disbursements for construction

purposes and was closed to that account. On this point Mr. Gore said:

#### WORK ORDER SYSTEM

In 1900 there was put into effect what is known as the "work order system" of handling expenditures for construction, by means of which a projected improvement or extension was set forth at length upon paper and submitted to the general manager, who, after approving the proposed improvement or extension and the method of its doing, would sign it and it would then be given a number. All disbursements on account of that improvement or extension of every kind and character would then be charged to that work order. Any salvage there might be resulting from the use of less material than had been charged would be credited to the work order. At the end of each month the amount disbursed to the various work orders would be closed to construction. The work order, however, would continue in existence until the work undertaken in connection therewith was finished. At the end of each year the construction account would be closed to property account, the balance remaining in the construction account. By this means the details of construction were easier to ascertain and to keep in the form of a record than in any other way, the introduction of this method being distinctly a step in advance in the matter of accounting. \* \* \* As a matter of fact, I should state here that the property account at no time and in no place on the records of the company, was ever shown in the detail necessary to ascertain how it was made up. That is to say, there was nowhere a record entering into the accounts which disclosed the estimated value of the trackage of the overhead work, or of the equipment, or any of these pieces of property necessary for the operation of a street railway.

When these sales of equipment were made the amount received for them was credited to property account in some instances. In later years, however, that was not the practice. It then became the practice to credit such things to depreciation reserve instead of to property, and in those instances, of course, property receives no credit. The practice was wrong in this, that the property account should have had a credit for the value of the things sold as carried in the property account. If more had been received, then the miscellaneous earnings of the company would be entitled to the credit; if less had been received, property account should be credited to the full amount received and cash debited, and depreciation reserve debited for the loss between the value at which it was carried in the property account and the amount received for it at the time of its sale.

#### RESERVE ACCOUNTS

When being cross-examined Mr. Gore discussed the propriety of keeping certain accounts such as accident reserve, depreciation, legal expense, etc. He spoke of there being an "over-reservation," and said that he could "think of no more effective method of concealing the actual earnings of the company." These accounts, he said, however, were kept open to view and aboveboard with no attempt to apply any part of the reserves to the payment of dividends. The reservations were, at the time of the conclusion of his investigation, still in possession of the company.

The witness said that the Milwaukee company had too large a reserve for injuries and damages, yet he did not know what the practice of other street railway companies was in providing for this account. Such as he could remember had made the charges against earnings as they occurred. He agreed that it was better practice to make a reservation and change the rate at times, so as to meet the requirements as nearly as possible. This was his theory and on that he had based his criticism of the account.

With regard to his general criticism that the reserve accounts had too large a surplus, a considerable amount of testimony was taken. The company had let its profit and loss account carry the surplus earnings outside of the more important reserve funds. The witness said that he would

not try to provide against any such contingency or extraordinary loss as might be occasioned by an earthquake or so-called disaster other than a reasonable sum which should be included in the profit and loss account. He would place the amount of this "reasonable sum" at \$200,000 or \$300,000, or approximately 2 per cent of the company's capital investment. In any other business a much larger surplus or profit and loss balance would be required to take care of unforeseen contingencies, but, as a rule, the depreciation, wearing out and constant breakages, accidents, etc., on a railway might be considered as a part of the normal business and should so be taken care of.

Mr. Gore stated that if a railway company were operating with horses or mules over very poor track and, to obtain more efficient operation, were to put in an electrical equipment of the best quality obtainable at the time, which allowed the railway to operate more cheaply and over a larger territory, sufficient profit should be obtainable from earnings to replace the capital discarded in order to put in the newer and better system. At the same time, in the case of a street railway company, the element of the interest of the public in the proposed change entered. If, however, the law of the State provided or an ordinance of the Common Council required the change to be made, the situation would be affected and the city or State should give permission to the railway company to take care of whatever loss accrued by reason of the change. The fact that such direction on the part of the city or State might have resulted in actual loss to the Milwaukee railway had not been called to the witness's attention when he was making his analysis of the company's accounts with a view to showing that its surpluses were so large that the fare might properly be reduced.

#### AMORTIZATION

In his consideration of the adjustments of the accounts Mr. Gore did not take into account the amortization of the value represented by the franchise. He said that he had been advised that a law of the State provided a means by which that feature could be taken care of; the company might secure a franchise from the city and be fully protected in the value of its plant at the time of the expiration of its franchise. If, however, the franchise were not an indeterminate one he would regard it as proper to establish an amortization fund for that purpose.

#### DEPRECIATION ACCOUNT

Mr. Gore said that the purpose of a depreciation account was to accumulate a fund, out of which to pay for the wear and tear that goes on and the deterioration that no repairs can take care of. He admitted that there was a wear and tear or a "death" of a property, no matter what amount was put upon it for maintenance and repairs. He stated that if the company found that it could operate more cheaply by using another type of equipment, then the loss resulting from the abandonment of the equipment should not go against the earnings of the company to the detriment of the public or as a justification of a higher charge to the public. It should be altogether a matter concerning the stockholders. When questioned regarding this statement, Mr. Gore said that he had not been a railway operating man and could not from experience as an accountant state the average life of street railway property. Again, the difference in the rate of expenditure for maintenance purposes and climatic conditions made it very difficult indeed to compare the depreciation of different railway properties.

For the purposes of his report on the Milwaukee accounts Mr. Gore accepted the figure of 8 per cent of the gross earnings as a fair charge for depreciation, because it had been adopted in the Chicago rehabilitation work, but testified in his direct and on cross-examination, that a depreciation fund should be based upon a percentage of the value of the property, although he knew of no road that treated its accounts in that way.

To base the amount of depreciation reserve upon a percentage of the earnings was incorrect. The proper way to ascertain the correct rate of depreciation and make a reserve for it would be to estimate the life of the physical property used, base the depreciation account upon that life and then at the end of each year inventory the property at its then fair value, charging the depreciation reservation with the loss during the year.

In estimating the value of the property Mr. Gore said: "The value of the property as reported by the engineers for the railway commission was \$9,410,177. Deducting therefrom year by year the amount expended for construction gives the value at the beginning of 1897 of the property of the railway, \$4,540,404.94. Starting with that amount for Jan. 1, 1897, \$4,540,404.94, add thereto \$5,029,972.06 for construction during the 10 years and we have \$9,670,377. If there be added to that the amount charged to depreciation reserve, \$2,280,065.22, the sum would be \$11,950,442.22."

The valuation staff of the railroad commission appraised the property as being worth \$7,161,926 on Dec. 31, 1906. During the 10 years previous to that date \$2,280,000 was disbursed and charged against the depreciation reserve. From this it will be seen that the difference between the cost of the property, \$11,950,442, as quoted by Mr. Gore, and the value of the property on Dec. 31, 1906, \$7,161,926, as determined by the valuation staff of the railroad commission, was \$4,788,516. On this basis the actual depreciation of the property, therefore, in the 10 years from 1897 to 1907, was \$4,788,516, or \$2,508,451, more than the cost of the replacements, renewals and reconstruction of the property charged against the depreciation reserve set aside by the appropriation of 10 per cent of the gross earnings.

In discussing the question of proper reservations the witness said that he assumed there was a difference between reconstruction and depreciation. "My idea of that is this: Reconstruction would apply to a plant which was absolutely useless in its present form and the reconstruction was the one thing necessary to make it available for use; while in the case of depreciation I would regard charges for depreciation to be those that were meeting the wearing out of certain portions here and there as they arose from time to time." In other words, reconstruction was the replacement of the entire plant and depreciation the replacement of parts worn out.

When cross-examined the witness admitted that the Milwaukee company charged every replacement or reconstruction to its depreciation reserve fund. In the 10 years over which period the business had been investigated there had been expenditures of \$2,280,000 from this depreciation reserve. In his adjustment of the accounts Mr. Gore said that \$860,000 of the amount had been expended in additions to property through the purchase of cars and similar items. That left approximately \$1,420,000 which, for purposes of argument, was considered in the discussion as \$1,400,000. In addition to these sums the railroad spent for construction approximately \$5,000,000. That is to say,

in the 10 years there was spent \$5,800,000 for new property and \$1,400,000 for property to replace other property that had worn out. The company had built up a depreciation reserve of \$2,873,000 when, according to Mr. Gore's statement, it should have reserved but \$1,700,000.

A considerable amount of testimony was taken which established a clear statement of the witness's ideas of depreciation reserve. According to his deductions he estimated the value of the property at \$4,500,000 on Jan. 1, 1897; the company had added \$5,000,000 worth of property from its construction account during the 10 years. The witness admitted that \$860,000 had been spent to furnish new cars, \$1,420,000 had been spent to renew old property, making a total of \$2,280,000. The railway company contended that this amount did not appear in the depreciation reserve as the witness had rearranged it and that there was \$860,000 more put into the property than he had allowed for in his adjustment of the accounts; and also that there was, according to the witness's own figures \$1,420,000 which had been kept to prevent depreciation that otherwise would have occurred. Therefore, the actual expenditure on account of depreciation was \$2,280,000. During the examination, however, the witness maintained that if the company had set aside as a depreciation reserve \$1,700,000 and had made all its renewals out of that, the amount would have been sufficient to have kept the property in such shape that the company could have obtained 100 per cent for its money spent during the 10 years.

Some of the more important views of the witness brought out in the concluding part of the testimony follow: It was his opinion that the decrease in operating expenses due to the supplanting of the old equipment by new would take care of the loss suffered by reason of the substitution—that is, the loss in value of the old equipment; and that the management would not make the change unless it were satisfied on that point. Also, if the rate of fare were to be predicated upon the cost of operation with the equipment now in use, the additional expense that might be incurred in the future to supplant the equipment now in use or similar equipment by a newer and better type of equipment, would be compensated for by the decrease in the cost of operation. For these reasons Mr. Gore did not consider obsolescence as an element of depreciation for the purpose of rate fixing. If it were true that a railroad company had the right to apply to the commission for permission to increase its rate he would consider that it would neither be necessary nor advisable to set aside a depreciation reserve to take care of the improvement that might be required by a municipality; that is, such improvements as would not be contemplated in the ordinary conduct of business. He would set aside the expense of organizing a corporation in an account by itself and charge it off from time to time against income so as to dispose of it as soon as possible. A street railway corporation doing business as the Milwaukee corporation had done ought to be able to take care of the expenses incident to the organization of the corporation within the first 10 years of its existence.

Under cross examination Mr. Gore stated that no dividends were paid on the preferred stock until 1900 and none on the common stock until 1902; that the average dividend paid on the preferred stock for the 10 years from 1897 to 1907 was about 4 per cent, and on the common stock about 3 per cent.

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The New England Investment & Securities Company is to move its headquarters from Boston to Springfield.

## COMMUNICATIONS

### OPERATING RULES IN INDIANA

INDIANA UNION TRACTION COMPANY

ANDERSON, Ind., July 22, 1908.

To the Editors:

The rules adopted for the operation of interurban roads in Indiana I consider more desirable than other rules which have been compiled by other associations to this time. They are, I believe, more nearly complete and meet the conditions better than any others which have been prepared. The rules adopted for Indiana roads can readily be used to advantage by any interurban line in the United States that operates fast trains in a safe manner. The rules pertaining particularly to the movement of trains have been brought more nearly in accord with present conditions and are more concise than any other rules with which I am familiar.

It was thought advisable to include the rules for the track and roadway department in our compilation on account of the necessity for our track and bridge men to keep in touch with the movement of trains when at work on the track and bridges; these men should be perfectly familiar with the use of flag and train signals and other rules relating to the operation of trains.

This company has had an elaborate book on rules for the government of its roadway department, which were in effect before the preparation of the new uniform rules, and they are still in force in conjunction with the standard rules.

I cannot see wherein any considerable expense will be involved in the compliance with the rules, except that some companies may have to purchase new train-order blanks, flags, and possibly classification and tail lights.

As is now well known, the Indiana rules were compiled at conferences between representatives of the Railroad Commission and the companies. No special reason appears to me why rules of this character should be compiled between representatives of the State and the companies, except that where the rules are approved by the State commission, as they are in our case, we have the absolute endorsement of the commission in their enforcement, which is quite desirable.

In the preparation of the Indiana rules an effort was made to improve the methods of operation, as well as to obtain standard rules that would be satisfactory and acceptable to all roads in the State. Most companies in Indiana had rules compiled with the same object in view, although these rules were worded differently and advanced the ideas of the individuals in charge. Therefore, the standardization which has now been effected will prove both beneficial and desirable.

H. A. NICHOLL,  
General Manager.

### DRAG-FIT METHOD OF ASSEMBLING WHEELS, AXLES AND GEARS

NORTHWESTERN ELEVATED RAILROAD

CHICAGO, July 22, 1908.

To the Editors:

I beg the privilege of replying to the criticism of the drag-fit method of assembling wheels, axles and gears, a description of which appeared in your issue of July 4, the criticism following in the issue of July 18 and being signed by C. G. Bacon, Jr. I doubt whether the method suggested

of endeavoring to bore wheels to accurate fits would work out well where the cutting for making the required fits was all done on the wheels. The average railroad company does not deem it wise to sacrifice its wheel centers by continually cutting them away for the purpose of bringing about the proper assembly fits of wheels and axles. It is considered more advisable to maintain the original bore of the wheels unless, as may occur, it is found that the wheel fit has become distorted on account of previously having been mounted on a taper fit. This distortion also occurs as the result of a loose fit, which is liable to come about if the sense of feeling is relied upon for making a fit with caliper measurements.

The point to be emphasized is that axles, in the course of time, will have to be replaced and obviously it is desirable that this work be done in the safest and most economical manner. To obtain these results requires a careful selection of good materials, proper dimensions and the assembling of the wheels in a thorough way by the observance of fixed rules and standard sizes under the care of men so experienced in their work that the different stages can be well governed.

The assembling of wheels and axles is a matter of vital importance in electric railway work and should not be left to the judgment of incompetent men who "have received experience in this class of work in two days' time."

The article appearing in the *ELECTRIC RAILWAY JOURNAL* for July 4 describing our method of assembling wheels, axles and gears, referred principally to steel-tired and pressed-steel wheels rather than to street-car wheels. The latter are subjected to far more abuse and require removal from the axles more often than the steel-tired or steel wheels, which oftentimes outlive more than one axle. Under these conditions the "drag method" is, in my opinion, the proper system to use when making renewals whether the wheel or the axle is machined to bring about the required fit. With the system mentioned the shopmen become familiar with the positive self-reliant method of making fits between any pieces of mechanism which should be assembled under given pressures.

I know of one instance where 116 new axles were turned previous to the making of the wheels. The wheels were bored by the maker to a certain size and the fit was taken care of by the drag method on the axles. These wheels have shown satisfactory service under heavy equipments on a road having many curves and using large motors.

J. E. OSMER,  
Master Mechanic.

### MEETING OF WAY COMMITTEE OF THE ENGINEERING ASSOCIATION

A meeting of the way committee of the American Street & Interurban Railway Engineering Association was held at the office of B. V. Swenson, secretary of the American Street & Interurban Railway Association, New York, on July 25. The following were present: Chairman Charles H. Clark, engineer of way, International Railway, Buffalo; Thomas K. Bell, chief engineer, Interstate Railways Company, Philadelphia, Pa.; E. O. Ackerman, engineer of way, Columbus Railway & Light Company, Columbus, Ohio; C. B. Voynow, assistant engineer, Philadelphia Rapid Transit Company, Philadelphia, Pa.; Martin Schreiber, engineer maintenance of way, Public Service Railway Company, Newark, N. J. The committee held an all-day session and transacted considerable business in relation to the part

of the program for the Atlantic City meeting in October, which this committee prepares.

Mr. Voynow was asked to write a paper on proposed railway construction for street railway tracks for strictly city service for the association. It was decided to invite Victor Angerer, vice-president William Wharton, Jr., & Company, Philadelphia, to prepare a paper on rail corrugation.

Mr. Schreiber was requested to take up the subject of the preservation of poles and ties by the open-tank method and to endeavor to induce an expert in the employ of the United States government to present a paper on this method of treating timber. It is also desired to present to the association statistics regarding the life of ties, buried or open and treated or untreated.

It was found to be the unanimous opinion of the members that the T-rail is the best type of construction and the committee will suggest to the association at the approaching annual meeting that as it did not have sufficient data on the subject and the matter is important, a special committee should be appointed to investigate the subject and make a comprehensive report at the annual meeting in 1909 as to the best rail and the best foundation and paving, etc. Mr. Bell, who has had experience with T-rails in Wilkes-Barre, Pa., will prepare a paper presenting his views on this subject.

The committee further decided to ask John W. Corning, electrical engineer of the Boston Elevated Railway, to invite some track engineer of that company to prepare a paper on the life of manganese steel rails for curved and straight track and to compare the cost and the expense of maintenance of these rails with other rails. A representative of the engineering department of the Pennsylvania Railroad will also be asked for some information on the same subject. Another topic tentatively adopted for the subject of a paper was that of open-hearth rails.

Considerable discussion took place regarding screw spikes and standard spikes, and it was decided to ask the engineering of way department of the Philadelphia Rapid Transit Company to submit statistics of the comparative cost of such spikes. A general discussion regarding track work was also recommended by the committee.

The subject of tie rods was brought up and caused considerable discussion. A number of suggestions were brought out.

### PUBLIC SERVICE COMMISSION FENDER AND WHEEL GUARD TESTS

The Public Service Commission of New York City has received many responses from manufacturers of fenders and wheel guards to its invitation to submit appliances to a public test. The tests will be held in Schenectady on the tracks of the General Electric Company about Sept. 10 and in Pittsburg, on the tracks of the Westinghouse Electric & Manufacturing Company, about Oct. 10, the tests continuing in each instance as long as it is necessary to give each appliance a fair trial.

These tests will be conducted by the Public Service Commission of the First District, New York, and will be under the supervision of A. W. McLimont, electrical engineer; George F. Daggett, chief of the accident bureau, and Daniel L. Turner, chief of the transit inspection bureau of the Commission. The tests will also be attended by the engineers of the Public Service Commission of the Second District, and the findings will be concurred in by both boards.

Letters have been received from railway commissions and supervising officials from many other States and from the Interstate Commerce Commission saying that experts would be sent to witness the tests. It is stated that the purpose of the commission is not to select any single appliance and enforce its use, but to name all those which are considered satisfactory and permit railway companies to exercise their preference.

Every fender or wheel guard will be subjected to 108 separate tests. There will be three dummies used, weighing, respectively, 180 lb., 120 lb. and 50 lb. Each dummy will be struck in six positions, at two speeds, 6 miles an hour and between 15 and 20 miles an hour, and each test will be tried on three different kinds of pavement. Inquiries concerning the tests have been received from more than 100 manufacturers.

The following list of intending participants has been furnished by A. W. McLimont, electrical engineer for the commission:

- Clark Automatic Car Fender Company, Decatur, Ill.
- Consolidated Car Fender Company, Providence, R. I.
- Eclipse Railway Supply Company, Cleveland, Ohio.
- Electric Service Supplies Company, Philadelphia, Pa.
- McGuire-Cummings Manufacturing Company, Chicago, Ill.
- Parmenter Fender & Wheel Guard Company, Boston, Mass.
- Worcester Railway Supply Company, Worcester, Mass.
- Sterling-Meaker Company, Newark, N. J.
- Pfingst Platform Fender, Boston, Mass.
- C. H. Weeden Automatic Fender, Quincy, Mass.
- P. B. Sullivan, Randolph, Mass.
- L. M. Maxham, Boston, Mass.
- Automatic Car Fender Company, Arlington, Mass.
- J. O'Leary, Cohoes, N. Y.
- Jenkins Automatic Fender Company, Toronto, Canada.
- C. D. Foulkes, Brooklyn, N. Y.
- F. J. Graf, 47 St. Mark's Place, New York.
- Mrs. F. E. Jousset, 320 East 118th Street, New York City.
- L. Mercier, Brooklyn, N. Y.
- E. Sherwood, Honesdale, Pa.
- L. S. Clark, 16 Court Street, Brooklyn, N. Y.
- E. T. Gibson, 168 Montague Street, Brooklyn, N. Y.
- J. G. McLean, 124 West Forty-seventh Street, New York City.
- J. Quirn, 1812 Brooklyn Avenue, Brooklyn, N. Y.
- C. N. Washburn, Flushing, L. I.
- M. Hirsch, 316 East Seventy-seventh Street, New York City.
- A. F. Barro, 32 Park Place, New York City.
- Hunter Illuminated Car Sign Company, 542 West Twenty-third Street, New York.
- Mountain & Gibson, Ltd., Burry, Lancashire, England.
- H. F. Heide, 176 East 112th Street, New York City.
- Albert W. Wilson (Lesser Fleischmann & Long), 142 Nassau Street, New York.
- I. H. Caliga, 142 Federal Street, Salem, Mass.
- J. P. Geraghty, 189 Pavonia Avenue, Jersey City, N. J.
- Geo. W. Schultz, 1230 St. James Street, Philadelphia, Pa.
- C. Sullivan, 90 Laidlaw Avenue, Jersey City, N. J.
- Samuel H. Coffee, Beverly, N. J.
- Edwin S. Coy, 34 Nassau Street, New York City.
- August Wirth, 144 Littleton Avenue, Newark, N. J.
- Adolpho Azzli, Seattle, Wash.
- American Automatic Fender Company, Minneapolis, Minn.
- Richard Preuser, Washington, D. C.
- John L. Hawthorne & Company, Chester, Pa.

The department of communications of Japan has granted a charter to the Muhashi Electric Railway to build from Tengen-ji Bridge, in the Iliro-o suburb of Tokio, direct to Hiranuma, with branch lines to Chofu-mura and Kamada.

## OPERATION OF THE CLEVELAND STREET RAILWAY SYSTEM BY A NEW COMPANY—II.

When the new corporation entitled the Municipal Traction Company assumed control of the Cleveland street railway system many changes in methods of operation were introduced immediately. It would probably be an accurate statement of the motives of the changes to state that they were made with the idea of establishing a 3-cent service with 3-cent fares. The new management evidently realized that 3-cent fares could not be given if the same quality of service furnished by the Cleveland Electric Railway were maintained. If revenues were to suffer a reduction, there must be a corresponding decline in the expense of operation, affecting almost inevitably the efficiency of the service.

Radical changes in the personnel of the management and employees were instituted, possibly as the result of some elation over victory on the part of the new executive officials. With the exception of W. G. McDole, the auditor, none of the officials of the old company, executive or operating, was retained by the new corporation. The places of the retiring officials were filled largely either by representatives of Mayor Johnson's existing low-fare railway in Cleveland or by appointment from the long list of city officials or politicians. Before the new administration had opportunity to organize and acquire experience as a body, the strike occurred, causing complete disorganization in the operating department.

The merits of the strike of old trainmen will not be discussed here. At present it is desired to show merely the effect of the strike upon the service of the company. Elimination of most of the platform men employed by the Cleveland Electric Railway had two effects upon the new company:

(1) It enabled the employment of low-priced men to take the places left vacant by the high-priced employees who struck, thereby effecting a material saving in operating expenses.

(2) As no strike breakers were employed the effect of the strike was to produce a new force of trainmen who acquired some slight familiarity with the system during the days of labor troubles, but who are not as well informed regarding their business or the city as experienced men would have been. It has been noticed, however, by regular travelers on the cars that conductors miss a great many fares. Undoubtedly during rush hours this is in part due to the overcrowded condition of the cars, but at other times it must be attributed to either indifference or inexperience.

Although the new management of the Cleveland street railway system has comprehensive plans for the future of the property, its principal efforts up to the present time have been in the direction of cheapening the cost of operation as much as possible. To accomplish this end many steps have been taken which appear radical because they are opposed to the existing practice of American street railways and wholly in conflict with the laws and the attitude of most, if not all, other municipalities. Freedom of action in working out its desires has been possible in Cleveland, however, because of the connection of the city officials with the road.

### FARE SYSTEM

The system of fares in force until July 28, when there was a slight change, is complex and so closely interwoven with the somewhat unique methods of operation in vogue that it is exceedingly difficult to describe fairly, and is,

furthermore, impossible of complete description or analysis with the material obtainable.

After one free day, the fare arrangement established when the new company took charge was an arbitrary one installed under the authority of a clause in the ordinance which allowed a period of 90 days from April 27, during which the provisions regarding the issuance and acceptance of transfers and the sale of tickets should not take effect. The regular provisions of the ordinance prescribed, in brief, a cash fare of 5 cents and the issuance of six tickets for 25 cents, with transfers under restrictive conditions. If the rate of cash fare is lower than that which the company is authorized to charge, it may make "such charge for transfers as shall not increase the fare for a ride and transfer in the aggregate amount above the ticket rate of fare herein provided."

Under the 90-day clause, the company placed in force 3-cent fares with a charge of 1 cent for each transfer issued to a passenger. At the expiration of the 90 days the company established, on July 28, a system of 3-cent fares with a temporary charge of 1 cent for a transfer, but the 1 cent was refunded when the transfer was presented for passage. This was declared to be an experimental plan, depending for its permanence upon the financial results obtained.

Under the system enforced prior to July 28, if a passenger paid, for instance, an initial fare of 3 cents with 1 cent for a transfer, he might find that his car did not run the full length of the line. In such a case, on taking a car that was run the whole distance, the passenger was obliged to pay an additional 3-cent fare, making a total of 7 cents. A passenger on a crosstown line, taking a transfer to an intersecting line and subsequently changing to another crosstown line, was also obliged to pay another fare.

The ostensible advantage of a low-fare arrangement is to make the service attractive for the short-haul passenger and not burdensome for the long-distance traveler. That doctrine may be sound in theory, but its operation based on the methods adopted in Cleveland has not been remunerative to the company or satisfactory to the public. The most important reasons for this fact will be outlined.

### RE-ROUTING

No one policy adopted by the new company has created more dissatisfaction in Cleveland than the changes in the routing of lines. Important routes have been rearranged and there has been some abandonment of stub-end lines of routes on certain streets where the traffic was so light that revenues would not meet operating expenses. These changes would perhaps have been regarded with more tolerance by the people of Cleveland if sufficient advance notice of altered arrangements had been given.

The new officials have had, of course, absolute freedom in the new arrangements of lines which have been worked out. As they have not been hampered in any respect by the authorities of the city, they have apparently been guided by no other consideration than a desire to obtain the most economical operation. It is related by not over-critical observers, that many residents of Cleveland have started for work in the morning only to find that the lines on which they were accustomed to travel had been abandoned or diverted to other streets.

A few instances may be given, not because they are typical, but for the reason that they happened to come under personal observation. The first indication of re-routing met by a stranger occurs when he boards a car at the station of the Lake Shore & Michigan Southern Railway for, say,



the Hollenden Hotel. The conductor announces that no car runs directly between those points. The inconvenience in this case is slight, however, because a Euclid Avenue car can be taken to a point one block from a rear entrance of the hotel or two blocks from the main entrance. The Broadway & St. Clair Avenue route, formerly a long through line, has been split in two at the Public Square. More general use of the Square as a terminal followed the completion of improvements at that point mapped out by the Cleveland Electric Railway when it expected a renewal of its rights.

The situation with respect to Euclid Beach has been especially exasperating to the people of Cleveland. This resort is on Lake Erie, and as a result of the rearrangement of lines it is not possible to travel there as easily as when the old company ran various cars to that point. Euclid Beach is outside of the city limits of Cleveland, but the old company charged one fare or sold 11 tickets for 50 cents, in order to accommodate the summer beach traffic. The new company does not operate any lines directly to the beach from the downtown sections of the city. Passengers may pay up to 9 cents or more for a ride, depending on the number of lines they are obliged to take or their unfamiliarity with the unusual ticket scheme in force. If they do not ask for the proper transfer, another fare is exacted by the conductor.

Conditions in East Cleveland, a residence suburb, are peculiar from the fact that its grants to the Cleveland Electric Railway require about the same service as is given on Euclid Avenue within the city, with the same rate of fare and the same transfer privileges. When the Municipal Traction Company took over the system, this village was treated the same as all the other suburbs in respect to the fare charge. A rate of 3 cents was made to the city limits and those who wished to ride to points within the village were required to secure a suburban fare check for which they paid 2 cents additional, making a straight 5-cent fare. A fare of 5 cents was also charged in the other direction and for rides within the village. As the grant provided that the same fare should be charged as was required on Euclid Avenue within the city, an injunction suit was brought by Mayor McQuigg and City Solicitor Clum, asking a restraining order to prevent the collection of more than 3 cents from East Cleveland passengers. The Common Pleas Court finally decided in favor of the village, but stated that the company might increase the fare to any figure within the limits of the security franchise on Euclid Avenue. In other words, the court held that anything less than six tickets for 25 cents is a voluntary reduction on the part of the company, but that the East Cleveland grant would require that citizens of the village be given any advantage that patrons of the Euclid Avenue line within the city enjoy. When the injunction suit was decided in favor of the village, the company immediately reduced its fare to 3 cents, but at the same time put into operation the schedule provided in the ordinance of Feb. 3, 1896, which required a car each way every 10 minutes. The result was that the cars ran morning and evening with heavy loads. Some of the smaller box cars are reported to have carried at times from 100 to 140 people.

Changes of this character affecting both the city and the suburban lines were made, it is plain, with the object of obliging each of the various routes to "pay its own way." The confusion incident to these changes has been increased greatly by the lack of knowledge on the part of the trainmen regarding the routes of the various cars. The standpoint

of the administration regarding these changes is that some of the lines were not profitable even when operated by the Cleveland Electric Railway and that no logical reason exists why they should continue to be a burden.

This subject may be considered from the points of view of both policy and profit. The Mayor's supporters assert that throughout the negotiations during the valuation of the Cleveland Electric Railway he insisted that the outlying grants were valueless because the traffic density was not great enough to pay expenses and the promises which were made related to the city alone and not to the outlying villages. No especial explanation has been made, however, regarding the arrangement of unprofitable lines within the city limits.

The sole determining factor in the policy of the new company with respect to these matters seems to have been, as stated, the profitableness of the service. It is scarcely necessary to point out that the Municipal Traction Company has attained a position regarding unprofitable lines which substantially all the companies operating in cities in this country will view with envy. It is especially difficult for street railways to obtain permission to abandon the operation of ends of routes or of any lines, even when their unprofitable character can be demonstrated clearly. The argument when such changes have been suggested heretofore has always been that citizens who have settled in a community in anticipation of a continuance of existing service would suffer inconvenience and financial loss if the arrangement of lines should be changed, and that companies should not be allowed to permit wrongs of this kind.

#### THE SHORT-HAUL PASSENGER

While that argument relates to one feature of the situation, it is of interest to inquire what the effect of the new scheme of operation has been upon the operating company and the general public. The ride possible in Cleveland for a single fare bears no semblance now to the length of ride obtainable in other American cities. The long haul has been eliminated, and in its place the short ride has been substituted. From this it is evident that the company's hopes of large profits must rest upon the cultivation of short-haul traffic. The service, however, has not stimulated such traffic to any marked degree and the methods of operation substituted for the familiar systems in vogue in most other cities have instead discouraged the transportation of profitable short-distance passengers. The force of this statement will be appreciated when it is stated that the general plan seems to be to reduce the car-mileage by operating fewer cars at all times of the day, increase the speed of cars and lessen the number of stops. The object of reducing the car-mileage by operating might be twofold: (1) To decrease the platform expense, and (2) to curtail the reserve for maintenance which the company, under its lease with the Cleveland Railway Company, is required to base on the number of car-miles run. The motive in the increase of speed and reduction of the number of stops must be considered in connection with the generally accepted theory that fewer cars are operated. With a smaller number of cars operated and fewer stops permitted it is necessary for passengers to accommodate themselves to the traffic arrangement of the company. The short-haul passenger who might take a car at a street corner is obliged to walk to another point, often unknown, where a pole marks a crossing place. The result is that he may be well along on his journey before the stopping point is reached. If the short-haul passenger is passed by a car when he is not near

enough to a prescribed stopping point to make it certain that his signal to the motorman will be recognized, the knowledge that some minutes, possibly 10 or more, will elapse before the next car arrives is likely to lead to the loss of a fare. It is reported that the more rapid speed of the cars has produced more accidents than the old company met, but this rumor is not confirmed. Residents of Cleveland have, however, complained, in some cases bitterly, that the cars are more crowded than under the former management.

Daily reports of the revenues and expenses of each line help the management to determine the drift of the traffic. Employees stationed at important points sell the disks, good for one ride each, which officials of the company state are in general circulation.

Reports that transfers are abused and that advantages are taken of the company by passengers and conductors must be based more or less upon hearsay. The fact that the new company issues a smaller number of transfers than the old corporation is confirmed by A. B. du Pont, president of the Municipal Traction Company. Mr. du Pont stated to a representative of the *ELECTRIC RAILWAY JOURNAL* on July 13, 1908, that the transfers aggregate about 22 per cent of the number of cash fares, as compared with 39 per cent for the old company. The percentage was, however, increasing, indicating, in Mr. du Pont's opinion, that methods of taking advantage of the system had been discovered. It is, of course, possible that some passengers may have walked part of the way to their destination because transfers are not free.

*(To be continued.)*

## CONVENTION ANNOUNCEMENT

B. V. Swenson, secretary of the American Street & Interurban Railway Association, has issued Bulletin No. 2 in regard to the 1908 convention. It is addressed to the members of the six associations and is as follows:

### CONVENTION BULLETIN NO. 2

The plans for the 1908 convention, to be held at Atlantic City, N. J., from Oct. 12 to 16, inclusive, have been progressing most satisfactorily. You will be interested in some of the things which have been accomplished since the first Convention Bulletin was issued on June 20.

#### PLACE OF MEETING

The choice of Atlantic City as the 1908 meeting place meets with the approval of practically all of those who attended the convention held there last year. For the information of those who are unfamiliar with Atlantic City it may be stated that it has a residential population of 40,000 people and a floating population which varies from 35,000 in October and November up to 200,000 in July and August. It is readily seen from this statement and from an inspection of the list of most excellent hotels shown on a page of this Bulletin that Atlantic City will have no difficulty in accommodating our convention in the very best possible manner.

Young's Million Dollar Pier has been selected as the place where the exhibits will be displayed, as well as where a majority of the convention meetings will be held. This pier, which is south of the one occupied last year, has recently been completed and in many respects is much better adapted both for exhibition purposes and as a place for the convention meetings than was the Steel Pier used at the 1907 convention. The pier is built of reinforced concrete, extends 1800 ft. from Atlantic City's beach front line and has an average width of 98 ft. Over 60,000 square feet of net space for exhibit purposes are available on the pier, and all indications point to a manufacturers' exhibit which will be fully as large and as interesting as that given in 1907. In addition to the exhibits shown on the pier proper, there

will be a fine display of cars immediately adjacent thereto. Along the boardwalk and convenient to the convention pier are located the leading hotels of Atlantic City. [A map showing the location of the pier and the hotels and a detailed schedule of hotel rates are contained in the bulletin.]

#### HEADQUARTERS HOTELS

Following the plans of the 1907 convention, it has been decided by the official representatives of the various associations that each association shall have its own headquarters hotel for the 1908 convention. It is not the desire of those in charge of the convention that these particular hotels be patronized to the exclusion of others, but rather that they may be used as general meeting places for those who are interested in specific lines of work.

The Marlborough-Blenheim will in general be considered the headquarters hotel of the American Association and also of the Manufacturers' Association. The Chalfonte Hotel will be the headquarters hotel for the Accountants' Association and the engineers will have their headquarters at the Dennis. Both the Claim Agents' Association and the Transportation and Traffic Association will use the Traymore as headquarters.

#### HOTEL RESERVATIONS

It is respectfully suggested that our members patronize the hotels that are listed in this Bulletin, for the reason that these are the ones which have contributed to provide for the convention.

Arrangements for hotel reservations should be made directly with the hotels. It will aid greatly in avoiding mistakes if the members when writing will indicate that their reservations are made in connection with the convention. Each reservation will be carefully checked to avoid any misunderstanding and to insure that the hotels are making the most adequate practicable provision for your convenience and comfort.

In making reservations, explicit statements should be made concerning the kind of room desired—whether with or without bath—and the dates of arrival and departure from the hotel. The special rates are made with the understanding that all charges of the hotel will be for the full time of reservation. With such exceptions as are indicated elsewhere in this bulletin, all charges are on the American plan, including a room and private bath when so stated, and three meals daily.

Most of the hotels provide comfortable coaches to and from the station. When arriving go directly to the coach of your hotel. It will be found at the side of the station platform. The charge to and from the station is 25 cents each way for each person. The charge for trunks is also 25 cents each way for each trunk.

#### PROGRAM

The committee on subjects for the various associations have been actively engaged on the program for several months past and there is every prospect of a convention at which will be presented a number of interesting papers which will be of great value to the member companies and their officers. Each of the five associations will have a program which in itself will amply repay those in attendance. The complete programs of the various associations will be announced in a bulletin which will be issued about the middle of August.

The morning of Monday, Oct. 12, will be reserved for registration purposes, and the first meetings of the convention will be held on the afternoon of that day. While the registration booth will be open to all delegates from 9:30 a. m. to 12:30 p. m. and from 2 p. m. to 5 p. m. on each convention day, it is desirable, where practicable, that delegates register a half a day previous to the opening meetings of their particular associations. Those attending the Claim Agents' and the Transportation and Traffic conventions should register on Monday morning. Tuesday morning's registration will be especially devoted to the delegates of the American and Engineering associations. Accountants should register on Tuesday afternoon.

The meetings of the various associations will continue throughout the week closing on Friday, Oct. 16. Considerable attention has been given to the arrangement of the days upon which the various associations will meet. The follow-

ing general schedule of meeting days has been decided upon:

MONDAY, OCT. 12

- 9:30 a. m. to 12:30 p. m.—Registration and badges.  
Claim Agents' Association.  
Transportation and Traffic Association.
- 2:00 p. m. to 5:00 p. m.—Meeting of Claim Agents' Association.  
Meeting of Transportation and Traffic Association.

TUESDAY, OCT. 13

- 9:30 a. m. to 12:30 p. m.—Registration and badges.  
American Association.  
Engineering Association.  
Meeting of Claim Agents' Association.  
Meeting of Transportation and Traffic Association.
- 2:00 p. m. to 5:00 p. m.—Registration and Badges Accountants' Association.  
Meeting of American Association.  
Meeting of Engineering Association.  
Meeting of Claim Agents' Association.

WEDNESDAY, OCT. 14

- 9:30 a. m. to 12:30 p. m.—Meeting of Accountants' Association.  
Meeting of Engineering Association.  
Meeting of Claim Agents' Association.  
Meeting of Transportation and Traffic Association.
- 2:00 p. m. to 5:00 p. m.—Meeting of American Association.  
Meeting of Engineering Association.

THURSDAY, OCT. 15

- 9:30 a. m. to 12:30 p. m.—Meeting of Accountants' Association.  
Meeting of Transportation and Traffic Association.  
Inspection of exhibits by Engineering Association.
- 2:00 p. m. to 5:00 p. m.—Meeting of American Association.  
Inspection of exhibits by Engineering Association.

FRIDAY, OCT. 16

- 9:30 a. m. to 12:30 p. m.—Meeting of Accountants' Association.  
Meeting of Engineering Association.
- 2:00 p. m. to 5:00 p. m.—Meeting of Engineering Association.

In addition to the above program the Accountants' Association will have a "get together" lunch and smoker on Wednesday afternoon, the Claim Agents will have a smoker on Tuesday evening and the Transportation and Traffic Association will have a dinner on Wednesday evening. Similar arrangements will probably be made for the American and Engineering Associations.

MEETING HALLS

Two convention halls located on the convention pier and each capable of seating approximately 300 people will be provided for the meetings of the convention. In addition, suitable meeting rooms are available in the Chalfonte Hotel and in the Traymore Hotel.

All of the meetings of the American Association, the Engineering Association and the Transportation and Traffic Association will be held in the meeting halls on the convention pier. The accountants will hold their two sessions on Wednesday at the Chalfonte Hotel and their Thursday and

Friday sessions on the convention pier. The Claim Agents will hold all of their sessions at the Traymore Hotel.

TRANSPORTATION

The usual arrangements are being made with the various passenger traffic associations whereby those attending the convention will be enabled to obtain round-trip tickets upon the certificate plan. Atlantic City is reached from New York and the East by the Central Railroad of New Jersey and the Pennsylvania Railroad, and from Philadelphia and the West by the Pennsylvania Railroad and the Philadelphia & Reading Railroad.

More detailed announcements relating to transportation and railroad rates will be given in a later bulletin.

ELECTRIC RAILWAY FOR MANCHURIA

Plans for the electric railway which is to be built by the South Manchuria Railway, Dalny, are beginning to take definite shape and tenders for the supply of materials will shortly be called for. There will probably be 13 miles of track. The most important line will connect the wharves with the railway station and the quarter where the official residences and the hotel are located, going thence to the Chinese settlement at Shokoshi. Other lines will bring all the outlying sections of the town into connection with the center, and it is even proposed to open an amusement park in one of the suburbs in connection with the street railway. The single overhead trolley system will be used and the gage will be 4 ft. 8½ in. To begin with the rolling stock will consist of 50 cars, each car being divided into first and second class compartments, the former accommodating 18 and the latter 30 passengers. While bids will be asked from Japanese car builders, the engineer in charge is inclined to think that it will be well to get American cars on account of their superior construction. Power will be furnished by the electric plant of the company, for which new equipment costing about \$135,000 has just been ordered from the General Electric Company. The total expenditures for the street railway and the light and power plant are expected to reach \$1,000,000. The following preliminary estimate gives a general idea of the work to be done for the street railway: Trolley wire and cost of putting up same, \$24,444; feed wire, \$3,414; rails and cost of laying same, \$136,718; engineering instruments, \$1,750; cars, 50, \$183,525; tower wagons and sprinkler cars, two each, \$7,150; car shed and shop, \$42,500; telegraph, telephone and signals, \$3,000; electric lights, \$1,750; transformer house, \$16,500; training conductors and motormen and traveling expenses, \$12,500; miscellaneous, \$12,500; interest for one year for machinery and materials (6 per cent), \$25,000; total, \$470,751.

Y. Kasuya, chief electrical engineer of the company, expects to visit the United States to study the latest developments in the street railway work. American manufacturers who wish to introduce their goods should communicate with the chief electrical engineer of the South Manchuria Railway, Dairen, preferably through their agents in Manchuria or in Japan, if they have agents already appointed.

The Worcester Consolidated Street Railway is operating a new route between Worcester and New London, Conn., via Central Village. The cars run between Worcester and Webster, where a change is made for Central Village. At Central Village there is another change for cars running to Norwich, Conn., and at Norwich passengers take cars for New London. The running time is: Worcester to Central Village ( 3 hours, 25 minutes, fare 70 cents; Central Village to Norwich, 1 hour, fare 30 cents; Norwich to New London, 1 hour, fare 20 cents.

## DISPATCHING SIGNALS ON THE WASHINGTON, BALTIMORE & ANNAPOLIS RAILWAY

The Washington, Baltimore & Annapolis Railway Company, which operates a high-voltage single-phase railway between the cities named in its title, has a dispatcher's signal equipment which was furnished by the Blake Signal & Manufacturing Company, of Boston, Mass. This

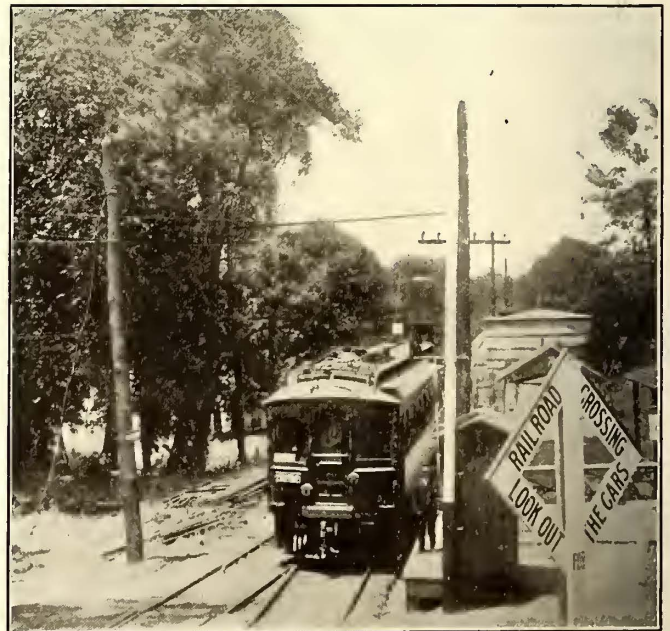
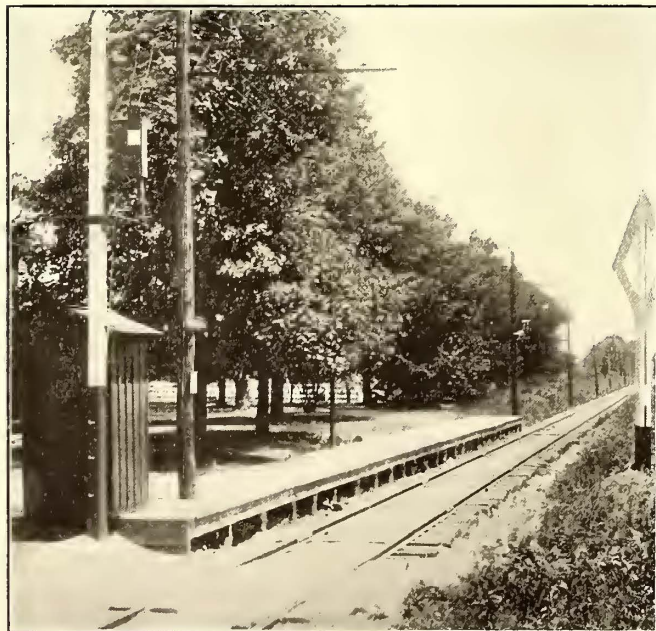


Washington, Baltimore & Annapolis Single-Phase Railway—Dispatcher's Office and View of Signal Post

particular installation is of special interest as it shows how easily this signal system, designed originally for d.c. railways, has been adapted for single-phase service.

In designing this installation the manufacturer had to consider the following three points which do not enter into an installation on a 550-volt d.c. line, namely: The need

and incident glassware. In the Blake system the semaphore blades operate in an upper quadrant so that it was possible to secure the lamp to the base of the signal. The lamp is firmly pinned to a short, vertical shaft which goes up through the base of the signal and is so suspended on a spiral as to permit the shaft making a quarter turn.



Washington, Baltimore & Annapolis Single-Phase Railway—Semaphore in the "Clear" and "Stop" Positions

for a small amount (about 0.7 amp) of 550-volt d.c. at the dispatcher's office for signal operation; the necessary light at each line signal for night signaling, and whether the presence of large amounts of high-voltage a.c. on the trolley and a rail return would by induction or otherwise seriously interfere with the signals.

In this case the first point was easily settled, as there is available at the dispatcher's office at Academy Junction an

The top of this vertical shaft also is strongly connected with the semaphore shaft, so that the semaphore shaft and hanger shaft turn together, although one is in a horizontal and the other in a vertical plane. By using a spiral support for the hanger shaft the weight of the lamp and hanger aid rather than retard the semaphore in going from the "clear" to the "stop" position. In the event of the breakage of the rod or pin connecting the semaphore shaft

ample supply of 550-volt d.c.; otherwise a ½-hp motor-generator set would be needed.

Standard railway oil lamps were considered best for night signals except that it was necessary to have also a suitable mechanical connection from the lamp to the signal. As the dispatcher's train order signals cover only the two positions of "clear" and "stop," it was decided to use a four-lens lamp and thus avoid the cumbersome spectacle

and hanger shaft the lamp will of its own weight make a quarter turn to display a red light. This prevents the lamp showing a clear signal when the semaphore is at "danger" or "stop."

On the Washington, Baltimore & Annapolis Railway a fork type long time burner lamp having two green lenses and two red lenses is used. The lamp may be readily replaced, but can only be put up so that the green lenses show in both directions along the track when the semaphore is in the vertical or "clear" position and the red lenses show in both directions along the track when the semaphore is at "stop." The lamps burn constantly and are filled and trimmed twice a week. It is practically impossible to blow them out and they show a steady light visible on tangents for more than a mile.

The third point, as to whether the signals would operate on a single-phase line, could only be settled by trial, as it was practically impossible to duplicate the operating conditions. The signals were installed June 24, 1908, within eight days from the opening for traffic, and so far are reported to be entirely satisfactory, no trouble occurring from the presence of a single-phase trolley.

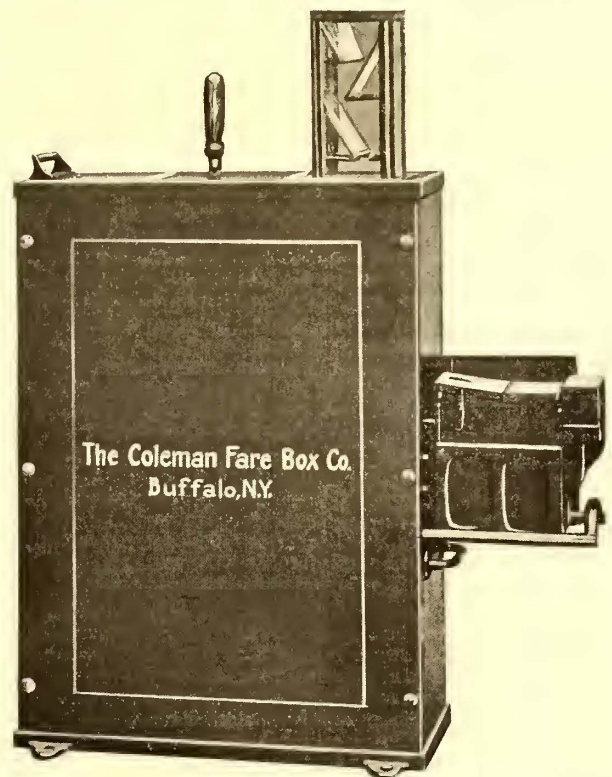
The Washington, Baltimore & Annapolis Railway furnished for the signal line two No. 10 bare galvanized iron wires on glass insulators. While the two wires make a better installation and insure a clearer indication in the dispatcher's office, the manufacturer believes that the signals would work as well on one wire as they do on 550-volt d.c. lines. In all other details as to both dispatching office equipment and line signals the equipment is exactly the same as the standard signals of this manufacturer installed on d.c. railways throughout the United States.

### A NEW FORM OF DIRECT CURRENT AMMETER AND VOLTMETER

Recent improvements in factory methods and in the design of the instruments by the Westinghouse Electric & Manufacturing Company have rendered possible the production of small sized ammeters and voltmeters of the permanent magnet type which possess new features and advantages at a price as low as that of the best moving iron instruments previously available. These instruments are mounted in neat black electrose cases, 5 in. in diameter, rear connected, with circular beveled glass front plates. The case made from insulating material instead of metal gives a degree of insulation not usually found in small instruments. The meters are supported by brass studs projecting from the rear of the case, serving at the same time as terminals. The voltmeters are made self-contained, including resistance, in any capacity as high as 300 volts, and the ammeters are operated from external shunts, the shunts of the capacities up to and including 75 amp being mounted directly on the meter studs. The scale divisions are uniform, and the total length is almost the same as that found in the usual 7-in. diameter meters. An interesting feature of the instruments is the "single air gap" type of construction, which differs considerably from the original D'Arsonval bi-polar magnet with two cylindrical air gaps in series. The movability of the permanent magnets is of the greatest importance to the user who desires to do his own repair work on the premises. The principal applications for this class of instrument will be for small panels, such as for rectifier outfits, battery charging, small isolated plants, small marine plants and for large switchboard work where a small sized instrument is desirable.

### FARE BOX SYSTEM ESPECIALLY ADAPTED FOR PAY-AS-YOU-ENTER CARS

At the June meeting of the Street Railway Association of the State of New York, W. H. Evans, master mechanic, and C. A. Coons, superintendent of transportation of the International Railway Company, referred to the satisfactory results which were being secured with the new fare box used on their pay-as-you-enter cars. This box, which was on exhibition at the June convention, is made by the Coleman Fare Box Company, of Buffalo, N. Y. The fare receiver is so constructed that when a passenger deposits his fare it enters a glass receptacle, dropping upon a cylinder to permit the conductor to see whether the money or ticket is valid. The conductor then pulls a top lever, causing the fare to drop through a chute into a locked cash box. He does not handle any tickets or money except when making change, and even in such cases the passengers must deposit the fare. The cash box cannot be opened except



Fare Receptacle with Security Box Unlocked, Ready to be Pushed Into Safe

with a key retained in the treasurer's office, although the glass receiver permits the entrance of tickets or coins of any denomination from cents to silver dollars. Transfers accepted as fare are not deposited in the receiver, but are collected by the conductor who places them in an envelope and turns them in separately. Of course, this prevents the substitution of transfers for cash or tickets.

On reaching the car house the locked cash box is taken by the treasurer or other proper official, who substitutes an empty one therefor. Consequently, the conductor does not handle the contents of the box even after the end of his trip, so no dispute can arise regarding discrepancies.

Among the advantages of this method are the following: The passengers soon become accustomed to the fare box and for their own convenience in entering the car will make it a point to have the exact fare; the conductor is relieved from a great deal of coin changing and can give more attention to other duties; and the company has the benefit of keeping losses from missing or stolen fares at a minimum.

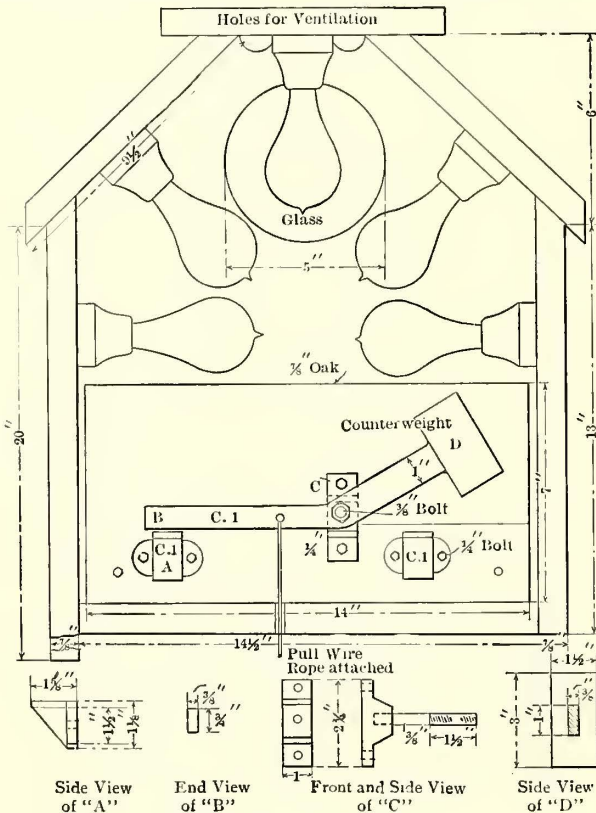
LONDON LETTER

(FROM OUR REGULAR CORRESPONDENT)

This fare box is confined by no means to the pay-as-you-enter car, but can also be used in other situations, such as elevated railways, subways, ferries and parks.

STOPPING SIGNAL ON UTICA & MOHAWK VALLEY RAILWAY

The Utica & Mohawk Valley Railway Company is using a simple station signal system to be used by intending passengers to stop cars, at any stopping point. This signal was described by H. S. Williams, electrical engineer of the Utica & Mohawk Valley Railway Company at the Niagara Falls convention last month and is an improvement over the ordinary group of lamps. The switch and lamps are protected from the weather by being enclosed in a box and the switch is at such height that meddlesome persons cannot tamper with it. A section of the box is illustrated.



Detail of Lamp Signal

All parts of the switch are of cast iron to reduce the cost. The circuit is from block A through arm B to the terminal at C and thence through the lamps to the ground. The switch is operated by a rope which the waiting passenger pulls down at the time that the car approaches. When the passenger releases his hold the counter weight of the switch causes the latter to open. Mr. Williams suggests that the signal be supplied with higher voltage than is needed for the operation of the lamps at better candle-light power as there is a superabundance of light which increases the voltage of the lamps whereby their lives would be greatly prolonged.

The outside casing is of wood which has been found more desirable than iron. The cost of the box complete, including lamps, sockets and switch, is \$2.95. There is practically no maintenance cost. The box is mounted on trolley poles on the Utica & Mohawk Valley Railway, and on the Oneida Railway, which is equipped with third rail, it is mounted on shelter houses.

The various power bills which have been considered by a House of Lords' committee presided over by Lord Cromer during the past month have all received favorable treatment. It will be remembered that these bills were three in number, the most important being the one for London & District Electric Power Company, the engineers for which were H. F. Parshall and Robert Hammond. The committee has decided that this bill may proceed to the House of Commons to be dealt with there. The bill provides for a new enterprise, with new power houses at tide water and power to supply railways, tramways, etc., in bulk. The companies and municipalities operating in London, however, are protected in so far as general power supply is concerned, the consent of the authorized distributors in London being necessary. The second bill was in the interests of eight of the largest of the already existing companies, which naturally opposed the bill already referred to and sought to work conjointly so that one company could help another at times of greatest load. This bill has also been approved. Permission has, however, been refused for a joint board to operate the various companies, but the several separate boards will be allowed to assist each other. The third bill was promoted by four of the other operating companies which desired to help each other in a similar way, and as some of these companies were already affiliated, the permission of the committee was granted without much discussion. Finally, it may be noted that the London County Council, which has no bill of its own this year, is supporting the decisions of Lord Cromer's committee, so that any opposition when the bills come before the House of Commons in the autumn is not likely to be severe.

The thirteenth convention of the Incorporated Municipal Electrical Association was held in Nottingham and the program was carried out practically as outlined in these columns. At the annual general meeting the ballot for the new council resulted in the appointment of S. I. Pearce, electrical engineer to the City of Manchester, as president, and W. W. Lackie, of Glasgow, and J. Christie, of Brighton, as vice-presidents. Mr. Pearce was born in 1872. After various engineering experiences both on land and at sea he became connected with the Metropolitan Electric Supply Company, in whose employ he remained for some years. Later he was appointed one of the staff of the British Thomson-Houston Company during the construction of the Central London Railway. In 1901 he became deputy engineer to the Manchester Corporation Electricity Department under Mr. Metzger, and engineer-in-chief in 1904, when Mr. Metzger resigned. He has been chairman of the Manchester local section of the Institution of Electrical Engineers and has also been a member of Council of the Institution of Electrical Engineers and has read many papers on electrical subjects before that association. The interests of the Incorporated Municipal Electrical Association are therefore in very capable hands and will undoubtedly be enhanced by these recent appointments.

The Tramways & Light Railways Association held its annual tramway congress this year in the Congress Hall at the Franco-British Exhibition. The president, his Grace the Duke of Argyll, presided at the opening session and welcomed the members of the association to London. He expressed regret that the Hon. Arthur Stanley, who is chairman of the association this year, was prevented from attending. Sir Clifton Robinson, who has recently returned from a trip round the world, addressed the meeting on the subject of "The Tramways of the World." He took the opportunity of reiterating his opinion that British tramway cars are not permitted to travel fast enough, that the double-deck causes delay and that the restrictions regarding the number of passengers carried ought to be removed. He said he was glad that Londoners were taking more kindly to the overhead system and that having experienced the advantages of rapid transit they were eager for increased facilities. An interesting paper was afterward read by A. H. Gibbings on "Tramway Rail Joints" and on the second day A. L. C. Fell, chief clerk of the London County Council Tramways, occupied the chair and delivered a short address in which he gave some interesting statistics as to the number of passengers carried in cars in the United Kingdom as compared with 30 years ago. In 1878 there were in the United Kingdom 269 miles of tramways, as against 2349 now, while during that period the number of passengers had increased from 146,000,000 to 245,000,000, and the capital expenditure from about £500,000 to £64,000,000. Prof. C. A. Carus-Wilson afterward gave an interesting address on "Rail Corrugation," which he illustrated by means of a model truck on rails. The wheels were con-

ned to the axles by delicate springs and weights suspended from the truck so as to illustrate his contention that corrugation was due to the torque on the axle, combined with grit-dust on the surface of the rail. The professor says that these corrugations are caused by the wheels slipping or skidding on the rails at the moment the adhesion is not sufficient to overcome the torque on the axle. To cause the actual indentations in the rail, however, he contends that a certain sand-grit on the surface is necessary, and instanced many cases where this grit is much in evidence. In conclusion, he said that four conditions were necessary to bring about these corrugations, namely: First, something wrong with the track; second, something wrong with the rolling stock; third, the existence of grit-dust, and, fourth, a certain critical speed. He believes that if all were agreed about the diagnosis the remedy would be more easily found, but that this remedy must depend largely upon local conditions. The paper will be discussed at a later meeting, but Mr. Dalrymple, of Glasgow, stated that rail corrugation cost that city from £10,000 to £15,000 a year. The members of the association, accompanied by ladies and friends, dined together in the banquet hall of the Garden Club in the exhibition. Unfortunately the weather was not propitious for an investigation of the attractions of the exhibition.

The Dumbarton County Tramways has been opened from Dalmauir to Balloch. The line within the borough was constructed by Dick, Kerr & Company, London, while that portion between Dumbarton and Balloch was built by J. G. White & Company, London. The line is a single-track overhead trolley with numerous turnouts.

With further reference to the accident at Bournemouth on May 1, the Board of Trade has recommended the Bournemouth Town Council, first, as to a compulsory stopping place at the top of Poole Hill, second, that so long as the magnetic or other track brake is not used for ordinary stops it shall be applied to test its effectiveness before reaching any steep gradients, and, third, that all controllers at every terminus, before the handles are removed, shall be opened and examined.

The Board of Trade has also reported on the recent accident at Glasgow. Owing to the death of the motorman it is impossible to say exactly how he lost control of the car, as no defect was found in the magnetic brake or the hand brake. In conclusion, the report states that it is the custom of the Glasgow Corporation Tramways to use the hand brake for ordinary stops and to reserve the magnetic brake for emergency stops and when coasting. The board does not regard this as the proper manner in which to employ the magnetic brake and suggests that it should be regularly on service, and not used only for emergency. The report also points out that in Glasgow sand can be applied to only one rail at a time and strongly recommends the Glasgow Corporation to fit all its cars with two sanders at each end.

It is interesting to note that at a recent meeting of the Institution of Electrical Engineers the chief business before the members was the proposed purchase of a building on the embankment close to the Savoy Hotel, which might be used as the headquarters of the Institute. The Institute has never had a proper home and has had to hold many of its meetings in other institutions. The building is at present used as the medical examination hall of the Royal College of Physicians and the Royal College of Surgeons, and is a particularly useful and suitable one. After some discussion the proposal to purchase the unexpired lease was duly carried, the purchase price agreed upon being £50,000. The Institute will probably take possession on June 1, 1909.

It may be remembered that we reported some months ago in this column that a British syndicate operating in sympathy with Bruce Peebles & Company, Edinburgh, had secured from the Moscow (Russia) municipality large orders for the electric equipment of the tramways in that city. This unfortunate firm, however, has since passed into the hands of receivers, so that the arrangement was not concluded. Some time ago it was decided that the Moscow electric tramways extension be undertaken by the municipality and recently orders have been received by Dick, Kerr & Company, London, and the British Insulated Cable Company to the value of £83,000, while smaller orders have gone to Continental firms. This is the first important contract of the British electrical industry in Russia, and the orders have been received in England with great satisfaction.

The London County Council has inaugurated a service from Smithfield Market to Highgate and Finsbury Park via St. John Street and Islington. Many alterations have taken place in the districts through which the cars run and much slum property done away with. With regard to the Whitechapel to Bow Bridge route, which has been equipped on the G. B. surface contact system, a provisional

certificate for six months has been secured from the board of trade and cars are now in operation. It can by no means be said, however, that the line is a success, and at a recent meeting of the Council it was determined to equip at an estimated capital expenditure of £173,000 the new route from Euston Road via Hampstead Road, Camden Town, to Holloway Road with the conduit system, which is in use in London. It was originally intended to equip this line also with the G. B. surface contact system, but that idea has been abandoned. The amount which the London County Council intends spending during the ensuing year on tramway electrification in London is placed at about £1,250,000. One of the most interesting subjects before the Council was the report of the finance committee upon the audit of the tramway accounts made by Peat and Pixley, who accused the county council of having lost £1,000,000. The principal recommendation of the finance committee is that the repayment of this debt, which of course represents capital expenditure outstanding on account of the purchase of the horse tramways, should be spread over a period of 15 years commencing March 31, 1914. Reports have also been made by the highways and finance committees for the proper provision of renewals in the tramway accounts, in which separate renewal and reserve funds are recommended, so that proper distinction may be made between repairs and renewals.

At a meeting of the tramway committee of the Dundee Town Council it was unanimously agreed to adopt the trackless trolley system, such as is in vogue in certain Continental countries, and apply it to a route connecting two outlying portions of the city. The cost was stated to be less than £1,000 a mile.

The Rawtenstall Town Council has decided to construct a new line of electric tramways from the existing line at Crawshawbooth to the borough boundary at Loveclough and has empowered the tramways committee to accept tenders for the conversion of the steam tramways within the borough to electric traction, and also to negotiate with the Rossendale Valley Steam Tramway for the purchase of its property. The Bacup steam tramways from Bacup to Waterfoot are also to be electrified.

The Liverpool City Council has by a large majority resolved to try the experiment of running "first-class" street tramcars on the route between Garston and the Pier Head, which passes through the better class suburbs of Liverpool. The fares are to be about double the ordinary rates.

Some interesting statistics as to tramway accidents in Great Britain were recently elicited in the House of Commons from Mr. Winston Churchill, who stated that, in the year ending on April 30, 1329 accidents were reported as having occurred through persons being knocked down or run over by tramway-cars. In the accidents there were 105 killed, 1003 injured and 221 uninjured.

The Fleetwood Urban Council recently sued the Blackpool & Fleetwood Tramroad for the non-payment of rate amounting to £525 19s 8d. The defendants had tendered payment of a quarter rating, and this had been refused. They contended that the decision of the Court of Appeal that a tramroad was a railway held good in that court also, and that they were only liable for quarter rating. The magistrates decided that the Council were only entitled to quarter rating, and an order for payment of £255 15s 8d was made.

The experiment of halfpenny car fares in Hull is now an accomplished fact, and in the Third Port it is possible, as in no other place in the Kingdom, to ride 3 miles for that small sum. The Hull tramways have been owned by the municipality for nine years. The amount expended on them is £400,000, and up to the present time £120,000 of profits or more than a quarter of the original expenditure has gone in relief of rates. Ever since the initiation of the system cheaper fares for the working classes have been contended for by the Labor members and other Progressives. Last year the Labor party carried a resolution by a narrow majority that riders should be able to travel along two routes for a penny fare. Opponents said that that would cost the city £3,000 a year. Six months' experience, however, proved that instead of incurring a loss the management reports a greater profit being earned. This success was the chief argument used when the resolution to inaugurate halfpenny morning fares was proposed, and its potency was irresistible. The Council was almost unanimous in adopting the proposal. It is useful to bear in mind, however, that Hull is a city of billiard-table flatness.

A. C. S.

A meeting of the committee of interurban rules of the American Street & Interurban Transportation and Traffic Association was held in Cleveland this week. J. N. Shannahan, of the Washington, Baltimore & Annapolis Electric Railway, is chairman of the committee.

# News of Electric Railways

## Cambridge Subway Station Locations Decided

The Massachusetts Railroad Commission has decided that stations will be required in the new Cambridge subway at Harvard, Central and Kendall Squares. The Boston Elevated Railway desired stations at the first two points, but sentiment in Cambridge favored from three to five stations between the Charles River and the end of the route in the Harvard Square district. One of the interesting features of the case was the decision by the Supreme Court of Massachusetts that the Railroad Commission, rather than the Mayor of Cambridge, has final authority in fixing the location of stations. The proceedings which led to this decision were begun by Mayor Wardwell, of Cambridge, in October, 1907, and after the decision by the court hearings were held in April, May and June, at which final arguments were heard. William Barclay Parsons, of New York, who acted as consulting engineer for the city, submitted a report recommending four stations, including Harvard Square. This report has been abstracted in the *ELECTRIC RAILWAY JOURNAL*.

The commission points out that as all interests agree that stations are needed at Harvard and Central Squares, the primary question is the necessity of additional stations. The commission says that the company's plans do not provide adequately for the section near the Charles River, but that one well-placed station will take care of the needs of this area. The commission recommends that this station be installed as near Kendall Square as safe operation will permit, and points out that as the subway is to be operated in connection with the existing surface lines of the Boston Elevated Railway, free transfers issued in the same general direction will afford a through service via the subway for one fare. It states that a single station in the Lower Port at a point farther west would deprive the traveling public of this advantage and compel a longer walk or an extra fare to reach the subway. The commission leaves the question of additional stations to be considered after the subway is placed in operation, as the situation may then be modified by changes in population and travel, and later by the East Cambridge subway and alterations in transit conditions in Boston. The commission is of the opinion that a station at or near Portland Street, Cambridge, would serve a comparatively limited number of patrons, and would inconvenience many. The same condition is found in regard to the proposed station at Dana Street. The commission states that the surface railway and subway facilities will provide adequate service for persons wishing to travel between the Harvard and Central Square stations, and between the latter and Kendall Square.

## Affairs in New York

To protect the mortgage of \$16,604,000, made to it on March 21, 1902, the Morton Trust Company, which has begun foreclosure proceedings, has filed a *lis pendens* against the tracks, franchise, real estate, buildings and all the other possessions of the Metropolitan Street Railway and the New York City Railway.

The investigation into the abandonment two years ago of the work of constructing the New York, Westchester & Boston Railroad and the New York & Port Chester Railroad was begun on July 22 by the Public Service Commission of the First District of New York. Mace Moulton, the president of the New York & Port Chester Railroad and the chief engineer of the New York, Westchester & Boston Railroad, was the only witness called. He said that doubt had been raised as to the validity of the franchise held by the New York, Westchester & Boston Company and that the stockholders did not wish to spend any more money on the enterprise until the courts had passed upon it. Another hearing is to be held on July 31.

## The Cleveland Situation

Perhaps the matter of greatest interest in Cleveland, outside of the question of fare, is an injunction suit filed against the Municipal Traction Company on July 24 to prevent the construction of a third track on Lexington Avenue, in the vicinity of League Park, for the purpose of storing extra cars during the ball games. City Solicitor Baker, a director of the company, brought the suit at the instance of citizens who have residences along the street where the track is being built.

The report of the company for June shows that the gross earnings were \$409,279, while the operating expenses, repairs and taxes were \$321,388, which added to the rental, \$111,719, makes a total of \$433,108. The deficit for the month is, therefore, \$23,829. The deficit for May was more than \$54,000. During the latter part of June and the first few days of July the National Education Association was in session and the receipts were abnormal. It is probable, however, that the receipts from this source were greater in July than in June.

The officers of the company have had little to say regarding the problem of fares, since the announcement that free transfers are to be issued beginning this week. Members of the City Council are divided in their opinion of the plan to prevent the abuse of the transfer privilege by charging a cent for a transfer, the cent to be refunded on demand. Some of them believe that there should be no strings to the transfer system and argue that the intention of the Council was that transfers should be free for the asking. Others, including one or two who have consistently opposed the municipal scheme, say they do not object to any plan that will prevent persons getting transfers and handing them over to others to make trips on.

It is the opinion of some of the well-versed street railway men in Cleveland that the Cleveland Railway could step in and operate the local lines. The law provides that a petition containing the names of 15 per cent of the registered voters of the city, asking for a referendum vote on a franchise, shall make that franchise inoperative until the vote is taken. Assuming that this view is correct, the lines are being operated without grants from the city on the West Side and in other districts where they expired last spring or where they are said to have expired by the city administration. The decision of the Common Pleas Court to the effect that the referendum law is constitutional strengthens this position, as it may be many months before a decision of the Supreme Court is secured if the case is appealed. If the case is allowed to rest on this decision, with the resolution adopted by the City Council to the effect that no vote is to be taken until after the Supreme Court passes on the legality of the referendum, the time may be indefinite. It would seem that those interested in the new holding company would rest a little uneasily with this condition pending, as any one interested in the old company might take action that would put the property back into its hands until a vote is taken on its security franchise.

**New Uniforms for Sterling, Dixon & Eastman Electric Railway Employees.**—Employees of the Sterling, Dixon & Eastman Electric Railway, operating on the city cars in Sterling, Ill., are wearing uniforms of khaki which have taken the place of the regular blue. The suits closely resemble military uniforms.

**Strike in Illinois.**—The employees of the Elgin & Belvidere Electric Company, operating an electric railway between Elgin and Belvidere, are on strike. The trouble was caused by the refusal of the company to meet the demand of the men for an increase in the wages of trainmen to 25 cents from 18 cents to 21 cents.

**Indictments Against Mr. Appleyard Dismissed.**—Indictments standing in Buffalo against A. E. Appleyard, Boston, who built the Columbus, London & Springfield and other lines now a part of the Ohio Electric Railway, have been dismissed. They were based on an alleged false representation as to the value of certain bonds of the Ohio Union Traction Company which were given the German Bank, Buffalo, as security on a loan of \$50,000. The bank failed and a settlement was reached with Mr. Appleyard by which he paid the bank \$10,000 in full of all claims that it might have against him.

**Employee Sentenced for Misrepresentation.**—The Rochester Railway had occasion last week to prosecute a man by the name of Geo. Kuhn, who obtained employment with the company recently by falsely stating that he had not been employed by any railroad company. W. C. Callaghan, superintendent of transportation, became suspicious of the man's actions and discovered that he had worked for the Syracuse Rapid Transit Company and that he had been discharged from the employ of the company. Mr. Callaghan had the man arrested and prosecuted under section 570 of the Penal Code, and on July 24 he was sentenced to a fine of \$30 and 30 days in jail.



**Investigating the Wrecking of the White Mountain Express at Greenwich, Conn.**—An investigation of the wrecking of the White Mountain Express at Greenwich, Conn., on July 16, in the electrified zone of the New York, New Haven & Hartford Railroad has established that the accident was due directly to spreading rails. An editorial statement in the *Scientific American* of July 25 ascribes the spread rails to the heavy lateral swaying or "nosing" of the New Haven 96-ton electric locomotives, which are without the customary pony trucks of steam locomotives. The New Haven electric locomotives are 36 ft. and are carried on two 4-wheel trucks, 14 ft. 6 in. centers.

**Accident Fakir in Iowa.**—J. G. Huntoon, general manager of the Tri-City Railway, Davenport, Ia., had an experience with an accident fakir recently. The man fell off a car and was removed to a hospital. When examined by the doctors he was pronounced to have a broken hip. Two days later to the amazement of Mr. Huntoon the man appeared at the office of the company on crutches and asked for a settlement. Mr. Huntoon deferred making an agreement until he had inquired into the case. In the meantime John Bose, for that was the assumed name of the fakir, departed for parts unknown. Mr. Huntoon has since heard that Mr. Bose is in Canada.

**Buffalo Lines Tied Up for Lack of Power.**—Nearly all the cars of the International Traction Company, Buffalo, N. Y., were tied up on the evening of July 24 for about two hours owing to an accident to the Niagara transmission line. The storage battery plant of the company was cut in promptly, and served to keep the cars going for about an hour after the failure of the Niagara power. The situation was peculiar because at the time of the accident the American plant at Niagara was shut down for repairs and power was being taken from the Canadian Niagara Power Company, thus making it impossible to cut over from one company to the other, an expedient that ordinarily would be resorted to on an occasion like this.

**Franchise Extension Negotiations in Sioux City.**—Samuel McRoberts, president of the Sioux City (Ia.) Traction Company, has announced that the company will accept at the hands of the voters of Sioux City a franchise embodying the modifications suggested in a statement addressed to the company. The franchise is now being drawn for presentation to the Council. It stipulates the extent to which transfers are to be issued until the population of the city is 60,000, provides for the payment by the company to the city of 2 per cent of its gross passenger receipts when the city has a population of 75,000, provides for extensions and improvements and limits the speed of cars within the city to 14 m.p.h.

**New Franchise Passed in Springfield, Ill.**—The City Council of Springfield, Ill., on July 21, granted to the Springfield Consolidated Street Railway a 20-year renewal franchise which provides that during the first 10 years the road shall pay 2 per cent of the yearly gross earnings to the city and during the second term of 10 years 4 per cent annually, the money to form a fund to pay off the city's bonded debt. The city obtains the right at the end of 20 years to purchase the property at a price to be agreed upon by the city and the company. In the event of the failure of the city and the company to agree upon a price, the matter is to be settled by a board of arbitration consisting of five persons, a majority of whom shall decide all questions.

**New Ohio Line Completed.**—The new line of the Columbus, Marion & Bucyrus Railway between Marion and Bucyrus, Ohio, has been completed to the corporation line of the latter city and regular service will be started this month. Through cars between Columbus and Bucyrus, however, will not be put into operation until the road is completed to the public square in Bucyrus. Between Columbus and Marion the Columbus, Delaware & Marion Railway, owned by the same interests, will be used. At Bucyrus connection will be made with the Cleveland, Southwestern & Columbus system, forming a through electric route between Cleveland and Columbus by way of Galion, Mansfield and other towns in that section. The latter has a gap to complete between Mansfield and Wooster, but this will be finished this fall, it is thought, as work is progressing on it satisfactorily.

**Philadelphia Subway Inspected.**—The Market Street elevated-subway of the Philadelphia Rapid Transit Company was inspected by invited guests of the company on July 30. The company operates the subway as far as Fifteenth Street at the present time, and it is the intention to continue the line to Second Street, until such time as the balance of the construction work is completed. On Aug. 3 it will commence operating the extension from Fifteenth Street to Second Street regularly and will operate under a four-minute headway during the rush hours, this headway being determined by the ability to get trains in and out

of the stub-end terminal at Second Street. The company expects to operate trains of five cars during the rush hours and at such other hours as the travel warrants. The subway stations are so arranged that entrances are made to a large number of the big department stores.

**Fort Dodge Company and City Settle Differences.**—The Fort Dodge (Ia.) Light & Power Company and the City Council have settled the differences which have existed between them regarding minimum charges. The matter has been pending for several years. In 1906 the City Solicitor petitioned the County Attorney, and at his request ouster proceedings were started against the company on account of its minimum charge of \$1 for electricity and 50 cents for gas. Ever since W. B. Foshay assumed the management of the company, which was about a year after the original action by the city, he has been working with a view to settling this matter out of court. On June 30 Mr. Foshay sent a communication to the Mayor and City Council, in which he agreed to cut the company's minimum charge in half if the city would pass an ordinance giving the company the right to make such a charge. On July 20 ordinances were submitted by the City Solicitor and were passed at the first reading on the unanimous vote of the Council.

**Strike on New York Suburban Lines.**—The employees of the Westchester Electric Railway, which is controlled by the Union Railway, a constituent of the New York City Railway, struck at 5 a. m. on July 23 and for 11 hours no cars were in operation in Mount Vernon, New Rochelle, Pelham, Pelham Manor, Tuckahoe and Bronxville. The cause of the trouble was the suspension by Receiver J. Addison Young, of B. W. Reynolds, superintendent of the company. The receiver announced within three hours after the strike began that if the men were not back at work by 5 o'clock a. m. on July 24 he would advertise for new men. He characterized the demands of the men as unjust and unreasonable, and added that any man who took the place of a striker would be told to consider his job a permanent one. The men thought the matter over, and finding that the public was not in sympathy with their action, decided about 4 o'clock on July 23 to go back to work the following morning, which they did. Mr. Reynolds advised the men to return to work.

**Another Attempt to End the Chester Strike.**—Another attempt was made at Chester, Pa., on July 28, to settle the strike of the motormen and conductors of the Chester Traction Company, which is now in its sixteenth week. Mayor Johnson, together with a committee of Councilmen, presented to John A. Rigg, president of the Chester Traction Company, at his office in Philadelphia, a proposition from the strikers, but President Rigg declined to consider it. President Rigg stated that a proposal to appoint the County Commissioners as a grievance committee had been offered by the company in May last, but as it had not been accepted by the strikers the company was not now willing to have any body of men act as arbitrators. The company would not agree to recognize the strikers' union, and the men would only be dealt with individually. With but few exceptions the men would be allowed to return to work. The citizens met on July 27 and considered a plan of organizing a law and order society to assist the city authorities in their efforts to break up the boycott against the company and the people who ride on the cars. It was conceded that the boycott was in a vicious stage and that its effects were extremely detrimental to the welfare of Chester.

**New York, New Haven & Hartford Railroad Appeals Electric Railway Suit.**—The New York, New Haven & Hartford Railroad took an appeal on July 26 from the final decree of Judge Rugg, of the Supreme Court, in the anti-electric railway merger suit which Attorney-General Malone had entered against it. The appeal raises objection to the form of the decree as well as its scope, upon the ground that it went beyond the jurisdiction of this court to deal with what the New York, New Haven & Hartford Railroad and the Consolidated Railway have done or may do as a Connecticut corporation in Connecticut and impairs an alleged obligation of contract between both companies and the State of Connecticut contained in legislative grants. The decree is also claimed to take property without due process of law. The probable effect of the appeal is to take the case back to the full bench of the Supreme Court for a decision as to whether the final decree is warranted by the case made out. The final decree now appealed from was entered by Judge Rugg as the result of the decision of the full bench, which held that the evidence and findings of the master showed that the company was indirectly holding or acquiring the stock of electric railway companies in Massachusetts mentioned in the suit, which was in violation of the Massachusetts statute, being a franchise or privilege not granted to it and prohibited by law.

# Financial and Corporate

## New York Stock and Money Markets

JULY 29, 1908.

During the week ended July 28 the Wall Street market lost much of that activity and advance which had distinguished it during the few days immediately preceding. After having almost reached the "million-share" mark for several days, the volume of sales dropped back. There is, however, a much better feeling and the confidence in returning prosperity seems more marked than at any other time recently. The present season is, of course, even in normal times, the duller of the year in the financial market. The professional traders clear their books in order to enjoy peacefully their hot weather vacations; outsiders persistently remain outsiders when trading is inactive and important deals are not engineered when the principal leaders are on vacations. There were several things, however, which helped along the growth of confidence. The decision of the United States Court of Appeals in Chicago, setting aside the \$20,000,000 verdict of the lower court against the Standard Oil Company was a decidedly encouraging feature. It gave confidence to those who had been timid about investment in corporate securities. The satisfactory crop situation, the gradual resumption of manufactories and the brightening prospects for traffic on the railroads all helped the general tone. The declaration of the usual dividends upon Union Pacific and Southern Pacific had been so generally expected that it had little effect upon the stocks of these companies and was only valuable in demonstrating that the Harriman properties were expected to continue their excellent earning capacity. The publication of the United States Steel Corporation's quarterly figures, which was made after the close of the market on July 28, was another encouraging feature. Money was easy at 1 and 1¼ per cent on call, and 2¼ and 2½ per cent for 90 days. The demand was still so light that bank reserves continue to increase.

### Other Markets

There was little movement in traction stocks in the Boston market. Massachusetts Electric was practically nominal at 9 and the preferred was quoted at 46 with few sales. A few shares of Boston Elevated were sold at 135.

In the Philadelphia market there was a better demand for the tractions and both Rapid Transit and Union Traction scored fractional gains. The opening of the completed subway is supposed to have stimulated investment in traction securities. Rapid Transit closed July 28 at 100½ and Union Traction at 50½.

In Chicago transactions in traction securities were very limited, only small and odd lots changing hands. Series B bonds of the Chicago Railways sold up to 80¼.

United Railway's bonds were the only traction securities in demand in the Baltimore market and these were only moderately active. A few changed hands each day during the week at prices ranging from 87 to 87½, but the offerings were not large. Stocks were nominal with few sales.

Washington, Baltimore & Annapolis pooling certificates continued in interest last week on the Cleveland Stock Exchange, although the sales were not as large as the preceding week. During the latter part of the week they reached 11 and one sale "buyer 90 days" was made at 11½. Aurora, Elgin & Chicago preferred sold in small lots at 78½, while Cleveland Railway held between 92½ and 93, only small blocks changing hands. Some sales of Northern Ohio Traction & Light were made at 16 and 16½.

Quotations for various traction securities as compared with last week follow:

	July 21.	July 28.
American Railways Company, Philadelphia.....	a44½	a44½
Boston Elevated Railway.....	135	135
Brooklyn Rapid Transit Company.....	51¾	52
Chicago City Railway.....	a180	a190
Cleveland Railway.....	a92¾	a95
Consolidated Traction Company of New Jersey.....	68	a70
Consolidated Traction Company of New Jersey, 5 per cent bonds.....	103½	103½
Detroit United Railway.....	39½	a40
Interborough-Metropolitan Company.....	11¾	11¾
Interborough-Metropolitan Company (preferred).....	32	31¾
Manhattan Railway.....	a139	a139
Massachusetts Electric Companies (common).....	9	9
Massachusetts Electric Companies (preferred).....	47	46
Metropolitan West Side Elevated Railway, Chicago (common).....	a15	a15½
Metropolitan West Side Elevated Railway, Chicago (preferred).....	a50	a50½
Metropolitan Street Railway.....	26	a30
North American Company.....	64¾	66
Philadelphia Company, Pittsburg (common).....	39	39
Philadelphia Company, Pittsburg (preferred).....	41	41
Philadelphia Rapid Transit Company.....	14	16
Philadelphia Traction Company.....	89½	90
Public Service Corporation, 5 per cent collateral notes.....	a96¾	a96
Public Service Corporation, certificates.....	a70	a70
Twin City Rapid Transit Company, Minneapolis (common).....	a91½	a91½
Union Traction Company, Philadelphia.....	48¾	50½

a Asked.

**Albia (Ia.) Interurban Railway.**—This company has filed with the Secretary of State an amendment to its articles of incorporation providing for an increase in the capital stock of \$150,000, making the total authorized capital stock \$250,000. The increase is for the purpose of building the extension north from Hiteman. More than \$75,000 of the increase has already been subscribed.

**Consolidated Traction Company, Chicago, Ill.**—A committee has been named by the holders of Consolidated Traction Company 4½ per cent general mortgage bonds to protect their interests. The committee consists of W. F. Harrity, John B. Parsons, J. Nelson Vance, Benjamin Wolf, Clarence J. Housman, Edward A. Cummings and Henry G. Foreman. Philip H. Gray, Chicago, is secretary of the committee.

**Denver (Colo.) City Tramway.**—The shareholders will vote Aug. 27 on the authorization of a 5 per cent 30-year bond issue not to exceed \$25,000,000, to be secured by a mortgage upon all the property of the company. Such proposed bond issue to be used: (a) To refund and discharge the present outstanding indebtedness; (b) to acquire and purchase all or any part of the property and assets of the Denver & Northwestern Railway and the Denver Tramway Power Company and to pay off, discharge or exchange for the outstanding bonds of the two last-named companies; (c) from time to time to provide money for extensions of the company's lines and for additions to its equipment and properties.

**Easton (Pa.) Consolidated Electric Company.**—The directors last week decided not to declare a dividend on the \$1,500,000 stock. Cash dividends of 2½ per cent each were paid in October, 1906, and April and October, 1907. In April last action on the dividend was deferred until July, but it was decided that earnings do not justify a distribution at this time.

**Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.**—Judge Carter, of the Superior Court at Indianapolis, has granted Charles L. Henry, receiver of the Indianapolis & Cincinnati Traction Company, permission to issue renewal certificates for \$900,000 in receivers' certificates secured by a first lien on the company's property. The original certificates were issued for the purpose of raising funds to extend the lines from Shelbyville to Greensburg and from Rushville to Connersville.

**Lowell, Acton & Maynard Street Railway, Maynard, Mass.**—This company has filed petitions with the Massachusetts Railroad Commission asking for authority to issue \$25,000 of additional stock for alteration and extension of its location in Acton, Mass. The desired extension begins in the village of South Acton and is planned to run through West Acton to Kelley's Corner.

**Menominee & Marinette Light & Traction Company, Menominee, Mich.**—The directors of the company have voted to increase the capital of the company from \$450,000 to \$1,000,000 for the purpose of building a power plant at Grand Rapids, 16 miles from this city.

**Mohawk Valley Company, New York, N. Y.**—Certificates filed at Albany on July 25 with the Secretary of State show a reduction of the capital stock of the Mohawk Valley Company and an increase of that of the Rochester & Eastern Rapid Railway. The reduction of the capital stock of the Mohawk Valley Company is from \$20,000,000 to \$7,500,000, and the certificate was signed by W. C. Brown, as vice-president of the New York Central & Hudson River Railroad Company, and by Horace E. Andrews, as president of the Mohawk Valley Company. It sets forth that the ascertainable debts and liabilities of the company are \$7,104,657.58 and that the amount of the reduction of the capital stock shall be distributed among the stockholders of the company. The capital stock of the Rochester & Eastern Rapid Railway is increased from \$1,500,000 to \$15,290,200, and the certificate is signed by Horace E. Andrews as president of the Mohawk Valley Company.

**New York City Railway.**—United States Judge Lacombe has filed a decision on the petition of the Fort Creditors' Committee of the New York City Railway for various reliefs in the action brought by the Pennsylvania Steel Company and the Degnon Contracting Company against the New York City Railway and the foreclosure suits instituted by the Morton Trust Company and the Guaranty Trust Company against the Metropolitan Street Railway. He denied that part of the petition asking to have the lease of the Metropolitan Street Railway Company to the Interurban Company set aside; also the request that all claims for injuries or damages resulting from the operation of the road from February, 1902, to September, 1907, be paid ahead of any rental mortgage or fixed charge. It is understood that Justice Davis, of the Supreme Court, is spending part of his vacation in framing an opinion in the case of the

Attorney General of New York against the New York City Railway for the dissolution of the charter of the company, and that his decision will be made public in the fall.

**New York City Interborough Railway.**—Justice Erlanger, of the Supreme Court, denied on July 24 the application of the New York City Interborough Railway for leave to change its name to the Bronx Crosstown Railway. The application was endorsed by the Public Service Commission, but many taxpayers, property owners and minority stockholders opposed it on the ground that there was an underhand motive in the application. Justice Erlanger says that the endorsement of the Public Service Commission carries no weight. The main reason put forward for the proposed change, that there is a possibility of a confusion of names because of the existence of the Interborough Rapid Transit Company, which controls the subway and elevated roads, loses force, Justice Erlanger points out, from the fact that the Rapid Transit Company was organized in May, 1902, two months after the incorporation of the New York City Interborough Company. In the six years that have elapsed no such confusion seems to have arisen as would warrant the court in taking action. Justice Erlanger says that the same interests control both corporations, that the two boards of directors are almost identical and that the public has been led in various ways to believe that an intimate relationship exists between the two companies. Furthermore, the change of name proposed might easily lead to a confusion in the public mind between the Bronx Crosstown Railway Company and the existing Bronx Traction Company, which is part of the Union Railway system. The court's opinion concludes: "The proposed new name is liable to result in much more confusion and possible injury than if the petitioner retains its present name. The court cannot lose sight of the fact that this is a public service corporation, and when objections are presented of injuries to stockholders, property owners and taxpayers interested in the developments along the line of the railroad the objections have weight when they are not controverted or answered."

**Pacific Electric Railway Company, Los Angeles, Cal.**—The Pacific Electric Railway has leased the Los Angeles Interurban Railway and will hereafter operate it as a part of the system of the Pacific Electric, but for the present the name will remain the same.

**Raleigh (N. C.) Electric Company.**—The Electric Bond & Share Company, New York, announces that on Aug. 1 it consolidates under the name of the Carolina Light & Power Company the following corporations: Raleigh Electric Company, including local railway systems, Raleigh, N. C.; Central Carolina Power Company, Fayetteville, N. C.; Consumers' Light & Power Company, Sanford, N. C.

**Virginia Passenger & Power Company, Richmond, Va.**—Judge Edmund Waddill, Jr., of the United States Circuit Court of Appeals, has set Sept. 24, 1908, as the day for signing the order directing the sale of the Virginia Passenger & Power Company and its underlying companies to satisfy creditors. The Bowling Green Trust Company, New York, is trustee in the suit and William Northrop and H. T. Witcham have been the receivers of the court since 1904. Ford, Bacon & Davis, of New York, have been engaged to prepare a report on the street railway and lighting properties at Richmond, Va. The work is being done for the reorganization committee of the bondholders, of which Douglas Robinson, of New York, is chairman.

**Winnebago (Wis.) Traction Company.**—The foreclosure sale of the property of this company is advertised to take place on Aug. 6. The upset price is \$900,000.

J. P. Graves, president of the Spokane & Inland Empire Railway, operating electric railway lines to Cœur d'Alene and Hayden Lake, Idaho, east, and Palouse and Colfax, Wash., and Moscow, Idaho, south of Spokane, announced at a recent meeting of the City Council of Spokane that he has discussed the building of an electric railway to the Big Bend wheat country, west of Spokane, with Eastern friends and associates and that he is confident they will join with him in obtaining the capital necessary to construct and equip the line. The building of a line from Miles to Kettle Falls, Wash., is also planned. The line from Spokane to Miles will be about 70 miles in length and thence to Kettle Falls is between 52 miles and 60 miles. He also has a project to extend from the eastern city limits of Spokane to the irrigated tracts at Opportunity and Vera in the valley, the line running a mile south of the present Cœur d'Alene road. Mr. Graves says that surveyors will be put out at once and that the field line will be run within 60 days. The route has not yet been decided upon, it being uncertain whether the river or plateau will be followed, and it is not determined where the line will touch the Columbia River.

## Traffic and Transportation

### Coney Island & Brooklyn Railroad Contemplates Increase in Coney Island Fare

The Coney Island & Brooklyn Railroad, which has been charging a 5-cent fare to Coney Island except on Saturdays, Sundays and holidays, notified the Public Service Commission of the First District of New York on July 23 that it contemplated abolishing the 5-cent fare on July 27. The company's letter, stating its intentions, signed by S. W. Huff, the president, follows:

"I am instructed to notify you that pursuant to a resolution duly adopted by this company a fare of 10 cents will be charged between all points north of Prospect Park and Coney Island on every day in the week, beginning Monday, July 27.

"In the proceeding now pending before your commission we proved, as we think, beyond question that the Coney Island fare of 5 cents could not be continued because it costs the company for operating expenses alone more than 5 cents per passenger carried, while by reason of the half fares, etc., the receipt per passenger is substantially less than 5 cents.

"Since the evidence in the case pending before your commission was closed we have made a thorough test of the effect of stimulating travel between New York and Coney Island on 5-cent fare days. On the Franklin Avenue line, running from the Williamsburg Bridge to Coney Island, open cars were substituted for closed cars, the company advertising in newspapers and by hand bills widely distributed, and a very great increased travel filled the increased service of cars, so that the experiment of a low fare and an increased travel has been well tried.

"Before open cars were substituted for closed cars the Franklin Avenue line was carrying mainly a local travel, and was more than meeting operating expenses. Since July 1, although the increased service of cars is running well filled, the line is not earning operating expenses on the 5-cent fare days, and is making no contribution whatever to taxes or interest, or the proper reserves.

"Complaints have been made to your commission, and by your commission demands have been made upon the company that the Franklin Avenue line should be reconstructed. The company is aware that this reconstruction must be made, and the railroad must therefore earn not only its operating expenses, taxes, interest, and a fair dividend upon the capital invested, but also a sum judged to be sufficient for its reserve and to meet final renewal.

"This company was chartered to serve the people of Brooklyn. The 5-cent fare fills the cars at the Park Row and Delancey Street terminals with passengers bound for Coney Island, and the result is that the people of Brooklyn riding short distances, from whom alone the company derives any profit, are deprived of adequate service in cars filled with passengers from the bridge terminals.

"It is impossible for the company to add further service because this would add to the deficit and make shorter the term during which the company can be operated at a loss. It is not fair to the company or the people of Brooklyn, whom it is specially chartered to serve, that it should carry holiday passengers at a loss, and put the burden of the loss upon the short travel in Brooklyn.

"I am further instructed to say that the company will welcome an examination of its books by the commission to the end that the financial result of this 5-cent fare operation may be verified, and the position taken by the company justified to the commission and the public."

The Public Service Commission called the attention of the company's officials to the fact that according to the law under which the commission was created a railroad could not increase its fares without first giving at least 30 days' notice to the commission, and in order to consider the situation it was decided to hold hearings on the subject. The first of these hearings was held on July 24. William N. Dykman, counsel for the company, withdrew the notice and said that in place the company would file an application requesting permission to make the increase in the fare charged to Coney Island.

### Application of Interurban Express Company Denied

In denying the application of the Interurban Express Company, of Syracuse, for permission to exercise rights as an express company on certain railroads in and near Syracuse, the Public Service Commission, Second District, lays down the rule that an operating railway or trolley company should not be permitted to divest itself in favor of another corporation of the obligation to perform any of the public

services for which it is incorporated unless it can show clearly that public necessity so demands or public convenience can be better served thereby.

The company in question was organized as an express company to do an express business from and to any points in the United States or otherwise by means of electric cars and vehicles, horses, wagons, boats, or other means of transportation. The application to the commission was made particularly in connection with the following roads: Auburn & Syracuse Electric Railroad, the Rochester, Syracuse & Eastern Electric Railroad, the Syracuse & South Bay Electric Railroad, the Syracuse, Lake Shore & Northern Railroad and the Auburn & Northern Electric Railroad.

Under the Public Service Commissions law, the company cannot do business without the consent of the commission. The opinion written by Commissioner T. M. Osborne, among other things, says that the advantages claimed by the service applied for can be easily secured by the trolley companies themselves without the formation of a central express company. He urges against the granting of the application the duplication of companies whereby the public would pay directly to the express company for carrying the package, and would also pay indirectly to the railroad company for the use of its tracks in carrying the same package, stating that the cost to the public is certainly increased by the addition of the extra company.

**Conductor of Connecticut Company Receives Severe Sentence**

The Connecticut Company, of New Haven, Conn., has dealt a severe blow to fare speculation on its lines through the successful prosecution of James Meacham, who was sentenced on July 21 to spend 12 months in jail. This term is one of the longest ever inflicted for this offense. Three or four years ago the Connecticut Company realized the uselessness of merely discharging conductors who were caught stealing fares and since that time it has succeeded in securing nearly a dozen convictions.

The Meacham case was a particularly flagrant case, as the accused, who was under constant surveillance for two days by a corps of New York detectives from the P. Edward Wisch service, was found to be stealing fares on nearly every trip whether the travel was heavy or light. An important feature in securing the conviction was the defendant's statement to one of the detectives that Saturdays or Sundays were worth \$25 to him. When asked in court what he meant by this incriminating remark, he asserted that this statement referred to his total fare collection, but he failed to explain why he had turned in \$80 for one of these days instead of some amount nearer \$25.

The charge was preferred in the form of "embezzlement by agent" rather than as petty larceny, since the latter would not have been so likely to result in a severe sentence. The accused was arrested on July 2 and found guilty on four counts on July 14 and sentenced to jail for 20 months. To avoid the expense of an appeal and in consideration of the defendant's family the original sentence was reduced later to 12 months.

**Accidents in New York City**

The following summary of accidents for June on steam, elevated, subway and street railroads within the City of New York has been made public by the Public Service Commission of the First District of New York:

	June	Total for six months
Car collisions .....	167	1,021
Persons and vehicles struck by cars...	1,070	5,799
Boarding .....	707	3,361
Alighting .....	1,252	3,724
Contact with electricity.....	50	226
Other accidents.....	2,493	13,692
<b>Total .....</b>	<b>5,739</b>	<b>27,823</b>
<b>INJURIES</b>		
Passengers .....	2,517	10,442
Persons not passengers.....	630	3,569
Employees .....	834	3,195
<b>Total .....</b>	<b>3,790</b>	<b>17,296</b>
<b>SERIOUS INJURIES INCLUDED IN ABOVE</b>		
Killed .....	42	218
Fractured skulls .....	16	93
Amputated limbs .....	40	30
Broken limbs .....	40	200
Others serious .....	194	708
<b>Total .....</b>	<b>302</b>	<b>1,249</b>

**Freight Rights in Massachusetts.**—The Railroad Commissioners have approved the petition of the Springfield & Eastern Street Railway for authority to act as a common carrier of freight and baggage on that part of its railway in Monson known as the Fiskdale extension.

**Collision on Aurora, Elgin & Chicago Railway.**—More than 30 passengers were injured on July 21 in a head-on collision between two trains on the Aurora, Elgin & Chicago Railway near Aurora. The failure of a motorman to obey orders is said to have caused the wreck. A train leaving Elgin for Aurora is said to have failed to stop at a switch 4 miles north of the city, and in consequence collided with a train going to Elgin from Chicago. Both coaches were thrown partly from the track and telescoped.

**New Transfers in Spokane.**—The Washington Power Company, Spokane, Wash., is using a new transfer. The only punching necessary is the direction the passenger is going, and the hour when it was issued. The date of the transfer is printed in red ink in large figures across the face. The passenger receiving the transfer at any transfer point can plainly see on what cars the transfer will be accepted. The transfers on the lines of the Spokane Traction Company are not so specific, but an order has been issued that on all crowded cars a transfer is to be given which will entitle the passenger to transfer to any car except a parallel line from which the transfer was issued.

**Bridge Service Increased in New York.**—Bridge Commissioner Stevenson, of New York, has announced that the local trolley-car service across the Williamsburg Bridge is being operated under a new schedule, which went into effect July 23. This schedule increases the number of local cars operated in and out of the subway station of the bridge from 398 per day to 450 per day. The chief benefit will be felt during the evening rush hours, when it is proposed to operate cars up to the full capacity of the loop set aside for the locals. This will mean an increase of about 33 1/3 per cent above the present rush-hour operation. The Coney Island & Brooklyn Railroad has increased the number of cars operated over the bridge daily from 154 to 300.

**Curtailing Transfers in Indianapolis.**—The strict enforcement of a rule regarding trunk-line transfers by the Indianapolis Traction & Terminal Company has resulted in the reduction of the number of transfers issued, as many passengers were taking advantage of the situation by making round trips on one fare and a transfer. Heretofore transfers punched for trunk lines were good on lines branching from the trunk line, but the company has ordered that the conductors take an additional fare after the car leaves a trunk line. This requires a passenger to call for transfers on the particular line over which he desires to travel after leaving the trunk line, and discontinues the round-trip privilege. The company also complains that many passengers ask for transfers for the express purpose of giving them away.

**Virginia Companies Seek to Increase Fares.**—The Newport News & Old Point Railway & Electric Company and the Hampton Roads Traction Company have made application to the Virginia State Corporation Commission for permission to increase the fare between Newport News and Hampton from 5 cents to 10 cents. The fare to Hampton was 10 cents until about seven years ago, when the Hampton Roads Traction Company's line was built, and then it was cut to 5 cents. About two years ago the Hampton Roads Company's line, which had been in the hands of receivers for some time, passed into control of the Newport News & Old Point Railway & Electric Company, by which application for the increase is now made so that a fair return may be assured to the company on its investment and for the service rendered.

**Baltimore Company Issues Folder.**—The United Railways & Electric Company, Baltimore, has issued a folder entitled "Bay Shore Park," which tells about the trip which can be made from Baltimore by trolley to the park. The route to the park is along the shore, and some interesting points are visible from the cars, among these the Man-of-War Shoals, Old North Point, New North Point, Sparrow Point and other places, all of which are illustrated, together with other scenes on the line. The booklet contains a double page view of the park and views of the fountain, music pavilion, "loop the loop," bathing pavilion and picnic grove. A map is presented showing the route of the road along the Patapsco River from Baltimore to the park. The booklet is enclosed in a decorated cover with a bird's-eye view of the park and a picture of a train of cars en route to the park.

**Ohio Ticket Case Goes to Supreme Court.**—The Ohio Railroad Commission has carried to the Supreme Court of Ohio the case brought by the Hocking Valley Railway against the commission in regard to twin tickets between

points in which the steam railroad was in competition with the electric railways, in which the lower courts upheld the railroad. The ruling of the commission required the company to stop issuing twin tickets at 16/10 cents a mile from Columbus to Lancaster, Logan and Marion and return, while it charged 2 cents a mile between points where it has no competition. The lower courts held this discrimination to be legal and in doing so followed the construction of the Federal courts of the Federal law. The Hocking Valley Railway is in competition with the Columbus, Delaware & Marion Traction Company between Columbus and Marion and with the Scioto Valley Traction Company south of Columbus.

**Lehigh Valley Timetable.**—The Lehigh Valley Transit Company, Allentown, Pa., has issued its official timetable. The towns reached by the company's lines are arranged in the form of a table, and the distances and fares from Allentown are given. As stated recently in the *ELECTRIC RAILWAY JOURNAL*, the company is operating a through service from Philadelphia to the Delaware Water Gap and directions for making this 90-mile trip are given. The line of the company between Philadelphia and Allentown traverses the Liberty Bell Route, which is replete with reminders of events that have helped to shape the destiny of the United States. Several one-day outings are described and brief descriptions are presented of the different towns through which the company operates. The booklet concludes with a statement regarding the general service of the company in Allentown, Bethlehem and other cities. The cover is printed in colors with a map on the back of the line between Philadelphia, Allentown, Slatedale, Delaware Water Gap, Eastern and Bethlehem.

**Oneida Railway Timetable.**—The Oneida Railway Company has issued an official timetable of schedules in effect on June 21. It gives the distances and fares between Utica and Syracuse in both directions and Little Falls and Rome in both directions and the time and fares on the city and suburban lines of the Utica & Mohawk Valley Railway Company. The classification and rates are given for the electric express service of the Syracuse Rapid Transit Company, Utica & Mohawk Valley Railway Company and Oneida Railway. An interesting feature of the publication is a table of the fares between Utica and Syracuse and the mileage distance between stations on the Oneida Railway. The joint ticket rates between stations on the Oneida Railway and stations on the Utica & Mohawk Valley Railway Company are given, and a map is published of the Utica & Mohawk Valley Railway, the Oneida Railway and the Syracuse Rapid Transit Railway. There is also a page of general information. The cover is in red, white and black and on it attention is called to the connections made between the electrified West Shore Railroad operating as the Oneida Railway and the Syracuse Rapid Transit Company at Syracuse and the Utica & Mohawk Valley Railway at Utica. The fact that the road is protected by block signals is noted and attention to it is impressed by semaphore arms in red and white as decorations for the cover.

**Accidents in Indiana.**—Advance sheets of the bulletin of the Indiana Railroad Commissioners for the quarter ended June 30, 1908, show that the total number of fatal accidents to travelers on highways during the quarter was 24, of which the electric railways were responsible for 8. The total number of such accidents during the previous quarter was 16, of which 5 were charged against the electric railways. The total number of deaths of trespassers during the last quarter was 53. Of these 49 were caused by steam railroads and 4 by electric railways. The number of such deaths during the previous quarter was 42. Of these the steam railroads were responsible for 39 and the electric railways for 3. The total number of fatal accidents to employees during the last quarter was 24, all occurring on steam roads. The number of such accidents occurring during the previous quarter was 23, all due to steam lines. The figures for the last quarter are regarded by the commission as encouraging. Not a passenger met death on either steam or electric railway. During the previous quarter there were two fatal accidents to passengers, one on an electric railway and one on a steam railroad. Commenting on the decrease in the number of fatal accidents the bulletin says that the commission does not hesitate to accord this credit to the railroad men and to congratulate them on the result. Attention is again called to the necessity for great care at grade crossings. The bulletin shows that the total number of fatal accidents to travelers on highways during the year ending with June was 93. Of these 70 were on steam railroads and 23 on electric railways. Of the 175 trespassers killed during the year 13 were killed on electric railways and 162 on steam railroads. The total number killed this year was 391, against 412 the previous year.

## Personal Mention

**Mr. Angus T. Wright** has been elected treasurer of the Salt Lake & Ogden Railway, Salt Lake City, Utah.

**Mr. C. V. de Jong** has resigned as superintendent of car shops of the Chicago Railways Company and has taken the management of the Danville, Ill., plant of the J. G. Brill Company.

**Mr. D. J. Duncan**, retiring manager of the Chattanooga (Tenn.) Railways Company, was recently presented a diamond ring by the employees of the company as a token of esteem. Mr. Duncan has not yet announced his plans for the future.

**Mr. George H. Dreybus**, who has been connected with the International Railway, Buffalo, as chief clerk in the engineering and transportation departments for nearly seven years, has resigned to accept the management of The Coleman Fare Box Company, Buffalo, N. Y.

**Mr. Charles Schenck** has been appointed superintendent of car shops for the Chicago Railways Company. During the past 10 years Mr. Schenck has been connected with the mechanical and engineering departments of the street and elevated railway companies in Chicago.

**Mr. W. A. Haller** has recently been appointed general manager of the Mobile (Ala.) Light & Railroad Company. Mr. Haller was formerly connected with Sanderson & Porter, New York. At one time he had charge of that firm's New Orleans office, to which was entrusted the rehabilitation of the power generating system of the company.

**Mr. A. C. Denman, Jr.**, has resigned as general manager for the San Bernardino (Cal.) Valley Traction Company, his resignation to take effect Aug. 1. He will spend a part of the summer at Santa Barbara with his family, and in the autumn will take active charge and control of an orange grove which he and his father bought recently in Southern California.

**Mr. William Hasson** has been elected vice-president of the Citizens' Traction Company, Oil City, Pa., and Mr. George G. Sloan, secretary and treasurer. The election of Mr. Joseph Seep as president and Mr. F. D. Shaffer as general manager of the company to succeed Mr. James F. Heyward as president and general manager was referred to in this column in the *ELECTRIC RAILWAY JOURNAL* for July 25.

**Mr. P. Ney Wilson** has resigned as roadmaster of the Rochester (N. Y.) Railway to accept a position with the Mack Paving & Construction Company, Philadelphia. Mr. Wilson served for nine years in the maintenance of way department of the southern division of the Public Service Railway Company before going to Rochester, where he has spent two years. As a token of their regret at parting with Mr. Wilson his former subordinates presented him a diamond ring.

**Mr. Andrew S. McSwigan**, manager of Duquesne Gardens, Pittsburg, Pa., and formerly manager of the amusement resorts of the Pittsburg Railways, had a narrow escape from death on July 21 when an auto in which he was riding in the company of Dr. E. B. McGraw plunged over an embankment and overturned, killing Dr. McGraw and hurling Mr. McSwigan violently to the ground. Mr. McSwigan was injured only slightly. Mr. McSwigan was one of the organizers of the National Amusement Park Association and is well known throughout the United States to amusement resort managers.

**Mr. George T. Bishop**, Cleveland, was interviewed by the *New York Tribune* for the issue of July 19 by J. B. Morrow on the future of the electric railway. Mr. Bishop reviewed the early history of the interurban railway, and among the latest roads to be built and cited by him as examples of the tendency toward steam railroad standards were the Northern Texas Traction Company operating between Dallas and Ft. Worth, and the Washington, Baltimore & Annapolis Railway. He referred to the increase in land values following the construction of electric railways, the possibilities of the use of water power for generation, the growth of the electric railway freight business and the precautions taken to insure safety in operating electric railways.

**Mr. W. A. Satterlee**, assistant general manager of the Metropolitan Street Railway, Kansas City, Mo., who was stated in the issue of the *ELECTRIC RAILWAY JOURNAL* of July 18 to have assumed the duties of general superintendent of the company, will carry on this work in addition to his duties as assistant general manager. Mr. Satterlee has

been assistant manager of the company since 1902, prior to which time he was general superintendent in charge of the operation of all lines. Since 1902 he has given his entire attention as assistant general manager to damages and claims. On account of the resignation of Mr. J. W. Carter as general superintendent on July 1 Mr. Satterlee has again taken up his work with the operating department, and has relinquished his work in connection with the claim department of the company.

**Mr. S. D. Wager** has recently been appointed master mechanic of the Toledo, Port Clinton & Lakeside Railway, Genoa, Ohio. Mr. Wager began his railroad career on April 1, 1891, from which time until Dec. 1, 1903, he was connected with the transportation departments of the Lake Shore & Michigan Southern Railroad, Chicago, Rock Island & Pacific Railroad and the Missouri, Kansas & Texas Railroad. From Jan. 1, 1903, to June 15, 1906, he was connected with the construction and operating departments of the Toledo & Indiana Railway and the Toledo, Port Clinton & Lakeside Railway. On June 15, 1906, Mr. Wager was appointed chief train dispatcher of the Toledo, Port Clinton & Lakeside Railway, and on Nov. 15, 1907, he was promoted to general shop foreman of the company. From this position he was made master mechanic.

**Mr. William H. Forse, Jr.**, secretary and treasurer of the Indiana Union Traction Company, Anderson, Ind., has been appointed a member of the Committee on Standard Classification of Accounts of the American Street & Interurban Railway Accountants' Association, succeeding Mr. W. G. McDole, auditor of the Municipal Traction Company, of Cleveland, whose resignation as a member of the committee has been announced. Mr. Forse has been for some years a worker in the association, and in the recent labors of the committee on the standard classification of accounts has been called upon several times to assist it in matters pertaining to interurban railway accounting. Mr. Forse will now officially represent the interurban railways upon that committee. Mr. Forse was a member of the committee which met at Atlantic City several weeks ago and prepared, at the request of Prof. H. C. Adams, of the Interstate Commerce Commission, the tentative text for the new classification of electric railway accounts to be promulgated by the Interstate Commission.

**Mr. Horace F. Parshall**, London, the well-known consulting engineer, has had conferred upon him by Lehigh University the honorary degree of Master of Science, being the highest honorary degree that it gives to its alumni. Mr. Parshall was graduated in 1887, and almost ever since has practised in England. Having important work in connection with a parliamentary committee in London, Mr. Parshall could not possibly leave England to receive the honor, whereupon the University of Liverpool undertook, by letters patent from America, to act for Lehigh. In this manner the degree was bestowed in person on Mr. Parshall at Liverpool on June 30. Chancellor Dale in his letter to Dr. Drinker, of Lehigh, says: "So far as I am aware, no precedent or parallel for such an act can be found in the history of British universities. But it is our business to make precedents as well as to follow them, and we trust in so doing our act will be regarded as an expression of fellowship and sympathy with kindred institutions carrying on similar work, and bound to us by many ties."

**Mr. John H. Cain** has resigned as superintendent of the Glens Falls division of the Hudson Valley Railway, Glens Falls, N. Y., to assume the position of superintendent of transportation on the Buffalo, Lockport & Rochester Railway, now in course of construction between Rochester and Buffalo and to be opened for traffic from Rochester to Albion about August 15. The portion now practically completed, from Rochester to Albion, covers 35 miles. On this road Mr. Cain will be responsible for the entire transportation system, a position which he has been fitted for by 11 years of service with steam and electric railways. Mr. Cain's railroad work began on steam lines, later he was chief inspector on several electric railways in Western New York and subsequently he entered the service of the Rochester & Eastern Rapid Railway Company as train dispatcher. Mr. Cain came to Glens Falls from Rochester, where he had been for three years in electric railway service, and entered the employ of the Hudson Valley Railway as assistant to the general manager. Later he was made superintendent of the Glens Falls division. Mr. Cain's new offices will be at Rochester.

#### OBITUARY

**Thomas Colston Kinney**, attorney for the Manila (P. I.) Electric Railway & Light Company, is dead. Mr. Kinney was 42 years old. He was a native of Virginia.

## Construction News

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

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

#### FRANCHISES

**Springfield, Ill.**—The City Council has passed the ordinance granting a 20-year franchise to the Springfield Consolidated Railway. The ordinance provides that for the first 10 years the company shall pay 2 per cent of its gross earnings to the city and for the second 10 years 4 per cent. The payments are to go into a sinking fund for the retirement of the bonded indebtedness of the city.

**Crawfordsville, Ind.**—The Kokomo, Frankfort & Terre Haute Traction Company has applied for a 50-year franchise to enter this city. The company agrees to use 70-lb. rails and wants the right to carry passengers, freight and the U. S. mail. The company has also applied to the Council of Terre Haute for a franchise. [E. R. J., July 4, '08.]

**Erie, Kan.**—The Kansas Southern Electric Railway has been granted a franchise to construct its line through this city. F. V. Crouch, Iola, president.

**West Orange, N. J.**—The Mountain Railway has applied for a 50-year franchise to cross Valley Road. The road is to be double-tracked and will connect with the South Orange & Maplewood Traction Company's line.

**Elyria, Ohio.**—The Cleveland, Southwestern & Columbus Traction Company has notified the City Council of Elyria that it will accept the franchise recently offered providing for the double-tracking of Cleveland Street.

**Janesville, Wis.**—The Council of Janesville has passed the amended franchise of the Beloit, Delavan Lake & Janesville Interurban Company.

**Chillicothe, Ohio.**—The Scioto Valley Traction Company, Columbus, Ohio, secured a satisfactory franchise in Chillicothe, through which it will be able to operate its cars to the heart of the city by building about 2000 ft. of track. The City Council had insisted that the company use the tracks of the local company for an entrance to the city, with the result that the cars have always stopped at the city line.

**Staunton, Va.**—The city will receive bids until noon, Aug. 4, for a street railway franchise amendment granted to the Blue Ridge Light & Power Company. J. M. Spotts, president.

**Spokane, Wash.**—The Council has passed the ordinance granting a franchise to the Spokane Traction Company to build a single or double track railroad, extending 1½ miles over the following route: Connecting with the present line at Olive Avenue and Madelia Street, south on Madelia Street to Mendenhall Avenue, east of the O. R. & N. right of way, southeast to Regal Street, south to Sprague Avenue and east to Freya Street.

#### RECENT INCORPORATIONS

**Colfax Springs (Ia.) Railway.**—Articles of incorporation of this company were filed with the Secretary of State of Iowa on July 24. The company has a capital of \$25,000 and proposes to construct an electric railway in Colfax and through Jasper County from a point near the Rock Island depot to the hotel at Colfax Springs, a distance of about 2 miles. The officers of the company are: Frank B. Hooper, president; James P. Donahue, vice-president and treasurer; John W. Martin, secretary. The incorporators are: James P. Donahue and Dick R. Lane, Davenport, Ia.

**\*Centralia & East St. Louis Traction Company, Chicago, Ill.**—This company has been incorporated with a capital stock of \$30,000 to construct an electric railway from Vincennes, Ind., through the counties of Lawrence, Richland, Clay, Marion, Clinton or St. Clair. J. J. Burns, Dennis O'Connor and J. E. Burns, Chicago, are incorporators.

**\*Railways Realty Company, New Orleans, La.**—Final arrangements for the transfer of the real estate not now being utilized by the New Orleans Railway & Light Company to a holding company have been made by the filing of articles of incorporation for the Railways Realty Company, a subsidiary corporation to the Railway & Light Company. Its affairs will be administered by a directorate made up entirely of members of the Railway & Light Company's board of directors. Hugh McCloskey, president of the larger corporation, is also president of the new concern. Lynn H. Dinkins, president of the Interstate Trust & Banking Company and a director of the railway company, is vice-president, while the following others are directors of the holding company: R. W. Wilmot, Maurice Stern and Joseph H. DeGrange.

## TRACK AND ROADWAY

**Ocean Shore Railway, San Francisco, Cal.**—This company has closed several contracts providing for the completion of the line between San Francisco and Santa Cruz. The gap of 37 miles between Granada on the north and Scotts Creek on the south is to be closed as rapidly as possible. President Harvey, of the company, says that he hopes to see through trains in operation by Jan. 1, 1909.

**Baltimore & Washington Transit Company, Washington, D. C.**—A bond has been filed by this company with the city to guarantee the construction of its Takoma Park line. The extension must be completed within two years. William A. Mellen, Washington, vice-president and general manager.

**Red Oak & Northeastern, Red Oak, Ia.**—This company is surveying for its electric railway from Red Oak to Des Moines through Greenfield, Stuart, Redfield, Adel and Waukee. The line will be about 100 miles in length. Water power will probably be used from the Raccoon and Nishnabotna Rivers. M. N. Spencer, Red Oak, secretary. [E. R. J., June 13, '00.]

**Boston (Mass.) Elevated Railway.**—Plans have been filed at Everett City Hall for an elevated structure to Malden Square. The details have not been given out, but it is thought that it will be built almost entirely on private property. Rumor had it that the route will be from the Sullivan Square terminal to the Mystic River, over a new bridge which will be built for the elevated road only, thence to Chemical Lane, Everett, and running parallel to Broadway. It will also extend to the tracks of the B. & M. Railroad, Eastern Division, near the junction of Broadway and Cain Street. The route will then extend through West Everett to Malden Square. The plans must be agreed upon by the city governments of Boston, Everett and Malden and accepted within 60 days. It will be completed in 2½ years.

**Hagerstown (Md.) Street Railway.**—It is reported that plans are under way to build an electric railway from Hagerstown to Security, about 2 miles. W. C. Hepperlee, superintendent.

**Michigan United Railways, Lansing, Mich.**—The Northern Construction Company has sublet the contract for grading the Jackson-Mason section of the projected Jackson-Lansing division of the Michigan United Railway to W. S. Tench & Company, of Detroit. A gang of graders began work on the line near Mason on July 13. The steel has been laid from Mason to Lansing. When completed in 1909 this division will have maximum 2-deg. or 3-deg. curves and 1 per cent grades. The line will be operated by third-rail.

**Missouri Electric Railroad, St. Louis, Mo.**—This company, which has recently been incorporated to take over the property of the St. Louis, St. Charles & Western Railway and other railroad property in St. Louis County, recently filed an application with the St. Louis County Court to double-track a short strip along St. Louis Rock Road. The application states that Festus J. Wade, who bought the road several months ago at a forced sale, has transferred his rights to the new company.

**Missouri & Kansas Interurban Railway, Kansas City, Mo.**—A. F. Hunt, Jr., president, is authority for the statement that the road will be converted to an electric line, and saying that the Arnold Company, of Chicago, will probably do the construction. The line connects Kansas City, Mo., with Olathe, Kan., by a road 21 miles long. It traverses a very prosperous agricultural territory, which is being divided into small tracks for intensive farming and for suburban property. It connects with the St. Louis & San Francisco Railroad at Lenexa, and with the Santa Fé at Olathe, Kan.

**New York & North Jersey Rapid Transit Company, Paterson, N. J.**—It is reported \$60,000 was subscribed in Passaic on July 17 toward the building of one link in the road. The company proposes the construction of a high-speed surface electric railway between Paterson and Suffern. [E. R. J., July 18, '08.]

**New York, N. Y.**—Bids are asked by J. W. Stevenson, Commissioner of Bridges, until 2 p. m., July 30, for constructing the outer trolley tracks of the Blackwell's Island bridge over the East River, between the boroughs of Manhattan and Queens. And also for the construction of block signals for the elevated railway tracks of the Williamsburg (New East River) bridge over the East River, between the boroughs of Manhattan and Brooklyn.

**Black River Traction Company, Watertown, N. Y.**—The Public Service Commission has ordered this company to change the location of its track on Pearl Street on Sewall's Island from the side of the street to the center, the change of location to be completed before Aug. 1, and immediately after the company is ordered to resume operation of its

line and passenger service northerly from Factory Square to the terminus of the road.

**Tuscarora Valley Traction Company, Addison, N. Y.**—E. C. Smith and W. E. Barron, of Addison, are trying to interest Addison and Woodhull business men and farmers along the proposed line in the subscription of sufficient funds at least at once to begin the construction of a mile of the line. This company was organized to construct an electric railway from Addison, through the town of Jasper to the village of Woodhull. A charter was secured, but for some reason work on the proposed line has never been undertaken. This charter will expire on Oct. 1 unless some work of construction is by that time under way. [S. R. J., May 5, '07.]

**Champlain & Sanford Railroad, Albany, N. Y.**—The company has agreed with the up-State Public Service Commission to operate its proposed road with electricity instead of steam power. The company has applied for a charter to build and operate a road 58 miles long wholly in Essex County, N. Y. The road is to start at Addison Junction and will run in a southerly direction past Schroon and Loon Lakes, to a junction with the Adirondack division of the Delaware & Hudson at Riverside. Capital stock, \$600,000. [S. R. J., May 2, '08.]

**Buffalo Southern Railway, Gardenville, N. Y.**—The company has advised the Public Service Commission that plans, surveys and specifications are under way for the completion of the extension in Union Street, Ebenezer, along Seneca Street and along the private right of way to the town of East Aurora, approximately 20 miles. The company states that construction work will be commenced at once and it hopes to have the extension completed within the current year. It estimates that the cost of construction and equipment will be \$500,000.

**Corning, Keuka Lake & Ontario Railway, Corning, N. Y.**—This company has just placed contracts for ties and rails for the 18 miles of its line, the roadbed of which is ready, from Savonia to Wayne, N. Y. The road will eventually run from Corning, N. Y., to Sodus Bay, on Lake Ontario. C. A. Baldwin is president of the company, with offices at 30 Church Street, New York. The 18 miles of track soon to be completed will be operated by steam until an electric installation can be made. The company eventually expects to put a water-power plant at Little Lake, where it is estimated 7000 hp can be developed.

**Weaverville Electric Company, Asheville, N. C.**—The contract for the grading of this new electric railway to Weaverville has been let to the Asheville Dray, Fuel & Construction Company, R. M. Ramsey, manager. It is stated that laying of track will follow the roadbed work and that it is probable that the construction will be complete in a few months. The line will extend from Weaverville to New Bridge station on the rapid transit line, which will furnish connection both to the Golf Club station of the Asheville Street Railway and to the connection which will be made at Grace when the Asheville Electric Company's line is carried out Merrimon Avenue from North Main Street. The line will be about 4 miles long and will use the right of way of the line projected some time ago.

**Columbus, Marion, Upper Sandusky & Toledo Traction Company, Marion, Ohio.**—It is reported that this company has begun work on its proposed road. A large number of men have begun grading at Marion. The line will run from Marion to Fostoria, connecting at those points with lines for Columbus and Toledo. Frank M. Ohl, Toledo, is interested.

**Cleveland & Indianapolis Interurban Railway, Norwalk, Ohio.**—It is officially announced that arrangements for financing the construction of this road from Norwalk to Bluffton, Ind., are under way with prospects for early completion. C. F. Jackson, of Norwalk, and J. Y. Todd, of Toledo, are interested.

**Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont.**—This company has completed the final survey in connection with the bridge over the Welland River and the extension from the present terminus of the St. Catharines line to the center of the town to connect with the T. H. & B. Railway. The Niagara, St. Catharines & Toronto Railway has already secured its own right of way through the town.

**Bloomsburg & Millville Street Railway, Bloomsburg, Pa.**—A contract is said to have been let to Lawrence & Company, Chicago, for the construction of the Bloomsburg & Millville Street Railway. Ten miles of track will be required. The road will, it is said, be operated by Strang gasoline motor cars.

**Texas Union Traction Company, Paris, Tex.**—W. B. Rollins, of Kansas City, Mo., writes that this company is

to construct a standard gage electric railway between Paris and Bogata, a distance of about 25 miles. It is intended in the future to extend this line in the same direction for 25 miles, making a connection there with a steam line. Mr. Rollins states that the territory through which this road is projected is a rich agricultural district and at present has very meager railway facilities. The preliminary surveys have already been made. The overhead trolley system will be adopted and the power station will be built at Paris. No contracts have been awarded up to the present time. C. P. Moore, Longfellow, Tex., president; John T. Upchurch, Clarksville, Tex., treasurer. [S. R. J., Feb. 15, '08.]

**Lynchburg, Va.**—R. J. Hughes and others are reported to be organizing the People's Improvement Company to build a street railway extension of about 1 mile to Durmid.

**Yakima Valley Transportation Company, Spokane, Wash.**—This company has decided to build 70 miles of electric railway costing \$2,000,000. It is headed by J. Splawn, North Yakima. G. S. Rankin, president of the Yakima Trust Company, is vice-president; Murray B. Miles is secretary, and E. M. Kenley is chief engineer and superintendent. Preliminary surveys have been made, right of ways have been secured, the capital has been subscribed and some of the material has been ordered. The first extension of the line will be to the Washington State fair grounds, south-east of North Yakima. Thence the road is to be continued south to Yakima City, thence across the Yakima River and through Union Gap toward Parker and Zillah. Eventually it will be extended to Granger and Sunnyside.

**Wheeling (W. Va.) Traction Company.**—This company is improving its Moundsville division by taking out several curves and laying a considerable quantity of new rails.

**\*Cincinnati Construction Company, Janesville, Wis.**—This company has been incorporated to build an electric interurban railroad between Janesville and Madison. Chief Engineer Joseph Ellis, of Columbus, has finished the first survey of the line from this city to Stoughton. It is understood the road will run from Janesville to Madison by way of Edgerton and Stoughton. It will leave Janesville by what is known as the River Road and cross the Rock River above Indian Ford. It will be an air line running to the west of both Lakes Kegonsa and Waubesa. Capital stock, \$25,000. Incorporators: J. M. Bostwick, M. P. Richardson, Archie Reid, P. H. Korst, Richard Valentine and H. H. Zigler, all of Janesville.

**SHOPS AND BUILDINGS**

**Lake Shore Electric Railway, Cleveland, Ohio.**—Negotiations are pending between the Lake Shore Electric Railway and the Wheeling & Lake Erie Railroad to combine their passenger stations at Fremont, Ohio, using the steam road's station as the joint station.

**Ottawa (Ont.) Electric Railway.**—This company will build an additional car barn.

**POWER HOUSES AND SUBSTATIONS**

**Tampa (Fla.) Electric Company.**—This company has contracted with the Stone & Webster Engineering Corporation, Boston, for enlargement of its main power station on West Jackson Street, Tampa, and improvements in the light and power service of the city. The present building will be enlarged sufficiently to house two turbine units with all necessary steam and electrical auxiliaries in addition to the present equipment. One turbo-generator of 1500 kw capacity, arranged to generate current at 2300 volts, with a 520-hp water-tube boiler, will be installed immediately. The present overhead lighting circuits of the company will be reconstructed for 60-cycle current and extended, and the present meters will be readjusted or replaced by three-wire lighting and two-phase power meters. The present 133-cycle overhead power circuits will be rebuilt to carry 60-cycle, two-phase current with corresponding changes in service connections, building wiring and in meters. The work planned will cost in excess of \$250,000.

**People's Gas & Electric Company, Burlington, Ia.**—The ELECTRIC RAILWAY JOURNAL is advised that this company is in the market for 1000-hp water-tube boilers, also for coal and ash handling apparatus. C. H. Walsh, purchasing agent.

**Menominee & Marinette Light & Traction Company, Menominee, Mich.**—Jacobson & DeGuere, Grand Rapids, have secured contract for plans, specifications and supervision of a 7000-hp hydro-electric power plant for the company to be located at Grand Rapids, on the Menominee River, about 18 miles north of Menominee. The plans call for a solid concrete dam about 500 ft. long, a dike of 1000 ft. long, a reinforced concrete power house and flume, a canal on the opposite side of the river leading to the power house about 4000 ft. long. It is not definitely decided just how many and what capacity units will be installed.

**Manufactures & Supplies**

**ROLLING STOCK**

**Dayton (Ohio) Street Railway** is having 20 semi-convertible single-truck cars built by the Barney & Smith Car Company, Dayton. These cars are 31 ft. 10 in. long over the platforms, have a seating capacity for 32 people and are mounted on Class "G" single-motor trucks. They are intended for city service.

**Corning, Keuka Lake & Ontario Railway, Corning, N. Y.,** which plans to build 18 miles of road between Savonia and Wayne, is preparing specifications for passenger and freight cars and within two or three weeks will ask for bids for cars and electrical equipment. C. A. Baldwin, president of the company, has an office at 30 Church Street, New York, N. Y.

**West Pennsylvania Railways Company, Pittsburg, Pa.,** as noted in the ELECTRIC RAILWAY JOURNAL of July 25, placed an order on July 16 with the Cincinnati Car Company for seven suburban cars. The dimensions of these cars are as follows:

Seating capacity.....	52	Height inside....	8 ft. 2½ in.
Wheel base.....	6 ft.	Sill to trolley base,	
Length of body.....	40 ft.		9 ft. 7 in.
Over vestibule.....	51 ft.	Height from track to sills,	
Length over all....	52 ft. 4 in.		3 ft. 3 in.
Width inside.....	8 ft. ½ in.	Body .....	Composite
Over all.....	8 ft. 9 in.	Underframe ....	Composite

**Special Equipment**

Bolsters, body,	1 in. x 10 in., plates built up	Seats, Hale & Kilburn rattan.
Car trimmings .....	Bronze	Steps,
Curtain fixtures,	Front pinch handle	Double steel hangers and risers.
	Curtain material...Pantasote	Special devices, etc.,
Interior finish.....	Cherry	Large platform and end door openings.

**Connecticut Valley Street Railway Company, Greenfield, Mass.,** has recently received from the Wason Manufacturing Company five 14-bench vestibuled-front open cars. The principal specifications of these cars are as follows:

Seating capacity.....	70	Height inside....	8 ft. 5½ in.
Wheel base.....	4 ft. 7 in.	Height from track to sills,	
Length of body.	Over vestibule.41 ft. 7½ in.	Body,	2 ft. 6 in.
Length over all....	43 ft. 1½ in.	Wood and steel carlines	
Width inside.....	7 ft. 4 in.	Underframe,	
Over all.....	8 ft. 5¾ in.	Wood, steel sill plates	

**Special Equipment**

Air brakes.....	Christensen	Journal boxes,	
Axles .....	4 in.	Taylor M. C. B.	
Bolsters, body,	Wason Standard	Markers .....	Henderson
Bolsters, truck,	Wason Standard	Motors, type and number,	
	Wason Standard	4, West. 101 B-2	
Brake rigging,	Wason Standard	Paint,	
Brakeshoes..	Wason Standard	Green body, straw upper	
Car trimmings.....	Bronze	Roofs.....	Steam coach
Center bearings,	Wason Standard	Sanders .....	Kilbourn
	Wason Standard	Seats...Paneled, curved back	
Control system,	Series multiple	Side bearings,	
Couplers....	Wason Standard	Springs .....	Wason Standard
Curtain fixtures.....	Acme	Steps.....	Double folding
Curtain material...Pantasote	4, Revolving	Trucks, type and make,	
Destination signs,	Cherry and ash	Taylor S. B.	
Fenders.....	Wason Standard	Varnish..	Edw. Smith & Co.
Gongs.....	Wason Standard	Vestibule.....	Glass front
Hand brakes.....	Peacock	Special devices, etc.,	
Heating system.....	None	No bulk head. All seats	
Headlights ...	Crouse-Hinds	reversible. Double folding	
Interior finish,		steps. Large sand reser-	
		voir in vestibule. Side	
		guard rails whole length of	
		car.	

**TRADE NOTES**

**D. F. Holman Tracklayer Company, Chicago, Ill** has removed from 1102 Ellsworth Building, that city, to 1715 Railway Exchange.

**Zelnicke Crayon Works, St. Louis,** have appointed Harmon & Dixon, New York, exclusive agents for their crayons for New York and contiguous territory. A full stock of the Zelnicke crayons will be carried by Harmon & Dixon for immediate delivery.



**Darrow Engineering Company, Cincinnati, Ohio,** has been incorporated with a capital stock of \$10,000 by Eleazar Darrow, Howard Ferris and others.

**Lorain Engineering & Construction Company, Lorain, Ohio,** has been incorporated with a capital stock of \$10,000 by F. J. Penny, L. M. Penny, Minor Corron, G. C. Penny and E. P. Corron.

**R. M. Marshall & Company, New York,** announce that F. B. Massey, formerly with the Electric Service Supplies Company, has joined their sales force and will continue to cover his old territory.

**Norton Interurban Construction Company, Evansville, Ind.,** has been incorporated with a capital of \$7,000 to construct interurban and street railways. The directors are: J. J. Wilson, W. W. Ackert and C. A. Kaufman.

**Electric Service Supplies Company, Chicago, Ill.—G. E. Watts,** Atlanta manager of this company, has been elected president of the Mechanical & Manufacturers' Club of Atlanta, newly organized with a membership of 500.

**Pay-Enter-Fare Box Company, Cleveland, Ohio,** has been incorporated with a capital stock of \$10,000 by M. C. Mulhall, A. L. Welch, E. F. Archer, G. A. Howell and C. J. Judkins presumably to manufacture the box upon which Mayor Johnson is at work.

**Rooke Automatic Register Company, Providence, R. I.,** reports that the Rooke registers were put in use on July 14 on the North Attleboro-Providence, Attleboro-Providence and Attleboro-Plainville lines of the Interstate Consolidated Street Railway, Pawtucket, R. I.

**Sprague Electric Company, New York,** has recently opened another branch office on the Pacific Coast. The San Francisco office is now supplemented by one in the Colman Building, Seattle, Wash., in charge of W. R. Hendrey, who is well known in the electrical field on the coast.

**Acme Ball Bearing Sales Company, New York,** calls attention to the fact that it is prepared to furnish 1-in. and ½-in. electric field webbing at the following prices: 1-in., \$1 per gross yard; ½-in., \$1.30 per gross yard. The company carries a large stock on hand to enable it to make prompt shipments. Samples of the webbing are being sent to street railway companies throughout the country.

**Independent Pneumatic Tool Company, Chicago, Ill.,** reports that during the first two weeks of July it received more orders for its Thor pneumatic tools and appliances than during any similar period since last October. The company has also received a large number of inquiries from railroads, foundries, boiler shops and bridge works, from which the company feels confident orders will soon materialize. In view of the improvement in business the company is increasing the force of workmen at its plant at Aurora, Ill.

**American Stoker Company, Erie, Pa.,** has moved its general office to the Park Building, Pittsburg, Pa. The company in reorganizing its management installed as its chief engineer John Van Brunt, an engineer who has had several years' experience with the stoker problem, and having made advantageous arrangements with the Coshocton Iron Company is prepared to execute promptly all orders for stokers or stoker repair parts, both chain grate and American underfeed, at the lowest market price for similar goods. Estimates are furnished for complete installations or for repair parts upon request.

**R. D. Nuttall Company, Pittsburg, Pa.,** is placing on the market a new trolley pole made of cold drawn seamless tubing of the highest grade to be obtained. Great strength is insured by a reinforcement at the bottom and a gradual taper at the top. The reinforcement is 16½ in. long and made of the same material as the pole proper. It is inserted cold and with such care as to fit that it practically becomes a part of the pole. The taper begins 3 ft. from the top and reduces the diameter from 1½ in. at this point to 1 in. at the end. The pole is made in all lengths up to 18 ft. and combines rigidity with light weight. The average weight of the 12-ft. poles is 22 lb.

**Murphy Iron Works, Detroit, Mich.,** have been adding up the experience of different patrons, and an interesting fact is the record of the New Orleans Railway & Light Company, New Orleans, La., which has had 13 years' experience with Murphy furnaces and now has 59 furnaces aggregating 17,000 hp. Sanderson & Porter, of New York, consulting engineers of the New Orleans Railway & Light Company, ran a series of tests on 900-hp Babcock & Wilcox and 600-hp Heine boilers. Two runs were made with Texas fuel oil and the others with Alabama coal. It is a record of fact which, from an engineering standpoint, should interest all owners of electric power plants, and the test data will be furnished by the Murphy Iron Works on application to any of their offices.

**Mesta Machine Company, Pittsburg, Pa.,** owing to the increased demand for its product in the Central and Middle West, has opened an office at 844 Commercial National Bank Building, Chicago, from which point the company's business in rolling mill machinery, gas and steam engines, condensers and machine molded gears, steel castings, etc., will be taken care of by Lane Johnson, who for some time has been connected with the Pittsburg office of the company. Mr. Johnson is a graduate of the Massachusetts Institute of Technology, and for five or six years previous to accepting a position with the Mesta Machine Company was actively engaged in the iron and steel industry, holding for some time a prominent position with the Colorado Fuel & Iron Company.

**Westinghouse Electric & Manufacturing Company, Pittsburg, Pa.,** reports that the Compania de Transvias Luz y Fuerza de Guadalajara, S. A., which is a combination of the two former electrical companies of that city, and operates the entire lighting and railway systems of Guadalajara, has en route to Mexico a large order for electrical machinery which was bought from G. & O. Braniff & Company, Mexico City. The company finding that its power generating stations at La Junta and Juanacatlan were insufficient purchased a 750-kva Westinghouse, three-phase, belted type generator for installation at Juanacatlan, one of the four machines which will be installed as needed. The Westinghouse Electric & Manufacturing Company is supplying the new equipment.

**General Electric Company, Schenectady, N. Y.,** announces that the following orders for new apparatus have been received recently: Isthmian Canal Commission—Six vertical Curtis turbine units, 1500-kw, 25-cycle, 2200-volt, each complete with individual base condenser, air and circulating pumps and necessary piping; electrical equipment for one 20-ton traveling crane, four 35-kw, 125-volt direct-current turbine-driven exciters, four 500-kw, 600-volt rotary converters, each complete with three air-blast type transformers, six 100-kw, 2200-6600-volt, single-phase, oil-cooled transformers, six 110-kw air-blast type transformers, two switchboard equipments. Mitsui & Company, Japan—Fifty GE-52 railway motor equipments, rotary converters, transformers, etc., 20 GE-52 double motor equipments, with headlights and spare parts, three 1000-kw alternating-current generators. Australian General Electric Company—Seventy 4-motor Type N control equipments for GE-81 railway motors. Santos Dock Company, Brazil—Six 3000-kw transformers and five 50-light constant current transformers, one motor generator set, 628 arc lamps, one switchboard, miscellaneous small motors and transformers. Pueblo Tramway, Light & Power Company, Mexico—Ten water-cooled 1500-kw, 60-cycle transformers.

**Westinghouse Traction Brake Company, Pittsburg, Pa.,** says that the adaptation of the standard types of air compressors used with air-brake equipments to many industries requiring compressed air has resulted in the development by it of a line of belt-driven compressors similar to its well-known motor-driven compressor for cases where the only power available is from shafting or where it is not expedient to use either steam or electric motive power. These compressors, designated as the Type F-B belt-driven air compressors, are made in four different sizes, viz., F-1-B, F-2-B, F-3-B and F-4-B, having 15 cu. ft., 26 cu. ft., 44½ cu. ft. and 54½ cu. ft. of free air per minute capacity, respectively, at the standard speeds, 220 r.p.m. for the F-1-B and F-2-B, and 200 r.p.m. for the F-3-B and F-4-B compressors. The horse-power required to operate the compressor in the four different sizes at 100 lb. pressure is 3, 5, 9 and 11, respectively. They will operate successfully against pressures up to 200 lb. per square inch, and may be had with or without water-jacketed air cylinders as occasion requires. The F-B compressor is most compact in design, being similar in all respects to the motor-driven compressor, except that the motor is replaced by a belt wheel, keyed on the crankshaft of the compressor. It is of the duplex, horizontal, single-acting type, portable, applicable to any industrial service and maintained at small cost.

**J. G. Brill Company, Philadelphia, Pa.,** announces the organization of the Compagnie J. G. Brill, 14 Place de Laborde, Paris, France, to handle the business of the J. G. Brill Company in France and Spain. Brill trucks and equipment have been largely used for a number of years in Paris and throughout France and Spain, and the formation of the French Brill Company is indicative of the growth and magnitude of the Brill interests in these countries. A plant is to be established and Brill trucks will be built by French workmen under French supervision and with French machinery. As an indication of the extent of the use of Brill types of trucks in France, it may be said that the Brill No. 21-E type is in general use wherever four-wheeled cars are operated and that the maximum traction

and short-base pivoted types are well represented in Paris and other large cities. The high-speed truck of the No. 27-E type has met with the approval of French railway officials and is in service on lines running out of Paris. In the larger cities the maximum traction truck is repeating the remarkable success it has obtained in the United States and Great Britain. For faster and heavier traffic the equalized short-base truck of the No. 27-G type, which the builder claims is used in larger numbers in the United States than any other one type, is coming into vogue in suburban service. The decision to erect a plant and construct trucks in France is apparently a wise one and well warranted by the large demand and the excellent reputation established. Compagnie J. G. Brill will handle all of the business for the J. G. Brill Company in France and Spain which has heretofore been cared for by Jacques Worms, 97 Rue de Courcelles, and all correspondence relating to French or Spanish business should be addressed to the Compagnie J. G. Brill.

#### ADVERTISING LITERATURE

**F. Bissell Company, Toledo, Ohio.**—This company has issued another souvenir card, one of the series showing the experiences of the Bissell frog. The card will be sent to any one upon request.

**Pittsburg Pole & Forge Company, Pittsburg, Pa.**—A book of blue prints has just been issued containing original designs of span wire poles with brackets, cross arms and feeder arms and a special pole for high-tension transmission work. These prints are useful in preparing data sheets for construction work.

**G. & O. Braniff & Company, Mexico City, Mex.**—In view of the increasing use of electricity in Mexico, Braniff & Company, who are the general representatives in that country for the Westinghouse Electric & Manufacturing Company, of Pittsburg, are distributing among their customers large, illustrated placards, upon which are printed Dr. A. H. Goelet's instructions for resuscitating persons who have suffered an electric shock. These placards are printed in Spanish and English and are intended to be placed in generating or substations, or wherever high voltage electricity is employed. The cards will be furnished, upon application, to parties in Mexico who are users of electricity.

**Niles-Bement-Pond Company, New York.**—The *Progress Reporter* for July, issued by this company, contains as its leading article a description of the new combined slotting, boring, drilling and milling machine, recently built from new designs. The machine has a clear distance between posts of 12 ft. 2 in. The maximum height is 8 ft. 7 in. from the top of the table to the underside of the boring spindle. The table itself is 10 ft. wide by 15 ft. 7 in. long between pans. Among the other articles are the following: "16-25-Ft. Heavy Pattern Extension Boring Mill," "48-In. Niles Steel-Tired Car Wheel Lathe," "60-In. Forge Lathe," "48-In. Niles Engine Lathe," "Pratt & Whitney Spline Milling Machine" and a number of others, all of which are illustrated with half-tone engravings. The steel-tired car wheel lathe is of especial interest as it was designed for turning steel-tired car wheels up to 40 in. in diameter for steam and electric railway requirements. It will take axles having either inside or outside journals and may be readily converted from belt and motor drive. It is illustrated by a full-page, half-tone engraving.

**General Electric Company, Schenectady, N. Y.**—Bulletin No. 4600, recently issued by this company, describes various types of controllers for use in connection with both alternating and direct-current motors, on electric cars, locomotives, automobiles, launches, elevators, trains, hoists, etc., and also in rolling mills, machine shops, printing plants and pumping stations. The bulletin describes the controller most suitable for a specific purpose, and contains general data and dimensions which will be found of value to any one contemplating the installation of motor drive. The company also describes in Bulletin No. 4603 an arc lamp specially suited to the illumination of mills and factories, where the vibration caused by machinery, and the variation in line voltage resulting from the use of motors for machine drive render the ordinary arc lamp unsatisfactory. The lamp described is of the multiple type and is for use on 220-volt direct-current circuit. In the design of this lamp special attention has been paid to the insulation of the binding posts and the hanger in order to render practically impossible the grounding of the lamp as a result of the accumulation of dust on the top.

**American Blower Company, Detroit, Mich.**—This company has issued a publication entitled "A. B. C. Blowers for the Railroad," printed in black on cream-colored paper with tint blocks of pale yellow. Representative installations are illustrated suggested by the great variety of applications of which the A. B. C. apparatus is capable. The fol-

lowing subjects are taken up: "Heating and Ventilation of Round Houses," "Heating and Ventilation of Shops and Car Barns," "Heating and Ventilation of Power Stations," "Heating and Ventilation of Depots and Office Buildings," "Ventilation of Tunnels and Subways," "Mechanical Drafts," "Dry Kilns for Lumber," "Vertical Self-Oiling Engine" and "Exhaust Fans and Blower." Under the title, "Heating and Ventilation of Power Stations," the heating and ventilating apparatus installed at the Yonkers power house of the New York Central & Hudson River Railroad is described, while under the title, "Ventilation of Tunnels and Subways," the installation of blowers at the East Boston tunnel under Boston Harbor and the New York subway at Fifty-fifth Street and Broadway and at the Brooklyn Bridge is described. A. B. C. forced draft apparatus is installed at the power stations of the Birmingham Light, Heat & Power Company, Wilkesbarre-Wyoming Traction Company, Winona Railway Company and Georgia Railway & Electric Company, all of which are illustrated.

**J. G. Brill Company, Philadelphia, Pa.**—*Brill's Magazine* for July 15 contains as its leading feature a detailed description of the novel features of the new cars for the Northern Ohio Traction & Light Company, which were the subject of an article in the *ELECTRIC RAILWAY JOURNAL* of July 11, 1908. In addition to the article on the cars for this company the magazine contains descriptions of Brill semi-convertible cars for LaCrosse, center-aisle open cars for the Lehigh Valley Transit Company, new cars for the Trenton-Princeton line of the New Jersey & Pennsylvania Traction Company, open cars for the Bahia (Brazil) tramways and the motor omnibuses for New York and Philadelphia. The use of motor omnibuses on Fifth Avenue, New York, was described in the *STREET RAILWAY JOURNAL*. The new car bodies are the same type as the previous Fifth Avenue coaches and are practically the same style as those used in London. They have a capacity of 52 passengers, the enclosed portion seating 34 and the roof 18 passengers. The seats on the roof are placed transversely and are of special design with sloping backs 15 in. high with wide ash panels. The bodies are secured to the chassis by means of bolts and can readily be disconnected from the running gear. The bodies for the Anti-Transit Company are of the sight-seeing type with transverse seats, center aisle and rear entrance and are 17 ft. 2½ in. long over all. The cars are operated between Claremont Park and the City Hall.

**Joseph Dixon Crucible Company, Jersey City, N. J.**—*Graphite* for July, published in the interest of the Joseph Dixon Crucible Company, contains the third chapter of W. H. Wakeman's article on "Preventing Corrosion of Steam Machinery." Another interesting article entitled "Commutation" deals with commutating brushes and their use. There is an illustrated article on the Master Mechanics' and Master Car Builders' convention. Under the title, "Painting Steel Cars," a report is printed by the Master Car and Locomotive Painters' Association concerning the painting of steel cars. An interesting original article by L. H. Snyder, M. E., is entitled "Charging Costs in Shop Practice." The company reports that its graphite brushes, which are made in only one quality, are giving satisfaction. It acknowledges in its literature that a one quality brush is not adapted to all conditions, but says that where its brushes are adapted their use results in the commutator's taking on in a short time a highly polished surface, smooth and well rounded, and that since the installation of its own electric plant some eight years ago it has not had occasion to turn down its commutators and attributes the condition of the commutator to the use of its graphite brushes. A concise booklet of 12 pages is supplied to any and all who may be interested in commutation and who will write to the company for it. Some incidental hints given in this booklet include information concerning the testing of brush pressure, and the filing of mica insulation. There are also some conclusions given as a result of tests made by Professor Albert F. Ganz, of Stevens Institute.

#### ELECTRIC RAILWAY PATENTS

UNITED STATES PATENTS ISSUED JULY 14, 1908.

[This department is conducted by Rosenbaum & Stockbridge, patent attorneys, 41 Park Row, New York.]

**Fare Register, 892,986;** Charles E. Gierding, Newark, N. J. App. filed July 25, 1907. Means for preventing over-movements of the numeral wheels in the registering and resetting operations respectively by means of devices having other essential functions.

**Railway Tie, 893,030;** Bernard A. Steinke, Botkins, Ohio. App. filed Jan. 2, 1908. Comprises a metal core having a

longitudinal web, and a plastic filling upon opposite faces of the web and projecting beyond the sides of the core, the upper and lower faces of the filling being flush with the corresponding faces of the core.

**Railroad Cross-tie**, 893,051; Joseph Calvin and Hubert A. Bell, Stanton, Mo. App. filed Dec. 31, 1907. A hollow metal cross-tie formed of a folded plate of metal having its upper side thickened from end to end, and an integral lug near each end of and within said tie projecting downwardly from the thickened top and resting on the bottom of the tie to support a superimposed rail.

**Trolley Pole Attachment**, 893,067; Karl O. Garner, West Alexandria, Ohio. App. filed April 27, 1908. The pole is detachable from the socket on its supporting bracket by a special form of bayonet joint fastening which is designed to be secured against accidental disconnection.

**Connection for Switch-points**, 893,133; William F. Bosser, Utica, N. Y. App. filed Oct. 17, 1907. A housing for the adjusting mechanism comprising a casing made up of hinged parts whereby access and inspection may be readily had without removal of caps. Provides a plurality of adjusting and lock nuts in a single chamber, the abutment surfaces for the adjusting nuts being integral with the casing.

**Track Construction**, 893,134; William A. Braden, Chicago, Ill. App. filed Sept. 14, 1907. A securing means for tracks comprising a pair of clamps each made in two sections and adapted to secure a rail to a parallel flanged stiffening section, a tube extending between the clamps and bolted to the two sections of each clamp whereby the clamp sections are secured together and the two clamps held against the opposite ends of the tube.

**Apparatus for Signaling and Communication to Moving Trains**, 893,147; Henry B. De Groot and William A. Kendrick, Washington, D. C. App. filed March 10, 1908. Each train is provided with a local circuit in which is included a battery or source of energy and a buzzer or coil provided with a vibrator which alternately makes and breaks the battery circuit through the coil, and in utilizing the magnetic discharge generated by the make and break in said coil to produce audible signals in a telephone receiver in a normally open secondary circuit which includes a block or section of the track, whenever the secondary circuit is closed by the passage of a second train upon the block.

**Detector-bar**, 893,169; John S. Hobson, Edgewood Park, Pa. App. filed Oct. 22, 1907. A detector-bar adapted to be attached to the inside of the rail.

**Brake-shoe**, 893,260; Clifton D. Pettis, Chicago, Ill. App. filed April 9, 1908. Comprises a cast metal front portion having a ribbed or offset back, and a cast metal back portion united to and shrunk upon said front portion in the casting operation.

**Valve Mechanism for Air-brake Apparatus**, 893,261; Franklin A. Pierce, Wheeling, W. Va. App. filed Dec. 17, 1906. Provides air-brake apparatus wherein, although the auxiliary reservoir is recharged while the brake cylinder is operating to apply the brake and hold the latter applied in and upon the partial or gradual application of the brake, full communication between the auxiliary reservoir and the brake-cylinder in the case of an emergency may be instantaneously established to at once fully apply the brake.

**Brake Beam Hanger**, 893,274; Samuel Starrett, Reading, Pa. App. filed April 8, 1908. Obviates the use of bolts or rivets.

**Metallic Underframe for Railroad Cars**, 893,282; Henry Tesseyman, Dayton, Ohio. App. filed Jan. 20, 1908. A bolster composed of a plurality of sections comprising a pair of channels spaced apart and connected by upper and lower plates, a connecting block intermediate the sections and secured thereto, in combination with means for connecting draft sills and a center sill with the connecting block.

**Brake Hanger**, 893,306; Horace S. Clark, Los Angeles, Cal. App. filed Sept. 19, 1904. According to this invention the bearings of the hanger pivots are made tapering or conical and automatic means, such as a spring, are provided for taking up the wear and preventing any further looseness of the parts in the bearing.

**Fluid-pressure Brake**, 893,307; John W. Cloud, London, England. App. filed Nov. 10, 1904. Consists in the combination with a train pipe of a small expansion chamber and a large expansion chamber, and a valve device operated by a gradual reduction in train pipe pressure to vent air from the train pipe to the small expansion chamber and by a sudden or rapid reduction in train pipe pressure to vent air from the train pipe to the large expansion chamber.

**Rail Joint**, 893,315; George Ely, Montpelier, Ind. App.

filed March 4, 1908. Contemplates the interposition of web blocks, or bridge pieces, between adjacent rail ends or sections, said web blocks interlocking with the rail sections both at their upper and lower ends so as to prevent possible lateral displacement and insure a continuous surface for the car wheels.

**Railway Cross-tie**, 893,327; Joseph B. Kenney, Sacramento, Cal. App. filed Dec. 26, 1907. Comprises wooden railway ties having trough-shaped plates of substantially the length of a tie secured to the top and bottom of the tie, said plates having diagonally disposed bolt-holes for securing railway rails to the tie, and another set of bolt-holes disposed nearer to the center line of the tie whereby the rails may be adjusted to compensate for wear.

**Car Brake**, 893,376; Albert H. Roger, Philadelphia, Pa. App. filed March 26, 1908. A combined wheel and rail brake and means for automatically sanding the rail when the brakes are applied.

**Metallic Tie and Rail Fastener**, 893,388; James H. Shaw and Edgar B. Boyer, Johnstown, Pa. App. filed March 12, 1908. A metallic tie of double Z-bar construction whereby the tie can be easily ballasted in a road bed.

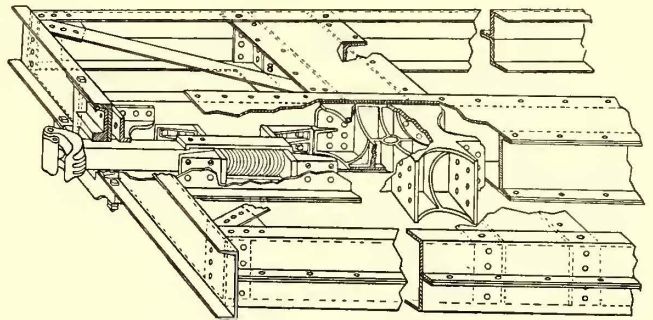
**Automatic Electric Signal System**, 893,402; Earle Van Briggie, Kokomo, Ind. App. filed Dec. 10, 1907. Displays signals on a single track road at switches so that when a train approaches a switch there is automatically set at the next succeeding switch a signal which will indicate to the approaching train the fact that there is a train upon the block between the switch approached and the next succeeding switch.

**Composite Railroad Cross-tie**, 893,430; Maximilian F. Bonzano, Goshen, Va. App. filed May 7, 1907. Channel beams or trough sections having the central portion of the upper web slit and all or part of the metal on opposite sides of the same displaced toward the side walls.

**Rail Joint**, 893,460; James Daugherty, Akron, Ohio. App. filed June 21, 1907. Details of construction.

**Track Fastener**, 893,504; William D. Hutchins, Bloomburg, Tex. App. filed March 17, 1908. The tie has transverse pockets therein for the reception of the rail bases and plates for securing the same.

**Tie-tamping Apparatus**, 893,505; John Iliff, Madison, Wis. App. filed Feb. 25, 1908. Provides an apparatus including a plurality of tamping sections relatively adjustable so that tampers of each section can be brought into proper relation with the ties to be tamped, in combination with suitable driving connections whereby power can be obtained from a single motor.



Metallic Underframe for Railroad Cars—Patent No. 893,282

**Electric Lighting System**, 893,534; James F. McElroy, Albany, N. Y. App. filed Nov. 15, 1904. A controlling system for charging a storage battery from a dynamo running intermittently and at variable speeds. Has means depending on the conditions of the storage battery for limiting the current flowing into the battery during the charging period.

**Electrodynamic Brake**, 893,536; Frederick W. Newell, Hastings-on-Hudson, N. Y. App. filed Dec. 5, 1906. Means for stopping an electric motor when the same is being driven as a generator. Has a differential relay with a winding connected directly across the mains, and means controlled by said relay for effecting a positive stop of the motor when the same acts as a generator.

**Rail Joint**, 893,575; Chester A. Dyer, Coalton, Ohio. App. filed June 10, 1907. One side of the rail chair is formed with an upwardly turned flange which extends uninterruptedly the length of the chair, and the other side of which is formed with upwardly turned lugs. A plate secured to the rails and provided with toes which extend outwardly between the lugs, said toes being secured to the tie.

TABLE OF MONTHLY EARNINGS

Notice.—These statistics will be carefully revised from month to month, upon information received from the companies direct, or from official sources. The table should be used in connection with our Financial Supplement, "American Street Railway Investments," which contains the annual operating reports to the ends of the various financial years. Similar statistics in regard to roads not reporting are solicited by the editors. \* Including taxes. † Deficit. ‡ Jamestown Exposition in 1907. § Atlantic fleet at Seattle four days in May.

COMPANY	Period	Gross Income	Operating Expenses	Gross Income Less Operating Expenses	Deductions From Income	Net Income	COMPANY	Period	Gross Income	Operating Expenses	Gross Income Less Operating Expenses	Deductions From Income	Net Income
Akron, O. Northern Ohio Tr. & Light Co.	1m., June '08	174,444	98,895	75,549	44,120	31,429	JACKSONVILLE, FLA. Jacksonville Elec. Co.	1m., May '08	37,369	23,825	13,544	9,711	4,132
	1 " " '07	182,242	100,807	81,434	43,550	37,885		1 " " '07	32,384	19,259	13,125	6,722	6,404
	6 " " '08	837,744	517,657	320,086	261,167	58,924		6 " " '08	408,908	245,763	163,146	100,634	62,512
	6 " " '07	849,257	513,405	335,852	252,735	83,117		12 " " '07	245,763	206,836	152,615	63,152	89,463
BELLINGHAM, WASH., Whatcom Co. Ry. & Lt. Co.	1m., May '08	28,958	17,696	11,262	8,003	3,259	LEXINGTON, KY. Lexington & Interurban Rys. Co.	1m., May '08	50,271	35,180	15,092	.....	.....
	1 " " '07	28,003	16,307	11,697	7,373	4,324		1 " " '07	46,649	30,816	15,833	.....	.....
	12 " " '08	364,522	203,972	160,550	92,550	68,000		5 " " '08	225,340	154,458	70,882	.....	.....
	12 " " '07	311,079	181,507	129,572	71,300	58,273		5 " " '07	204,221	138,565	65,656	.....	.....
BINGHAMTON, N.Y. Binghamton Ry. Co.	1m., May '08	26,638	14,435	12,203	8,284	3,919	MILWAUKEE, WIS. Milwaukee Elec. Ry. & Lt. Co.	1m., June '08	330,189	162,755	167,434	115,330	52,104
	1 " " '07	15,364	12,218	3,146	8,254	15,108		1 " " '07	332,193	155,797	176,396	100,529	75,866
	2 " " '08	49,368	29,280	20,088	16,643	3,445		6 " " '08	1,890,411	1,004,765	885,654	591,717	293,938
	2 " " '07	35,604	25,595	10,009	16,381	16,372		6 " " '07	1,861,927	936,303	925,624	568,694	356,930
BOSTON, MASS. Boston & Worcester Elec. Cos.	1m., May '08	48,156	23,891	24,265	.....	.....	Milwaukee Lt., Ht. & Tr. Co.	1m., June '08	127,278	31,416	95,862	59,392	36,470
	1 " " '07	42,836	25,847	16,989	.....	.....		1 " " '07	122,831	30,365	92,466	56,695	35,771
	8 " " '08	304,845	194,677	110,168	.....	.....		6 " " '08	633,230	176,368	456,862	346,094	110,768
	8 " " '07	276,724	189,395	87,329	.....	.....		6 " " '07	389,535	158,711	230,824	209,922	20,902
CHAMPAIGN, ILL. Illinois Traction Co.	1m., June '08	324,272	*188,258	136,013	.....	.....	MINNEAPOLIS, MINN. Twin City R. T. Co.	1m., June '08	553,501	270,019	283,481	128,250	155,232
	1 " " '07	307,119	*176,109	131,010	.....	.....		1 " " '07	530,741	248,769	281,972	115,142	166,830
	6 " " '08	1,913,517	*1,138,593	774,924	.....	.....		6 " " '08	2,982,849	1,535,590	1,447,259	749,428	697,832
	6 " " '07	1,706,317	*974,882	731,435	.....	.....		6 " " '07	2,848,614	1,397,142	1,451,472	691,317	760,156
CHARLESTON, S. C. Charleston Con. Ry., Gas & Elec. Co.	1m., June '08	67,970	40,971	26,999	15,160	11,809	MONTREAL, CAN. Montreal St. Ry.	1m., June '08	331,212	166,084	165,128	65,088	100,040
	1 " " '07	62,785	37,190	25,595	14,810	10,784		1 " " '07	325,252	175,031	150,221	55,786	94,436
	4 " " '08	254,180	160,747	93,433	60,126	32,307		9 " " '08	2,672,764	1,651,707	1,021,056	450,876	570,180
	4 " " '07	235,644	147,048	88,595	59,454	29,142		9 " " '07	2,494,888	1,585,593	909,290	389,614	519,675
CHICAGO, ILL. Aurora, Elgin & Chicago Ry. Co.	1m., June '08	125,592	62,698	62,894	28,259	34,635	NORFOLK, VA. Norfolk & Portsmouth Tr. Co.	1m., May '08	152,176	90,262	61,913	.....	.....
	1 " " '07	136,909	70,455	66,454	27,650	38,804		1 " " '07	1216,919	140,084	76,835	.....	.....
	12 " " '08	1,401,107	766,977	634,130	334,404	299,726		1 " " June '08	164,527	98,623	65,904	.....	.....
	12 " " '07	1,331,986	722,281	609,705	319,100	290,605		1 " " '07	254,247	149,235	105,012	.....	.....
CLEVELAND, O. Cleveland, Painesville & Eastern R.R. Co.	1m., June '08	27,068	*15,619	11,449	7,490	3,960	PENSACOLA, FLA. Pensacola Elec. Co.	1m., May '08	15,084	12,073	3,012	4,328	†1,316
	1 " " '07	27,387	*14,972	12,415	7,213	5,202		1 " " '07	19,233	11,333	7,900	3,644	4,256
	6 " " '08	125,259	*72,502	52,757	43,649	9,108		12 " " '08	217,191	150,376	66,815	49,793	17,022
	6 " " '07	123,186	*68,477	54,710	43,276	11,434		12 " " '07	192,523	121,251	71,272	36,838	34,434
Lake Shore Electric Railway Company	1m., May '08	69,538	*40,041	29,498	25,812	3,685	PHILADELPHIA, American Rys. Co.	1m., June '08	254,370	.....	.....	.....	.....
	1 " " '07	73,882	*42,694	30,919	23,314	7,605		1 " " '07	266,058	.....	.....	.....	.....
	5 " " '08	307,440	*189,189	118,251	128,425	†10,174		12 " " '08	2,896,408	.....	.....	.....	.....
	5 " " '07	317,960	*194,768	123,192	118,138	5,053		12 " " '07	2,855,320	.....	.....	.....	.....
DALLAS, TEX. Dallas Elec. Corp'n.	1m., May '08	90,460	64,063	26,397	29,939	†3,543	PLYMOUTH, MASS. Brockton & Plymouth St. Ry. Co.	1m., May '08	10,643	8,219	2,425	2,343	82
	1 " " '07	89,532	62,390	27,142	25,615	1,527		1 " " '07	9,772	6,422	3,350	2,254	1,096
	12 " " '08	1,140,405	750,980	389,424	345,925	43,499		12 " " '08	122,249	89,321	32,928	27,560	5,368
	12 " " '07	1,058,952	721,227	337,726	283,029	54,695		12 " " '07	114,868	68,271	46,597	26,456	20,141
DETROIT, MICH. Detroit United Ry. Co.	1m., June '08	640,457	*384,191	256,266	137,179	119,087	ST. LOUIS, MO. United Railways Co. of St. Louis	1m., June '08	915,339	*572,259	343,080	230,833	112,247
	1 " " '07	639,275	*371,442	267,833	131,980	135,853		1 " " '07	961,189	*598,353	362,836	230,852	131,984
	6 " " '08	3,314,037	*2,110,307	1,203,730	812,973	390,757		6 " " '08	5,163,556	*3,367,498	1,796,058	1,395,518	400,510
	6 " " '07	3,315,108	*2,105,239	1,209,869	769,078	440,791		6 " " '07	5,287,612	*3,526,036	1,761,576	1,386,310	375,266
DULUTH, MINN. Duluth St. Ry. Co.	1m., June '08	75,851	45,326	30,525	18,417	12,108	SAVANNAH, GA. Savannah Electric Co.	1m., May '08	48,097	30,244	17,854	17,003	850
	1 " " '07	72,816	34,712	38,104	17,925	20,179		1 " " '07	48,332	32,630	15,701	15,653	49
	6 " " '08	410,381	262,379	148,003	110,500	37,503		12 " " '08	602,987	407,218	195,769	202,187	16,418
	6 " " '07	386,121	201,052	185,068	105,932	79,137		12 " " '07	597,231	358,037	239,194	182,063	57,131
E. ST. LOUIS, ILL. East St. Louis & Suburban Co.	1m., June '08	166,729	89,982	76,747	.....	.....	SEATTLE, WASH. Seattle Elec. Co.	1m., May '08	†386,961	216,857	170,104	87,432	82,672
	1 " " '07	183,413	94,100	89,313	.....	.....		1 " " '07	339,616	199,104	140,512	77,401	63,111
	6 " " '08	977,997	515,351	462,645	.....	.....		12 " " '08	4,365,709	2,593,833	1,771,876	1,101,398	770,478
	6 " " '07	1,003,406	547,124	456,281	.....	.....		12 " " '07	3,592,756	2,010,423	1,582,333	773,695	808,638
EL PASO, TEX. El Paso Cos.	1m., May '08	42,634	28,480	14,154	7,247	6,907	SYRACUSE, N. Y. Syracuse R. T. Co.	1m., May '08	108,692	62,481	46,211	28,719	17,492
	1 " " '07	40,537	30,565	9,972	5,738	4,234		1 " " '07	103,072	60,609	42,463	25,201	17,262
	12 " " '08	532,527	375,284	157,242	77,650	79,592		5 " " '08	518,832	312,027	206,805	143,491	63,314
	12 " " '07	435,659	321,846	113,813	59,466	54,347		5 " " '07	490,983	277,867	213,116	125,577	87,539
FT. WAYNE, IND. Ft. Wayne & Wabash Valley Tr. Co.	1m., May '08	107,190	63,337	43,853	.....	.....	TACOMA, WASH. Puget Sound Elec. Ry. Co.	1m., May '08	154,205	92,166	62,039	49,956	19,084
	1 " " '07	101,012	60,566	40,446	.....	.....		1 " " '07	148,273	84,320	63,953	35,800	28,153
	5 " " '08	505,166	295,152	210,014	.....	.....		12 " " '08	1,693,211	1,057,086	636,125	492,268	143,857
	5 " " '07	461,971	284,757	177,213	.....	.....		12 " " '07	1,490,503	927,128	563,375	392,840	170,535
GALVESTON, TEX. Galveston-Houston Elec. Co.	1m., May '08	91,024	54,700	36,323	19,740	16,583	TAMPA, FLA. Tampa Elec. Co.	1m., May '08	45,405	32,254	13,151	2,303	10,848
	1 " " '07	85,605	54,428	31,177	18,494	12,683		1 " " '07	43,612	33,058	10,554	1,348	9,206
	12 " " '08	1,072,171	627,729	444,442	235,462	208,980		12 " " '08	535,859	379,408	156,451	18,676	137,774
	12 " " '07	968,228	572,505	395,723	210,676	185,047		12 " " '07	493,350	316,117	177,234	18,862	158,373
HOUGHTON, MICH. Houghton County St. Ry. Co.	1m., May '08	21,504	12,089	9,415	4,648	4,768	TOLEDO, O. Toledo Rys. & Lt. Co.	1m., June '08	201,774	107,458	94,316	71,762	22,554
	1 " " '07	20,775	10,366	10,409	4,724	5,685		1 " " '07	212,972	123,867	89,105	66,227	22,878
	12 " " '08	256,162	146,468	109,694	57,360	52,334		6 " " '08	1,233,158	682,388	550,770	420,136	130,634
	12 " " '07	241,034	142,355	98,679	55,595	43,084		6 " " '07	1,251,077	734,051	517,026	380,142	136,884