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Of this issue of the ELECTRIC RAILWAY JOURNAL 10,500 copies are printed.

Valuations of Electric Railway Property

The establishment of public utility commissions does not necessarily mean the appraisal of all public utility properties, but in Wisconsin the enlargement of the powers of the railroad commission in 1907 was coincident with the enlargement of the engineering staff of the tax commission to render service also to the railroad commission of the State. This staff now consists of from 20 to 30 members, and has been engaged in the appraisal of steam and electric railways and other public utility properties in

the State. While appraisals of railway properties have been made many times in the past by banking and other interests, the objects sought by them and by a State board of a kind now in Wisconsin present radical points of divergence. The purpose of the private appraisal has nearly always been to determine the value of the property as a going concern—that is, its present and future earning power. In the valuations of the Wisconsin State Board, however, the study has been confined throughout to the physical property, without regard to the intangible elements—that is, the board has made complete inventories and valuations of the different properties, based upon their cost of reproduction—new, and "cost of reproduction—present condition." The novel character of the valuation lends interest to the paper on the organization and work of the board published elsewhere in this issue, written by Prof. William D. Pence, engineer of the railroad and tax commissions of Wisconsin. Prof. Pence also gives a summary of the valuations fixed. The largest electric railway system valuated was that of the Milwaukee Electric Railway & Light Company, and this work required 5½ months.

Bulletin Board Hints

The bulletin board forms a convenient medium through which the manager on the small road, or the division superintendent on the large road, can have daily talks with his men and can call their attention to methods by which he thinks that they can improve the service. The bulletin board should not be a substitute for weekly or monthly talks to the men on questions of operation, but as a means for calling attention to brief suggestions it is unrivaled, as every trainman sees it and practically every one reads what is posted on it. A number of roads have adopted the plan of placing on the bulletin board articles from the daily or technical press, which appear particularly advisable to bring to the attention of the trainmen. Clippings from this paper are often used for this purpose. Reports of legal decisions form excellent material for the bulletin board—not the decisions in which the railway company has been held non-liaible, but those in which it has been held responsible for errors in judgment on the part of trainmen. Thus in a recent issue of this paper a case was reported in which a company was penalized because a conductor did not use special care to prevent an accident during alighting of a minor who was unaccustomed to riding on street cars and became frightened because she had been carried past her destination. Decisions on the amount of force which can lawfully be used during expulsions can also be treated to advantage in this way. It is impossible to formulate a set of rules to cover every possible case of contributory negligence or of legally justifiable expulsion. They can be defined only by reference to previous decisions, and each

court opinion is helpful in more nearly approximating the conditions under which any particular event takes place. A little thought will suggest other notices which can be posted to advantage on the bulletin board.

Manipulation of Transfers

The throttling of transfer frauds requires continuous vigilance. In nearly every large city it has been found that certain people make a business of manipulating street railway transfer slips and by selling them derive a variable but substantial income. As we recorded nearly a year ago, the United Railways & Electric Company, of Baltimore, until certain changes were made in the transfer form, suffered largely by these frauds because the date was not plainly indicated on the transfer slip. Upon the revision of the form it was discovered that the estimates of the amount of transfer manipulation had been low. The Chicago Railways Company has been making a crusade against trading in transfers, and the success of this determined resistance against swindling is recorded elsewhere in this issue. Publicity, it has been shown, is a strong weapon against a large number of people who manipulate or use manipulated transfers in riding to or from their daily work. The Chicago Railways Company has not hesitated to give due prominence by way of the daily press to such "patrons," and by use of the patrol wagon to transfer dealers in transfers to the station house. The results, as stated, have been all that could be desired. One company, operating 250 miles of track and 650 cars in a large city of the Central West, has found that some regular riders are going so far as to fill in the original punch marks of transfers and imitate the desired punching by carefully cutting out with a knife small holes of the same shape as those made by a punch, but relocated so as to change the time of day indicated. Examples will, no doubt, be made of these "regular riders." As with paper currency, it is hardly possible to devise for commercial use a transfer that cannot be manipulated, but it must be acknowledged that the forms used by some companies are an open temptation to those inclined to defraud. An interchange of ideas and possibly a slight additional outlay for printing a carefully arranged transfer slip will, in many instances, be rewarded by a surprisingly large decrease in transfer trafficking.

Obstacles to Track Construction in 1908

The records of track construction during 1908, published in another part of this issue, represent so far as can be shown by the figures which we have been able to secure, the curtailment of development resulting from the financial panic which started in October, 1907, and spread inevitably to all sections of the country.

The construction of electric railway track, whether undertaken as an ambitious new project or as an extension of an existing system, necessitates the expenditure of so large an amount of money that it can be raised ordinarily only through the issue of capital securities. When the sale of such securities cannot be negotiated, or if their disposal within a reasonable time cannot be foreseen by interests in control of railway properties, few ventures involving important construction are likely to be started.

From every point of view the year 1908 has been inauspicious for the promotion of new lines or the extension of existing properties. It is unfortunate that advantage could not have been taken by more companies with plans for profitable enterprises of the lower costs for labor and materials which could have been obtained during the year than appears to have been the case; but, with revenues reduced and prospects for improvement in traffic discouraging, few railways have been able to obtain the credit needed for capital improvements on terms that were reasonable.

Except in extraordinary cases, railways must depend upon bankers for the flotation of their securities. Since bankers who underwrite securities do not acquire them usually for permanent investment, but employ capital in buying and selling, as other merchants deal in merchandise, avenues of credit are difficult of access to the railways if banking interests, seeing investors frightened, decline to commit themselves to purchases.

Where track construction of importance has been conducted during the year, it has been due in most cases to the fact that the work had been started or commitments made before business conditions changed, and the continuation of building operations was therefore expedient. In instances of this character, the organization of the company being completed and the necessary capital subscribed, it was desirable to carry the construction work to a point permitting operation. To leave the capital invested unremunerative until conditions changed would have involved a loss which it was advisable to prevent.

Since the fundamental causes of the reduction in construction in 1908 are in the main those arising from business and financial conditions, it would seem to be a simple matter to predict that in 1909 new and postponed construction work will be conducted throughout the Union on a scale greatly in excess of that which has been known in any other year. A prediction of this nature, however, would fail to take into consideration the effect of the movement toward regulation which is manifested in many States. Theoretically, some of the advantages to the public of supervisory control of the construction of new lines would lie in the elimination of new competitive roads that are not necessary and the reduction of capitalization to a point representing the actual cost of the property; practically, however, the operation of rigorous laws on this subject restricts promoters. While it may be in the interest of the entire public to enact laws that will place restrictions upon the activities of promoters of some classes, such restrictions reduce materially the prospects for improved transportation in many communities. The practice of building roads in districts that could not support them at existing rates and extending lines into sparsely settled outlying districts has redounded much more to the benefit of the traveling public in the past than to the owners and creditors of the properties concerned in the improvements; and if such roads can be placed on a more profitable basis by careful analysis of operations, and the public will recognize the desirability of having service, even at a higher rate of fare than custom has sanctioned, transportation facilities now desired in many communities may be provided.

Rolling Stock Ordered in 1908

The statistics of the total number of cars in operation on the electric railways in the United States at the close of the year 1907 were published in the *ELECTRIC RAILWAY JOURNAL* for Aug. 29, 1908. The figures were compiled from the reports of individual roads prepared for the 1908 edition of "American Street Railway Investments," the average date of the reports approximating Dec. 31, 1907. In this tabulation 68,636 electric motor cars and 17,568 other cars were reported. Many persons have been under the impression that very few additions have been made to the number of electric cars in operation in this country during the past year. It is true that the electric railway companies have suffered from the inactive business conditions, which have prevailed in other industries, but not to the same extent as the steam railroads. But, in spite of hard times, the number of cars included in the list ordered during 1908, published elsewhere in this issue, will probably be surprising to many manufacturers as well as railway officials. Every effort was put forth to make this list complete, and it is hoped that there are not many serious omissions. As a whole, the orders placed for new equipment aggregate 3262 cars. Compared with totals of last year, as reported in the *ELECTRIC RAILWAY REVIEW* for Jan. 4, 1907, this is a decrease of 48 per cent. The corresponding decrease in steam railway rolling stock purchases during the year was 72 per cent. The largest order placed by a single company during the year was that of the Chicago Railways Company for 700 double-truck cars. These cars were required under the terms of the rehabilitation ordinances in Chicago.

The records of the year show that out of a total of 3262 cars ordered, 8.8 per cent were to be built in company shops. In the year 1907, 12.02 per cent were so constructed. The statistics do not include, of course, the work on reconstruction of cars carried on in the companies' own shops, and also in the plants of manufacturing companies. Of this work there has probably been more than usual, not only because of the desire to save the large initial expense which a new car would require, but also because many existing cars have been reconstructed to adapt them to the prepayment system of fare collection.

Progress in car design during 1908 has followed lines already well established in 1907. The most important advances made during 1907 included the gradual introduction of more steel into car bodies, a rearrangement of the platform and door design to afford facilities for collecting fares as the passenger boarded the car and general improvements in motor and control apparatus. On roads which must subject their rolling stock to severe handling in order to carry traffic most efficiently there is a growing tendency to utilize steel more and more in the main structure of the car. The 700 new cars which are being delivered for use on the Chicago Railways Company's lines probably include in their makeup as much steel as it would be possible to use and yet not designate the car as being of steel construction. The underframe of these cars is similar to that found satisfactory in St. Louis and on the Twin City lines in Minneapolis and St. Paul, and is comprised mainly of two 18-in. steel side plates with

the necessary end connections of steel and the reinforcing angles. The platform supports are of steel and the side panels and the window and deck sash are also of metal. Cars built entirely of steel are being ordered for use practically to the exclusion of any other for subway service, and are also being introduced for surface use. In general, however, the introduction of methods for prepayment of fares may be said to have been the most marked feature of car development during 1908.

The Discussion of Convention Reports at Home

The papers and reports annually presented before the Engineering Association have come to represent such rich mines for shop mechanics and foremen that they well deserve more thorough digestion than is possible in the hurly-burly of convention week, nor is there good reason why those who are not fortunate enough to attend the yearly meeting should not discuss with their fellow-craftsmen the value of recommendations made. A few weeks ago we mentioned the practice of one company in having the topics considered at the monthly meetings of the heads of departments. Where there is an association of shopmen another opportunity is afforded. This latter plan has been adopted in the Public Service Railway of New Jersey. The method followed is for the chairman of the organization to choose an appropriate convention report and divide it into assignments for different members who lead the discussion on the given topic at the next monthly meeting. The discussion is prefaced by a reading of the given section in open meeting so that others who are present may add their opinions.

Such a system as this should have beneficial results for both the employee and the railway. The criticisms of the various suggestions are made by men who have, through their daily labors, the closest possible intimacy with actual service requirements. This often renders it possible for them to advise their superiors that certain schemes are impracticable or to point out that peculiarities in the behavior of equipment are due to unusual external influences not suspected by those who lack minute knowledge of individual divisions. These home discussions bring out the important differences in the characteristics of the various lines forming parts of one system and make it easier to decide whether the same standards are applicable throughout.

But aside from the technical aspects of these meetings, there is the far greater benefit of making the shop and outside men realize how their attention and ability affect the entire service. The frequent interchange of opinion on the work of the national convention committees also trains them to analyze and weigh the thoughts of others and gives each the chance to develop along broader lines than afforded by the scope of his daily duties. The man who has learned in these domestic conferences to listen carefully and then give bold utterance to his thoughts has received just the kind of training that will make it worth while for his employer to send him to those larger conventions where he can commune with the most progressive men in the industry and return to his work with the feeling that he has taken the first big step upward to a more responsible position.

Saving in Power Consumption

The introduction of some new type of prime mover or perfected auxiliary machinery in an electric railway power house which would save 10 per cent of the cost of power generation would be hailed as a notable achievement in engineering. A reduction of 10 per cent in the amount of power consumed in the operation of cars would accomplish the same result, however, so far as the operating expenses of the road are concerned. With the present-day economy of power house machinery there is far less opportunity of effecting any considerable reduction in the unit costs of production than there is for lowering the total cost of power through stopping the leaks in the distribution system and putting an end to many of the wastes in consuming the power in the operation of cars. Broadly stated, the problem confronting electric railway managers is how to lower car mile operating costs and raise car mile receipts. The cost of operation, so far as the cars are concerned, may be divided under three general heads—wages, maintenance and cost of power consumed. Wages tend always to increase, and on most roads have grown materially greater during the last five or ten years. Maintenance cannot or should not be slighted, for any temporary reduction in this item is sure to carry compound interest at a large rate, as well as to be reflected in the additional power required and in some of the general expense accounts, particularly in damage claims. The cost of power consumed holds out the most encouragement of being kept within bounds if carefully watched and controlled.

The opportunities for reducing the power consumption per car mile on most roads are many and varied. First, and perhaps most important, is the weight of cars. Every pound of unnecessary weight in the cars requires extra power to transport it. One large city railway company has estimated the cost of running its cars at 10 cents per pound per year. Of this amount, which includes maintenance of track as well as cost of power and maintenance of the equipment itself, the cost of power represents by far the largest part. Lubrication, condition of the wheels and the riding qualities of the trucks all affect the running resistance of cars, and therefore the power consumption. Tight gage, bad joints and rail surface and alignment also have a direct effect on the car resistance. Insufficient feeder section and defective bonds constitute as great a loss of power as a partially grounded feeder or trolley wire. The source of greatest waste, however, and the one most difficult to restrict is the methods of manipulating the motor control apparatus on cars by motormen. This probably can never be wholly eradicated, but great improvements in this direction are possible through education and discipline. Some of the lesser channels of waste on cars are the motor compressors on air-braked cars, the lighting circuits and the electric heaters. A motorman who wastes air in making a stop wastes the power required to compress that air. The trainmen, too often, are careless in the handling of the heater switches and the lights, and supply more than is needed of both. These are a few of the leaks in the power circuit that exist to a greater or less extent on every railway system. Some of them are more easily stopped than others, but all are of sufficient magnitude to repay an effort to eliminate them.

Lighting Large Spaces

One of the troublesome questions which now and then arises in electric railway working is the proper illumination of large interiors like repair shops and car houses and of occasional railway yards. At present the situation is complicated by the common practice of subdividing car houses in order to lessen the fire risk, which reduces the size of the individual spaces, it is true, but at the same time gives them rather awkward shapes. As a rule, pretty good illumination must at times be available, especially in the repair shops, although for much of the time a very moderate degree will serve. Whatever the illuminants are, they must be so arranged that several degrees of illumination can be conveniently obtained without too much sacrifice of uniformity. As a rule, the early car houses were all lighted with 16-cp incandescents run in series off the regular circuit, and the result was none too good. The lamps, in the first place, were of very uneven quality, and the pressure generally varied over a wide range. At present the 16-cp lamp is too small a unit for the spaces commonly used, and it is also decidedly inefficient as compared with the newer lamps, both arc and incandescent. When it comes to the matter of yards, the illumination required is less than indoors, but still should be much better than one usually finds. The arc lamp is now, as it always has been, the main reliance in such situations.

Of the newer illuminants one must reckon in indoor work with high efficiency incandescents, mercury arcs and the various forms of intensive arcs. In many cases the ordinary tungsten lamps are worthy of very serious consideration. They are, when equipped with proper reflectors, much more efficient for the purpose than ordinary incandescent or enclosed arcs, and their negative temperature coefficient enables them to stand fluctuating voltage better than do carbon lamps. The 100-watt size is a very convenient one for general purposes. When fitted with a proper shade, it gives considerably better efficiency than its rated 1.25 watts per candle-power, so far as the lower hemispherical output is concerned, and the wiring can very readily be arranged so as to permit turning on half or a quarter of the total number of lamps when only moderate illumination is necessary. The weak point of the lamp is that it is somewhat fragile, and hence does not stand much rough handling or vibration. In many cases this danger can be avoided, and when it is possible the net result of a tungsten installation is most excellent. The economy possible is limited by the price of the lamps, which is at present rather too high to make their use actually pay well at a very low price for current, such as would customarily be charged to itself by an electric railway plant. This otherwise very attractive illuminant is therefore relatively little used for the purpose under consideration. Yet its use can show some saving, and it should be given a chance. At, say, 1 cent per kw-hour as the nominal charge, a 100-watt tungsten lamp will consume during its average life of about 1000 hours 100 kw-hours, costing \$1.00, and the lamp itself will cost about \$1.50, making the total cost for 100 hours \$2.50. With carbon lamps, at least five would be required for the same service, costing, say \$2.00 for 1000 hours burning, the ordinary useful life being a scant 500 hours. The

cost of current would be at least \$2.50, giving a total cost of \$4.50 for the equivalent service. It is therefore clear that it will often pay to use the lamp even with very cheap current, if the item of breakage can be kept down by careful installation and use.

The mercury arc has been somewhat serviceable for such work, and stands in power between the large incandescents and arc lamps. Its color is, from the æsthetic standpoint, rather dreadful, but as a practical illuminant it has done well in large interiors where the green color is not in itself objectionable. Its efficiency has been the subject of some debate, but it is probably a little better than that of the tungsten lamps plus their reflectors. The chief item to be considered is breakage of the tubes, which in the later lamps is less serious than it used to be, and the total cost is certainly much lower than with carbon incandescents. Were the mercury arc with quartz tube available in this country still better economic results would be obtainable. Unfortunately, however, the quartz tubes are at present made in quantity only in one factory in Germany, so that from the commercial standpoint the light is somewhat unavailable. The ordinary mercury arc is, however, well worth a trial in car houses and shops, and it will doubtless soon come to a renewal cost that will make it rather an attractive proposition.

For big spaces, especially out of doors, the arc is very much in the game. The common enclosed arc is, of course, out of the competition when efficiency is to be considered, as compared with either the tungsten lamps or mercury arcs. But the flame arcs are beyond any doubt the cheapest illuminants when a large amount of light is required, especially in places like storage yards. In Germany flame arcs are extensively used for lighting steam railroad yards, and give admirable results. They are hung high, say 30 ft. to 40 ft., on very simple poles, usually of steel lattice, and give very fine results in illumination. They are commonly of the inclined carbon type, and give a distribution that is well adapted to yard lighting. In this country they are beginning to find use for steam railroad purposes. As light producers they are in a class by themselves, but they require daily trimming and the carbons are as yet costly, especially on account of the duty, which, being specific, hits especially hard the cheap grades of mineralized carbons extensively used abroad. In spite of this, they furnish a cheap form of light, and some modified flame arcs are now coming along that promise relief from the present severe cost of trimming. Even now the flame arc is a straightforward commercial and economical proposition where a large amount of light is needed. No known illuminant, unless possibly the quartz mercury arc, is in the same class as they for efficiency or low cost per candle-power hour.

For interior use the flame arcs are commonly too powerful units. If, however, the space is big and high, such arcs hung high are very much to the purpose. There are now available flame units taking not over 250 watts and giving at least double the light of the best enclosed commercial arcs. Besides these, there are the intensified single enclosure arcs, giving far higher efficiency than the ordinary enclosed arcs, owing to their use of slender carbons, say not over $\frac{1}{4}$ in. in diameter. These require trimming

every 24 to 36 hours, but give, perhaps, half as much light again as the ordinary enclosed type and a much better distribution for indoor work. They are certainly worthy of a trial for such work, like the flame arcs out of doors.

Condemnation of Land for Private Purposes

The Court of Appeals of New York handed down, Oct. 13, a decision in the case of the Hudson & Manhattan Railroad Company against Wendell et al. The suit has been in the courts for a number of years and establishes a ruling in New York State which is novel because it could be brought up in just this way only through underground railway operation. With steam railroads the combination of commercial office buildings with railroad terminal stations is rare. The smoke and noise from the steam locomotives would drive away most tenants, except possibly the employees of the railroad company whose business required them to be at or near the station. With an electric railway, however, the advantages of being near a station are great and in an underground railroad in lower New York every consideration of the conditions under which business is conducted suggested the erection over the Cortlandt Street terminal of the Hudson & Manhattan Railroad of a large office building whose tenants could reach New Jersey by descending to the ground floor. The law in regard to the condemnation of private property, however, is very strict. The convenience of the public may require that one private individual or corporation can take real estate away from another private individual or corporation, as in railroad condemnation proceedings, provided the land so acquired is to be used for railroad purposes. But it is another question whether an owner of real estate should be divested of his property when it is the intention of the railroad company not only to use the land for a railroad station, but also for the erection of a large office building from which rental for commercial purposes would be obtained.

One of the plots on Dey Street which was included in the original plan of the Cortlandt Street terminal in New York had long been in the possession of one of the old families in New York, the Wendells, who are large owners of real estate in New York and, rarely, if ever, sell any land which they acquire. The Hudson & Manhattan Railroad had received permission for the construction of a terminal station on Dey Street and tracks under that street to New Jersey from the Rapid Transit Railroad Commission, as well as the right to acquire such real property for the station and road "as may be found convenient for the operation of the railroad." Under this authority the company proceeded to condemn the plot in question. The case which has just been decided was very involved, as both the general railroad law and the Rapid Transit act provide for condemnation of real estate by railroad companies and the company was the possessor of privileges under both acts. As a whole, however, the Court of Appeals holds to the theory that real estate acquired by railroad companies through condemnation should be held only for the purposes of the grant and that an unqualified fee in land cannot be taken by condemnation by a private corporation without express authority.

LARGE NEW SUBSTATIONS OF THE CHICAGO RAILWAYS COMPANY

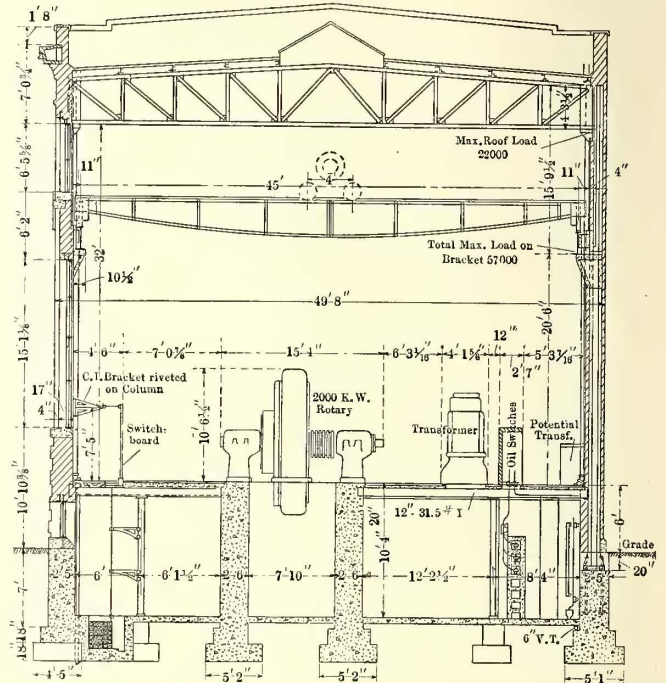
Construction details of two new substations which will be erected immediately by the Chicago Railways Company as a part of the work of rehabilitating its lines are shown in the accompanying drawings. One of these substations, for which the foundations already have been completed, will be located at Lill Avenue near Sheffield Avenue in the north part of the city; the other will be built at Twenty-fifth Street and Leavitt Street in the central western portion of the city.

The Lill Avenue substation is located in a residence district and therefore an ornamental design has been chosen for the exterior. The over-all dimensions of the structure, which is rectangular in plan, are 49 ft. 8 in. x 96 ft. 6 in. The basement under the entire building will have a head room of 10 ft. 4 in. and the machine room from machine floor to bottom of roof trusses will be 32 ft. high in the clear. The structural materials used to support and enclose the steel frame are concrete, face brick and terra cotta. The exterior of the building will be finished in face brick ornamented as shown in one of the engravings, with white cut stone and a light-colored terra-cotta cornice. The windows, which will have metal frames, will be arranged in groups to swing horizontally about trunnions at the side of each sash. Features of interest which will add considerably to the appearance of these later substations as compared with those previously built are the ornamental design of the exterior, the paneling of the interior walls and the absence of pilasters for supporting the crane runway brackets.

The posts which support the five steel roof trusses have been designed sufficiently stiff to support the crane runway girders on brackets riveted to these posts. The side walls and steel frames are so designed that the roof-supporting columns are entirely enclosed by the brick walls. This de-

capacity of 25 tons and will be equipped with three electric motors. The clearance between the machine room floor and the crane hook when raised will be 20 ft. 6 in.

The interior walls of the substation above the machine room floor will be faced with enameled brick arranged in large panels enclosing the window groups. The brick used for this purpose will be of two colors, green and white. The green enameled brick will form the border of each



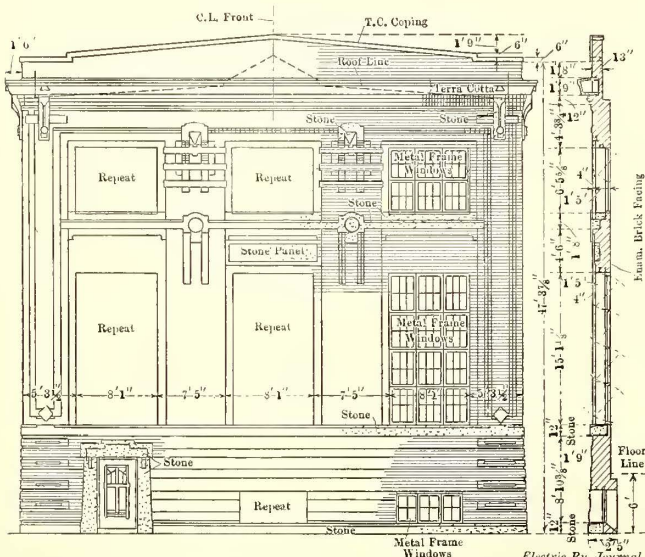
Chicago Railways Substations—Cross Section Through Lill Avenue Station

panel enclosing the center of white brick surrounding the window frames. The wainscot also will be of green enameled brick to a height of 6 ft. Green was chosen for this purpose rather than white because the darker color will not show grease marks so readily.

The roof of the substation building will be made of book tile covered with composition. The floors of the basement and machine room are to be reinforced concrete.

The accompanying floor plan and sectional elevation will serve to show the general arrangement of the principal electrical apparatus. Current for this substation will be purchased from the Commonwealth Edison Company and delivered into the substation by lead-covered underground cables terminating just at the floor level at the right-hand side of the substation, as shown in the sectional elevation. The lightning arrester equipment is installed between barriers directly above the cable potheads and in the same compartment on the opposite side of the aisle are six horizontal high-tension buses enclosed in concrete sections. Connections between the incoming cables and the high-tension buses and also between the buses and the step-down transformers are to be made by oil switches mounted in compartments on the machine room floor directly above the bus compartment and controlled from the main switchboard on the opposite side of the station.

The floor above the busbar compartment is supported by 12-in. 35.5-lb. I-beams on which stand the step-down transformers. The entire busbar compartment will be kept under air pressure by three blower fans mounted in the basement at the end of the compartment. Three 2000-kw rotary converters will be mounted on wall foundations which will extend lengthwise of the station and form a

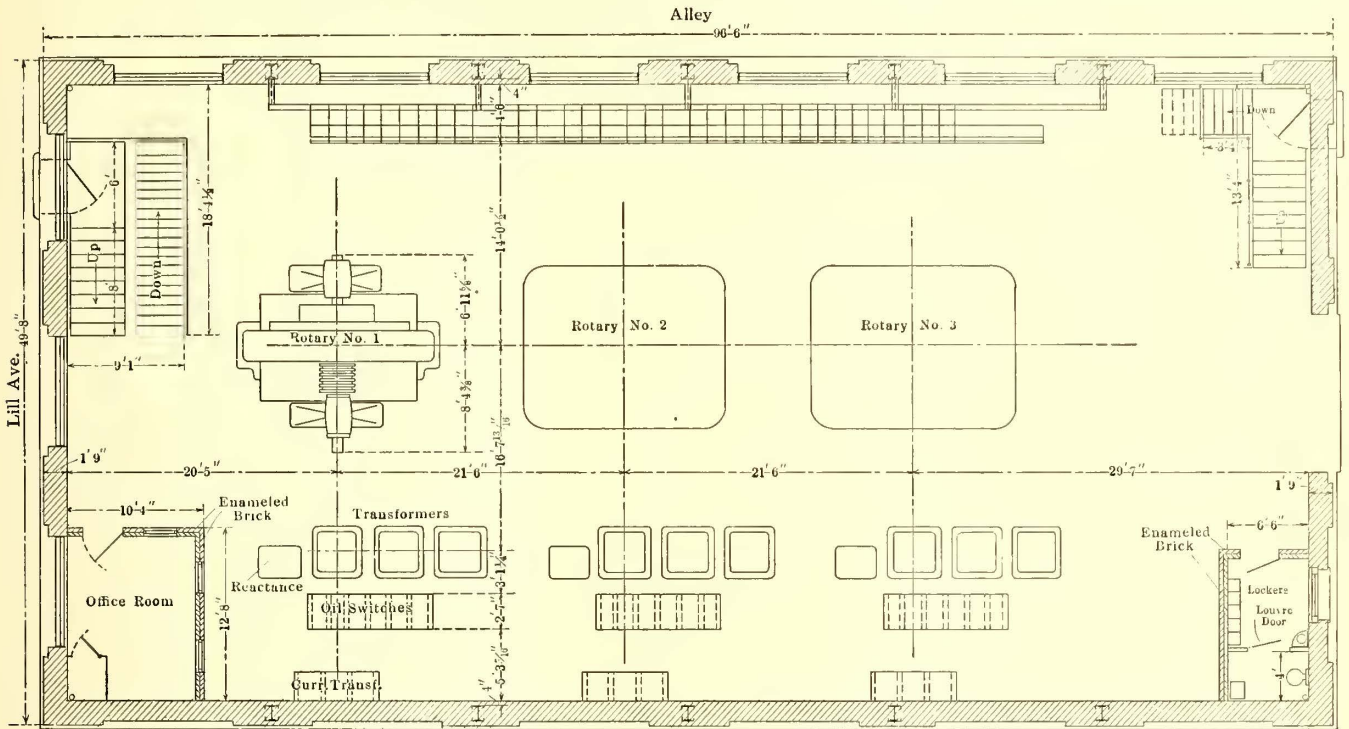


Chicago Railways Substations—Front Elevation of Lill Avenue Building

tail of construction it is thought will add considerably to the appearance of the station interior and will afford a maximum floor space within the side walls. On top of the crane runway brackets will be placed a 24-in. 80-lb. I-beam tied to the main columns with 3/8-in. steel plates. To this I-beam will be bolted the crane rail weighing 50 lb. per foot. The crane will have a span of 45 ft. and a travel the entire length of the substation. It will have a lifting

passageway through which the underside of the machines may easily be reached. One of these rotary foundation walls will form one side of the bus compartment which, as earlier stated, is to be kept under air pressure; and to pro-

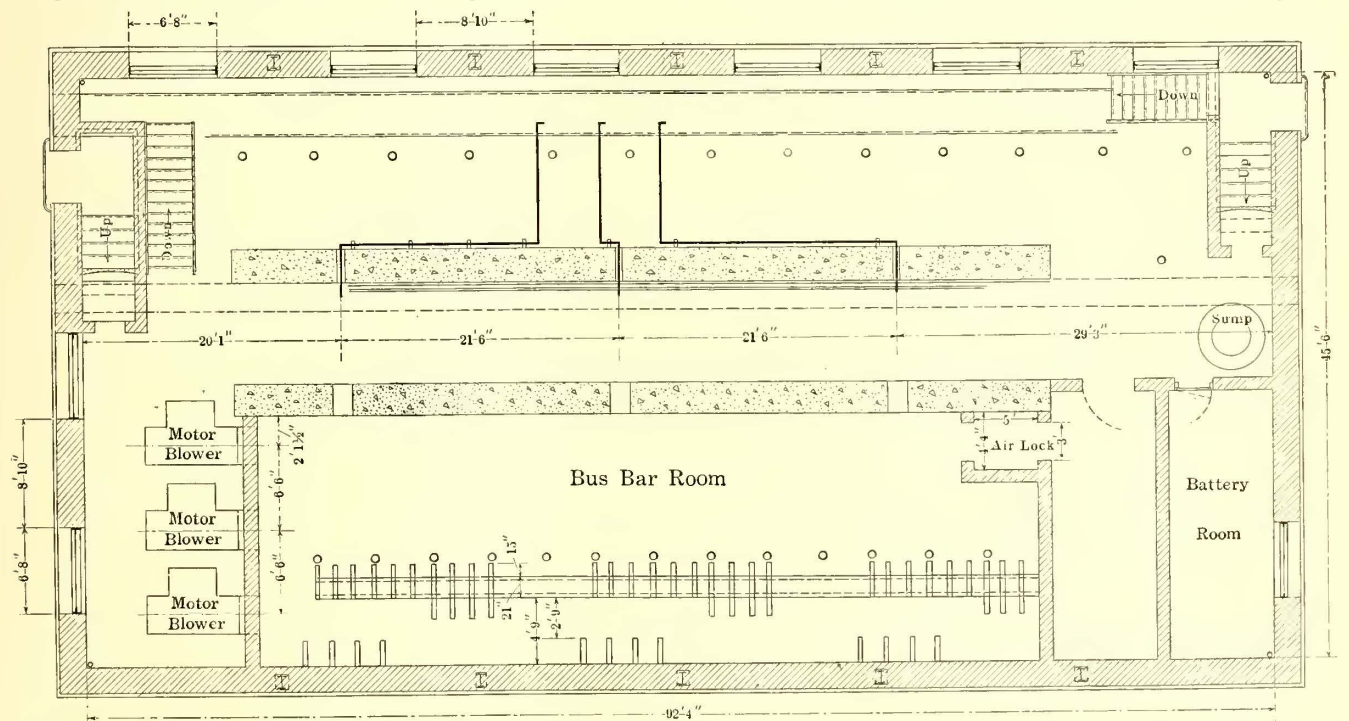
coming high-tension cables are carried underneath the machine room floor. The d.c. conductors are made of copper bars supported on cast-iron brackets. An accompanying sketch shows in detail the method of supporting the switch-



Chicago Railways Substations—Plan of Operating Room of Lill Avenue Station, Showing Location of Apparatus

vide against pockets of air becoming highly heated underneath the machines, this foundation wall will be pierced under each machine by a hole 18 in. square in section. The escape of air from the high-tension compartment through

board panels in the steel floor structure. Improvements have been made in this design of substation in the method of supporting the outgoing d.c. feeders beneath the switchboard. In substations of earlier design these trolley-feed



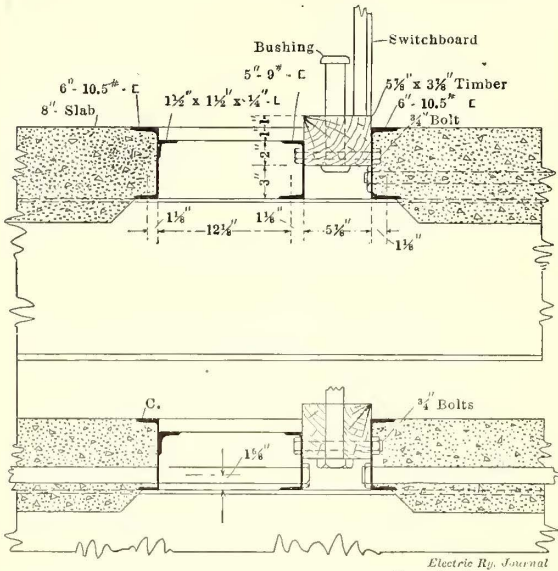
Chicago Railways Substations—Basement Plan of Lill Avenue Station, Showing Foundations for Apparatus

these holes directly under the machines has been found to give a valuable cooling effect and to assure a plentiful supply of fresh air under the rotaries.

The machine connections with the switchboard which stands on the opposite side of the substation from the in-

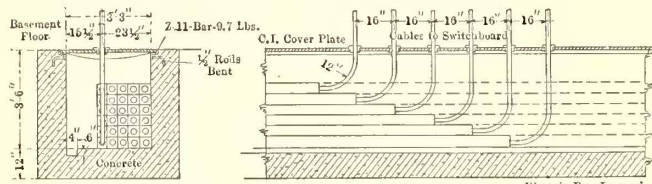
cables have been carried on iron racks along the building wall below the switchboard. With the large number of heavy cables it was found a difficult task to satisfactorily arrange supports so that after a time the cables would not sag and become unsightly. Accordingly the new scheme of

continuing the cable ducts under the full length of the switchboard has been introduced in the design of the present substations. An accompanying engraving shows the arrangement of the d.c. feeder ducts in a concrete trench



Chicago Railways Substations—Detail of Support for Switchboard

below the level of the basement floor. The general location of this trench also is shown in the sectional elevation of the substation. Thirty d.c. feeder ducts are accommodated at the Lill Avenue substation and these ducts, each enclosing one cable, are so arranged that the top cables



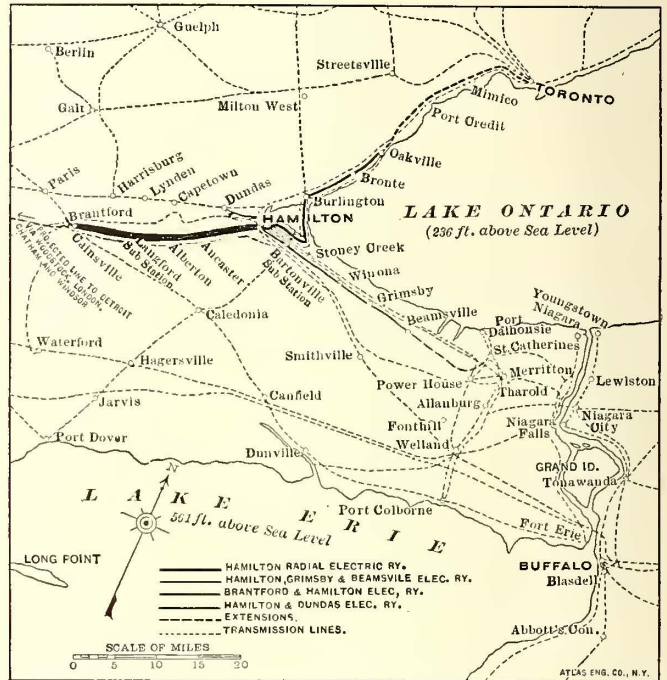
Chicago Railways Substations—Direct-Current Cable Trench Under Switchboard

may rise successively directly under the switchboard panel with which each is connected. Cast-iron checker-plate covers fit tightly over the trench and serve to keep the cables properly spaced. By this arrangement an unsightly cable rack is done away with and a considerable amount of copper for connection bends and fittings is saved.

The use of accumulator cars on main lines has latterly begun to assume some importance, and some particulars of experience gained during 10 years' trials on the main lines of the Palatinate Railways, which are given in the "Bulletin of the International Railway Congress," should not be allowed to pass unnoticed. The chief conclusion to be drawn from the experience of the Palatinate Railways, extending over a number of years, is that an accumulator motor car service can be economically successful if the battery is well and carefully maintained, and if the current can be generated at a cheap rate; in it we have a motor car system which is reliable to a high degree. These indisputable advantages probably outweigh the disadvantages inherent to accumulator cars, the allowance that has to be made, when drawing up the time tables, for time of charging, the very careful supervision required, and the fact that the possibility of using them is frequently limited by the capacity of the battery and the long distances between charging stations.

THE BRANTFORD & HAMILTON ELECTRIC RAILWAY

In the completion of the Brantford & Hamilton Electric Railway on May 23, 1908, the Dominion Power & Transmission Company, Ltd., of Hamilton, Ont., secured an important link in the all-electric system it has planned to join Toronto and Detroit—a distance of over 500 miles—via Woodstock, London, Chatham and Windsor. At the present time this company operates 22 miles eastward from Hamilton to Oakville, within 19 miles of Toronto, and 22 miles westward to Brantford. Bearing in mind the eventual operation of through long-distance service, these lines have been constructed on right-of-way wherever possible, with such low grades and easy curves



Brantford & Hamilton Electric Railway—Lines Operated by the Dominion Power & Transmission Company, Ltd., in and About Hamilton, Ont.

that real speed competition with steam trunk lines will be more than a possibility. The accompanying map covers the section between Brantford and Toronto, and shows the courses of the following railways centering at Hamilton controlled by the Dominion Power & Transmission Company: Brantford & Hamilton Electric Railway; Hamilton, Grimsby & Beamsville Electric Railway, and the Hamilton Radial Electric Railway.

BRANTFORD-HAMILTON ROUTE AND TRACK

The Brantford & Hamilton Electric Railway covers a route of 22 miles with 22 1/2 miles of single track. The greater part of the road from Hamilton is a uniform climb to a height of 600 ft. in 6 miles along the side of a mountain overlooking the prosperous and picturesque Dundas Valley. The maximum grade, despite the ascent, is only 2 1/2 per cent, and the tangent sections are unusually long—that from the summit west to Fairchild's Creek being fully 9 miles. The disintegrated limestone of which the mountain is composed, while easy to remove, makes a rather treacherous foundation. The track, therefore, has been well ballasted with gravel from the company's pits at Brantford, and the cuts and fills are more liberal than they would have to be in firmer strata.

The rails, which are of 80-lb. T-section, are laid on cedar ties spaced 2 ft. centers, with staggered angle-bar joints

carrying American Steel & Wire Company's No. 00 bonds. The same construction is followed in the city, except that the base is 6-in. concrete with brick paving. There are several concrete culverts and two steel bridges, one at Fairchild's Creek and one over the tracks of the Toronto,



Brantford & Hamilton Electric Railway—Span Suspension for Double Trolley Construction

Hamilton & Buffalo Railway (steam), and a short temporary trestle in Brantford. The cattle guards are homemade, consisting simply of a set of inclined slats laid across the track.

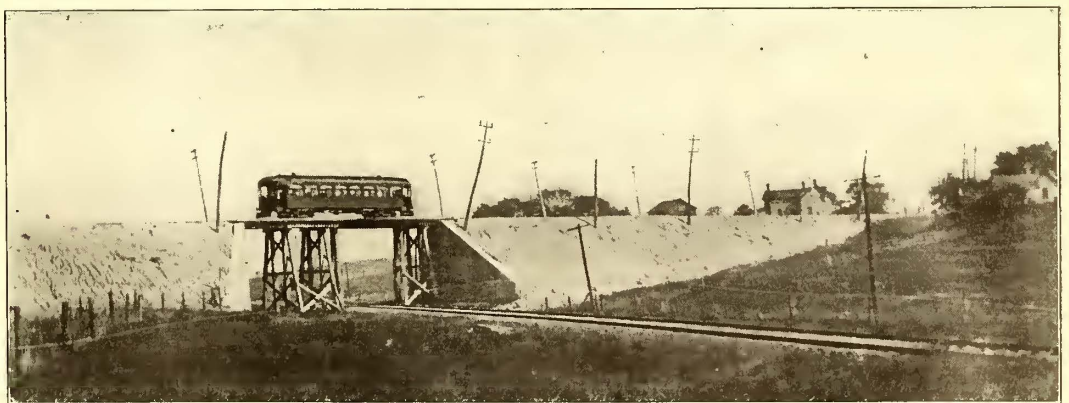
ELECTRIC SHOVEL

A valuable factor in the construction of the line has been an automatic shovel, built for electric operation by the Thew Automatic Shovel Company, of Lorain, Ohio. This shovel, unlike the steam apparatus, does not require three sets of engines for the independent control of the hoisting, swinging and crowding motions, but is operated by one 35-hp, shunt-wound constant-speed Westinghouse d.c. motor controlling the various motions through suitable frictions. The manufacturer has designed this electric shovel with planetary transmission gears for controlling the swinging and crowding motions from a main motor, to do away with many of the difficulties which friction clutches have given in this connection.

Current is supplied from the feed wire to the motor through flexible cables connected through switches to copper rings upon the upper side of the truck frame. The current is transmitted through carbon brushes suspended from the underside of the turntable coming into contact with these copper rings. This electrical operation eliminates the fireman, worry about fuel and water and trouble from freezing. In operating this shovel it is desirable to have the current supply independent of line fluctuations.

The shovel illustrated is mounted on one truck, weighs 25 tons, and has a 24-ft. cutting radius at a height of 9 ft. The dipper is 1 to 1 1/5 cu. yd capacity, according to the nature of the material. The horizontal crowding motion of the dipper is a special feature which makes it entirely practicable to dispense with a crane-man, so that all movements can be controlled by one operator. In the construction of the Brantford-Hamilton line one man operated the shovel and another tripped it.

The average cost of handling material with this shovel runs about 0.10 cent per cubic yard, but in the following unusually favorable case the plain labor cost for a day was much less, as will appear from the following details: When this shovel worked in the gravel pit the depth of the cut was about 14 ft. The gravel was loaded onto flat cars having 14 cu. yd. capacity each, and frequently 100 loaded cars were hauled away daily. This meant an output of 1400 cu. yd. loose measurement, or 1050 cu. yd. placed measurement. The men employed and the wages paid in this work were as follows: Superintendent, \$4; shovelmen, \$3; pit men, \$1.50; motormen, \$3; trainmen, \$1.50; dump men, \$1.50. The labor cost for a day was \$29.50, divided as follows: One superintendent, \$4; shovel crew, consisting of two shovel men and two pit men, \$6 and \$3, respectively; one motorman at \$3 and one signal man at \$1.50 for spotting cars; transporting two trains, requiring two motormen at \$3 each and two trainmen at \$1.50 each; and two men at the dump at \$1.50 each. With 1050 cu. yd. moved in a 10-hour day, the labor costs were as follows: Superintendence, \$0.004; loading, \$0.013; transportation, \$0.009; dumping, \$0.003; total, \$0.029. When the output fell to 800 cu. yd. place measurement, the total unit labor cost was \$0.037. This extreme minimum figure, of course, does not include charges for power, plant, repairs and track work.

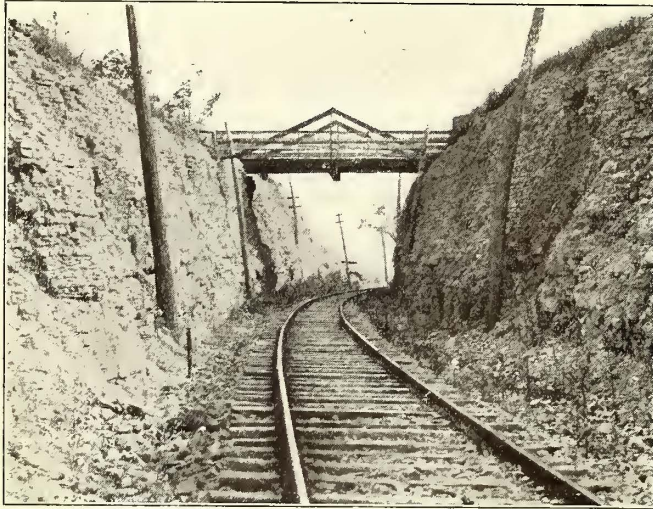


Brantford & Hamilton Electric Railway—Fill and Crossing over Steam Railroad at Cainsville, Ont.

LINE CONSTRUCTION

The power supply for this railway comes from De Cew Falls, about 40 miles from Hamilton, and is transmitted at 40,000 volts, three-phase, 66 cycles to substations at the mountain top (No. 1) and Langford (No. 2), respectively

3 and 15 miles from Hamilton. There is also a general substation in Hamilton. Along the Brantford-Hamilton right-of-way this transmission is carried on 40-ft. cedar



Brantford & Hamilton Electric Railway—Rock Cut near Hamilton

poles 180 ft. apart, over Thomas triple-petticoat insulators. A ground wire is carried above the high-tension wires for lightning protection.

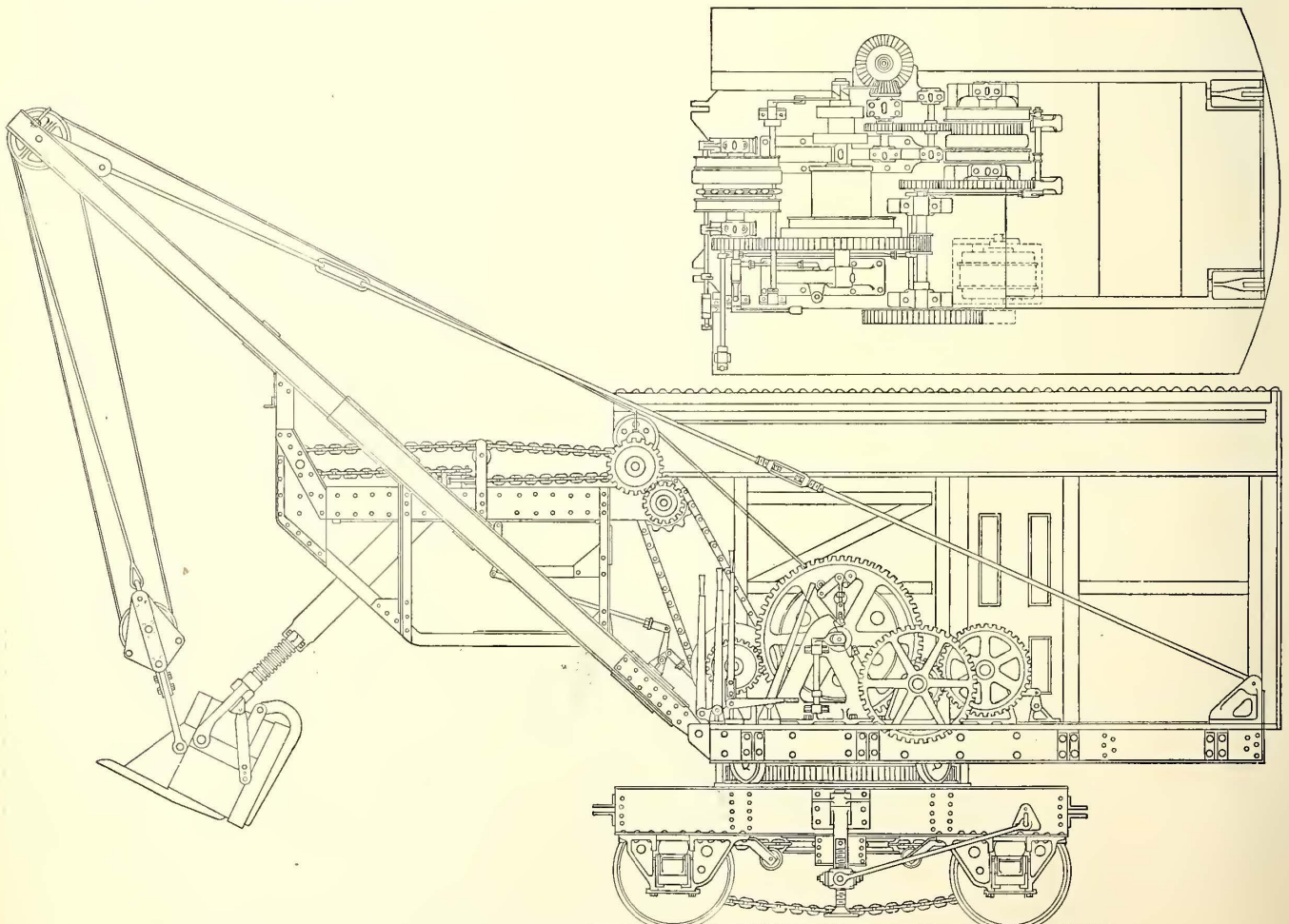
The line for the d.c. circuits consists of 30-ft. cedar poles,

low-tension poles carry on glass insulators a No. 0000 feeder fed in one direction from substation No. 1, at the mountain top, and in both directions from station No. 2, at Langford. Feeder taps are made every quarter of a mile. The low-tension line is provided with GE lightning arresters every half-mile.

SUBSTATIONS

Both the Bartowville and Langford substations are designed for three 300-kw motor generator sets, but have at present only two-thirds of that capacity. Each generator set consists of a 440-hp, 2400-volt, 66-cycle, three-phase, 666-r.p.m. synchronous motor direct connected to a 300-kw, 600-volt, d.c. generator. Each set is furnished with an 11-kw exciter. The two 300-kw, 40,000/2400-volt transformers are of the oil-insulated, self-cooling shell type. Lightning protection on the low-tension circuit is given by tank arresters and on the high-tension side by low equivalent arresters. The switchboard in each station is composed of two a.c. panels and one d.c. panel, with the usual switches and instruments, including power factor meters. All of the electrical equipment is of Canadian Westinghouse manufacture.

Both stations are single-story structures, built of reinforced concrete, and, aside from the loading platform, cover an area of 56 ft. x 33 ft. 6 in. The columns, which are 18 in. square and 28 ft. high, are reinforced by a continuous hoop with six inside rods. These columns were



Brantford & Hamilton Electric Railway—Plan and Elevation of Electric Shovel

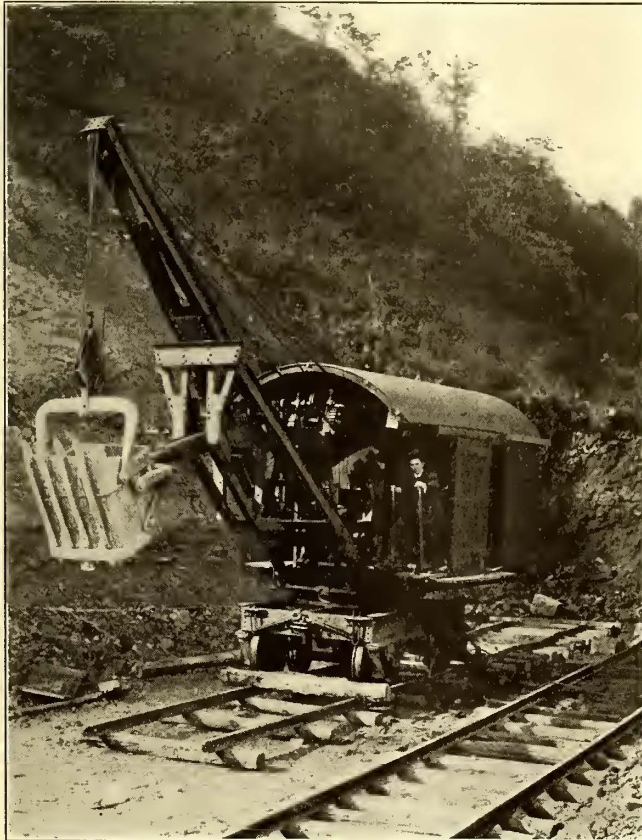
which are spaced 90 ft. apart on tangents, except that the alternate poles on one side are those forming the carriers of the high-tension wires. From this it will be understood that the entire line construction is of the span type. The

concreted in one filling, and are believed to be the highest of this type in Canada. The column footings are 4 ft. square and the piers 2 ft. square. The roof, which was in place before the completion of the walls, is composed

of 4-in. concrete slabs reinforced with plain round rods and laid over two 20-in., 65-lb. I-beams. Instead of a crane, each station has a 15-in., 42-lb. I-beam track, which carries an 8-ton Brown hoist and Yale & Towne triplex block.

PASSENGER ROLLING STOCK

All passenger service is now cared for by six double-end Kuhlman cars, 56 ft. over all, each equipped with passenger and smoking compartments. The cross seats in the coach section are of Brill "Winner" rattan, while longitudinal seats are used in the smoker to make room for trunks and other baggage. Both compartments have package racks. The trucks are of Brill No. 27 design, carrying four No. 112 Westinghouse 75-hp motors used with L-4 controllers; Westinghouse straight air brakes complete the power equipment. Among the other equipment features may be noted the following: Wilson trolley



Brantford & Hamilton Electric Railway—Electrically-Operated Shovel Carried on Single Truck

catchers, Crouse-Hinds headlights, Q & C steps, Consolidated electric heaters and Curtain Supply Company's window fixtures. The ventilator sash is wired glass. It will be seen from the foregoing that these cars are properly equipped with many essentials for high-class inter-urban service. Their approximate weight without passengers is 72,000 lb. each.

PASSENGER BUSINESS

The cities of Hamilton and Brantford have populations respectively estimated at 65,000 and 20,000, while the rich farming country between has only about 3000. The electric railway already has taken practically all the old steam railroad passengers, and through its hourly service naturally has created other traffic. The schedule on all its lines entering Hamilton includes a theater train, which brings the patrons to the terminal and gives them a covered walk to a nearby theater controlled by the railway interests

The fares on the mountain section approach a three-cent basis, but elsewhere the cost is nearer 2 cents a mile.

The Dominion Power & Transmission Company, Ltd., has no permanent station in Brantford as yet, but has erected in Hamilton a very handsome station for its various lines, making office provision at the same time for its 13 constituent companies. Terminal facilities are furnished for six railways. The building has a steel frame with solid masonry and terra cotta walls. The first story is Indiana blue limestone and the rest of the structure of pressed brick with Perth Amboy terra cotta trimmings. The cornices and balustrades are also treated with artistic designs in terra cotta. The roof carries an illuminated clock with 6-ft. diameter dial. The main entrance, which has a vestibule 22 ft. square, is a strong feature in the artistic ensemble, with its carved stone finish and two bronze electroliers on stone pedestals.

The interior columns and beams are of concrete reinforced with Kahn bars. The main floor is laid with ceramic tile, the office floors with hardwood, and the hallways with Terrazo. The walls are wainscoted with marble to a height of 10 ft., or half-way to the ceiling. The woodwork is of quartered oak.

The front part of the main floor contains the ticket office, and back of it a vault extending from the basement to the second floor. The stairway and elevator to the offices are on the right. To reach the tracks, passengers leave the main room through one of five double doors opening on fenced enclosures.

Part of the basement contains the room for general electrical supplies, and another section has a motor-generator set which supplies light to the building on the three-wire system and current to every electric elevator in Hamilton. The three boilers which supply steam heat to this terminal and the nearby theater are located under the tracks between these structures.

Particular attention has been given to both inside and outside lighting. The main floor is lighted by Nernst glowers placed in the ceilings and columns; incandescent lamps are used elsewhere. The metal passageways outside the building are studded with hundreds of small incandescents, which make this block the most brilliant spot in the city. Outlets are also provided for the illumination of the front of the terminal on gala occasions. The main distributing panel is on the station floor, and the sub-panels elsewhere are controlled by cut-out switches in the motor generator room.

FREIGHT AND EXPRESS BUSINESS

As the Brantford-Hamilton line has been in operation only a few months, it is possible to indicate the probable importance of the non-passenger business only by referring to an allied line like the Hamilton, Grimsby & Beamsville Railway Company, whose freight earnings are about 30 per cent of the gross. All of the lines carry freight according to the standard Canadian classification; accept and, where necessary, prepay advance charges on freight emanating on other lines; and, in general, comply with the legal requirements and practices of steam railroads. Wagon deliveries of freight are maintained at the important stations, the charge for this service being 2 cents per 100 lb., with a 12-cent minimum.

The company has a contract with the Dominion Express Company whereby the latter pays 12 cents per 100 lb. for all goods carried over its line, except interstation traffic, which is handled exclusively by the railway company.

ACTION NECESSARY TO ASSURE A REASONABLE RETURN ON THE INVESTMENT—II.

BY CHARLES V. WESTON, PRESIDENT, SOUTH SIDE ELEVATED RAILROAD, CHICAGO

Controversies with regulating bodies, such as Councils, State Legislatures and commissions, bid fair in time to work themselves out to an equitable basis, but in the matter of fare per passenger there is an immediate need for action. Immediate on the part of the urban transportation companies, because to them this item spells ruin or success.

In the United States the 5-cent piece is the basis of fare. Let us see whether that amount represents a reasonable payment for the service rendered. In the continental cities of Europe the average rate charged per passenger mile is 1 cent, and in Great Britain the average is 1.1 cents. In Berlin the average of all classes for the combined elevated and tunnel service is 1.25 cents per passenger mile.

What is the situation in Chicago?

On the South Side Elevated system the road is now receiving 0.8 cent per passenger mile for each person carried. Figures presented for the South Side Elevated are of particular importance, because the road is under and not over-capitalized. The capital stock of the company, \$10,323,800, represents \$10,500,000 of bonds issued for the original construction of the Chicago & South Side Rapid Transit Company, the promotion stock issue of \$7,500,000 having been entirely wiped out in the reorganization of the company in 1897. The bond issue of \$8,000,000 represents the cost of electrification in 1898, and the cost of the recent extensions. To these items should be added the so-called "reserve" of \$1,376,484, since this sum has been expended in improvements and new equipment. This makes a total investment of \$19,700,284, and to-day the property could not be replaced for that amount.

The company last year (1907), after paying operating expenses, bond interest and rentals on leased lines, had left only 4 per cent for dividends, and thus far this year, on account of the business recession, the net earnings are under 3 per cent per annum on the capital stock. The short-haul business of the company is decreasing largely because of the stronger competition of the surface lines, and the increase in total business shown is due to a disproportionately large increase in the long-haul traffic.

From year to year the line on one side of which the business of the company diminishes and on the other side of which its increase is steadily moving farther from the business center, and the length of the average haul is increasing.

The average haul on the South Side Elevated Railroad to-day on its main line, including one-half the circuit of the loop, is 6.6 miles. The average cost of hauling a passenger on the elevated railroads in Chicago is 3½ cents, leaving 1½ cents per passenger to pay fixed charges, depreciation, renewals and fair return on the actual investment in the property.

Let us now consider what the rate of fare should be under this condition of average-haul distance to yield the cost of operating, maintenance, fixed charges, depreciation and a return of 6 per cent on the investment. The heaviest month's business the South Side Elevated Railroad Company ever has had (outside the abnormal traffic created by the strike on the City Railway Company's

line in October, 1903) was an average of 125,000 passengers per day, a greater average than the company will carry for the year 1908. Assume a daily average of 125,000 passengers for the year, this would give a total of 45,625,000 passengers per annum. The revenue at 5 cents per passenger would equal \$2,281,200; operating expenses at an average of 70 per cent, which is about the actual average of operating cost, including charges and loop-rental, \$1,596,840. The operating expenses, including loop-rental and taxes, include everything except interest on the bonds and rental of leased lines. The charges and interest on investment would be as follows:

Bond interest	\$360,000.00
Rental on leased lines.....	96,000.00
<hr/>	
Total	\$456,000.00
Allowing for depreciation only 2½ per cent on \$19,972,445.....	\$499,311.00
Interest on capital stock at 6 per cent on \$10,313,000.....	618,780.00
<hr/>	
Total	\$1,574,091.00

These charges, plus the operating expenses, would make the total cost of carrying 45,625,000 passengers \$3,170,931. The cost per passenger would equal 6.95 cents. The cost per passenger mile on a basis of 6.6 miles, which is the average haul at the present time, would be 1.05 cents. Applying this cost of 1.05 cents per passenger mile to a flat rate of 5 cents, the average haul which an elevated railway company can afford to give for 5 cents is 4¾ miles.

It is quite evident that as to the elevated railroads in Chicago any increase over the present average haul will result in a heavy financial loss to the company.

It has been stated by those who have advocated the through routing of trains of the elevated roads in Chicago that the added facilities given to the public, enabling one to ride from one end of the elevated lines to the other for 5 cents, would result in an enormous increase in business. Such a scheme might result in a very great gain in business, but if it came it would be from long-haul passengers, because in competition with the surface lines the elevated roads never can hope greatly to increase their business from short-haul passengers.

What, therefore, would be the situation if through routing were established? It would mean simply that the long-haul passengers, on whom there is at present a loss, would have to be carried twice as far for the same rate, 5 cents, and they, therefore, would represent an increased loss to the company.

Through routing in itself is not opposed by the transportation companies. What they have a right to demand, however, is that any such scheme must be based on a rate of fare which will give to each of the carrying companies a reasonable profit.

Nor is there any great difference in its effect on the elevated companies between through routing and transfers. It has been stated by the consulting engineer of the local transportation committee of the City Council of Chicago that, in his judgment, the effect of giving transfers on the flat rate of 5 cents would not result in any great number of persons availing themselves of the privilege, and that the effect would not cause any large financial loss to the companies.

Let us consider for a moment the effect of the transfer system of other cities. The New York City Railway is now in the hands of a receiver. While there may have been some questionable financial transactions in the con-

duct of that property, they were not the prime cause for the company going into bankruptcy. The real reason for the failure of the New York City Railway Company may be placed to the credit of the imposition of universal transfers forced upon it by the State of New York.

For the year ending Sept. 30, 1888, the reports of the companies which, until the recent segregations, comprised the system of the New York City Railway Company, show that 193,933,484 passengers were carried and that there were 1,996,871 transfer passengers, or a percentage of transfer to revenue passengers of 1.1 per cent. The average fare received was 4.94 cents. The business of the New York City system up to 1895 showed that the percentage of transfer to revenue passengers ranged from 1.1 to 5.6 per cent, and in the year 1895 the average fare for each passenger was 4.76 cents.

The next year the State imposed upon the railway company transfer privileges between connecting lines, some of them of other companies, and in the year 1896 the percentage of transfer to revenue passengers jumped from 5.06 in 1895 to 16.42 per cent, and in the following year the transfers were 31.89 per cent, and the average fare per passenger was 3.79 cents. This increased steadily until 1907, when 53.13 per cent of the passengers rode on transfers, and the average fare was 3.16 cents.

No transportation company can maintain its equipment and roadway, give an adequate service and live under such conditions, to say nothing of providing for depreciation and a fair return to the investor. That is the reason that the New York City Railway Company is in the hands of a receiver to-day.

Search for a solution of the transportation problem of the large cities of America seems to lead to this: There should be a rearrangement of the fare system, and there should be a unification of interests. In other words, the flat 5-cent rate, irrespective of the length of haul, should be abandoned in favor of a scale which would mean a reasonable profit for the company for each passenger at all distances, and there should be a merging of companies which would make possible a centralization of power plants and management.

Competition, despite a public conception to the contrary, is not the ideal condition for urban transportation interests. We have, for instance, in Chicago a monopoly in the matter of gas, water and electric light. Water need not be especially considered, because it is a municipally owned business, but we know that both as to gas and electric light the cost to the people has been reduced very considerably in the last few years. Combination of capital has been chiefly responsible for this.

If the surface and the elevated roads of Chicago were operated as a single system, under the control of one company, conditions vastly better than those that prevail to-day undoubtedly would result. The elevated roads are essentially long-haul lines, and much greater speed can be developed on them than is possible on the streets where cars must share the right of way with other traffic. Under a unification of interests, the outlying surface lines naturally would constitute feeders to the elevated system. The short-haul business, therefore, could be diverted to the surface lines, to the manifest advantage of both the public and the transportation companies.

Under any scheme, save the unification of all the transportation systems in Chicago, the elevated roads, as the operators of through trains from the end of one line to the end of another in competition with surface lines, at a

flat rate of 5 cents, could be considered only as permanently non-paying enterprises. An impartial view of the situation would seem to bring but one conclusion, and that is that the placing of additional burdens on these companies in the way of increased service, through the imposing of a system of unlimited transfers and increased distance of haul, for a flat rate of 5 cents, would be distinctly detrimental to the interests of both the public and the company.

Transportation men in this day are eager to get into fresh touch with the public, and there may come about a mutual understanding. The claim is made by the companies that the present rates of fare, with the long hauls, the extensive granting of transfers, and the menace of through routing, are such as to give much less than a reasonable return on the investment.

Rates should be readjusted. If, for instance, it is reasonable to charge 5 cents for hauling passengers 5 miles, then certainly it must be worth more to carry a passenger 8 or 10 miles. The elements of cost which would fix the compensation to be paid for service could be determined once an agreement was reached as to what should be the return on the capital investment. Unquestionably in any equitable adjustment of the fare question there must be adopted some system which will yield a compensation for the individual service rendered. Perhaps we may come to the zone system which prevails in Europe; not the elaborate scheme known there, but the fixing of an initial distance within and up to which the fare would be 5 cents, but beyond which an additional charge would be made. The elaborate European zone plan could not well be used in America, because our coins are not divided on the fractional basis they are abroad.

Under a unification of the transportation companies of Chicago there would come something which is very greatly needed, if the corporations are to receive a reasonable return on investment, and that is a reduction of the average distance of haul, through a proper routing of traffic and a minimizing of the use of transfers. There is one point which must not be lost sight of, and that is that whenever a readjustment is made it must be on the basis that for individual service there can be no rate less than is founded on the unit of 1 cent per passenger mile. Urban transportation companies have proved to their own sorrow that at any rate less than this they cannot earn those charges which they are justly entitled to receive.

It is a woeful story, that of the urban transportation companies of the United States. Founded in optimism, they have traveled through their devious ways to converge, in an appalling number of instances, at the doors of the courts. Spectacular dividends and eras of splendid prosperity have slowly vanished, and the traction shareholder who to-day is receiving 5 per cent on his money considers himself fortunate indeed.

Who is to blame? Both the company and the people. Pioneer street railway men paid dividends out of capital, though they did not realize it, and conducted their affairs so without regard to depreciation and increased cost that a comparatively few years found their concerns in a perilous financial condition. The people have much to answer for, in that they have permitted demagogues and self-seekers in their law-making bodies to viciously assail the transportation companies. For years it has been a popular thing for the alderman or the State legislator to prod the street car company, and a condition has resulted where the public service corporations and the people stand at

opposite poles, when a betterment of conditions for both is an absolute necessity.

What is the remedy? What shall be done to correct this unfortunate condition? It seems to me there is but one answer. There should immediately be a recognition by the companies and the public of their mutuality of interests; a recognition that each is absolutely essential to the other, and the only way that each can get the best returns in fair treatment is to "get together"; to meet on a basis of fairness; for each to say: "I have made mistakes, but the time has come for us to sit down, talk this thing over calmly, and reach an agreement."

JAPANESE RECEPTIONS TO AMERICAN SAILORS AND MERCHANTS

During October, 1908, the Japanese people had the opportunity of entertaining both our sailors and business men, and this they carried out with such ardor that their cordiality must long be agreeably remembered by their guests. It is pleasant to learn that the electric railways of Japan placed their transportation facilities at the command of the visitors with the most delightful hospitality, particularly in Tokyo and Amagasaki.

ENTERTAINING THE AMERICAN SAILORS IN TOKYO

The Tokyo Electric Railway Company (known at home as Tokyo Tetsudo Kabushiki Kwaisha) took a very active

mens of the chrysanthemum, the favorite flower of Japan. The post card bears the imprint, "The Tokyo Railway, To commemorate the coming of Japan's respected and most welcome visitors from the great neighboring Republic, October, 1908."

The pass which was presented to every naval visitor is a lithographed card, 2½ in. x 4½ in. in size, the upper part of which shows the American eagle and shield flanked by the banners of the two countries and surmounted by a 13-star circle and the word "Welcome." The background of this part of the card is tinted the rosy color of the dawn, probably to symbolize the "Land of the Rising Sun." The lower portion of the card shows a trolley car, a bridge and some buildings to typify Japanese industry and art, to all of which the forest outlines and the famous snow-capped peak of Fujiyama give a dignified perspective.

The Tokyo Electric Railway is managed by S. Nambu. An interesting description of this company's line and methods, as observed by Henry K. Brent, was published in the STREET RAILWAY JOURNAL of Dec. 7, 1907.

RECEPTION TO BUSINESS MEN IN AMAGASAKI

The following report on the treatment accorded the Pacific Coast Chamber of Commerce committee was written by a Japanese correspondent of this paper:

"October 31st was a memorial day to the Hanshin Electric Railway Co., Amagasaki, Japan, who owns a through double-track road between the cities Osaka and Kobe,



Group of Special Cars and Pass Prepared in Honor of the American Squadron's Visit to Tokyo

part in entertaining our sea-faring warriors. The accompanying half-tones are reproductions of a souvenir post card and complimentary ticket struck off in honor of the visitors. The souvenir card shows a group of decorated cars waiting to take the jacks about the city. The cars are not double-decked, although the height of the decorations on the monitor gives that impression. The artistic side of the Oriental host was well shown in the tasteful mingling of the Japanese and American flags on the tops of the cars and the Stars and Stripes bunting on the sides which was flanked by "Welcome" signs. The crowning beauty of the decorations was afforded by numerous speci-

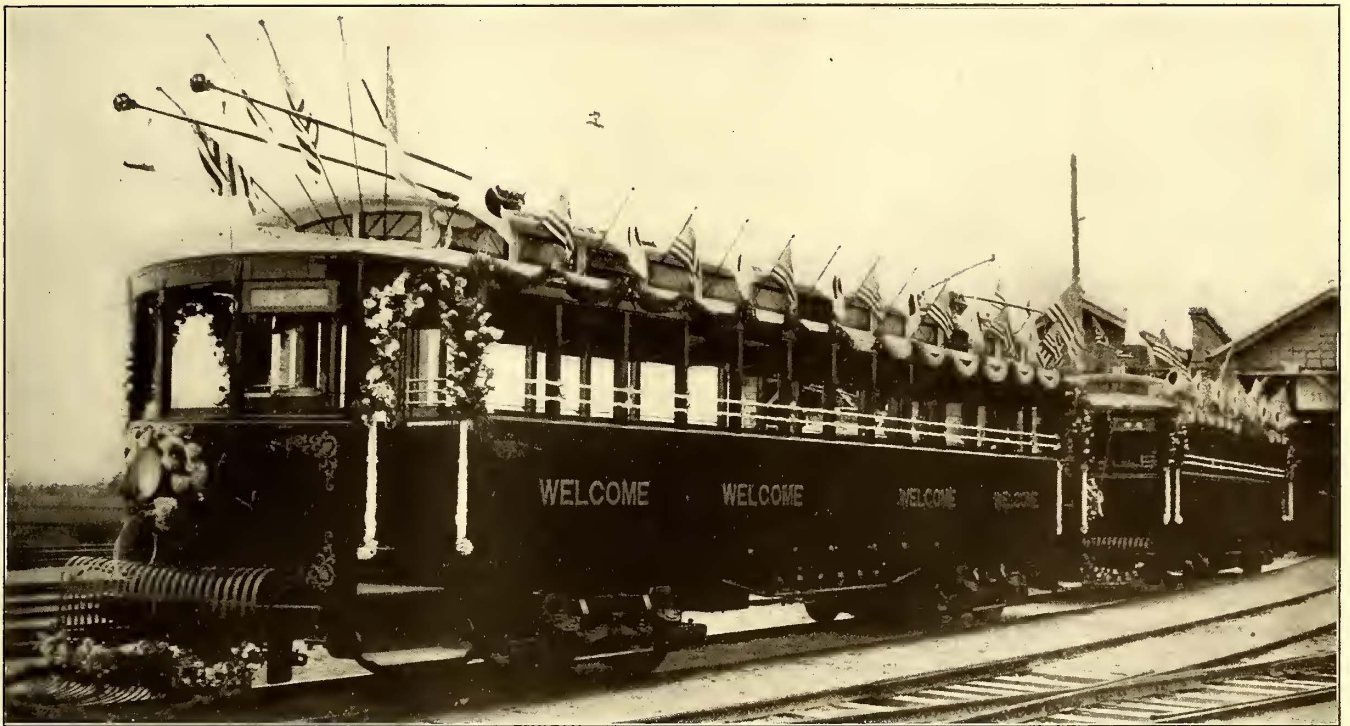
situated about 20 miles apart, and enjoys the prosperity of running the cars at 3 minutes head time. The delegates of the Chambers of Commerce of the Pacific Coast of the United States were received this day by the special cars of the Company on their way from Osaka to Kobe. The Company owns some 50 cars, all of which are of one kind, similar in every respect. Each measures 44 ft. from end to end, and is mounted on double-trucks. Two such cars were specially decorated mainly with silks and chrysanthemums, supplemented with greeneries, while on each side were gilded four words 'Welcome' in big letters, and on all the roof edges were planted American and

Japanese flags alternately. The Osaka terminus depot Deiribashi was also profusely decorated, a grand arch being erected at the entrance. Chrysanthemum vases in full bloom were put in a refined order on the platform by side of the Hanshin band stand, who were succeedingly playing "My Country, 'Tis of Thee," "The Star Spangled Banner," etc., the steel shed pillars being entwined with silks of several colors, and curtains enclosing the whole compound.

"The American guests arrived the depot at 4:20 p. m. Enthusiastic multitude, including school boys, poured in 'Banzais' in a loud roar, accompanied with bangs of fire works. In response, the American guests yelled out, swinging American flags and Japanese flags on their hands: Rah! Rah! Rah! A-me-ri-ca, Nippon, Nippon, Banzai, Rah!!! This was responded by several yells of respective schools, all waving American flags in their hands. The exchange of yells and Banzais had no interruption till the band played the American national song, when all the multitude kept silence by taking off their

McIntosh & Seymour engines, with steam delivered from Babcock & Wilcox boilers with Worthington pumps and condensers. The whole system was designed and constructed and is operated under the direction of our chief engineer, Mr. S. Misaki, a graduate of San Francisco Boys' High School, Stanford University and Purdue University, of Lafayette, Ind. The promoter and the first president of the company, Mr. S. Toyama, acquired the knowledge of constructing this first interurban electric railway in Japan during his journey through the United States. I am myself also one of America's sincere students, and in my present management I am following the instructions received during my journey through America. I wish you, the delegates of our teachers, would be able to examine whether your pupils have done well or not, and I am exceedingly happy if you feel thus at home even for a moment, on your way from Osaka to Kobe. I thank you heartily for your generosity to honor us with a ride.'

"When the speech ended, Mr. Misaki, the chief engineer, shouted, 'All abroad' in American manner, and the cars



Reception Cars for American Merchants Leaving the Amagasaki Car House

hats. After the music, Mr. R. Imanishi, managing director of the Company, addressed the guests. He said:

"Ladies and Gentlemen: On behalf of the Hanshin Electric Railway Company, I take the liberty to tender to you a most hearty and cordial welcome to our road, which you honor by riding on to-day. I feel that we are especially qualified to welcome you, because throughout our whole system we owe you and your fellow countrymen a great help from its birth to the present prosperity. I beg you would allow me to cite a few instances. The car in which you are riding is a product of Stephenson Car Company of N. J., mounted on Brill trucks, equipped with Westinghouse motors and controlling apparatus, and Christensen air brake, runs on the rails and steel girders supplied from the Carnegie Steel Works, receiving current through overhead construction supplied by the Electric Service Supplies Company, of Philadelphia. The current is generated by General Electric generators coupled to

started off Deiribashi, leaving behind roaring cheers. Multitudes along the road through the way all waving American flags in hands, banzaied loudly when the cars passed them. At 5:20 the cars arrived Kobe depot, when the guests were received by roars of 'Banzai' of Kobe citizens and school boys, in no less enthusiasm. Mr. Matsukata, chairman of the Kobe Chamber of Commerce, accompanied them from Osaka. Mr. Minakami, mayor of the city, received them at the depot. Thence the 'riki-shas' carried them to Tor and Oriental Hotels amidst the cheers of the spectators. This evening both the Tor and the Oriental Hotels were visited by torchlight processions as a demonstration of good will."

Subsequently the Hanshin Electric Railway Company received a letter from F. W. Dohrman, chairman of the American delegation, in which he expressed thanks for the splendid hospitality shown his party, and congratulated the railway company on its service and operation.

NEW INTERURBAN RAILWAYS IN THE CENTRAL STATES

The table of statistics on new track construction shows the extensions and new roads built during the past year in the Central States, but a comprehensive idea of the existing conditions of the electric roads in that part of the country can be obtained better from the accompanying map. This map has been prepared by The Arnold Company, of Chicago, has been carefully brought up to date from official reports and is believed to be very nearly complete. Information as to the new lines and extensions built during 1908 and their proper locations on the map have been supplied by the various electric railroads which have finished new work during the past 12 months, and this information has been used in revising and adding to the map which was published one year ago in the *ELECTRIC RAILWAY REVIEW*. Notwithstanding the care taken in compiling this map there may be errors, and if such are observed the *ELECTRIC RAILWAY JOURNAL* will be grateful for information tending to make its construction records more complete.

During the year 1908 the larger part of the track built by electric railways has been in extending the existing systems. It is interesting to note that one now may travel from Sheboygan, Wis., and Rockford, Ill., by electric cars to Port Huron, Mich., Louisville, Ky., or to Westfield, N. Y., with only one break in the continuity of electric service, and this gap of less than 20 miles is now rapidly being closed.

To travel by electric cars from Sheboygan, Wis., to Westfield, N. Y., one would pass over not only roads of the highest type built during the past two years, but also would travel along the lines of the large interurban systems of Indiana and Ohio, which, though built in the earlier days, have obtained most substantial roadways as the result of careful maintenance from year to year. From Sheboygan to Milwaukee, Wis., the intending passenger bound for New York State would travel over the Milwaukee Northern line, one of the very few large roads generating its power with gas engine-driven units. From Milwaukee south 75 miles to Evanston the Chicago & Milwaukee Electric Railroad operates hourly service over its recently completed double-track line in Wisconsin and the older four-track and two-track lines between Waukegan and Evanston. At Evanston the Chicago & Milwaukee Electric line has a joint terminal with the Northwestern Elevated Railroad, which, during the past year, has electrified a double-track surface line of the Chicago, Milwaukee & St. Paul Railroad, thus furnishing the elevated road with a surface extension from its former Wilson Avenue terminus to Evanston.

Across the city of Chicago there are many routes which a passenger can take in reaching Hammond, Ind. Arriving at Hammond, he would find the temporary terminus of the Chicago, Lake Shore & South Bend Railway, which has completed during the past two years a heavily built, high-speed, single-phase electric railway system of most modern design. The eastern terminus of this road is at South Bend and the present western terminus is at Hammond. However, only about two weeks' work remains before a connecting link between the Illinois Central suburban tracks at Kensington, Ill., and Hammond, Ind., on the Indiana-Illinois State line will be in operation. Then it is expected that the single-phase cars making the run from South Bend toward Chicago will be coupled onto the Illinois Central suburban expresses at Kensington and be

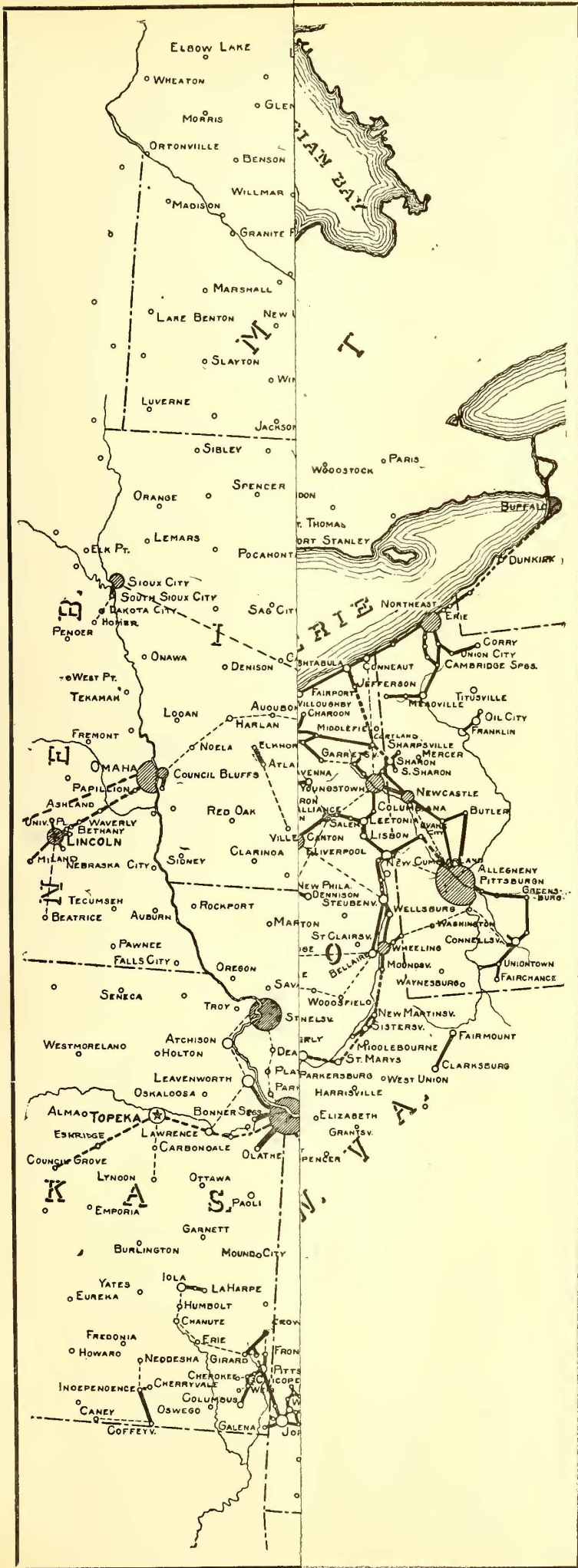
taken to the heart of the city of Chicago. This will make a suburban service with terminal facilities such as no other interurban road in this country enjoys.

The long-distance electric passenger on his eastbound trip would be carried by the Chicago, South Bend & Northern Indiana Railway and the Winona Interurban Railway from South Bend to Warsaw, Ind., on through limited trains. The Winona Interurban Railway is now completing a 43-mile extension from Warsaw to Peru, Ind. Already the northern section of this connection from Warsaw to Mentone and the southern section from Peru to Akron have been finished, and there yet remain less than 20 miles, this being the only link missing in the chain of electric lines between Westfield, N. Y., and Sheboygan, Wis.

At Peru, when the Winona Interurban has completed its line from Mentone to Akron, its limited cars from South Bend can connect with the limited service of the Ft. Wayne & Wabash Valley Traction Company, operating between Lafayette and Ft. Wayne. The eastbound passenger will find fast and frequent service from Peru via the latter-named line to Ft. Wayne, and thence by the Ohio Electric Railway to Lima, where the choice of two routes is offered him from Lima to Toledo. The older one of these routes, and the one over which the Toledo & Dayton limiteds are operated, is via the Western Ohio Railway from Lima to Findlay, and the Toledo, Bowling Green & Southern from Findlay to Toledo. The more recently completed route is that of the Ohio Electric Railway, which during the past year has built a new line from Lima into Toledo, obtaining at this city a most satisfactory private entrance for its high-speed cars, terminating in the center of the business district. From Toledo to Cleveland the long-established limited service of the Lake Shore Electric Railway over its route of 121 miles is offered the traveler, and from Cleveland eastward the electric route takes a direct line through Painesville, Ashtabula, Conneaut and Erie to Westfield, the various companies operating service over this route being the Cleveland, Painesville & Eastern, the Pennsylvania & Ohio Railways, the Conneaut & Erie Traction Company and the Buffalo & Lake Erie Traction Company. The latter named company, it is stated, has a line under construction from Buffalo to Westfield.

To this long electric route, which with its ramifications connects the cities of Louisville, Ky., Indianapolis, Ind., Cincinnati and Zanesville, Ohio, Detroit, Jackson and Kalamazoo, Mich., with Chicago (granting that the short connecting link of the Winona Interurban will soon be put in operation), there will be added, if existing plans mature, the extensive interurban system of the Illinois Traction Company. With the resumption of normal business conditions connecting links between the Illinois Traction System at Danville and the Indiana lines at either Crawfordsville or Terre Haute and with Chicago by way of Joliet will add to the interurban network of Indiana, Ohio and Michigan 800 miles of street and interurban lines—this under a single management—and will make possible electric travel between Westfield, N. Y., and St. Louis, Mo.

New lines and extensions that have been completed during the past year include the following to which it may be interesting to refer: In Illinois and Wisconsin the Chicago & Milwaukee Electric Railroad has completed its through line, making possible the service earlier mentioned between Evanston and the business district of Milwaukee. For this service new three-car trains are now being equipped. Also tributary to Chicago the Joliet & Southern Traction Company has built a road from Joliet to the





Map Showing Electric Interurban Railways in Operation, Under Construction or Proposed in the Central States.

Indiana line. This new road forms a link in a line of interurban railroads which nearly encircle the city of Chicago at a distance of 40 miles. In Wisconsin the Milwaukee Electric Railway & Light Company has completed an extension to Watertown and the Milwaukee Northern has completed its road from Port Washington to Sheboygan during the past year. Practically no new lines or extensions have been built in Iowa and Missouri, but in Kansas out of the many ambitious projects which have been contemplated for some time an exceptionally substantial line has been built from Pittsburg in the southeastern part of the State to Joplin, Mo., the center of a densely populated mining district. A 40-mile line from Kansas City, Kan., to Olathe, which until recently has been operated with gasoline motor cars, is now being equipped electrically.

Material has been purchased for a 93-mile line in Illinois to be known as the Rock Island Southern. This new line, as announced in the ELECTRIC RAILWAY JOURNAL three weeks ago, will connect Rock Island, Moline and Davenport with Galesburg, Ill., and Burlington, Ia., and will be built so that heavy freight traffic consisting of trains of coal cars may be hauled with locomotives.

A most extensive project completed during the past year in Indiana is the Chicago, Lake Shore & South Bend Railway, which is now operated, as earlier stated, from Hammond on the Indiana-Illinois line to South Bend, Ind., by way of Michigan City, and early this year will be connected by a short line known as the Kensington & Eastern with the Illinois Central Railroad's suburban express service operating from Kensington into Chicago. The Chicago, South Bend & Northern Indiana Railroad has completed a line from La Porte to South Bend, 27 miles, connecting with its existing road from La Porte to Michigan City, so that there are now two lines giving service between South Bend and Michigan City. With the completion on Jan. 25, 1908, of a line between Brazil and Greencastle, Ind., the Terre Haute, Indianapolis & Eastern Traction Company inaugurated through service from Terre Haute to Indianapolis, Ind., over a direct route 73 miles long. Mention already has been made of the construction work which the Winona Interurban Railway has under way between Warsaw and Peru, Ind.

In Michigan a connection is being made between the Detroit, Flint & Saginaw Railway, which now connects Saginaw with Bridgeport, and the Detroit United Railway, which connects Flint with Detroit. The completion of this link will make possible electric railway travel between Bay City and Detroit, Mich., approximately 100 miles apart. At Port Huron the Grand Trunk Railway system has electrified its tunnel under the St. Clair River and is operating all of its freight and passenger service through the tunnel and its terminals by means of single-phase electric locomotives. This project is of especial interest because the locomotives in this service can be called upon to handle 1000-ton trains up grades of 2 per cent and at speeds of from 10 miles to 15 miles an hour. The Michigan United Railways Company has recently inaugurated service on a new line from Lansing to Mason, which link is a part of its high-speed third-rail division completed between Lansing and Jackson. Inasmuch as this company for a number of years has operated a single-track third-rail line from Jackson to Battle Creek, and also has as several divisions operated by overhead trolley, it is interesting to note that the third-rail will be used for distributing current to the cars on its new line from Lansing to Jackson.

In 1908 as in the preceding year several important con-

nections have been built in Ohio. Among these are the Lima-Bellefontaine division, 34 miles long, and the Lima-Toledo division, 72 miles long, of the Ohio Electric Railway. These two connections offer a direct route from Springfield to Lima, Ft. Wayne and Toledo. The Columbus, Delaware & Marion has built an extension from Marion to Bucyrus and the Cleveland, Southwestern & Columbus has been connected with Mansfield over a new route by way of Seville and Ashland. Connecting links between the cities of Youngstown, East Liverpool and Wheeling have also been completed.

RECEIVERSHIPS

The following list of electric railway companies in the hands of receivers includes all of those reporting to the January, 1909, issue of the *Electric Railway Directory*, published by the McGraw Publishing Company. The date of the report is given in each case:

Colorado	
Canon City—Canon City, Florence & Royal Gorge Interurban Railway Company.....	December, 1908
Eureka Springs—Citizens' Electric Company.....	December, 1908
Delaware	
New Castle—Wilmington, New Castle & Southern Railway Company	December, 1908
Florida	
Miami—Miami Electric Railway Company.....	October, 1908
Georgia	
Gainesville—Gainesville Electric Railway Company....	December, 1908
Illinois	
Aurora—Aurora, DeKalb & Rockford Electric Traction Company	December, 1908
Chicago—Chicago Consolidated Traction Company.....	December, 1908
Chicago & Milwaukee Electric Railroad Company	December, 1908
Suburban Railroad Company.....	December, 1908
Mattoon—Mattoon City Railway Company.....	December, 1908
Indiana	
Indianapolis—Indianapolis & Cincinnati Traction Company	December, 1908
Kendallville—Toledo & Chicago Interurban Railway Company	December, 1908
New Castle—Indianapolis, New Castle & Toledo Railway Company	September, 1908
Kentucky	
Somerset—Somerset Water, Light & Traction Company.....	December, 1908
Maine	
Lewiston—Auburn & Turner Railroad Company.....	December, 1908
Rockland—Rockland, South Thomaston & Owl's Head Railway Company	September, 1908
Michigan	
Owosso—Owosso & Corunna Electric Company.....	September, 1908
Missouri	
Nevada—Missouri Water, Light & Traction Company... ..	December, 1908
New Jersey	
Camden—Camden & Trenton Railway Company.....	December, 1908
Trenton—Trenton, Lakewood & Atlantic Railway Company	September, 1908
Trenton & New Brunswick Railroad Company.....	December, 1908
New York	
Catskill—Catskill Electric Railway Company.....	December, 1908
Fulton—Fulton & Oswego Falls Street Railway Company	January, 1908
Mount Vernon—Westchester Electric Railroad Company.....	December, 1908
New York—Dry Dock, East Broadway & Battery Railroad Company.....	December, 1908
Forty-second Street, Manhattanville & St. Nicholas Avenue Railway Company.....	December, 1908
Fulton Street Railroad Company.....	December, 1908
Metropolitan Street Railway Company.....	December, 1908
New York City Railway Company.....	December, 1908
Second Avenue Railroad Company.....	December, 1908
Third Avenue Railroad Company.....	December, 1908
Twenty-eighth and Twenty-ninth Streets Crosstown Railroad Company.....	December, 1908
Union Railway Company.....	December, 1908
Oneonta—Oneonta & Mohawk Valley Railroad Company	December, 1908
Ossining—Westchester Traction Company.....	December, 1908
Yonkers—Yonkers Railroad Company.....	December, 1908
Ohio	
Cincinnati—Cincinnati, Hamilton & Dayton Traction Company	December, 1908
Miami & Erie Canal Transportation Company	December, 1908
Cleveland—Municipal Traction Company.....	December, 1908
Eastern Ohio Traction Company.....	December, 1908
Toledo—Toledo, Ann Arbor & Detroit Railroad Company	December, 1908
Toledo & Indiana Railway Company.....	December, 1908
Toledo Urban & Interurban Railway Company	December, 1908
Pennsylvania	
Erie—Conneaut & Erie Traction Company.....	December, 1908
Gettysburg—Gettysburg Transit Company.....	December, 1908
Philadelphia—Philadelphia, Bristol & Trenton Street Railway Company	December, 1908
South Carolina	
Anderson—Anderson Traction Company.....	December, 1908
Tennessee	
Clarksville—Clarksville Railway & Light Company....	December, 1908
Virginia	
Richmond—Virginia Passenger & Power Company....	December, 1908
Norfolk—Norfolk & Southern Railway Company.....	December, 1908

NEW ELECTRIC RAILWAY TRACK CONSTRUCTION IN 1908

The accompanying table shows the miles of single track built by electric railways during the year 1908 in the United States, Mexico and Canada, and has been compiled from answers received from the railway companies whose names appear in the list. The figures as given are therefore official, but, unfortunately, replies were not received from all companies, hence there may be some omissions. The total new mileage represented in the table is 1258.51. This is a large falling off from the unofficial figures compiled last year, but in view of the unusual financial conditions and the appointment of various railroad commissions, much new construction was held in abeyance during the year.

New York heads the list of States, with a total of 183.76 miles of single track built. This total is made up largely of the 56 miles of double track of the Buffalo, Lockport & Rochester and 22 miles of double track of the Rochester, Syracuse & Eastern, representing a total of 156 miles of single track. Ohio is second, with 170.75 miles. Three important new lines were built in this State during the year, notably the Mansfield-Seville extension of the Cleveland, Southwestern & Columbus, 44 miles; the Lima-Bellefontaine extension of the Ohio Electric Railway, 34 miles, and the Deshler-Toledo extension of the same road, 36 miles. In Pennsylvania the Pittsburg, Harmony, Butler & Newcastle, with 62 miles, contributed the largest part of the total new construction, which amounted to 113.97 miles. Other important lines opened during the year include the Texas Traction Company, from Dallas (Tex.) to Sherman, 63 miles; the Denver & Interurban, from Denver (Colo.) to Boulder, 40 miles; the Lewiston (Me.), Augusta & Waterville Street Railway, 42 miles, and the Joplin & Pittsburg from Joplin, Mo., to Pittsburg, Kan., 30 miles. The extension of the Chicago, Lake Shore & South Bend from Michigan City to Hammond, Ind., 36 miles, was completed during the year, and was the longest line built in that State. The Lincoln-Mackinaw extension of the Illinois Traction system was the longest line built in Illinois. In Wisconsin The Milwaukee Electric Railway & Light Company opened a new line 30 miles long from Waukesha to Watertown.

ALABAMA.

	Miles.
Mobile Light & R. R. Co.....	0.50
North Alabama Traction Co.....	0.50
Total	1.00

CALIFORNIA.

East Shore & Suburban Ry. Co.—Stege to Oakland and Richmond	1.75
Fresno Traction Co.....	5.00
Hueneme, Malibu & Port Los Angeles Ry.....	5.00
Los Angeles & Mt. Washington Railway Co.....	0.57
Los Angeles Ry. Co.....	8.14
Los Angeles & San Diego Beach Ry.—Terminal loops.....	1.00
Peck Railroad Co.....	2.00
Point Loma Railroad Co.....	8.30
Total	31.76

COLORADO.

Denver & Interurban R. R.—At Ft. Collins; Denver to Boulder; Marshall to Eldorado Springs.....	40.00
The Grand Junction Electric Railway Co.....	3.00
The Kansas-Colorado Railroad Co.....	20.00
Southern Colorado Power & Ry. Co.—Sopris Plaza to Viola and Cokedale	5.00
Total	68.00

DISTRICT OF COLUMBIA.

Capital Traction Co.....	3.00
Washington Railway & Electric Co.....	4.10
Total	7.10

FLORIDA.

	Miles.
Tampa-Sulphur Springs Traction Co.—Between Ybor City and West Tampa.....	1.50
Total	1.50

IDAHO.

Boise Valley Railway Co.—Between Ustick and Meridian..	10.00
Total	10.00

ILLINOIS.

Calumet & South Chicago Ry.	3.00
Chicago City Railway.....	6.67
Chicago, Ottawa & Peoria Ry.—(Illinois Valley Division)...	0.37
Chicago Railways Co.	4.00
Dixon, Rock Falls & Southwestern Electric Railway Co.—Tampico to Yorktown.....	7.00
Illinois Traction System.—Mackinaw Junction to Lincoln..	27.00
Illinois Valley Railway Co.—(See Chicago, Ottawa & Peoria Ry.)	14.90
Joliet & Southern Traction Co.—Joliet to Chicago Heights.	6.00
Mississippi Valley Int. Ry.—Springfield to Rochester and Clear Lake	1.50
Murphysboro Street Railway Co.....	0.40
Northwestern Elevated R. R.....	8.00
Sangamon Valley Railway Co.....	1.00
Sterling, Dixon & Eastern Electric Railway Co.....	4.00
Taylorville Railway, Light, Heat & Power Co.....	4.00
Total	83.84

INDIANA.

Chicago, Lake Shore & South Bend.—Michigan City to Hammond	36.00
Evansville Railways Co.—Between Evansville and Newburgh	10.00
The Evansville & Southern Indiana Traction Co.—Princeton to Patoka.....	4.30
Evansville Terminal Railway.....	9.62
Gary & Interurban Railway Co.—To Toleston.....	5.50
Marion Bluffton & Eastern Traction Co.—In Marion.....	0.33
Total	65.75

IOWA.

Albia Interurban Railway Co.—Albia to Hiteman.....	6.00
Clinton Street Railway Co.....	1.00
Colfax Springs Railway Co.....	1.00
Ottumwa Railway & Light Co.....	0.20
The Sioux City Traction Co.....	4.00
Tri-City Railway Co.....	2.33
Waterloo, Cedar Falls & Northern Railway Co.—In Waterloo	8.00
Total	22.53

KANSAS.

Glrand Coal Belt Electric Railway.—Dunkirk to Crowberg..	5.00
Hutchison Interurban Railway Co.....	2.00
Joplin & Pittsburg Railway Co.	13.00
Kansas City & Olathe Electric R. R. Co.—To Hoher's Grove, Shawnee	3.00
Total	23.00

KENTUCKY.

Lexington & Interurban Railway.....	2.00
Ohio Valley Electric Ry. Co.—Ashland to South Ashland..	1.25
Paducah Traction Co., Inc.....	0.19
Total	3.44

LOUISIANA.

St. Tammany & New Orleans Ry. Co.—Covington to Mandeville and Abita Springs.....	13.50
Total	13.50

MAINE.

Bangor Railway & Electric Co.....	0.50
Lewiston, Augusta & Waterville St. Ry.—Lewiston to Winslow	41.90
Total	42.40

MARYLAND.

Maryland Electric Railways Co.	4.00
United Railways & Electric Co.....	3.33
Washington, Frederick & Gettysburg Ry. Co.—Lewistown to Catoclin Furnace.....	3.50
Total	10.83

MASSACHUSETTS.

Boston Elevated Railway Co.....	10.06
Boston & Northern Street Railway Co.....	1.04
Concord, Maynard & Hudson Street Railway Co.....	0.18
Holyoke Street Railway Co.....	0.88
Old Colony St. Ry. Co.....	0.46
Shelburne Falls & Colerain St. Ry. Co.—Extension to Buckland	0.13
Total	12.75

MEXICO.

Compania Electrica y de Ferrocarriles de Chihuahua.....	7.00
Total	7.00

MICHIGAN.

	Miles.
Detroit United Railway	2.00
Michigan United Railways—Mason to Lansing	12.00
Houghton County Traction Co.—Alouez to Mohawk, and extension north of Calumet	5.00
Saginaw-Bay City Railway & Light Co.—In Saginaw	0.82
Total	19.82

MINNESOTA.

Northern Traction Co.—In Hibbing	0.75
Twin City Rapid Transit Co.	2.00
Winona Railway & Light Co.	0.25
Total	3.00

MISSISSIPPI.

Columbus Railway, Light & Power Co.	1.25
Yazoo City Light, Water & Sewerage Plant	3.00
Total	4.25

MISSOURI.

Blue Valley Railway	1.25
Excelsior Springs & Suburban Ry. Co.	2.50
Joplin & Pittsburg Railway Co.	17.00
Kansas City, Ozarks & Southern Mansfield Ry.—Mansfield to Ava	9.00
Total	29.75

MONTANA.

Great Falls Street Railway Co.	0.25
Total	0.25

NEBRASKA.

Omaha & Council Bluffs St. Ry. Co.	6.00
Total	6.00

NEW JERSEY.

Atlantic City & Shore R. R. Co.—In Atlantic City	0.27
Orange Mountain Traction Co.—Orange Valley and St. Cloud	2.00
Total	2.27

NEW YORK.

Binghamton Railway Company	0.68
Buffalo & Lake Erie Traction Co.	27.00
Buffalo, Lockport & Rochester Ry. Co.—Rochester to Lockport	112.00
Hornellsville & Canisteo Railway Co.	0.13
Interborough Rapid Transit Co.—Brooklyn extension and to Van Cortlandt Park	8.50
New York, Auburn & Lansing R. R. Co.	5.00
The New York & North Shore Traction Co.—Mineola to Hicksville	6.00
Orange County Traction Co.	0.50
Rochester, Syracuse & Eastern Railroad Co.	44.00
Schenectady Ry. Co.—Schenectady and Scotia	0.50
Suffolk Traction Co.—In Patchogue	4.00
United Traction Co.	1.95
Western New York & Pennsylvania Traction Co.—Limestone, Salamanca and Little Valley	17.50
Total	183.76

NORTH CAROLINA.

Consolidated Ry. & Power Co.—Fayetteville to Hope Mills	3.50
Goldsboro Traction Co.	2.00
Weaverville Elec. Co.	5.00
Total	10.50

OHIO.

Cleveland, Southwestern & Columbus Ry. Co.—Seville to Mansfield	44.00
Columbus, Marion & Bucyrus Ry.—From Marion to Bucyrus	18.00
Dayton & Troy Electric Ry. Co.	0.50
Northern Ohio Traction & Light Co.	0.75
Ohio Electric Railway.—Lima to Bellefontaine	34.00
Deshler to Toledo	40.00
The Scioto Valley Traction Co.—Extension into Chillicothe	0.50
Toledo, Fostoria & Findlay Railway Co.	4.00
Youngstown & Ohio River	29.00
Total	170.75

OKLAHOMA.

El Reno Interurban Ry. Co.	1.00
Oklahoma, Kansas & Missouri Interurban Railway Co.	4.50
Oklahoma Railway Co.—Oklahoma City to Britton	8.00
Total	13.50

OREGON.

United Railways Co.—Claremont to Holbrook	20.00
Total	20.00

PENNSYLVANIA.

	Miles.
Allen St. Ry. Co.—Nazareth to Bath	5.17
Chambersburg, Greencastle & Waynesboro Street Ry.—Greencastle to Chambersburg	11.50
Conestoga Traction Co.—Mount Joy to Elizabethtown	6.57
Easton Transit Co.—Northampton Heights to South Bethlehem	1.21
Hanover & McSherrystown St. Ry. Co.—Brushtown to Littlestown	5.50
Juniata Valley Elec. St. Ry. Co. & Big Valley St. Ry. Co.—To Cold Springs Park	3.00
Monongahela & Carroll Street Railway Co.	0.32
Philadelphia Rapid Transit Co.—Elevated and subway	2.50
Pittsburg, Harmony, Butler & New Castle Ry. Co.	62.20
Sunbury & Northumberland Elec. Ry. Co.	3.00
Washington & Canonsburg Ry. Co.—From Canonsburg to Castle Shannon	13.00
Total	113.97

RHODE ISLAND.

New York, New Haven & Hartford Railroad.—Tunnel Providence to East Providence	1.98
The Rhode Island Co.	2.50
Total	4.48

TENNESSEE.

Johnson City Traction Co.	0.50
Lake View Traction Co.	4.00
Nashville Interurban Railway Co.—Nashville to Franklin	17.00
Total	21.50

TEXAS.

Amarillo St. Ry. Co.	1.75
Angelo Power & Traction Co.	4.50
Austin Electric Ry. Co.	0.50
El Paso Electric Railway Co.	2.11
Gainesville, Whitesboro & Sherman Ry. Co.—Gainesville to Callisburg	12.00
Houston Electric Railway.—Houston to Harrisburg	3.50
Texas Traction Co.—Dallas to Sherman	63.00
Uvalde Electric Railway.—Uvalde Station to Uvalde	3.50
Total	90.86

UTAH.

Emigration Canyon R. R. Co.—To Emigration Resort and Head of Emigration Canyon	14.00
Total	14.00

VIRGINIA.

Bluestone Traction Co.	1.50
Total	1.50

WASHINGTON.

Puget Sound Elec. Ry.—Tacoma to Puyallup	6.00
Seattle Electric Company	15.00
Yakima Valley Transportation Co.	3.00
Total	24.00

WEST VIRGINIA.

Fairmont & Mannington R. R. Co.—Fairmont to Downes	12.00
Elkins Electric Railway Co.—Elkins to Belington	3.00
Morgantown Interstate R. R. Co.	2.00
Tri-State Traction Co.—At Follansbee, W. Va.	0.50
Wellsburg, Bethany & Washington Traction Co.—Wellsburg to Bethany	8.00
Wheeling Traction Co.	1.00
Total	26.50

WISCONSIN.

Chicago & Milwaukee Electric Ry. Co.	14.00
Janesville Street Railway Co.	0.50
Milwaukee Electric Ry. & Lt. Co.—Waukesha to Watertown	30.00
Milwaukee Northern Railway Co.—Belgium to Sheboygan	26.50
Wausau Street Railway Co.	1.50
Total	72.50

WYOMING.

Cheyenne Electric Railway Co.—Cheyenne to Fort D. A. Russell	5.00
Total	5.00

CANADA.

Berlin & Waterloo St. Railway	0.11
British Columbia Elec. Railway Co., Ltd.	5.00
Chatham, Wallaceburg & Lake Erie Railway Co.—To Erie Beach	9.00
Hull Electric Company	1.84
Mount McKay & Kakabeka Falls Railway	3.00
Sarnia Street Railway Co.	1.50
Total	20.45

ELECTRIC RAILWAY ROLLING STOCK ORDERED IN 1908

The accompanying table gives in detail a statement of all of the electric railway rolling stock equipment ordered by the roads of North America during the year 1908. The figures have been compiled from a canvass of all of the electric railway companies and from reports made by all of the manufacturing companies of the United States and Canada building electric railway cars. The statistics, therefore, are complete and accurate, with the possible exception of some few cars not reported, which were ordered built in companies' shops during the year.

The total number of cars ordered was 3226. Compared with the orders placed in 1907 this is a decrease of 48

per cent. In 1907 the number of cars ordered is given in the statistics published in the ELECTRIC RAILWAY REVIEW of Jan. 4 was 6311. In 1906 the total number of cars was 6127. The comparative figures for the three years, classified according to the service in which the cars are used, are given below:

Table with 4 columns: Service, 1906, 1907, 1908. Rows include Passenger cars—city, Passenger cars—interurban, and Freight cars.

The totals for 1906 and 1907 did not include snow plows, sweepers and other miscellaneous cars, but did include electric locomotives. The figures for 1908 include 315 work and miscellaneous cars and electric locomotives.

ROLLING STOCK EQUIPMENT ORDERED IN 1908

Table with 6 columns: Purchaser, No., Class, Length, Serv., Trucks, Builder. Lists various railway companies and their equipment orders for 1908.

Table with 6 columns: Purchaser, No., Class, Length, Serv., Trucks, Builder. Continues the list of railway companies and their equipment orders for 1908.

SIGNALS INSTALLED ON ELECTRIC RAILWAYS IN 1908

Information received from the manufacturers of signal apparatus for electric railways shows that there were installed during the year of 1908 486 automatic block signals, protecting 75.17 miles of single track, and 111 dispatchers' train order signals, operated from central dispatchers' offices, protecting 265.5 miles of track. Statistics of installations of signals were received from all of the signal manufacturers in the United States except two companies, who failed to reply. They are given in detail in the accompanying table.

Included in the table are all of the installations made on railways operated electrically, including electrified steam roads. There are two types of automatic block signals in use for overhead trolley lines: (1) Signals actuated by the passage of the trolley wheel under a contact device inserted in the trolley wire, and (2) signals controlled by electric track circuits. Comparatively few signals of the latter type have yet been installed on inter-urban electric railways operated by overhead trolley, chiefly on account of the expense involved. The installations on the Boston & Worcester Street Railway and on the Rochester, Syracuse & Eastern, included in the table, however, are both of this type. The installation on the Rochester, Syracuse & Eastern follows closely steam railroad signal standards, and is, we believe, the first of its kind. Alternating current is used for the track circuit.

Included in the table are five roads on which dispatcher's train order signals have been installed. This type of signal has met with the approval of a large number of roads, and it undoubtedly adds much to the safety of operation, but it is not to be considered in the light of a block signal.

The comparatively small mileage equipped with signals during the year reflects, as do the other statistics published in this issue, the financial stringency which prevailed during the greater part of 1908, and from which the railways are just beginning to recover. The signal manufacturers, however, report having received several large orders to be installed during the coming year; these are not included in the table, which shows only the signals put in actual operation.

TABLE OF BLOCK SIGNAL INSTALLATIONS IN 1908.

Name of Railway	Type of Signal	No. Sig-	No. Miles Protected	Maker
Boston & Worcester	O'Bryan Auto Block Elec. Tr. Cir.	22	....	F. L. O'Bryan Co.
Brooklyn Bridge	Auto Block Lt. Sig. Elec. Tr. Cir.	64	1.953	Union Switch & Sig. Co.
Chicago, Lake Shore & So. Bend	Dispatcher's Sig.	20	77.00	Telegraph Sig. Co.
E. St. Louis & Sub.	Dispatcher's Sig.	4	10.00	Blake Sig. & Mfg. Co.
Hudson & Man.	Home and distant Lt. Sig. A. C. Tr. Cir.	185	6.6	Gen. Ry. Sig. Co.
Indiana Un. Trac. Co.	Dispatcher's Sig.	52	111.00	Telegraph Sig. Co.
Interbrgh. R. T.	Au. Bk. Elec. Pneu. Slide A. C. Tr. Cir.	23	8.50	Un. Switch & Sig. Co.
Interna. Ry. Co.	Dispatcher's Sig.	20	37.00	Telegraph Sig. Co.
Lebanon Valley	Auto Block.	14	12.50	Smith Sig. Co.
Long Island	Elec. Sema. Auto Bl. 2 arm home and dist. Elec. Tr. Cir.	7	3.50	Hall Sig. Co.
Newton & Boston	O'Bryan Auto Block Elec. Tr. Cir.	1	....	F. L. O'Bryan Co.
N. Y. C. & H. R.	Au. Bl. Elec. Motor Sema. Home & Dist. A. C. Tr. Cir.	50	18.8	Gen. Ry. Sig. Co.
N. Y. C. & H. R.	Au. Bl. Home & Dist. Lt. Sig. A. C. Tr. Cir.	77	11.3	Gen. Ry. Sig. Co.
Phila. R. T.	Au. Bl. Lt. Sig. A. C. Tr. Cir.	17	3.75	Un. Switch & Sig. Co.
	Elec. Pneu. Sema. A. C. Tr. Cir.	11		
Rochester, Syracuse & Eastern	Au. Bl. Elec. Motor Sema. A. C. Tr. Cir.	6	6.865	Un. Switch & Sig. Co.
Toronto & York Rad. Cab Sig. Disp. Cont.	....	4	10.00	Stimmen Au. Ry. Sig. Co.
Wash. Balt. & An.	Dispatcher's Sig.	11	20.50	Blake Sig. & Mfg. Co.
Williamsb. Bridge	Au. Bl. Tr. Cir. Lt. Sig.	9	1.4	Un. Switch & Sig. Co.

WORK OF THE JOINT ENGINEERING STAFF OF THE WISCONSIN TAX AND RAILROAD COMMISSIONS*

BY WM. D. PENCE, ENGINEER, RAILROAD COMMISSION OF WISCONSIN AND WISCONSIN TAX COMMISSION; PROFESSOR OF RAILWAY ENGINEERING, UNIVERSITY OF WISCONSIN

The engineering staff which jointly serves the Wisconsin Tax Commission and the Railroad Commission of Wisconsin was organized in June, 1903, under authority of the law providing for the assessment of the steam railroad properties of the State on an ad valorem basis. The size of this staff ranged from a maximum of about 25 engineers and inspectors at the busiest portion of the first year's work down to the minimum of two persons assisting the chief engineer after the completion of the initial valuation report. Upon this latter basis it was found to be practicable to carry forward the annual revaluations of the steam road properties. In February, 1906, the first incumbent in the position of engineer for the Tax Commission resigned, and his successor was appointed (July 1, 1906) to render joint service for the Tax Commission and the then recently created Railroad Commission of Wisconsin.

The 1905 law prescribing the ad valorem basis of assessment for street railroad properties provided for the valuation work to begin on the initial inventory date of June 30, 1907, but the work was actually undertaken some six months earlier than that date because of a complaint lodged with the Railroad Commission respecting street car fares in the city of Milwaukee. To meet this emergency the staff was reorganized and greatly extended in January, 1907, and since that date a staff of from 20 to 30 members has been required continuously to meet the joint demands of the two commissions. Immediately upon the completion of the Milwaukee valuations in July, 1907, the field work for the valuation of the physical property of the remaining street railway and associated lighting companies of the State was undertaken, and before the completion of that work active service under the newly enacted public utilities law was inaugurated. Numerous inspection duties have also arisen in connection with several other laws recently enacted or amended.

The staff engaged in the 1903 steam road valuation work was organized under three general heads or chiefs of departments, respectively responsible to the chief engineer for the valuation of the permanent way, the lands and the mechanical features. With the reorganization for the purpose of making the street railway valuations there were still but three heads, the land valuations being associated with the "roadway" group, and an electrical department added. Under the still wider scope to the work of the staff arising under the administration of the public utilities law within the past year or so the civil and mechanical engineering groups have been extended to cover water works plants, the electrical engineering group to include telephones, and two additional groups or departments have been established, viz., gas engineering and the department of gas and electric service inspections.

In its present form the working organization includes the following groups or subdivisions: (1) Administrative, (2) office staff, (3) civil engineering staff, (4) mechanical engineering staff, (5) electrical engineering staff, (6) gas engineering staff, (7) gas and electric service inspections and (8) miscellaneous. The duties of these several departments of service cover all phases of the work of the two State commissions.

The work of three of these groups is as follows:

Civil engineering staff—Engaged in the inspection and valuation of those details of the physical property of steam and electric railways and public utilities plants which are customarily purchased, constructed or maintained under the direction of civil engineers, including such items as the following: Lands; track, track structures and bridges; buildings and miscellaneous structures, such as gas holders, stand-pipes, reservoirs, dams, wells and foundations; earthwork and paving; pipe distribution systems for water, gas and steam heating plants, includ-

*Abstract of a paper read before the Western Society of Engineers, Chicago, Dec. 16, 1908.

ing tunnels for same; office furniture and appliances; horses and wagons; tools, stores and supplies pertaining to the foregoing items, etc. Also investigations, in cooperation with other departments, with a view to suggest improvements in the operating conditions of railways, water works plants, etc.

Mechanical engineering staff—Engaged in the inspection and valuation of those details of the physical property of steam and electric railways and public utilities plants which are customarily purchased, constructed or operated under the direction of mechanical experts or engineers, including such items as the following: Power plant machinery and equipment (exclusive of electrical features), steam and hot water plants (except street mains), steam road locomotives and rolling stock, shop tools and machinery, tools, stores and supplies pertaining to the above items, etc. Also investigations, in cooperation with other departments, with a view to suggest improvements in the operating condition of water works, heating plants, power plants, etc.

Electrical engineering staff—Engaged in the inspection and valuation of those details of the physical property of steam and electric railways and public utilities plants which are usually constructed, purchased or operated under the direction of electrical experts or engineers, including electrical machinery and appliances in power plants and elsewhere, electric railway rolling stock, electrical distribution systems, overhead and underground, telephone plants, signaling appliances, tools, stores and supplies related to the above items, etc. Also investigations, in cooperation with other departments, with a view to suggest improvements in the operating conditions of electric railways, power plants, telephone properties, etc.

The basis of appointment of the staff is provided for in part by a formal rule of the Civil Service Commission, and in part by special authorizations given from time to time by the Railroad Commission for the employment of experts under the provisions of the public utilities and railroad commission laws.

It should be stated that membership on the staff is based upon ascertained fitness for the special service for which the appointment is made. There is entire freedom from political or other influence both in the matter of appointment and in the tenure of position on the staff. The tenure of service has been steady, the roll, except for the additions, being much the same as that established early in 1907.

The present membership of the technical staff consists almost exclusively of graduates of engineering schools, and about 60 per cent of the permanent staff are graduates of the University of Wisconsin. Seven members of the regular staff are also members of the faculty of the College of Engineering, University of Wisconsin, among this number being the engineer in charge, the chief mechanical inspector and the expert on light and heat. Five other members of the teaching force of the engineering college also render occasional service on the commissions' staff.

VALUATION WORK BY THE STAFF

The valuations reported to the commissions by the engineering staff have been confined throughout to the physical property, without regard to intangible elements. For a given inventory covering the items of any particular property, a definite value is fixed upon a fair basis as to unit prices, etc., and the results are reported by the staff at a definite amount, irrespective of the uses to which the figures are to be applied. These determinations are, by intention, entirely free from bias. Every reasonable effort is made to get at the exact truth in regard to local conditions. The figures are subject to revision upon finding evidence of defects of inventory, errors of judgment or other element likely to vitiate results. After submitting the valuation reports to the commission, opportunity is given for further conference and hearing upon any or all items of the physical valuation.

In certain public utilities cases the owners, and in a few cases the cities as well, have employed experts to give testimony on values before the Railroad Commission. In one or two such cases the State engineering staff has submitted to the representatives of the utilities company

and the city an "informal" valuation report to serve as a basis for preliminary conference and discussion. This preliminary report, after due consideration in the light of added data and information, is succeeded by the "tentative" valuation report which is submitted to the Railroad Commission as a part of the formal record in the case to be considered with other evidence. Before making up a final decision in the case the commission gives the engineer an opportunity to review the record and submit a supplementary report, in which are presented revisions or comments bearing upon the original or "tentative" valuation report.

The valuation work performed by the engineering staff falls under four heads, viz.: (1) Valuations of the physical property of the steam railroads of the State, (2) of the street railway and associated properties, (3) of the public utilities properties and (4) of public service corporation properties in connection with stock and bond issues. The accompanying tabulation includes the total valuations for one year's work each for the steam railroad and electric railway properties and all of the physical valuation work thus far reported upon under the public utilities and bond issue laws, the last two classes covering a period of somewhat more than a year's time:

SUMMARY OF RECENT PHYSICAL VALUATIONS MADE BY THE JOINT ENGINEERING STAFF OF THE RAILROAD COMMISSION AND THE TAX COMMISSION.

	(Cost of reproduction, Property, new.	Present condition.
<i>Steam Railroad Properties.</i>		
Fifty-two properties aggregating 7090 miles; inventory date June 30, 1907; fourth annual re-valuation under the 1903 ad valorem law....	\$244,128,868	\$196,239,314
<i>Street Railway Properties.</i>		
Twenty-four street and interurban properties with 10 associated lighting and heating properties; inventory date June 30, 1907; first valuation under 1905 ad valorem law.....	26,783,620	21,208,010
<i>Public Utilities Properties.</i>		
Twenty-four public utilities properties; varying inventory dates; valuations under 1907 law...	6,405,521	5,440,605
<i>For Stock and Bond Issues.</i>		
Five properties valued and reports made under 1907 law	305,576	270,008
	\$277,623,585	\$223,157,937

VALUATION OF MILWAUKEE STREET RAILWAY PROPERTIES

The staff as organized in the initial work at Milwaukee in January, 1907, included the following roll:

- Engineer of the two commissions.
- Consulting engineer.
- Assistant engineer.
- Chief roadway inspector.
- Chief mechanical inspector.
- Chief electrical inspector.
- Field roadway inspector.
- Field mechanical inspector.
- Field electrical inspector.

A staff of assistant inspectors, office assistants and stenographers.

Total staff roll, 23 persons.

The more responsible staff positions were filled chiefly from those previously engaged on the steam road valuations of Wisconsin in 1903-1904 and from the staff employed in the 1906 electric railway appraisals at Chicago. Bion J. Arnold, of Chicago, was called in consultation and arrangements made whereby several members of the special staff previously engaged under his direction in the Chicago valuation work were transferred temporarily for service on the Wisconsin engineering staff. George Weston, previously assistant chief engineer on the Chicago appraisals, was appointed chief electrical inspector on the Milwaukee work, and field electrical and mechanical inspectors were similarly engaged. Other experts were drawn from various sources, each person being selected with particular reference to his fitness for the intended service. Within three weeks' time after authorization was given to proceed with the work practically the entire staff was on the ground engaged in the preliminary examinations of the property to be valued.

At the preliminary conference held early in February between representatives of the two State commissions, the City of Milwaukee and the street railway company, it

was agreed that the date of inventory should be Dec. 31, 1906, for the purposes of the Railroad Commission and June 30, 1907, for the report to the State Board of Assessment, the latter date being in accordance with the 1905 ad valorem assessment law. It was stipulated by the representatives of the State commissions at this conference that the basis of the valuation of the physical property would be identical except as the inventory and the condition of the property itself might differ at the two inventory dates. It was the original idea that the street railway company should furnish a complete inventory of its property, but certain delays occurred which led to a change in plan whereby the State engineering staff undertook the preparation of the inventory from the company's records and by field examinations. It was roughly estimated at the start that the work could be completed in about 3 months' time, but the actual time required was 5½ months, the final report being submitted on July 13, 1907.

The classification of the property adopted in this report on the Milwaukee properties was as follows:

- Group 1. Land (right-of-way and other).
- Group 2. Track and track structures.
- Group 3. Cars and car equipment.
- Group 4. Electrical distribution system.
- Group 5. Power plant equipment.
- Group 6. Buildings and miscellaneous structures.
- Group 7. Office furniture and appliances.
- Group 8. Tools, implements and machinery.
- Group 9. Horses, wagons and miscellaneous.
- Total of items 1-9.
- Group 10. (See note below.)
- Total of items 1-10.
- Group 11. Stores and supplies.
- Total of items 1-11.
- Group 12. Paving.
- Total of items 1-12.

NOTE.—Group 10 is the addition of a percentage to cover engineering and supervision, interest during construction, contingencies, etc.

The final report included the entire property owned by the Milwaukee companies, known locally as the "Beggs properties," viz., the city railway lines (123.6 miles) and the associated lighting properties (Milwaukee Electric Railway & Light Company), the country or interurban railway lines (144.2 miles) and the associated lighting properties at Racine and elsewhere (Milwaukee Light, Heat & Traction Company), and the Milwaukee steam heating company (Milwaukee Central Heating Company). One exhibit in the report showed the property classified under the heads "railway only," "light and power," "steam heat" and "other property." Another exhibit classified the railway property only under "operating" and "non-operating." A third showed the operating property under city lines and interurban lines. A fourth classified the non-operating railway property in a similar way. The total physical valuation, including all the properties mentioned above for the inventory date of Dec. 31, 1906, amounted to \$18,435,960 for the property new and \$14,864,849 for the property in existing condition.

PHYSICAL VALUATION OF OTHER WISCONSIN STREET RAILWAY PROPERTIES

Immediately upon the completion of the formal report upon the valuation of the Milwaukee street railway properties the field work for the valuation of the remaining electric railway lines of the State was undertaken. The size of the staff was somewhat reduced and the organization modified in some respects to meet the varying conditions. Of these additional electric railway lines, numbering in all 22 properties, about one-half are operated in association with public utility properties supplying electric lighting and power service. This field work on the street railway properties chanced to be undertaken immediately after the enactment of the public utilities law (July, 1907), and it was then foreseen that the results of such work might ultimately be required by the Railroad Commission in rate complaint cases. In view of this development the methods and basis used in the work were critically reviewed in the light of the experience in the Milwaukee valuations, and certain modifications and improvements

adopted. The field work on these remaining electric railway properties occupied a period of about 3 months, and the office work an additional period of approximately 2 months.

The methods of field work employed on the street railway properties had much in common with those used in the steam road valuations, particularly as regards the details relating to roadbed, track structures, etc. However, the inclusion of so many electric lighting plants with these operating properties placed many features of these street railway valuations upon an identical basis with the utilities valuations.

An effort was made to have each street railway company throughout the State prepare a detailed inventory and valuation of its own property, as in the case of the larger roads in the 1903 steam road valuation. It was soon found, however, that the smaller electric lines were in much the same condition as were the smaller steam roads in 1903 in that they lacked the records and the requisite skilled staff to prepare these valuation reports. The Milwaukee company, operating roughly one-half the street railway mileage of the State under one management, alone of all the 23 street railway companies concerned in these valuations had the necessary records and staff. It is believed that the Milwaukee company would have submitted its own valuation to the commissions for review had there been sufficient time for its preparation, as in the 1903 valuations of the larger steam roads.

PHYSICAL VALUATIONS UNDER THE PUBLIC UTILITIES LAW

The law prescribes that "the commission shall value all the property of every public utility actually used and useful for the convenience of the public," and further provides that "in making such valuation the commission may avail itself of any information in possession of the State Board of Assessment."

As stated, the methods now employed by the engineering staff in the valuation of the physical property of public utility plants are in many respects in close agreement with those adopted early in 1907 for the valuation of the electric railway properties of the State for the joint purposes of the two commissions. These methods in general embrace the following distinct steps or processes:

1. The preparation of a detailed descriptive inventory.
2. Field examinations of the property by a trained staff.
3. Determination of the "cost new" of each item.
4. Estimation of the depreciation on each item of property.
5. Calculation of the present value.
6. Summing up the detailed valuations by groups.

As an initial step in each important utilities valuation, it is customary for the commission's engineer to hold a joint conference with representatives of the company and the city, at which conference a formal request is extended on behalf of the commission that all interested parties cooperate to the fullest extent possible with the commission's staff in getting at the facts with reference to local conditions. These conferences have, as a rule, resulted satisfactorily and in but few instances have the responsible officials of utilities companies or cities seemed disposed to withhold information and assistance, and then only temporarily.

The preparation of preliminary inventories or descriptive check lists of the properties has been entrusted to the responsible officials of the public utilities companies wherever practicable. Although in some cases this process has been found to lead to undesirable delays in the earlier stages of the work, it is believed, in general, to result ultimately in a saving of time. In cases where no inventory is supplied in advance by the company, the engineering staff before taking up the actual field work examines such office records as the company may have and prepares a tentative check list for field use.

The field examinations of the physical property begin with a careful checking up of the inventory. The record includes such matters as the following: A comprehensive description of the machine in its original or new condition; whether new or second hand when installed in its present service; if reconstructed at any time, the extent and character and also the reasons for such reconstruction; date of installation, and also of reconstruction if any;

character of service rendered by the machine, whether severe or moderate, continuous or intermittent, etc.; quality or character of maintenance, whether good, fair or poor; and any other information which may have a bearing in fixing the final value of the item or in judging of its operating value.

Throughout the progress of these field investigations due consideration is given to the fact that the public utilities law provides for periodical revaluations of each property examined, necessitating a permanent record from the very start. This view of the situation, coupled with the rate-making feature, has naturally led to an open-minded attitude on the part of the commission's staff and of the interested parties with respect to rectifying any discrepancies discovered in the descriptive record.

With a view to establish a definite and reliable basis for fixing costs, extensive investigations have been made relative to existing commercial conditions, with the result that a vast amount of cost data as to the purchase and installation of the various kinds of physical property embraced in the public utilities plants is now available in the confidential records of the engineering staff. This information has been gathered from many sources, one of the most important of these being the actual contracts and other records of costs kept in the offices of the various public utilities companies of the State. The records of the utilities companies are made available to the commission or its authorized agents by the terms of the public utilities law. These records combined with the confidential quotations and cost data of many kinds supplied through direct solicitation by manufacturers throughout the country, provide a substantial basis upon which the unit costs are kept up to date. In responding to the requests for information, the manufacturers in a number of instances have found it necessary to carry on considerable research work. In such cases it has been the practice to offer to defray the necessary clerical expense involved in compiling the desired information. In but few instances, however, have these offers of reimbursement been accepted. The invaluable assistance thus extended by the manufacturers is believed to have resulted not only from their being frankly and fully informed at the outset as to the special purposes for which the information would be employed, but also because of their desire to co-operate in an important public movement based primarily upon substantial justice to all concerned. It scarcely need be said that the figures obtained from manufacturers are treated as confidential and used only for the specific purposes for which they are solicited.

It should be stated in this connection that the utilities companies of the State have shown but little disposition to interfere with this free co-operation on the part of the manufacturers. In the very few instances where such interference has actually been noted, the utilities officials have usually been quick to respond to the suggestion that such action was not only shortsighted, but also in direct violation of the spirit of fairness pervading this entire matter. In like manner, citizens and officials of certain cities of the State where a feeling of antagonism had previously developed against certain public utilities companies have in a number of instances desisted from what seemed to be an effort to withhold essential facts required by the engineering staff.

In addition to the sources of information above referred to, the members of the staff have been able to supplement their personal records of cost data through many voluntary contributions from the professional notes of prominent engineers and by figures gathered from publications of technical societies, the columns of trade and technical journals, etc. Reference may also be made to the accumulation of valuable data included in the sworn testimony given by experts at the formal hearings of the commission.

In order to avoid extreme variations in unit prices due to the fluctuations in market quotations and also with a view to approximate as closely as practicable the conditions which usually prevail in building up public utilities properties, it has been the practice of the staff to use average prices for a term of years rather than to apply the current quotations or unit costs prevailing at the actual date of inventory. For this purpose the average price for the 5-year period immediately preceding the date of valuation

has been used whenever in the judgment of the staff such rule was practicable.

DEPRECIATION OF VALUE

In determining the allowance to be made for depreciation in value due consideration is given by the staff to the actual condition of each machine or other item of the property, taking into account the age of the device in connection with its probable ultimate efficient life, the character of the service, the standard or quality of maintenance, and such other elements as may aid in reaching a reliable judgment in the matter. In the steps leading up to such final conclusions, accumulated experience with reference to closely similar property, maintained to a like standard and operated under identical or similar conditions as to service, etc., receives due consideration. An individual item of physical property is judged with reference to its agreement with or departure from the average of such related group or class of property in fixing the probable useful life and in estimating the depreciation. Results obtained by this method in the valuation of physical properties of Wisconsin railroad and public utilities companies aggregating many millions of dollars have established the trustworthiness of the method here described.

The depreciation percentage is customarily applied against the net or service value found by deducting the scrap or residual value from the "new value," and the so-called "present value" is determined in the usual way by combining the scrap value and the depreciated service value. The treatment of scrap values has perhaps been carried somewhat beyond the degree of refinement customarily used by most engineers engaged in waterworks and other like appraisal work, although, it is believed, not beyond what is consistent and proper, considering the magnitude and permanence of these Wisconsin valuations. However, undue refinements in this respect are guarded against, and in cases where the scrap value is slight or much in doubt, the depreciation percentage is applied directly to the cost new to determine the present value.

OTHER VALUATION WORK

In addition to the railroad and public utilities valuations covered by the foregoing description, the engineering staff by special instructions from the Railroad Commission has made a number of valuations of "public service corporation" properties under the terms of the stock and bond issue law of 1907. These valuations have been based upon a detailed inventory, but in most instances it has not been necessary to enter into the refinements called for in the more formal valuations. Only five cases of this class of valuation are included in the tabulated "summary of recent valuation." Two other properties, one involving values of large magnitude, were valued approximately for bond issue purposes, in advance of the completion of the more exact physical valuation for the primary purposes of the Tax Commission. A few approximate valuations of utilities properties have also been made by the staff under special instructions from the Tax Commission to assist in the more equitable apportionment of values between adjacent assessment districts. The Railroad Commission has received a number of informal requests for valuations of utilities properties intended to serve as a basis for preliminary negotiations between cities and utilities companies looking toward the municipal purchase of such plants. Curiously enough, several requests or inquiries of this sort have reached the commission indirectly from a neighboring State.

In exercising the broad powers conferred upon it with respect to service regulation of railroad, express, telephone, and the municipal utilities companies, it has been the uniform policy of the Wisconsin Railroad Commission to insist upon adequate service, but without undue intrusion upon the routine of actual management. The inspections of service made by the technical staff under instructions from the commission are directed primarily to the actual results. When the results are found to be unsatisfactory, the commission frankly reports the facts to the company and also to the complainant if any, with such recommendations or suggestions as may seem necessary or desirable. In the more important matters publicity is usually given through the daily press in order that the general public

may be kept fully informed. Such publicity is often the only means of fixing in the public mind the responsibility for poor management or in establishing substantial justice where there have been false reports or wrong impressions as to the facts.

TRANSFER CRUSADE IN CHICAGO

Within the last few months the open abuse of the transfer privilege on the lines of the Chicago Railways Company has been reduced approximately 75 per cent. At certain busy junction points, where illegal trafficking in transfers was most objectionable, it has been practically abolished. Favorable results were brought about through a carefully planned crusade, based on constant vigilance and publicity. The ELECTRIC RAILWAY JOURNAL has been supplied with the following account of the transfer crusade by Joseph V. Sullivan, general supervisor, Chicago Railways, to whom acknowledgment is made:

The cars of the north and west side lines operated by the Chicago Railways Company carried during the last year about 367,000,000 passengers, of whom 151,000,000 were transfer passengers. This proportion of transfer patrons, owing to the generous privilege granted to the public by ordinance, is among the highest in the country. It was reasonable to expect, therefore, that the abuse of this privilege would be correspondingly large. It is, of course, impossible to estimate what share of the passengers made improper use of their transfers, though there must have been a large percentage who took advantage of crowded cars to ride on slips for which they had not paid, or on others of which the time limit had expired or the direction of travel was not the one intended.

It is known that hundreds of men, women and children rode on the cars every day with transfers purchased of boys at intersections or picked up or traded on the street or in stores. At one point alone, according to a statement made by witnesses in court, each of a dozen newsboys had an income of from \$1 to \$3 per day through the sale of these slips. It developed during the "crusade" that there were about 100 points where, during the morning and evening rush hours, these slips were exchanged or sold. Numerous factories were discovered where employees traded transfers on the premises in the morning and secured others for the return trip in the evening.

The ordinance governing the use of transfers issued by street railway companies in Chicago is supposed to be broad enough to give ample protection against such trafficking, and in one important case the claims of the city and the company as to its validity were sustained in the Supreme Court. The law provides a penalty of from \$5 to \$100 for each offense of giving away, receiving for improper use, selling, bartering or exchanging these slips. But the company has not always had full support in its efforts to check these abuses. Until the Juvenile Court was established it was not easy to reach youthful offenders, and for adults there was unusual leniency, with the result that the company was put to greater expense than the convictions seemed to warrant.

With the passage of the new franchise ordinance under which the company now is operating, the city became a partner in the receipts, and a change in the attitude of the public, the police and the courts was soon apparent. The misuse of hundreds of thousands of transfer tickets every day then seemed to become an important item. About this time, also there was established a new system of courts, from which the influence of ward politics was removed and where laws were more strictly enforced.

Transfer trafficking at this time appeared to be at its worst, and officials of the company determined to take steps to abolish the nuisance. Notice to the public was given in a statement printed on the reverse side of transfers, as follows: "Warning—It is unlawful to give away or to receive for use, or to sell, barter or exchange this transfer slip. Penalty, from \$5 to \$100 for each offense. Section 1500 A, Revised Municipal Code of Chicago." Investigators meanwhile, had been detailed to locate the points where violations of this ordinance were most numerous, and when they had reported the police department was called on for help. Officers in plain clothes, accompanied by several investigators, began a series of raids under the direction of the company's secret service and legal departments. Junction points were visited, and whenever arrests were made the patrol wagon was called, to make the raids more impressive.

In all, more than 200 arrests have been made since the crusade started. Many of the offenders were boys of tender years, and these were either taken to the Juvenile Court to be reprimanded or to their parents for prompt punishment. It was a rare case when the same boys had to be taken into court for severe punishment on a second charge. In nearly every case where adults were arrested for purchasing, giving away or picking up transfers a conviction and fine were secured. Newspaper publicity concerning arrests was frequently resorted to, and when, as occasionally happened, the defendant was a business man of some prominence, the publicity in the daily press was something to be feared more than the fine.

As a further step in the campaign, concerns employing large numbers of men were asked to aid in checking violations of this ordinance. For the most part they agreed cheerfully, and as a result placards have been distributed by the company and posted in many factories and stores, warning employees against misuse of transfers on the premises, and quoting the section of the city ordinance under which prosecutions are threatened. These cards, printed in English, German and Polish, bear the signature of the firm or corporation in whose place they are posted. Other notices have also been prepared for display in the cars of the company, worded practically the same as the reverse side of the transfer slips. Employees of the company also have been asked to give information as to points where they discover misuse of transfers, and conductors have been forbidden to leave their transfers at any place where they might tempt improper use.

The company and the city have both profited by the crusade. Publicity and prosecutions have had their effect, and where hundreds have been educated by arrests it is probable that thousands have been enlightened through printed notices in the newspapers and elsewhere. The following quotation from an editorial in the *Chicago Tribune* is evidence of the attitude of the better element in the city concerning the campaign:

The man who trades off his street car transfer for a newspaper and the man who buys the transfer and a newspaper from a scalper are both contemptible thieves. They are quite as deserving of punishment if they could be caught as the go-between who makes a living out of their petty dishonesty. They are guilty of a double offense, for they are robbing both the traction company and the city. As long as the company alone was a loser, one can understand why their undeveloped consciences did not trouble them. Now that they are robbing the city of rather more than they are the company, they ought to have some compunctions.

The crusade is still being pressed, with the chances in favor of stamping out this evil entirely.

THE REASONS FOR INCREASED FARES ON MASSACHUSETTS STREET RAILWAYS.—VI.

CONNECTICUT VALLEY STREET RAILWAY

The Connecticut Valley Street Railway, operating 48 miles of line, has had disproportionately low car-mile earnings on one of its four divisions. The directors, upon consideration of this condition, voted to increase the fare for a through trip on the backward division, the Millers Falls division, from 10 cents to 15 cents by charging an additional fare of 5 cents for part of the ride. The Board of Railroad Commissioners, on petition from merchants affected, disapproved this increase. The company thereupon withdrew the increase and then announced as a substitute an advance from 10 cents to 12 cents. The Railroad Commission, after protest had resulted in a reopening of the case, held this change to be reasonable.

The company announced just before the close of 1908 that it would increase the unit of fare on all its lines to 6 cents on Jan. 1, 1909. This remedy is adopted by the company in the belief that it has been shown to be the idea of the Railroad Commission, in various decisions, to consider the necessity of changes in fares with respect to the total results of operation of all the lines of a system rather than on any particular division the operations of which may be proved to be unprofitable.

HISTORY OF THE CASE

The directors did not decide upon the original advance in fare on the Millers Falls division until a reduction in car-mileage had proved inadequate to effect the desired improvement in net revenue.

The Millers Falls division is located substantially in the shape of the letter T, with Turners Falls at the base, Lake Pleasant nearly at the connection of the vertical and the horizontal line and Millers Falls and Montague at the left and right ends, respectively, of the horizontal line.

The necessity of changes that would produce greater revenue was brought before the board of directors in a communication presented on March 24, 1908.

This communication discussed the financial and legal aspects of the existing conditions. An abstract of its principal points follows:

STATISTICS AND ARGUMENT

On Oct. 1, 1908, a change of schedule was inaugurated by the management. The schedule as changed was planned with the object of taking care of the business on the various divisions as well as possible and also with an idea of bringing, as near as the business would warrant, the various divisions of our line to a common earning capacity per car-mile.

For the year ending Sept. 30, 1907, we have the following record before us:

The average passenger earning capacity of the system for the year was 19.2 cents per car-mile.

The Amherst division averaged during the year 22 cents per car-mile and the range of the earnings was from 18 cents in January to 28.6 cents in June.

The Deerfield division averaged 17.8 cents for the year and the range of earnings was from 12.2 cents in February to 27.2 cents in August.

The Greenfield division averaged 23 cents and its range was from 19 cents in February to 30.2 cents in July.

The Millers Falls division averaged for the year 14 cents and its range was from 8.9 cents in January and February to 22.8 cents in August.

The Amherst division in the two months, namely, January and February, was below the average of the system for the year; the receipts of the Deerfield division per car-mile for November, December, January, February, March, April and May were below the average of the system; the

Greenfield division, with the exception of February, showed above the average for the system and in that month its receipts per car-mile were at the average; the Millers Falls division, with the exception of July and August, was below the average all the time.

As you have undoubtedly noted from our last year's report, our average operating expense per car-mile was 14.4 cents and by this you will see that the operation of the Millers Falls line on the basis of averages was conducted at a loss during the year, not mentioning at all the proportionate part of fixed charges.

Using these figures as a basis, we inaugurated on Oct. 1, 1907, a new schedule decreasing the service on the Millers Falls and Deerfield divisions.

For the period ending Feb. 29, 1908, or five months, we have the following figures:

Amherst division, passenger receipts, \$18,690; car-miles run, 79,277; receipts per car-mile, 23.6 cents.

Deerfield division, passenger receipts, \$19,399; car-miles, 118,181; receipts per car-mile, 16.4 cents.

Greenfield division, passenger receipts, \$21,747; car-miles, 91,291; receipts per car-mile, 23.7 cents.

Millers Falls division, passenger receipts, \$4,004; car-miles, 32,077; receipts per car-mile, 12½ cents.

During these five months we have operated an average per month of 64,165 miles, against an average of 69,770 miles in the previous year; have averaged 285,908 fares per month, against 259,443 fares per month in the previous year, and have increased our receipts per car-mile from 16½ cents to 19.8 cents. The Amherst division has shown an earning capacity per month of receipts per car-mile from 27½ cents in October to 21 cents in January, against 22.6 cents in October and 18 cents in February of the preceding fiscal year. The Deerfield division shows receipts per car-mile of 21 cents in October and 14 cents in February, against 16½ cents from October and 12.3 cents in February a year before. The Greenfield division shows 25.2 cents in October and 22 cents in February, against 21.4 cents in October and 19.6 cents in February of one year previous. The Millers Falls division results were 15.8 cents in October and 9.8 cents in February, against 11 cents in October and 8.9 cents in December and January of the previous year.

These figures convince us that on two divisions, namely, the Deerfield and the Millers Falls divisions, we are transporting the public at too low a rate of fare and one of the purposes of this meeting is to discuss certain recommendations that we have to make as to changes of fares on the divisions in question.

The first aspect of the matter which we discuss is our right legally to make changes in the rates of fare.

We find no conditions in any of our franchises holding us to any particular rate of fare and even if such conditions did exist the decision of the Supreme Court of Massachusetts in the case of Keefe against the Lexington & Boston road [see ELECTRIC RAILWAY JOURNAL, Nov. 28, 1908, page 1463.—Eds.] gives us the legal right to alter our rates of fare even though they were conditions incorporated in the franchise. In this case the Supreme Court of this State held that conditions incorporated in franchises as to rates of fare were non-enforcible and unconstitutional. The two questions legally involved seem to be: First, the power of directors to fix fares; second, whether the statute permitting consolidations of street railway companies has the effect of fixing as the maximum fares forever thereafter to be charged and as the minimum amount of service and other details of accommodation to be furnished, the fares and service in fact actually enforced at the date of consolidation of companies, regardless of any and all changes and conditions which would otherwise affect the rates to be charged or facilities to be furnished.

The power of directors of street railway companies to raise fares is left entirely with them subject always to the revisory power of the Railroad Commissioners.

We do not believe the statute of 1897 authorizing consolidations of street railway companies was intended to limit their rates of fare, service or other details to the precise system that happened to be in use at the time of the consolidation. The intent of the Legislature, we think, was to guard against increases of fares as a result of consolidation of competing lines.

The section of the statute to which we refer reads as follows: "If the facilities for travel on the railway of each of the said companies shall not be thereby diminished or the rates of fare increased." The question of whether such a fact was involved in our consolidation of 1905 is probably conclusively settled by the approval of the Railroad Commissioners thereto. In our case we were the only street railway line between the points in question and did not parallel any other.

REDUCED FARES NOT THE SOLUTION

That the raising of fares in our case is not due to consolidation is obvious from the lapse of time, almost three years. From what we have done by experiments of reduced fares, with a view to increasing traffic, we do not believe any one can contend that experiments of reduced fares have not been fully tried. It is known to all of us that the cost of living, labor and materials and the cost of maintenance and operating street railways have greatly increased since April, 1905. These suggestions lead directly to this proposition in support of our contention that the statute was not intended to make permanent fares or facilities without regard to changed conditions. The very nature of the street railway business, the changing interest to be served, as well as frequent changes in the commercial and financial conditions in the country—all negative legislative intention to limit by any such restrictions upon the management of the consolidated company. The case of the village of Boyleston, which was entirely wiped out by the commonwealth in the building of the reservoirs at that point, is a good illustration of the situation in which a consolidated company might find itself if by this statute it was unable to vary its service in accordance with changed conditions of business. In the case of the commonwealth against the Fitchburg Railroad the court recognized the right of the carrier to vary its service; so in the matter of fares, unless the company can meet the exigency rising from higher cost of labor, supplies and materials, the service rendered by the company is likely, in every respect except that of fares, to be impaired. To give to the law any different meaning from that which is here contended would almost paralyze the railroad business in this commonwealth, as almost every railway to-day is the result of one or more consolidations and the railroad field in this State is reduced from 36 companies in 1873 to six at present.

The statistics in P. F. Sullivan's address [see STREET RAILWAY JOURNAL of Feb. 15, 1908.—Eds.] before the Massachusetts Railway Association give valuable information as to the proportionate charges of various items which go to make up the cost of operation on a street railway. From the statistics therein given it is apparent that our interest charge, namely, 18 $\frac{2}{3}$ per cent of our income, is too high a proportion of the gross for full satisfactory results in the net.

We operated last year an average of 10.2 car days of 18 hours each, substantially one-quarter of a car per track-mile. This is a low average, but we know that we operate all the cars which the traffic will justify. It is apparent, therefore, that we cannot expect more than a normal growth in our gross business and this growth is largely necessary to take care of increased maintenance, particularly maintenance of equipment, which will be high in view of our high average speed.

The Millers Falls division appears to be the worst offender and is lowest in earnings. This division made less than one-eighth of our car-miles last year and its income was less than one-twelfth of our total.

INCREASED FARES ESTABLISHED

The directors acted upon the recommendation in the foregoing and the increased fares were established on the Millers Falls division. Under the new schedule the fares were as follows: Turners Falls to Lake Pleasant (5 miles), 10 cents, no change; Turners Falls to Millers Falls (7 miles), 15 cents, increase of 5 cents; Turners Falls to Montague (7 miles), 15 cents, an increase of 5 cents. An arrangement by which coupon tickets were sold at the rate of 4 cents each was discontinued and a round-trip ticket be-

tween Millers Falls and Montague on Turners Falls and return for 25 cents was introduced.

On the same date on which these changes were introduced, April 1, 1908, certain readjustments were made on two of the other divisions. On the Deerfield division the rate of fare between Greenfield to Hatfield (15.5 miles) was made 25 cents, an increase of 5 cents; between Greenfield and Laurel Park (19 miles), 30 cents, an increase of 5 cents; between Greenfield and Northampton (22.2 miles), 35 cents; an increase of 5 cents. The rate for a round-trip ticket between Greenfield and Northampton was made 60 cents instead of 50 cents. These changes were effected by the introduction of additional fare-limit points. On the Greenfield division the rate for the coupon ticket was advanced from 4 cents to 4 $\frac{1}{6}$ cents.

Public announcement concerning the changes was made late in March to the newspapers in the communities affected. This announcement referred to the desire of the company to bring the four divisions as nearly as possible to equality in the car-mile earnings, and continued: "To obtain the desired result without a revision of the fares the management in the past has tried various experiments of reduced fares with a view to increasing traffic. The costs of labor and materials and the maintenance in operating street railways have increased greatly within the past few years and a great many street railway companies in the State have already revised their fares to meet the changed condition."

At the same time that this action was taken the company petitioned the Railroad Commission for authority to withdraw the transfer privileges to Lake Pleasant. This petition and the complaint of merchants of Turners Falls against the increase in fare on the Millers Falls division were heard together. The other readjustments were accepted without appeal to the Railroad Commission.

The decision of the commission rendered on May 9, 1908, was that it was unable to adjudicate the increased fare a reasonable one. Recommending a reduction in the rate of fare the commission at the same time withheld its approval of the petition for withdrawal of the free transfer at Lake Pleasant. The commission ordinarily disapproves the withdrawal of free transfer privileges after the public has received the advantage of them in any locality.

Complying with the recommendation of the commission, the company withdrew its rate of 15 cents on the Millers Falls division on June 1, but on June 2 announced a rate of 12 cents and at the same time discontinued the sale of workingmen's tickets. These changes resulted in a protest to the Railroad Commission from residents of Montague and the adjoining town of Ewing. The evidence submitted by the company at the resultant hearings consisted of both statistics and arguments. The action of the company was upheld by the commission in a decision in which it was stated:

DECISION OF THE COMMISSION

The board has thoroughly investigated the situation and caused the company to file with it a statement of passenger receipts on the Millers Falls division from Oct. 1, 1907, to July 1, 1908, compared with the previous year. A study of these tables discloses that the income received by the company under the present rate is not in excess of the reasonable return to which it is entitled from this division, taken in connection with the rest of its system. Making due allowance for the existing industrial depression in the township and computing the riding of 1906-7 on the basis of the existing rate, it is clear that the company is not requiring of the public an undue compensation for service rendered. The rate, tested by comparison with existing

rates for like service under like conditions elsewhere in the State, responds to the test of reasonableness.

This case is readily distinguished from the one formerly before us. In that case a new fare zone was established causing every patron of the road traveling between Turners Falls and the other villages on this division to pay an additional 5 cents. The present case results from the action of the company in charging an additional cent for each of its original fare zones. On Nov. 2, 1907, the board, upon complaints of service on this division, made this statement:

"The character of the territory traversed and of the patronage given would seem to fortify the claim that the line is operated under present conditions at a loss." It is apparent that these conditions have not improved since that time, and the company is therefore justified in making some increase in its passenger fares. The former fare case disclosed an excessive increase; the present case presents a reasonable one.

We cannot ask the company, in view of its annual financial returns and its comparative statements of passenger receipts, to reinstall the special workmen's ticket formerly issued, as this would compel part of the public traveling on this division to bear the burden that should be shared by all. Doubtless the workmen's ticket issued by the company contributed in no small measure to the selection of the several villages as the homes of many workmen employed in the town, and to withdraw this ticket entirely would work a hardship. Every endeavor consistent with the rights of all should be made by the company to provide for this portion of the traveling public. We are satisfied that a workmen's ticket should be issued, at least experimentally, but it is obvious that it must be sold at a rate in excess of that formerly charged, and we therefore recommend the issue by the company of workmen's tickets at such a rate as will make effective the spirit of the foregoing statement; these to be sold in books of such size as will permit their ready purchase by those for whom they are intended. If a six months' trial should prove the inability of the company to continue their use, the board will, upon application, again consider the matter.

Following the recommendation of the commission the company reissued the workmen's tickets on this division, but at the rate of 3.6 cents apiece instead of 3 cents, as heretofore, the percentage of increase being the same as that upheld for the regular fares.

In the discussion before the commission it was shown on behalf of the company that the withdrawal of the transfer privilege was one step by which it was hoped to make the Millers Falls division self-supporting. Transfers, under the suggested scheme of fares, became of no use, because Lake Pleasant became a fare limit point for passengers bound in all directions. The following comprises part of the argument that was presented:

ARGUMENT FOR WITHDRAWAL OF TRANSFERS

Lake Pleasant is a small village in the town of Montague. During the winter months the village is composed of about 25 families and from June 1 to October more or less pleasure business is drawn to Lake Pleasant by the natural attractions. The Millers Falls division runs from Turners across Montague plain to Lake Pleasant, Millers Falls and Montague. These four villages have an aggregate population of approximately 7300 people with five-sevenths of the total in Turners Falls. During the summer months Lake Pleasant will probably be increased by 500.

It is probably a safe statement to make that the Millers Falls division, from the time of its first operation in 1895 to the present time, has not been self-supporting. During all of this time it has been operated in connection with other divisions and the fare has been maintained at the old figure with the idea that if business increased the revenue would increase to a point where the division would be self-supporting. Despite some increase in business at times business on the whole is smaller at present than in years gone by and conditions, both as to cost of operation and others, have changed so that it has been thought wise by the management of the street railway company to at least

attempt to bring this division to a self-supporting basis. In years past up to 1904 the cars on this division were largely operated by one operator. This was changed due to the recommendations of the Board of Railroad Commissioners and two men are now on all cars that operate on this line.

In 1895, when this company first started operation, power was supplied entirely from a water power station at Millers Falls. This station has been made less effective since 1903 by the raising of the water in the pond below the dam of this power station so that the available head has been diminished and the power which can be produced there has been curtailed. This raising of the water was by interests entirely foreign to the street railway and at the present time is a matter of litigation, but nevertheless the fact exists that the loss of power at this point has compelled the street railway to purchase power at a larger price elsewhere which, in itself, adds to the cost of operation of the cars.

The following table shows the passenger earnings and traffic by months on all divisions of the Connecticut Valley Street Railway, with a comparison, since April 1, 1908:

	Car-miles.	Total fares.	Revenue passengers.	Car-mile revenue, \$.	Passengers per car-mile.
April, 1907...	70,214	275,485	\$12,380.13	0.176	3.92
April, 1908....	63,636	275,422	12,496.08	0.197	4.33
May, 1907....	73,091	318,934	14,391.54	0.197	4.36
May, 1908....	66,985	354,896	16,342.11	0.244	5.31
June, 1907....	72,813	371,971	16,959.38	0.233	5.10
June, 1908....	66,071	365,106	17,075.77	0.259	5.53
July, 1907....	78,733	443,279	20,207.07	0.257	5.63
July, 1908....	71,565	384,934	18,290.86	0.254	5.38
Aug., 1907....	75,451	437,074	19,824.99	0.263	5.79
Aug., 1908....	70,919	389,273	18,352.15	0.261	5.49
Sept., 1907....	72,388	357,918	16,174.58	0.223	4.95
Sept., 1908....	65,776	340,120	15,906.49	0.242	5.17
Oct., 1907....	65,420	338,387	15,183.79	0.232	5.18
Oct., 1908....	66,354	326,164	15,108.01	0.228	4.92
Nov., 1907....	64,692	304,365	13,618.85	0.211	4.70
Nov., 1908....	63,975	288,851	13,277.67	0.208	4.52

UNIT ON ALL LINES ADVANCED TO 6 CENTS

The formal announcement to the public concerning the increases in fares established by the Connecticut Valley Street Railway as of Jan. 1, 1909, making the unit on all lines 6 cents, states in part:

While it might be a debatable question as to what constitutes a fair return or a proper ratio of profit to capitalization, we submit that it would probably be agreed if a company like the Connecticut Valley Street Railway, which had on Sept. 30, 1908, capital stock of \$500,000, funded debt of \$500,000, net current liabilities of \$192,934, or a total capitalization in round numbers of \$1,200,000, were allowed to convert its debt into stock, a net yearly income of \$85,000 above its operating expenses would not constitute an unfair return for interest, taxes, dividends and depreciation.

We submit that the Connecticut Valley Street Railway has a conservative capitalization, and that its gross income per dollar invested is low.

Total cost of permanent property Connecticut Valley Street Railway, Sept. 30, 1908, was \$1,200,458; cost per mile of single track, \$25,378. Average cost per mile of single track (81 companies State of Massachusetts) for year ending Sept. 30, 1907, \$37,540; year 1908 not available.

This average does not include companies in Boston, Worcester or Springfield.

Ratio of gross income Connecticut Valley Street Railway to cost of permanent property for year ending Sept. 30, 1907, was 15½ per cent. Above mentioned 81 companies same year was 17 2/5 per cent.

The operating expenses of the Connecticut Valley Street Railway, we submit, are economical and not extravagant.

Year ending Sept. 30, 1906, they were \$0.116 per car-mile.

Year ending Sept. 30, 1907, they were \$0.144 per car-mile.

Year ending Sept. 30, 1908, they were \$0.164 per car-mile.

Average operating expenses per car-mile year ending Sept. 30, 1906, (excluding the companies in above cities and covering 90 companies in Massachusetts) were \$0.166 per car-mile; for year ending Sept. 30, 1907, (81 companies), \$0.167 per car-mile; year ending Sept. 30, 1908, not available.

The earnings per car-mile of the Connecticut Valley Street Railway, we submit, are low.

Year ending Sept. 30, 1906, they were \$0.192 per car-mile.

Year ending Sept. 30, 1907, they were \$0.208 per car-mile.

Year ending Sept. 30, 1908, they were \$0.230 per car-mile.

Average earnings per car-mile year ending Sept. 30, 1906, above 90 companies, were \$0.255 per car-mile; for year ending Sept. 30, 1907, above 81 companies were \$0.258 per car-mile; year ending Sept. 30, 1908, not available.

A condensed statement of earnings and expenses for the three years ended Sept. 30, 1908, was submitted, showing net divisible income and dividends as follows: 1906, net divisible income of \$22,199 and dividends of 2 per cent, or \$9,718; 1907, net divisible income of \$15,737 and dividends of \$9,948, or 2 per cent; 1908, net divisible income of \$10,240, and no dividend disbursement. The statement to the public continued:

Taxes during these three years amounted to \$15,011 and amount paid to stockholders \$19,666. Since the life of this company as a consolidated one, namely, April 1, 1905, it has, in order to provide better service for its patrons, expended in additions to property the sum of \$173,929. It has credited to its property accounts in the same period \$47,103, of which \$20,852 represents direct charge to profit and loss as depreciation, the difference of \$26,251 being property sold or destroyed. It has, therefore, added net to its property by the sum of \$126,826.

From these three years' statements it is apparent that the return for interest, taxes, dividends and depreciation has been insufficient, and that if the property is to give the public service it demands and its stockholders the dividends to which they are entitled, the net earning capacity must be increased.

The present condition is due primarily to the following facts:

1. The wages paid are very much in excess of those paid a few years ago.
2. The cost of motive power has increased 20 per cent.
3. The cost of all material used in the construction and operation of street railways has increased in a varying ratio from 20 to 100 per cent.
4. The distance which patrons can ride for one unit of fare has been gradually extended by transfer facilities.
5. The roadbed and equipment have been gradually and constantly wearing out, with the result of necessary replacement.
6. Increased burdens have been placed upon us by legislation and by municipalities at the time of added construction.

In the three years, while gross earnings have increased 5 per cent, operating expenses have gone up by 9.8 per cent. The result of all of the above conditions makes it absolutely imperative that some legitimate means be taken to increase the net income.

Although the wages paid are very much higher than those paid a few years ago, the directors, in considering the matter, decided not to reduce the wages of employees, and thereby possibly render poorer service, believing that the public, as a whole, prefers good service at a reasonable rate, to poor service at a cheap rate.

The details of the changes in fares were published in the ELECTRIC RAILWAY JOURNAL of Dec. 26, 1908, page 1668. The statement to the public continues:

While it is hoped that the changes suggested above will bring satisfactory results, should they not, a withdrawal of tickets may be necessary.

To the 230 stockholders up and down the Connecticut Valley who have invested funds in the stock of this corporation, it is due that a just return should be paid them on their investment. It is part of the principle and spirit of the law and must be done if this company or any other

public service corporation is to secure new capital for further additions or improvements.

It has been impossible for this company, in common with others in the recent past, to market its securities except at a price that was prohibitive. The result has been that in order to finance its improvements, it has had to borrow money in the market, which for a concern of this kind is unsatisfactory and hazardous in time of financial stringency.

We believe that the majority of the citizens and patrons, when they have sufficiently familiarized themselves with the real situation to permit of their looking at it from an entirely and equitable standpoint, will accept this necessary change in a spirit of fairness.

It is hoped that the necessity for this advance in fares will not be permanent, but until a return to the former unit is made possible by an improved financial showing of the company, the directors ask the reasonable co-operation of the public as a whole.

BROCKTON & PLYMOUTH AND BLUE HILL STREET RAILWAYS

The two roads in Massachusetts of which Stone & Webster are the general managers—the Brockton & Plymouth Street Railway and the Blue Hill Street Railway—have increased their units of fare from 5 to 6 cents. The change of fare by the Brockton & Plymouth road was made on April 1, 1908, and was not followed by complaint to the Board of Railroad Commissioners by the residents of the communities affected. Before the 6-cent fare was placed in effect Alba H. Warren, who was local manager for

To the Patrons of the Brockton & Plymouth St. Ry. Co.

We invite your careful consideration of the following financial statement of the Brockton & Plymouth Street Railway Company

	1906	1907	Estimate 1908
Maintenance Expense	\$10,620.00	\$14,539.00	\$19,405.00
Transportation	37,668.00	41,880.00	50,280.00
General	21,458.00	26,140.00	29,600.00
Total	\$69,746.00	\$82,559.00	\$99,105.00
Gross Earnings	\$109,776.00	\$117,721.00	\$129,970.00
Expense	69,746.00	82,559.00	99,105.00
Net Earnings	\$40,022.00	\$35,161.00	\$30,865.00
Interest Charges	21,792.00	21,446.00	21,250.00
Balance	\$18,229.00	\$13,715.00	\$9,615.00
Per cent of expense to earnings	63.54	70.11	76.25

From the above figures you will see that the per cent. of expenses to earnings is increasing rapidly and that all our expenses are steadily rising. The increased expenses are due largely to rising costs of labor and supplies and to constantly heavier renewals due to increasing age of our property. According to our books we have a surplus on March 1st, 1908, of \$40,841.04, but this is merely a book surplus, as we have never charged off any depreciation of our plant. We are now borrowing \$132,100.00 on our notes. The stockholders have never received any dividends on the \$256,000.00 of actual cash which they have had invested in the property for 7 1/2 years.

The situation has been carefully considered for the past three months and we can see but two possible ways to make the Company earn enough to pay its increasing expenses and renewals. First—To Reduce Wages. Second—To Increase the Unit of Fare.

The first method would be much against the interests of the public and our employees, and we do not feel we ought to adopt it.

The second method seems to offer the only feasible remedy and this plan it has been decided to follow.

Beginning April 1st, 1908, the unit of fare will be 6 cents, instead of 5 cents.

All conductors will be supplied with strips of 5 tickets for sale at 30c. By purchasing these, patrons can avoid the bother of penny change.

It is hoped by the Company that the necessity for this advance in fare will not be permanent, and that the public will give the management their hearty cooperation in this change, necessitated by causes beyond our control.

BROCKTON & PLYMOUTH STREET RAILWAY COMPANY,
ALBA H. WARREN, Manager.

Circular to Patrons of Brockton & Plymouth Road

Stone & Webster at Plymouth at the time, addressed a meeting of influential citizens on the subject. Facts and figures in relation to the financial history of the company, together with an estimate of results for the current fiscal year, were laid before the citizens.

Stone & Webster state that the arguments and public announcement were made with the "idea of educating the public to know the exact situation and to realize that adequate service could not be given through a long term of years unless the company received a fair return on the investment."

The unit of fare on the Blue Hill Street Railway was increased from 5 to 6 cents on Jan. 5, 1908. The residents of Stoughton, Mass., protested to the Railroad Commission against the increase of fare, and an investigation, with hearings, resulted. Statements of daily passenger earnings were filed with the commission. These showed the follow-

ing results for the first few days after the change in unit of fare became operative:

	1907.	1908.	Per cent.	
			Increase.	Decrease.
Jan. 5.....	\$253.05	\$206.28	—	11
" 6.....	166.20	145.50	—	12
" 7.....	129.70	148.08	14	—
" 8.....	148.10	168.96	14	—
" 9.....	144.45	158.68	10	—
" 10.....	157.40	149.16	—	5

The gross revenue decreased six days in January, as compared with the corresponding days of January, 1907, and increased 21 days. Nine days in February showed a decrease and 20 an increase. Fourteen days in March showed a decrease, 15 an increase and two substantially no change. Decreases were shown in April until and including April 5, the last date covered by the statement. The gross earnings from Jan. 5 to April 5, 1908, both inclusive, were shown to be \$15,520.44, as compared with \$14,797.24 in the corresponding period of the previous year, or an increase of 5 per cent. Figures showing the operating expenses per car-mile, average expenses per passenger and number of passengers per car-mile were published. Included in the statistics presented were the following:

Year ended Sept. 30.	1904.	1905.	1906.	1907.
Gross earnings.....	\$7,864.10	\$7,894.73	\$8,344.05	\$8,227.48
Operating expenses—				
Per cent of gross.....	71.1	80.6	71.1	70.8
Maintenance—				
Per cent of gross.....	11.5	13	12.7	16
Results after payment of interest and taxes—				
Loss.....	\$6,358.78	\$6,070.34	—	\$7,040.32
Gain.....	—	—	\$1,078.88	—

In 1906 and 1907, after these figures were shown, entries to profit and loss were made of \$4,426 and \$10,061.46, respectively, "constituting mainly damage claims covering previous periods." The accumulated deficit on Sept. 30, 1907, was \$55,622.07.

In announcing its decision upholding the increase, the commission said that the figures submitted "convince the board that the company is unable to operate profitably for a 5-cent fare over its established fare limits, and must of necessity advance the charge." The decision continued:

It is of the greatest importance that a community served by a public service corporation should receive reasonable accommodations, and increased receipts tend to increased facilities for transportation. An unsuccessful street railway company is a poor public servant. It is not in a condition financially to render the service that it ought or that the public has a right to expect.

The province of this board with respect to facilities for transportation and rates, therefore, is primarily to see that the public is well served at a reasonable toll; and it is a proposition too clear for discussion that no company can or ought to be asked to furnish the high standard of railway equipment and service that Massachusetts laws demand without at the same time being assured of sufficient income from the public to maintain such equipment and service. The foregoing statistics in themselves decide the main question before us.

RESULTS OF FARE CHANGES

The result of the change in fare on the Blue Hill Street Railway is shown by the following statement:

BLUE HILL STREET RAILWAY.

	Comparative Monthly Earnings.		Increase.	Decrease.
	5 ct. fare. 1907.	6-ct. fare. 1908.		
January.....	\$5,125.44	\$5,538.65	\$413.21	.....
February.....	4,892.54	5,304.54	412.00	.....
March.....	6,055.96	5,991.08	.....	\$64.88
April.....	6,013.64	6,584.93	571.29	.....
May.....	7,672.93	9,236.31	1,563.38	.....
June.....	9,387.75	10,909.82	1,522.07	.....
July.....	11,253.09	11,061.69	.....	191.40
August.....	11,020.86	11,392.22	371.36	.....
September.....	8,688.38	9,281.65	593.27	.....
October.....	7,689.62	8,252.63	563.01	.....
	\$77,800.21	\$83,553.52	\$6,009.59	\$256.28

Number of Passengers Carried Per Month.

	1907.	1908.	Increase.	Decrease.
January.....	94,988	88,475	.....	6,513
February.....	84,488	81,580	.....	2,908
March.....	109,640	92,622	.....	17,018
April.....	113,995	102,678	.....	11,317
May.....	145,235	146,307	1,072	.....
June.....	174,510	169,083	.....	4,827
July.....	215,984	177,130	.....	38,854
August.....	211,431	182,595	.....	28,836
September.....	165,511	153,773	.....	11,738
October.....	145,914	131,076	.....	14,838
	1,461,696	1,325,919	1,072	136,849

A net gain of 7.4 per cent was shown in revenue and a net loss of 9.3 per cent in the number of passengers carried.

The following statement shows the corresponding results on the Brockton & Plymouth Street Railway:

BROCKTON & PLYMOUTH STREET RAILWAY.

	5 ct. fare.		Increase.	Decrease.
	1907.	1908.		
April.....	\$7,814.88	\$8,154.57	\$339.69	.....
May.....	9,771.92	10,643.49	871.57	.....
June.....	12,359.81	12,152.06	.....	\$207.75
July.....	17,451.55	15,955.93	.....	1,495.62
August.....	17,326.82	16,515.99	.....	811.73
September.....	11,620.07	12,602.77	982.70	.....
October.....	9,057.08	9,767.25	710.17	.....
	\$85,402.13	\$85,791.16	\$2,904.13	\$2,515.10

Number of Passengers Carried Per Month.

	1907.	1908.	Increase.	Decrease.
April.....	149,789	129,388	.....	20,401
May.....	189,178	167,686	.....	21,492
June.....	240,420	204,103	.....	36,317
July.....	340,547	275,134	.....	65,413
August.....	344,960	286,700	.....	58,260
September.....	228,136	207,865	.....	20,271
October.....	171,168	148,921	.....	22,247
	1,664,198	1,419,797	.....	244,401

On this road there was a net gain in revenue of 0.5 per cent and a decrease in the number of passengers carried of 14.7 per cent.

In further explanation of the foregoing figures, the following statement has been made by A. Stuart Pratt, district manager of the Stone & Webster Management Association:

"In regard to the figures shown by the Blue Hill Street Railway, I would say that there was some reduction in car-miles in 1908 and general business was very poor in the district served by this company, which accounts, as we believe, very largely for the decrease in the number of passengers carried.

"In regard to the Brockton & Plymouth Street Railway figures, the same conditions apply, except that the loss in gross for the summer months is partially due to the fact that we sold an extra coupon with every five 6-cent tickets, which was redeemable at the railway park for 5 cents' worth of food or fun, and part of these redeemed tickets were charged up against the gross earnings.

"We do not feel that the comparative figures show the true effect of the 6-cent fare, as the condition of general business was quite abnormal."

Alba H. Warren, who was manager of the Brockton & Plymouth Street Railway and the Blue Hill Street Railway at the time the changes in fares were made, and who is now manager of the Pensacola (Fla.) Electric Company, has expressed an opinion in response to a request from the ELECTRIC RAILWAY JOURNAL regarding the meaning of the decline in traffic. Mr. Warren said:

"Careful comparison of figures and conductors' trip sheets, making due allowance for general business conditions, convinced me that the advance in fares on the Blue Hill and Brockton & Plymouth lines had almost no effect on the number of passengers carried. The very slight decrease in short riding will undoubtedly come back when business is good and mill operatives are again working full time. I am safe in saying that in these two instances

there was no material decrease in traffic, and no permanent loss of traffic will result."

CONCORD, MAYNARD & HUDSON STREET RAILWAY

The Concord, Maynard & Hudson Street Railway increased its unit of fare from 5 cents to 6 cents on March 1, 1908. The following statement regarding the reasons for the increase and the effect thereof has been given to the *ELECTRIC RAILWAY JOURNAL*:

Regarding the raise of fares on the Concord, Maynard & Hudson road it might be well to review briefly the early history of the line. At the time the road was built the same mistake was made regarding fares that was common with roads 8 to 10 years ago, namely, of promising low fares and transfers, with no thought for the future, if only a franchise was received. The fare for the whole line, approximately 15 miles, was fixed at 20 cents and the zones were arranged in such a way that in some cases the fare was less than a cent a mile and in others 2 cents to 2½ cents a mile.

With the general depression in business lessening the amount of traffic and with the advance in the cost of labor and materials it was imperative that some legitimate means be taken to increase the net income, certainly if the stockholders were ever to receive any dividend. The matter was considered carefully by the management and the directors and it was decided to raise the unit of fare to 6 cents for the time being and see what the result would be.

The public was somewhat prepared for the raise by articles which appeared for two or three weeks in the local papers, and accepted the situation in the spirit of fairness.

While the figures show that for a time the numbers of passengers carried from week to week, as compared with the corresponding weeks of the two years preceding, were perceptibly less, the receipts show quite an increase, some weeks as high as 20 per cent. The falling off in the number of passengers is attributed more to the hard times than to the raise in fares. It is felt that the decrease in traffic would have been practically the same without any change in fares and that in reality the road is a gainer to a larger extent than was anticipated.

It is a question, however, which is the better policy to adopt in the method of increasing the receipts, the raising of the unit of fare or the establishment of more zones. It is felt even now that a change in the zones with the fare at 5 cents would be productive of even better results than have been secured by the advance in the unit of fare. There are now four zones and a charge of 6 cents in each zone. In this way the short rider has to pay a share of the expense of the longer rider or, in other words, the long rider gets more in proportion for his ride than does the short rider.

There is no question but that a readjustment of fares should be made on all the suburban lines in order that an adequate return can be had on the investment. The public feels that in a general way it should pay more for the rides, as it is constantly getting better accommodations through cars, quicker service and better transfer privileges.

The policy of the early promoters of the roads of promising anything and everything has caused the failure of many roads and the time has come when the owners have a right to expect a fair return on the money invested. The increase in wages, the demands of labor organizations, excise taxes, expenses incident to changes due to State highways, relocation of streets and many other things tend to deplete the treasury of the companies; and in order

that they may live, a higher rate of fare must be charged and the public is beginning to realize this fact.

The raise of fare of the Concord, Maynard & Hudson Street Railway may mean the possibility of a small dividend in the near future.

Much more could be said on the fare question, but the experience of the Concord, Maynard & Hudson road is the same as that of a majority of the Massachusetts roads.

TAUNTON & PAWTUCKET STREET RAILWAY

The Taunton & Pawtucket Street Railway, operating 18.6 miles of track, increased its fares on Feb. 1, 1908, by adding another fare zone. A statement concerning the effect of the change has been made for the *ELECTRIC RAILWAY JOURNAL* by A. C. Ralph, general manager of the company.

Mr. Ralph said that about a year ago the management came to the conclusion that, in view of the great advance in the costs of supplies and labor, it must necessarily increase the revenue of the road. To do this, it was finally decided, after other methods had been considered, to insert another fare zone. This was done by dividing a zone where passengers were carried a distance of 6½ miles for 5 cents, most of the way through a sparsely settled territory.

This change affected locally about 20 families, and it naturally seemed to them a great hardship. These people have not ridden as often since the company raised the fare as they did before, but it has not been discovered that any appreciable amount of through travel has been lost, while the 20 families have undoubtedly paid a gross sum equal to what they did previously. Another section of the line of equal length was earning approximately \$24,000 per annum, while the section in which the new fare zone was inserted was earning about \$14,000 per annum, with practically the same amount of expense for operation as the section earning \$24,000 per annum. This the company considered unfair and wholly improper.

Mr. Ralph said that the figures compiled before the change was made showed that if no loss of patronage resulted from the advance in rates, the new fare zone would increase the gross revenue about \$9,000. The probable increase was placed, however, in view of all the possibilities, at \$5,000.

"The results thus far," Mr. Ralph added, "show that this estimate was conservative, although we cannot make a true calculation upon just what the results would be under normal business conditions."

Although the new fare zone was established on Feb. 1, the effects of hard times did not begin to be felt in the locality in which this road operates until about March 1. During the month of February the operations showed a substantial gain in gross receipts, which came almost wholly from the new fare zone. The gross revenue from operation for the fiscal year ended Sept. 30, 1908, was \$1,500 less than in the previous year, but Mr. Ralph attributes this decrease almost wholly to business conditions, and believes that if the company had not established the new fare zone the loss would have been much greater. While the decrease in gross receipts of this road from the previous year was about 3 per cent, other roads in the same locality have shown a decline of from 6 per cent to 8 per cent, and some a trifle more.

Concerning the attitude of the public, Mr. Ralph said: "In discussing this matter with our patrons we have assumed the attitude that we do not desire and they would

not wish to have us curtail the service, nor would they wish to have us reduce our expenses to a point which would mean that the cars, track and overhead construction would be out of repair and in a dangerous condition for operation. We have argued that the public ought to be willing to produce revenue enough to keep our property in good physical condition consistent with economical operation. We have maintained the property in first-class shape and have not reduced the schedule anywhere upon our system. Our patrons admit that the service is perfectly satisfactory, but, unfortunately, to some the rate of fare seems too high."

The average rate of fare on the lines of the company is about 1.4 cents per mile.

The increase in fare of the Taunton & Pawtucket road was taken before the Board of Railroad Commissioners on a petition from citizens of Rehoboth and Taunton, stating that the advance "works a hardship on patrons of the line and is unjust and unnecessary." Statements of daily earnings were presented to the commission. From Feb. 1 to 29, 1908, the gross earnings were \$3,174.05, as compared with \$2,994.90 from Feb. 1 to March 2, 1907; from March 1 to 31, 1908, the gross earnings were \$3,436.95, as compared with \$3,528.55 from March 3 to April 2, 1907; from April 1 to 30, 1908, the gross earnings were \$3,387.40, as compared with \$3,474.30 from April 3 to May 2, 1907; from May 1 to 7, 1908, the gross earnings were \$868.45, as compared with \$854.50 from May 3 to 9, 1907. A statement of the annual earnings and expenses of the road and its predecessor line, the Bristol County Street Railway, beginning with the fiscal year 1901, was also presented. This showed that out of the seven years ended with Sept. 30, 1907, a deficit was shown, after meeting fixed charges, in four years. The only dividend paid on the stock in that time was one disbursement of 2 per cent. The net deficit as of Sept. 30, 1907, was \$8,147.52. The following statistics are for the year ended Sept. 30, 1907:

Gross earnings per mile.....	\$3.005
Expenses per mile.....	\$2.579
Net earnings per mile.....	\$4.26
Miles main track operated.....	17,612
Passengers carried.....	1,045,082
Car-miles run.....	270,446
Car-mile earnings, cents:	
Gross earnings.....	19.57
Expenses.....	16.80
Net earnings.....	2.77

The decision of the commission showed that the Taunton & Pawtucket Company acquired the property of the unsuccessful Bristol County Street Railway at receiver's sale, and had never received a return on its investment satisfactory to its shareholders. The decision stated:

Since the change in fare the company, at the request of the board, has furnished a daily comparative statement of the gross income, from which it appears that its earnings are substantially the same as before the increase. This result is in large measure accounted for by the decrease in travel, owing to the general financial depression. Making due allowance, however, for the income so to be received by the company under its newly established fare in times of normal travel, the board learns nothing that justifies it in finding the fare now established to be excessive, and, when compared with existing fares for like service under like conditions in the Commonwealth, the fare does not appear to be unreasonable. Petition dismissed.

WESTERN MASSACHUSETTS STREET RAILWAY

The situation on the Western Massachusetts Street Railway has been before the Board of Railroad Commissioners for consideration at various times within the last year or so.

The subject was considered in a decision rendered by

the board on Dec. 4, 1907, which made certain recommendations, leaving the problem of working out the details to the company. Changes which were made shortly afterward resulted in a protest to the board by citizens of Westfield and Holyoke. The board was unable to find that the withdrawal of the free transfers was in the interest of the whole public, but declared that if there was merit in the statement made at the hearing, that the company's fares in Westfield ought to be readjusted, it would, upon petition involving the whole subject, take appropriate action. The petition of the company for the withdrawal of free transfers was therefore dismissed without prejudice.

The subject was considered by the board several months later. No petition that the entire subject be reopened was made in the meantime, but citizens asked for a reduction in fare on one portion of the lines, on the ground that the existing fare was unreasonable and excessive. The board, after examination of the returns, concluded that it ought not to recommend a reduction.

BOSTON & WORCESTER STREET RAILWAY

The Boston & Worcester Street Railway made formal announcement on Dec. 21 that on and after Jan. 1, 1909, the unit of fare would be 6 cents on all the lines owned and operated by the company. The official notice which has been issued states in part:

The company will continue to sell the round trip and book tickets at its local ticket agencies at the same price as at present.

Books of 50 single-fare rides, price \$2.75, or 5½ cents per ride will be on sale at the company's local ticket agencies. This book will be good anywhere on the system and may be used by more than one individual.

For special convenience of passengers paying cash fare, conductors will have for sale 6-cent tickets in convenient form, so that passengers may purchase tickets to cover the fare to be collected on car.

Conductors are instructed, in collecting cash fare from passenger, to sell them 6-cent tickets for the succeeding collections.

By allowing the payment of a through cash fare to all points on the system, the company aims to relieve its patrons, as far as possible, of the inconvenience of continual change-making.

The following statement in regard to the change in fares by the Boston & Worcester Street Railway has been made to the ELECTRIC RAILWAY JOURNAL by James F. Shaw:

STATEMENT OF JAMES F. SHAW

"The Boston & Worcester Street Railway Company establishes an increased rate of fare on its lines as of Jan. 1, 1909. This increase is necessary, as the revenue from the company's railway, after paying its operating expenses, fixed charges and taxes, is not sufficient for a fair return to the stockholders for the investment which they have in the property.

"As in all other Massachusetts street railways, the outstanding securities represent actual cash invested, no issue of securities being authorized by the Board of Railroad Commissioners exceeding the actual value of the property as determined by an appraisal of engineers approved by the board. Under Massachusetts laws, the board of directors of a street railway has the sole right to establish the rates of fare. The public, however, has the right of appeal to the Board of Railroad Commissioners in case the rate as fixed by the directors seems excessive and unreasonable. The fares on many street railways in Massachusetts have been increased recently, and in most cases where an appeal has been made to the board, after careful investigation and

public hearings have been held, the increased rates, as fixed by the directors, have been approved by the board.

"It is my belief that the public has begun to realize that the rates heretofore charged have been too low for the service rendered, and will not object to a reasonable increase in fares to allow the company to maintain the present standard of service, with a view of improving that service, rather than decrease the standard. The Boston & Worcester company has been maintaining a 30-minute schedule on its lines during the winter months and a 15-minute schedule during the four summer months, and the routes to the various points on its lines are so laid out that the 30-minute winter schedule gives a 15-minute service to South Framingham and all points east, while the 15-minute summer schedule gives a 7½-minute service to South Framingham and all points east.

"The earnings per car-hour for the past year, including both main line and slow-speed branch lines, average \$4.74, and the earnings per car-mile average 29 cents, and while these earnings per car-hour and per car-mile might seem high, they are due mainly to the high speed at which the cars are operated, and the fixed charges due to the high standard of construction and equipment necessary to make the required speed have to be considered. The Boston & Worcester company has expended fully \$1,000,000 on boulevard construction through the various cities and towns, and some of the demands made by local authorities in the orders of location, when granted, seem very excessive and unnecessary. This expenditure for boulevard construction represents a fixed charge of \$45,000 each year, and while the local authorities evidently considered it good judgment to impose such conditions upon the company, it must now be apparent to them that the rate of fare necessarily must be based on the actual cash investment in the property.

"Fortunately, the company's property is located in a community which is not surpassed for character and intelligence, and it is not anticipated that any material objection will be made.

"The company will advance the unit of fare from 5 to 6 cents, but as it will not increase any ticket rate now existing, the regular patrons will not be affected materially.

"While the earnings during the fiscal year ending Sept. 30, 1908, were received in large part from the sale of tickets, 7,000,000 passengers paid cash fares. If all the 7,000,000 passengers paid the extra cent, the earnings would increase \$70,000.

"After careful analysis, deducting the estimated decrease in number of passengers on account of the increased fare, and taking into calculation the increased use of tickets for the same reason, it is estimated that the net improvement in earnings will yield the company about \$51,000.

"This increased revenue, together with the receipts from the new line recently built into Natick and the normal increase in business, which has never been less than 4 per cent, should give the company sufficient earnings to justify the payment of its regular dividend of 6 per cent and allow the company to maintain the property in its high state of efficiency and continue the excellent service for which it is noted."

CONCLUSION

The articles comprising the series in relation to the fare situation on the Massachusetts lines have contained figures in regard to the earnings and traffic of the various lines on which increases in rates have been made.

These figures can now be supplemented by a statement received from Matthew C. Brush, vice-president and gen-

eral manager of the Newton Street Railway, on the lines of which a charge of 1 cent each for transfers was established, with the approval of the Board of Railroad Commissioners, on Sept. 1. The statement shows the numbers of cash passengers carried and transfers issued on each of the divisions of the Newton Street Railway for the months of September, October and November, 1908, as compared with the corresponding months of the previous year. The figures are as follows:

NEWTON STREET RAILWAY					
		Cash passengers.		Transfers issued.	
		1908.	1907.	1908.	1907.
September—	N. St.....	305,355	380,906	32,614	47,684
	C. A.....	145,733	112,769	14,813	12,930
	W. B.....	108,382	116,360	21,806	24,101
	Total	619,470	610,035	69,233	84,615
October—	N. St.....	359,643	367,127	30,435	45,052
	C. A.....	104,671	88,851	10,331	12,938
	W. B.....	107,129	110,250	17,310	22,246
	Total	571,443	566,228	58,076	80,236
November—	N. St.....	330,846	340,445	27,838	41,497
	C. A.....	84,539	87,889	8,480	11,875
	W. B.....	97,122	100,670	15,183	19,952
	Total	512,507	529,004	51,501	73,324
	Total three months.....	1,703,420	1,705,267	178,810	238,175
Percentage of transfers issued to cash passengers.					
				1908.	1907.
September				11.18	13.87
October				10.16	14.17
November				10.05	13.86
Three months				10.50	13.97

The totals for three months show a decrease of 24.92 per cent, or 59,365, in the number of transfers issued and a decrease of 0.11 per cent in the number of cash passengers carried.

The movement for increased fares in Massachusetts has already progressed much farther than was disclosed when the first article in the series prepared by this paper was published. It has not yet reached an end, and the ultimate result, in its bearing upon the question of fares on urban and interurban railways, will be significant.

HEARING ON THROUGH ROUTES AND JOINT RATES IN NEW YORK

The hearing before the New York Public Service Commission, First District, on the order requiring the establishment of through routes and joint rates between the Third Avenue Railroad and the Central Park, North & East River Railroad was concluded on Dec. 24.

At a hearing on Dec. 19 the closing arguments were made by counsel. An abstract of the argument of John M. Bowers, counsel for the Central Trust Company of New York, trustee under the mortgage securing the bonds of the Third Avenue Railroad, follows:

STATEMENT OF JOHN M. BOWERS.

One—The public service act, appointing the commission, is unconstitutional and void.

Two—There is no power vested in the commission by such act to compel transfers or establish through routes between street railroad corporations.

Three—Section 49, of the public service act, gives no such power, and is, by its terms, applicable only to railroads other than street railroads.

Four—The lines of railroad operated by either the Third Avenue Railroad or the Forty-second Street road and the lines of railroad operated by the Fifty-nines Street road, are not, and cannot be, made by construction and maintenance of switch connections or otherwise to form a continuous line of transportation. On the contrary, the Fifty-ninth Street line operates practically at right angles to either the Third Avenue or the Forty-second Street lines.

Five—That such lines are not connecting, but intersecting lines.

Six—Even if it could be held that the commission had power, under Section 49 of the public service act, to estab-

lish through routes on street railways, there would still be no power in the commission to compel transfers.

Seven—That the commission, under no circumstances, has any power to make an order which would apply to three different railroad corporations.

Eight—That the order made by the commission, on which this proceeding is based, is void and in violation of the fourteenth amendment of the constitution, because it was made without any hearing of the parties proposed to be affected, and because the commission had declined to specify the facts or the inquiries it made or the facts or evidence on which it based such order, and that an order thus made, without a hearing, being the basis of the present proceeding, by which the commission calls upon the receiver of the Third Avenue Railroad and the receiver of the Forty-second Street, Manhattanville & St. Nicholas Avenue Railway to proceed with the hearing without an opportunity of knowing the evidence or confronting the witnesses, or being advised of all the facts on which the commission intends to act, and will act if it makes any further order in this proceeding, even if it also considers the evidence that has been produced by the receiver of the two railroad corporations above specified.

Nine—That upon the evidence in this case it is clear that the proposed order would be confiscatory and in violation of the provisions of the fourteenth amendment to the constitution, and especially such provision as provides that no State shall deprive any person or property, without due process of law, or deny to any person within its jurisdiction the equal protection of the laws.

I quite appreciate that the public service act is an act that has undoubtedly come to stay. I quite appreciate that the future of these roads of this city, and the future of their use for the public and the benefit to be given to the public and to those interested in the railway securities, are going to be dependent upon the provisions of that act. I quite appreciate the enormous responsibility that attaches to the commission, the first commission appointed under the act, because the success, or non-success, it is plain, is entirely dependent upon the ability, and care, and wisdom, and progress in their work, of the members who constitute that commission.

We can move neither to the right, nor to the left, in the resuscitation and development of these properties, except by the exercise of the best judgment of this commission. No capital can be obtained, except such as the Third Avenue is obtaining on receiver's certificates, for the developing or resuscitation of these properties, except upon securities to be approved by this board. No new capital can be invited, except upon terms which will seem reasonable, and allow some reasonable interest to those who are to advance it.

In dealing with this situation, it seems to me that the first and most important requirement is the safety of operation. Cars cannot be permitted to run in the streets of this city, operated by electricity, or any other power, unless every possible device that protects the passenger or wayfarer, that is known is put upon the cars, and unless every possible step that human ingenuity can devise, is availed for their protection, and that this board is justified in ordering, without reference to any one fact, except the safety of operation. If a corporation wishes to operate cars in the street of this city, or is engaged in that business, that operation must be had at the highest point of safety whether it has the revenue with which to pay for it or not, or else it must not operate. On that point minds cannot very well disagree.

Now, the comfort of the passengers is secured by the condition of the cars: their cleanliness; their being properly painted; the courtesy of the employees hired to operate them; and the convenience required by the running of sufficient cars, with allowance for the reasonable number of detentions that must obtain in the management of a road; and the carrying of passengers and seating them, except during hours where it is impossible to give them all seats. Now, that, too, has been done under this administration; done by the receiver of this road; done, probably, of his own motion and partly in accord with your order, and possibly the same acts moving at the same time.

The cars are clean; the cars are painted; the conductors and motormen are polite, and there is fairly convenient

operation. We have got thus far with the work, and thus far there have been means found, from the receipts of the road, or otherwise, to meet these requirements. There is a vast difference between the condition of operation on that road to-day, and one year ago this day.

But we have come to a somewhat difficult problem, because it involves so many interests, and yet one that we cannot throw out of consideration, and that is, the revenue that goes to the State; that goes to the municipalities; franchise taxes; license taxes; direct taxes on real estate; taxes of very many kinds, under various laws. The franchise tax has not been paid on this road ever since it was levied. We have got to meet it. It is a lien on that property at some amount. And therefore it is, I suggest to this commission, that those who are engaged in the operation of this property—and for this purpose I treat this commission as overlooking it—in looking for any operation at all in the future, have first to consider the other questions that I have specified, and then see where the revenue is to come from the property to pay these taxes.

Of course, that is not a conceivable position, but the position is conceivable, and right upon us, of considering how much money the State is to get, and what the State ought to take. Of course, the real estate taxes here are to be fixed in the same method as all other real estate taxes. The franchise tax is to be fixed here, according to the proceedings now in existence, unless there be some amelioration or amendment of the law.

And, having got that far, and found the necessary expenditures for these three things which must be made, before anything can go to capital, then, of course, the commission is confronted with the proposition as to what, if any, return shall be made on the capital that is invested or to be invested. As to what that return shall be depends upon whether the statutes of this State are to apply, or whether it has to be a reasonable return. When I say the wording of the statute of this State, I do not want to be understood to use it as saying it does of necessity apply, but there is a statute which allows 10 per cent return, or rather seems to forbid a reduction of fares until the total earnings of the road have reached that point, and then there are the decisions of courts, in many cases, where they have indicated that 5 or 6 per cent return is a reasonable return.

In arguing this question to this commission, I do not address myself very much to the confiscation question. After all, there is a higher question than that, which we are discussing; that is, this city cannot go on without its street surface roads. It has subways; it has elevated roads; it may have more subways, and it may have more elevated roads, but these surface roads do serve a public convenience which cannot be served in any other manner, and, of course, are largely of avail for short rides, which is the reason the roads are able, so far as I can ascertain, to live; because of the considerable profit they get in short hauls.

To assist in this matter, we have placed in evidence before you all the sums of money ever paid by the Metropolitan system, from the time it took this lease, for maintenance of way or equipment, as best we could, in order that you could determine the real results of this road. The exhibit of maintenance charges of the Third Avenue road, commencing for the year ending June 30, 1901, and running up to Sept. 30, 1908, which included the items in the receiver's accounts, aggregated \$2,753,000. That is for a period of seven years, three months and a few days.

The owners of these properties for the future are interested in the property depreciation fund, and so is the commission. The days are gone by in which dividends can be paid out of capital and in which a physical construction of the road can be permitted, and nothing laid aside to invite new capital, or to give good operation in the future, for the citizens of the city. Any depreciation fund that is fixed, whatever percentage it may be of the earnings, is a matter in which the people of the city are just as much concerned as are the owners of this property. If it be 10 per cent of the earnings, it must be kept and I think this commission will see that it is so kept. If it be 5 per cent, it is sufficient to keep, and there is always reason why those interested should see to keeping enough, but on

that question I submit that neither the owners of the property nor this commission want to minimize.

In other words, the owners of that property may have to take it now, with that 5-cent fare, and be barely able to pay all the expenses which I have outlined, and keep up the operation as it must be for the future, and they may be getting a precious small return on the true value of their property. In that I cannot help them; you cannot. When they came to me and employed me in the business, to help them on this reorganization, I quite appreciated the situation in which they stood, and I never expected, and we cannot ask, that there shall be anything more done for them than to put them in a position, so far as their affairs are concerned, as the law now puts these affairs, and let them work out their own salvation; unless, indeed, you shall find that on the fair value of the properties, that would result in an earning to them greater than the law justifies or requires.

If the result of ordering the transfers is likely to be—and I think that is all I need say—to reduce the present earning capacity of that road, it will be a mistake to order it. It is exceedingly unfortunate that such questions have to be met in a time of reorganization. It is unfortunate if anything must be done to destroy the effort of the receiver, or those behind him, to get the property foreclosed, and get the whole thing on a basis which is to stand for all time to come.

ARGUMENT ON BEHALF OF CENTRAL PARK LINE

William N. Dykman, counsel for the Central Park company, moved to dismiss the proceedings, stating the grounds as follows:

1. There is no power vested in this commission by the act creating it, to compel transfers or establish through routes, between the street railroad corporations.
2. Section 49 of the act gives no such power, and is limited to railroads other than the street railroads.
3. The lines of railroads operated by the Third Avenue Railroad, Forty-second Street Railroad, and the line in question operated by the Central Park road will not, and cannot be made, to form continuous lines of transportation; they are intersecting lines, intersecting at right angles.
4. The commission has not power, under Section 49, to compel the Central Park road, from the Fifty-ninth Street line, to carry passengers between the Third Avenue Railroad Company and the Forty-second Street, Manhattanville & St. Nicholas Railway.

Now, may it please the commission, since we were here before, and since the testimony was closed, a judgment has been made in the Appellate Division, in this department, which changes this proceeding materially. It makes the testimony that has been taken here a record upon which this proceeding, and any order that may be made, will stand or fall. Concerning the Fifty-ninth Street line, the facts are absolutely undisputed. The cost has been ascertained to the fraction of a cent, and not even the pleasantries of cross-examination by the counsel for the commission have materially or at all varied the figures. I am not going to go over those figures again, but ask the commission to remember that the testimony of the cost to carry each passenger of the 20,000,000 that were carried on the Fifty-ninth Street line, the last year of the full and free transfers, was 1.77 cents. I am going to make the confession to the cross-examination that the cost of power has been materially reduced by the installation of the meter, and that has made a difference of perhaps 30 per cent in the cost of power, which would make a difference of about 0.1 per cent in the total cost of carrying each passenger, so that as near as I can ascertain, by the corrections, which I have been asked to have made, those figures would be reduced to 1.67 cents per passenger.

We ought to be allowed an opportunity to make some agreement; we ought not to be handed over to these north and south lines, with a rate less than cost or approximating cost. We ought to be given a generous profit, because if we do not have a profit this road cannot continue to run. This road must be abandoned if it cannot collect. Absolutely it costs more than the receipts to run the east and west Belt line, and that is in evidence in this case. And if the east and west Belt lines are to continue for the

present, they must be supported by the paying of the only part of the lines that pays anything. So, I submit, that if we are to have transfers you must give to the Central Park company the 1.6 cents which a ride costs, and the return on capital; you must give it well above 2 cents, considerable above 2 cents, and there is no dispute or no difference in the testimony in this regard, and this is the record according to which your decision must, I very respectfully submit, be made.

Another hearing in the case took place on Dec. 11. Henry W. Brown, auditor of the Metropolitan Street Railway, was recalled for further examination, and testified that since his statement had been made showing the number of transfer passengers carried during the six weeks ended Sept. 16 an error in the figures had been discovered. The following corrected statement was presented:

Statement of receipts, revenue passengers, transfer passengers and total passengers on the lines operated by the receivers of the Metropolitan Street Railway during the six weeks ending Aug. 5, 1908, and the six weeks ending Sept. 16, 1908, the lines of the Central Park, North & East River Road not being included in the figures for the six weeks ending Aug. 5, 1908:

	Receipts.	Revenue passengers.	Transfer passengers.	Total passengers.	Average fare per passenger in cents.
Six weeks ending Aug. 5, 1908...	\$1,539,112.85	30,782,257	16,418,704	47,200,961	3.2608
Six weeks ending Sept. 16, 1908..	\$1,517,543.25	30,350,865	15,033,797	45,384,662	3.3437

By agreement between Oliver C. Sample, counsel for the commission, and Herbert J. Bickford, counsel for the receiver of the Third Avenue Railroad, part of the testimony in the case involving joint rates and through routes between the Metropolitan Street Railway and the Central Park, North & East River Railroad was offered in the Third Avenue case.

The following statement regarding the Forty-second Street, Manhattanville & St. Nicholas Avenue Railway was presented:

For six months ending April 10, 1908:	
Number of revenue passengers.....	14,220,770
Number of transfer passengers.....	5,475,215
Total	19,695,985
Gross earnings from passengers.....	\$707,905.00
Average rate of fare.....	3.59 cents
Ratio of revenue passengers to total.....	72.20 per ct.
Ratio of transfer passengers to total.....	27.80 per ct.
For six months ending Oct. 10, 1908:	
Number of revenue passengers.....	11,596,363
Number of transfer passengers.....	2,602,844
Total	14,199,207
Gross earnings from passengers.....	\$578,654.47
Average rate of fare.....	4.08 cents
Ratio of revenue passengers to total.....	81.67 per ct.
Ratio of transfer passengers to total.....	18.33 per ct.

An affidavit was presented from Thomas F. Mulaney, chief engineer for the receiver of the Third Avenue Railroad, stating that he had had general supervision of the operation of the Kingsbridge power plant and of all the substations of the Third Avenue Railroad. The amount of the electrical power generated at the Kingsbridge plant from Jan. 12, 1908, to Sept. 30, 1908, both dates inclusive, was 55,849,840 kw-hours of a.c. There was a loss of approximately 11 per cent in transmission and conversion. Some of the power produced by the plant was sold to other companies. The cost of the power produced from and the price received for the power sold to the receivers of the New York City and the Metropolitan companies was 0.012386 cent per kw-hour for a.c. and 0.018181 cent per kw-hour for d.c. Prior to July 1, 1908, the power purchased from and the power sold to the receivers of the New York City and the Metropolitan companies was not measured by meters, but was estimated upon a car-mileage basis. The amount of power used between Jan. 12 and Sept. 30, 1908, both dates inclusive, in the operation of the railways of the Third Avenue company was 14,434,297 kw-hours of d.c., partly estimated upon a car-mileage basis.

THE BARBER SINGLE-TRUCK CAR USED ON THE SUNBURY & SELINGSGROVE ELECTRIC RAILWAY

The STREET RAILWAY JOURNAL of Feb. 8, 1908, contained an article entitled, "Notes on the Black River Traction Company," in which A. H. Lefevre, general manager of that company, described the novel double-bolster, single-truck car invented by Edward A. Barber, superintendent of the same railway. This type proved so successful in Watertown that several months ago the Barber Car Company was organized, with headquarters at York, Pa., to build such cars for other companies. The first railway which has followed the example of the Black River Traction Company is the Sunbury (Pa.) & Selingsgrove Electric Railway, a 6-mile single-track line which began operation on May 15, 1908, with three Barber cars, two ordinary single-truck cars and four open cars. In view of the novelty of the Barber design, this second installation offered a favorable opportunity to examine it in other surroundings and to learn what the general public thought of its riding qualities. All of the people interviewed expressed a decided preference for the new car as against the ordinary single-truck cars, and many of the points they mentioned with favor brought out the fact that passengers give a great deal more attention to details of car design than many railroad managers suppose.

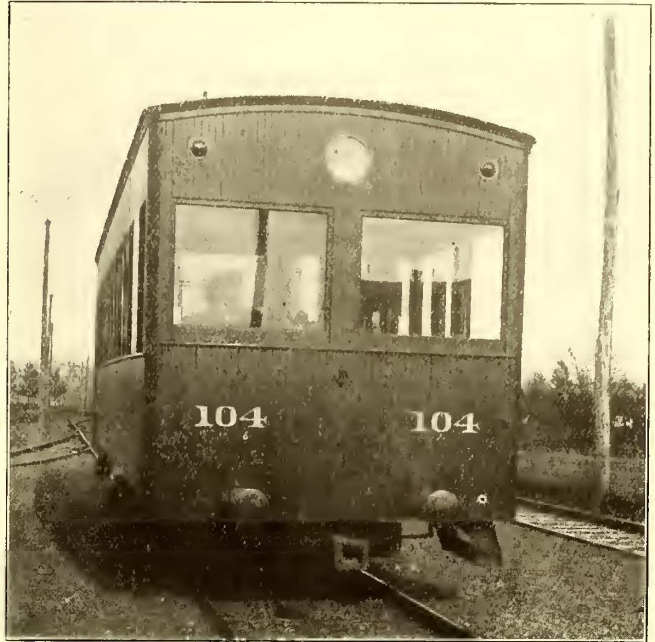
THE CAR BODY

It is readily apparent from a glance at the accompanying views of the car exterior that the most radical change in the body has been the elimination of the monitor roof. The change of outline thus produced gives the front of the car a rather squat appearance compared with the monitor-roof design, but it is a very small sacrifice in comparison with the benefits which accompany the single flat-curve roof.

In the first place, it has permitted so much more headroom that the lower side sash can easily be raised above

The use of grab handles on the seats naturally obviated unsightly car straps.

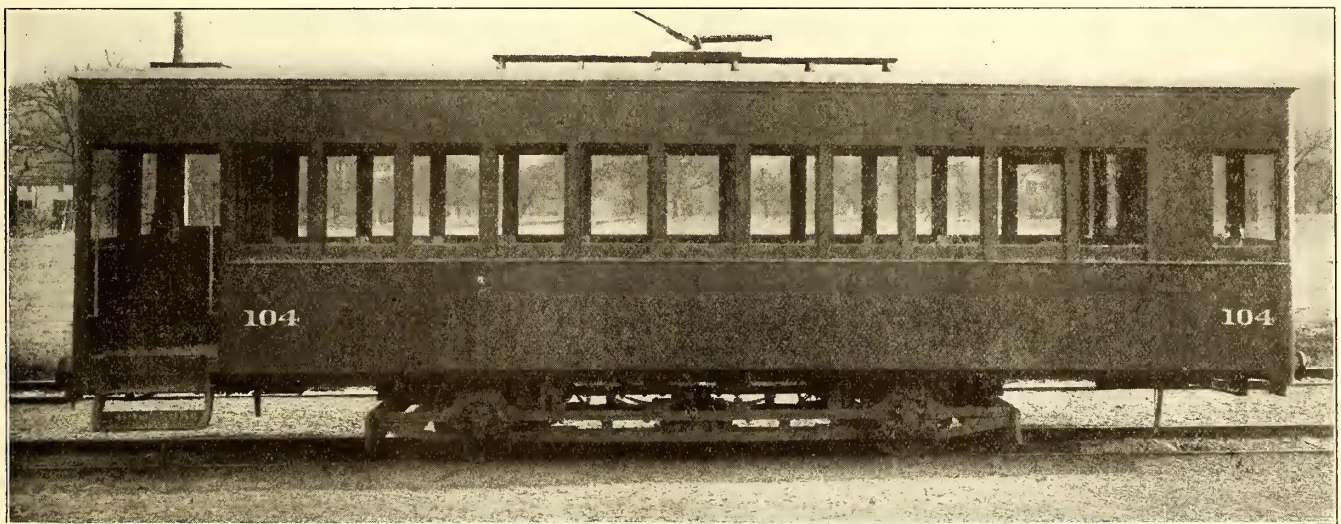
So far as the outside of the car is concerned, the elimination of the monitor has made it possible to place the headlight and markers in the upper part of the car, where they are far better protected from mud and breakage than



The Barber Car in Sunbury, Pa.—End-on View, Showing Absence of Monitor, Front Sash Arrangement and Advantageous Positions of Headlight and Markers

otherwise. Even a comparatively trifling change like this has been favorably noted by lay observers.

The car body is carried on a steel framing consisting



The Barber Car in Sunbury, Pa.—General Exterior View, Showing the Straight Outlines of the Body and the Type of Vestibule

the passenger's line of vision, and as the ends also have a liberal sash area, these cars are ideal for pleasant riding, whether summer or winter. No advertising cards are installed, so that the highly reflective white enamel is carried down the sides to the tops of the window sills. This arrangement gives the desired effect of finish and roominess, besides permitting the efficient and pleasing arrangement of lamps shown in the illustration of the car interior.

of the side sills, end sills and a pair of I-beams tied into the bolster at each end of the truck. The sides of the car are perfectly straight, thereby affording the maximum inside width desirable on lines where clearances are important. The straight construction, of course, also makes it easier and cheaper to replace woodwork which has been badly sidewiped or otherwise damaged. It would seem, however that the plainness of the sides of the car, and

possibly the ends, could be greatly relieved by arching the window framing.

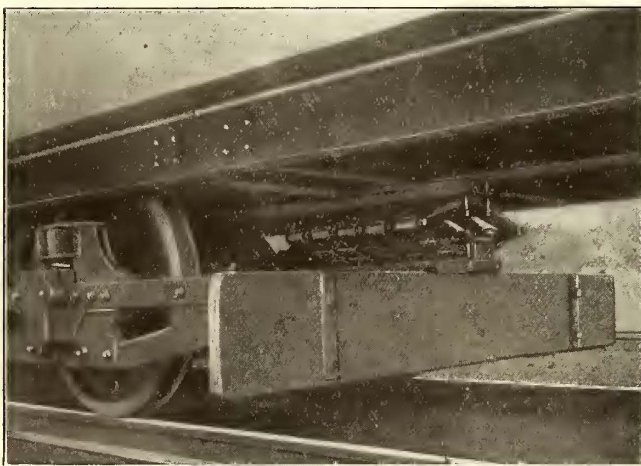
The platform and door arrangement are exceptionally interesting. Each platform is provided with an electrically



The Barber Car in Sunbury, Pa.—Interior, Showing the High Windows, Lighting Arrangement, Body, End Door, Etc.

heated motorman's cab, which contains a leather padded bench over compartments for sand and the personal effects of the crew. The cab is locked by an ordinary hinged door, and is provided with curtains for use when desired. The body end-doors are also of the hinged type. In summer each one is latched together with the motorman's door. It is apparent that standing on platforms is not encouraged by this design, as passengers must move immediately into the car to avoid blockading others. Safe ingress and egress is facilitated by the double Stanwood step and the grab handles.

Mention already has been made of the interior appearance of the car as affected by the roof and side construc-



The Barber Car in Sunbury, Pa.—One of the Two End Bolsters which Carry the Car Body

tion. The absence of all moldings or other dirt-catching parts, the use of linoleum flooring and Wheeler rattan cross seats make the matter of cleanliness simplicity itself. The Simplex electric heaters are set like wall radiators in the sides of the car, where they cannot gather dirt, and are much less likely to get into trouble. It is worth mentioning that despite the simplicity of the car all of the fit-

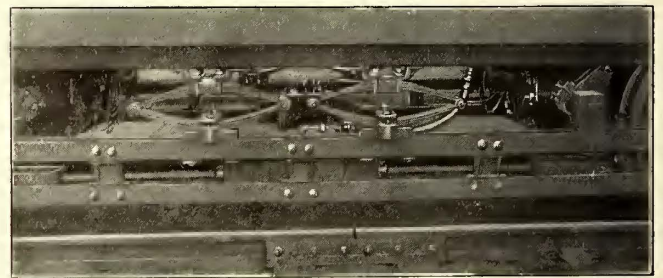
tings are as substantial and well finished as in the highest class of high-speed rolling stock. In fact, the car is expected to prove economical not only on account of its design, but because every part in it has been made for wear.

VENTILATION

The elimination of the monitor roof naturally did away with the ventilator sash which are so objectionable at times, especially in winter. A novel form of ventilation, therefore, has been installed, by which a partial vacuum is created in the open front vestibule when the car is moving. This vacuum draws the air from the car interior through a grating over the door between the car and the front vestibule, fresh air being allowed to enter through very small openings around the windows and rear door. The rear ventilator is opened when many people enter the car at one time, but it is not kept open very long.

THE TRUCK

The truck of the Barber car is as novel in construction as the car body, which is supported on the truck by bolsters at each end in just the same way as if it were mounted on the single-center bolsters of two trucks. As shown in the detail view, each bolster is made up of five elliptic springs set in a rocker plate. The side sway thus permitted is limited to about 12 in. either way by the pairs of elliptic springs mounted on the side framing between the truck wheels. The arrangement of bolster and side



The Barber Car in Sunbury, Pa.—View under the Car, Showing Direct Application of Brake Pistons, Truck Springs, Etc.

springs obviates lurching or oscillation. As the springs are very heavy in comparison with the weight of the body, their sluggish response to sudden changes in the track avoids sudden shocks to the car body and its passengers.

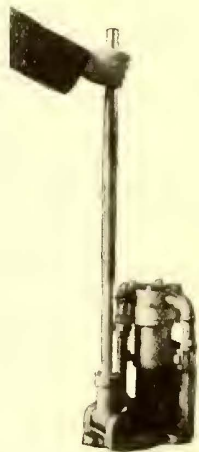
The truck wheel base is 12 ft., which has been found entirely satisfactory on the Sunbury line, the sharpest curve on which has a radius of 75 deg. This long wheel base has permitted the use of a body 34 ft. over all, 8 ft. 3 in. wide and seating 40 people. The motors are rigidly suspended, and can be very easily inspected from the pit because of the trifling room required for the springs and hydraulic braking mechanism. Whatever apparatus is required is carried directly on the truck, thus minimizing the transmission of sound and other vibrations to the body framing.

THE HYDRAULIC BRAKE

An interesting feature in the operation of these cars is the use of a hydraulic brake in place of the usual hand and air brakes. This brake is constructed on the principle of the hydraulic jack. The braking mechanism in the motorman's cab, as shown in the illustration, consists of a long metal lever operating a small piston. This piston is connected on one side to an adjacent 10-gal. supply tank and on the other side is joined to piping, which is carried under the car body along the top of the side sills, with flexible hose connections to the brake cylinders. The

latter are set on the truck frame in line with the wheels so that the brake plungers are applied directly on all four wheels.

To apply the brake shoes the motorman draws the cab lever back and forth two or three times, thereby pumping water to the brake cylinders. This water entering between the brake pistons, pushes them apart and thus causes the application of the brakes. The pistons have spring recoils which allow them to return to their normal position when the motorman allows the water to return to the tank by pressing his lever against the valve stem of the platform piston. Both the braking application and release may be graduated to suit the condition of the shoes. This hydraulic brake has been found very serviceable under the conditions obtaining on the Sunbury line. The platform apparatus takes up very little room, the tank itself being placed in the space ordinarily needed for the clearance of the controller handle. To avoid failure from freezing, the water is supplied with a quantity of calcium chloride.



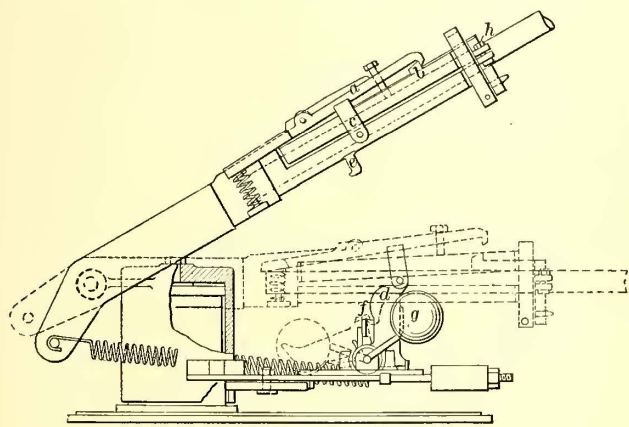
Hydraulic Brake Handle and Cylinder

MISCELLANEOUS CAR DATA

The total weight of each car is 23,000 lb., and the seating capacity 40, or 575 lb. per seated passenger. By examining the "Car Weight and Seating Capacity" table published on page 667 of the Sept. 19, 1908, issue, it will be seen that on the basis of passenger seats this car is remarkably light, whether compared with single or double-truck cars. The operating equipment consists of two GE-54 motors, K-10 controllers, Wilson retrievers, Van Dorn couplers and the hydraulic brake previously mentioned. Since May 15, when the cars began operation, the only money spent on them for maintenance has been the renewal of motor brushes and one new set of brake shoes per car.

A NEW TROLLEY STAND

The Fixler Trolley Stand Company, of Delta, Ohio, has placed on the market a trolley stand invented by Edgar L. Fixler, who as a motorman on the Toledo & Indiana Rail-



Fixler Trolley Stand

way had an ideal opportunity to observe the behavior of stands in service. The new stand was designed specifically to save time in changing poles and it appears to satisfy the purpose admirably since its manufacturer reports that on

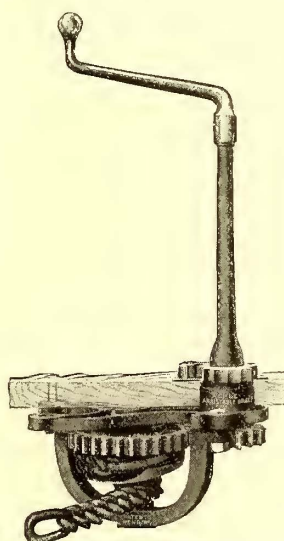
the cars of the Toledo & Indiana Railway poles fitted to this stand have been changed in from 12 to 20 seconds. The pole can be inserted in the socket in one position only and when once installed nothing but breakage above the socket can cause its loss. No tools whatever are required to make the change.

The accompanying illustration shows the pole in the socket held by the clutch *A* and *B*. When the pole must be removed, it is pulled down until the band *C* touches fulcrum *D* and the clutches *E* and *F* interlock. The lowering of the pole has the effect of raising the clutch *A* and thereby releasing the pole. The stand will remain with the clutches interlocked until the weight *G* is thrown over by hand or foot. After inserting the new pole, the stand is restored to its original position by pressing down the clutches *E* and *F* for release, thus permitting the fulcrum *D* and weight *G* to drop out of the way.

The clamps *H* are clamped on the pole in the shop and lined up with the wheel in the harp. This arrangement makes it impossible to place the pole in the stand and not have the wheel perfectly straight on the wire, even in heavy darkness. Two sets of pole clamps are furnished with each stand so that an extra pole can always be carried on top of the car.

ADJUSTABLE HAND BRAKE

The National Brake Company, Buffalo, N. Y., manufacturer of the well-known Peacock brake, has recently begun the manufacture of a new type of geared hand brake, invented by G. S. Ackley, president of the company. The new brake, which employs the same principle as the Peacock brake, is to be placed on the market under the trade name, Ackley adjustable brake. It is designed for use on cars where, owing to obstructions under the car body, the installation of the Peacock brake is difficult. The accompanying illustration shows the construction of this new



Adjustable Hand Brake

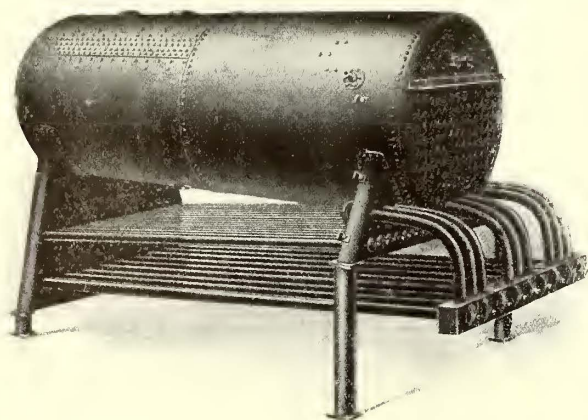
brake, from which it will be observed that there are a number of differences between it and the standard type of Peacock brake. The same spiral chain drum and gearing is employed, but the chain drum is supported under a yoke which is bolted to a separate casting mounted under the platform floor. The bearing casting contains the roller bearing for the brake shaft and a shaft and roller bearing on which the brake drum revolves. The yoke forms a step bearing for the brake drum and is attached to the upper casting by two bolts. The entire brake can be dismantled by removing these two bolts and dropping the yoke, whereas in the Peacock brake the brake drum is enclosed in the yoke, which is integral with the main casting and secured to the platform floor. The adjustable feature of the new brake consists in the means provided for shifting the yoke to either side of the brake shaft pinion so as to permit the brake chain to be led off the drum from either side of the rear leg of the yoke. The new brake has been patented in the United States and in foreign countries.

COMBINATION FIRE AND WATER-TUBE BOILER

The accompanying engravings illustrate the construction of the Hawkes boiler, which is a combination of the horizontal return-tubular and the water-tube types. The lower or water-tube member consists of two rows of water tubes, the upper row connecting into a front water-saddle at the forward end of the tubular boiler and with the water leg at the rear. These tubes are covered with a special tile or split firebrick on the top, and form a covering or roof over the furnace, preventing the hot gases from coming in contact with the shell of the tubular member. The water tubes in the lower row connect the rear water-leg with a series of steel box-headers at the front end, which are in turn connected to the front head and saddle by means of independent arch or circulating tubes.

The upper tubular boiler is made of 60,000-lb. tensile-strength flange steel, the riveted joints and shells being designed on the basis of a factor of safety of five. The tubes are expanded and beaded into the heads and liberal manholes and handholes are provided. The front water-saddle and rear water-leg are made without riveted joints, except where they are attached to the shell of the tubular boiler. Handhole plates are provided opposite each tube, giving access for cleaning and renewal. The legs are provided with staybolts. The front saddle is provided with compression plugs, placed opposite each tube, thus eliminating gaskets. The front box headers for the lower water tubes are made of flanged steel, the bearings for the handhole plates being faced on the inside to insure perfect contact for the gaskets. Each header is independently connected to the upper tubular boiler, with extra gage or thickness of circulating or arch tubes, causing the circulation of each tube to be taken care of independently and preventing any by-passing of the water.

The water circulation is as follows: The colder water passes down the rear water-leg into the water tubes, which are inclined upward toward the front end of the boiler. The water passes upward and forward through these tubes



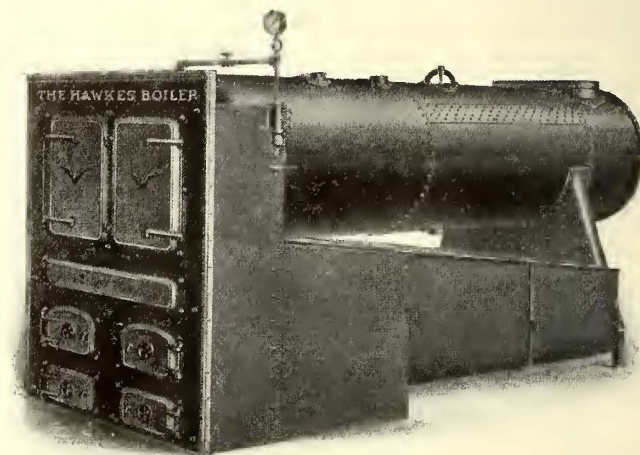
Combination Fire and Water-Tube Boiler Without Casing

in the same direction as the travel of the gases into the front water-saddle headers and circulating tubes into the front end of the upper tubular boiler, and to the rear through the tubular boiler, depositing the scale on the bottom of the shell of the upper tubular member, away from any fire action. This rapid circulation is said to keep the lower water tubes free from scale.

The boiler rests on cast-iron columns beneath the corners of the front water-saddle and rear water-leg, supporting the boiler entirely independently of the setting. One of the illustrations shows the boiler as constructed

with a steel jacketed casing instead of the usual brick setting. The casing is lined with tile insulated from the steel plates with non-conducting material. With a brick setting the method of support is such that the masonry walls are relieved of any weight or strains due to expansion of the boiler shell. The brick side walls, where used, extend to the top row of the water tubes, and the rear wall to the bottom of the rear water-leg. The front expansion chamber between the boiler front and front head of the upper tubular boiler is cased with steel lined with firebrick.

The rear supporting column is provided with expansion



Combination Fire and Water-Tube Boiler with Steel Casing

plates; rollers support the rear water-leg, and the front water-saddle rests on the front columns, expansion being taken care of to the rear of the setting and away from the masonry walls. The lower water tubes expand to the front, the box-headers being mounted on expansion plates. These lower water tubes will not sag on account of the extreme high temperature of the furnace, and they are flooded at all times.

The furnace is of the reverberatory-arch or Dutch-oven type, the arch being self-contained, and consisting of a series of interlocking tiles carried on the lower row of water tubes extending well back of the bridge wall. This arch dips downward over the grates toward the rear. The products of combustion come in direct contact with the heated arch, as well as the furnace brickwork, and the bridge wall over which the gases travel into an adequate combustion chamber to the rear of the bridge wall, before reaching the conduit or passage formed between the top of the arch over the grate and the roof or covering of the upper tubes to the front end of the tubular boiler, where the gases are equally distributed through the tubes of the upper tubular member. This construction is designed to promote combustion and reduce smoking to a minimum.

The tubes of the upper tubular boiler are accessible for either cleaning or renewal. The lower water tubes are also accessible from the front and rear, the boiler being provided with a removable panel at the front, giving access to handholes. The upper shell for its full length is jacketed with asbestos or other non-conducting material. The shell being accessible from the side and rear, hidden leaks and corrosion to the plates cannot exist undetected. The smoke outlet or connection is at the rear of the boiler, where it can be taken in any direction, or into a duct or flue beneath the floor, to the stack.

This type of boiler is adaptable to the conditions of low head room and limited length and width. The travel of

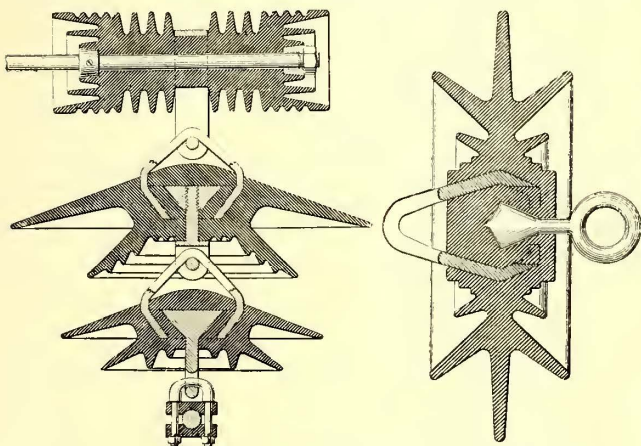
gases being practically three times the length of the shell, permits of building short boilers with a long passage for the products of combustion. This boiler is constructed by the Traylor Engineering Company, Allentown, Pa.

NEW TYPES OF HIGH-TENSION INSULATORS

The accompanying illustrations show three types of high-tension insulators for which patents have been issued to Louis Steinberger, of the Electrose Manufacturing Company, Brooklyn, N. Y. It is claimed that they cover the entire field of application of insulators to the transmission of electric power up to the highest voltage that now appears will be reached in the future. In the design of the flexible suspension type shown, provision is made not only for insulating the conductor, but also for insulating the cross-arm or support, which in effect insulates the insulator. Owing to the flexibility of this structure all direct strain on the insulating material is avoided. The dead weight of the conductor, including snow or sleet and the effect of wind pressure, is supported by insulating material which is wholly under compression. The form of the metal suspension members makes it quite impossible for the line wire to drop, even though the insulating material were totally destroyed.

The disk type of strain insulator shown provides large interrupted insulating surfaces for limiting surface leakage, while the design prevents moisture, soot or dust from forming a continuous conducting path extending from one strain member to the other over the surface of the insulator. The form of the strain members and their relation to each other and to the insulating disk are such as to provide an insulator of exceptionally great mechanical strength combined with the highest form of electrical insulation. The disk type of strain insulator may be used separately, or a number of them may be linked together for supporting a line, or used in any other desired relation where currents of very high potential are employed.

In the wall or barrier insulator shown the several sections of which the bushing may be composed are separable; should any of the parts become injured or destroyed,

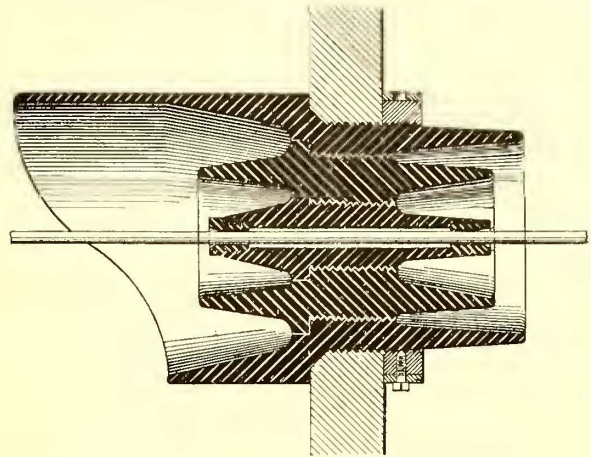


Double Petticoat Suspended Insulator

Disk Type Strain Insulator

they may readily be removed and a new section put in place, thereby avoiding the loss of the entire bushing. It will, of course, be evident that either one of the several bushings may be made of any predetermined length. The bushing is provided with a "protector," which shields the exposed parts from rain, snow, sleet, etc., and which may

be made integral with the bushing or attached separately thereto. The central bushing is provided with detachable members for supporting the line centrally with relation to the bushing. By means of these members the central bushing may be made watertight, thereby maintaining at all times a dry surface within the bushing. Finally, an

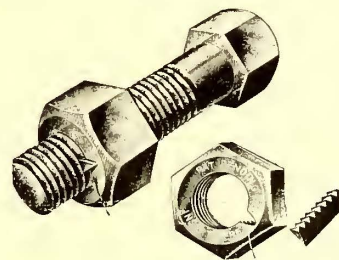


Wall Bushing with Hood Protector

insulating locking member is provided for securing the bushing relatively to the wall or barrier, thereby obviating the trouble and expense incident to cementing a bushing into place or removing it. These bushings may be mounted into or removed from the wall very readily.

AN EFFICIENT LOCK NUT

The accompanying engraving shows the construction of a recently devised lock nut, which, it is claimed, will not only lock securely in place at any point on the bolt, but will actually tighten by vibration. The Vibration lock-nut is similar in appearance to the usual nut, and is pressed cold or hot, with either hexagon or square heads. It has a longitudinal V-shaped slot holding a threaded wedge - shaped key that fits into this slot so as to form part of the nut. On account of its angle, this wedge plays no part in the operation of the nut while the nut



Wedge Lock Nut

is run on the bolt, but in reversing the nut to remove it, the key is carried over against the other side of the slot, forcing the teeth against the bolt so as to grip the bolt tightly. If the nut is to be removed it can be readily accomplished by inserting a pointed wire or piece of wood in the larger opening on the side of the key. This will prevent the key from acting as a wedge, and the nut can be removed in the usual way, without any more difficulty than with the ordinary nut. No tools other than the ordinary wrench are needed.

Unless it is taken off in a proper but simple way, it will be necessary to break the bolt before the nut can be removed. It is claimed that the lock-nut does not distort or damage the threads of the bolt, and that it will take up lost motion of the parts held that may be caused by wear, shrinkages or other conditions.

The L. S. Brach Supply Company, New York, is the sole manufacturer and distributor.

LONDON LETTER

(FROM OUR REGULAR LONDON CORRESPONDENT)

The subject of passenger traffic in London has been very much to the fore during the last month. The 173d volume of the Minute of Proceedings of the Institution of Civil Engineers, which was issued in October, has just come to hand, and brings the records down to March 17, 1908. Although this would appear to be rather stale news, it is the first time that the majority of the members of the Institution have been able to ascertain the particulars of the discussion on the paper particularly affecting this subject of transportation in London. Mr. William Barclay Parsons' paper on the New York Rapid Transit Subway, which he read on Feb. 25, takes up about 50 pages of the proceedings. This was followed by a discussion, the report on which takes up another 50 pages, and in which the most important men, engineers and others, who had had to do with the subject took part. The principal fact that was brought forth was the striking difference in the conditions between New York and London, a difference which greatly enhanced the difficulty of dealing with the subject in the latter town. Great admiration was expressed by all the speakers for the excellent design and the extraordinarily rapid construction of Mr. Parsons' undertaking, but it was clearly shown that such methods and rapidity of construction would be quite impossible in the English metropolis.

The speakers seemed to be divided into two camps, the shallow subway camp and the deep tube camp, and all that can be said on the subject is that whereas the shallow subway is certainly the most convenient, the tube railways have been able to accommodate the traffic along lines in which it was absolutely impossible, owing to cost and other reasons, to put in the other system. One very important difference between the English and the American systems was that of making provision for express traffic; had this provision been made in London much of the competition to which underground lines were subjected from the overhead tramways would have been obviated. One serious objection to the tubes was the enormous cost of, and delay occasioned by, lifts at the deep stations. This delay, according to Sir Herbert Jekyll, of the Board of Trade, was not really as long as it appeared to impatient passengers, and he quoted the following interesting question: "Why do married men live longer than single men?" and the answer, which is: "They don't, but it seems longer." Sir Herbert Jekyll is at the head of a traffic branch of the Board of Trade. Singularly enough, the president of the kindred Local Government Board, Mr. John Burns, at a recent dinner given in honor of Mr. Dickinson, one of the original Progressive members of the London County Council, spoke as follows: "In this vast city with so many millions of people in their midst they must strive to revive at once the old bold spirit of the first Progressive party of wider roads, broader streets, nobler buildings, more parks and better parks, and they wanted no Traffic Board for these. The Traffic Board sat in Spring Gardens (the headquarters of the London County Council) and in 20 years they had carried out 600 street improvements, built bridges, tunnelled rivers, made ferries and did their best to give greater order in the streets than previously prevailed." It must be confessed that the "greater order in the streets" exists only in Mr. John Burns' vivid imagination.

The London County Council's treatment of the G. B. Surface Contact Company, in the case of the Mile End Road Tramways, does not appear to an outsider as being altogether encouraging to anyone trying to help them out of the difficulty. The local authorities vetoed the overhead system; it was reported to the Council that the conduit system was impossible owing to an underground railway tunnel being too near the surface (this has subsequently been denied); and naturally their attention was directed to a surface contact system which had been in successful operation for some time at Lincoln. It is difficult in these matters to arrive at the truth, but it appears that the County Council, while accepting the designs of the company, insisted upon carrying out this installation themselves and in their own way. The result has not been satisfactory. According to the speech of Sir John Williams Benn, who may be described as the Leader of the Opposition in the Council, the "record was 50 live studs a day, injured people, roasted horses, fireworks at night, and the danger of a fatal accident to anyone who chanced to strike a live stud." This highly colored version was considerably toned down in the statement of the Chairman of the Highways Committee, which was to this effect: "There were 927 occasions recorded on which alarm indicators showed that studs remained alive immediately after the car left the studs. Seven hundred and twenty-eight of these cleared themselves; 185 cleared after being hammered; seven studs

would not clear and remained alive" (leaving seven unaccounted for). "The total number of cases in which it has been reported that accidents occurred, or were alleged to have occurred, is seven. In three cases claims were received and dealt with by payments amounting in all to £60. 4. 0." including one for a roasted horse. The most curious part of the whole affair is that throughout the negotiations regarding the laying-down and the subsequent unsatisfactory working of the system the company have offered to install and maintain the system to the satisfaction of the Council on the "no cure no pay" principle, an offer which has been persistently refused.

Another proposal which has also exercised, and it might almost be said electrified, the London County Council, is that of Sir Clifton Robinson, the engineer and manager of the London United Tramways. This gentleman actually has the audacity to ask for running powers over the lines of the London County Council from Tooting and Somers Town to two of the Thames bridges, along the Victoria Embankment and to Victoria Station. It is true that he proposes to give the Council a *quid pro quo* in the shape of running powers over his lines to Hampton Court Palace, etc., but it is exceedingly doubtful whether this very-much-to-be-desired consummation will materialize. In some cases where the county tramways stop at the boundary the tracks of the outside authorities start at a distance of a few feet from these dead ends, and, indeed, the respective rails are often not even in line with one another. The old objection that the Council had to adapting cars for both the conduit and the trolley wire systems has been overcome on their own lines to Camberwell, where cars on what might be called the "compound" system have been running for some time now. Another futile objection is that during busy hours it would be impossible to interpolate any more cars, but even if this were so (which is more than doubtful) it surely is not impossible to devise a time table whereby the through cars would take the place of certain local cars.

Another belated report is that of the Municipal association on the subject of brakes. This report is much shorter than that of the Tramways & Light Railways Association, and it naturally goes over very much the same ground and arrives at similar conclusions, or, rather, want of conclusions. The same reports of the Board of Trade on the same accidents are mentioned in both reports at great length; but, admirable as the Municipal report may be said to be, there is not any internal evidence in it to account for the delay in its issue. The only important difference in the recommendations is that the Municipal advocates one brake to be used for all kinds of stops, to be worked by one handle or lever, which, when the brake proved ineffective at one stop, should obtain further power by putting that one handle still farther over. The other association prefers to have two brakes in case of the failure of one of them from any cause. This would appear to be the most practical recommendation at present, as the single handle brake has not yet been produced.

Many of the tramway undertakings are beginning to feel the pinch of the cost of maintenance charges, and, as few of them have set aside a sufficient amount for depreciation, the case from the ratepayers' point of view is becoming serious. This question of maintenance, both of rails and of rolling stock, is indeed a most important one from every point of view. On account of the necessity for renewals it is impossible to reduce expenses *pari passu* with the reduction of the number of passengers which has followed the universal commercial depression. Some sections of rails, given by Mr. Parsons in his paper, go to show the fearful wear and tear to which the permanent way is subjected on the underground electric railways, and this wear is also going on in a lesser degree on tramway lines. Of course, where rails are worn out in less than three months it stands to reason that the wheels of the vehicles must have suffered to an equal degree, and the crying need at present is for some form of rolling stock which will not be so cruel to its own wheels and to the rails. This can only be accomplished by making the connection between the body of the vehicle and the truck more flexible than it is at present, and it is not unlikely that a satisfactory solution of this problem will soon be found.

Another problem which also appears to be in a fair way of being solved is that of the electric power and lighting supply to London in general. After an expenditure of some quarter of a million in promoting various ways of meeting this want the London Electric Supply bill has at last been read a third time, and it is probable that the linking-up of the many individual supply companies in London will eventually be effected. This linking-up of the various undertakings was successfully accomplished in the case of the different water companies, and it is to be hoped that the result will be equally satisfactory in the case of electricity.

A. C. S.

News of Electric Railways

Cleveland Traction Situation

On application of the receivers of the Municipal Traction Company, Cleveland, Judge Tayler of the United States Circuit Court ordered that before Jan. 1, 1909, \$50,650 be paid to the Central Trust Company, New York, out of the earnings of the railway. This is the interest due on \$2,026,000 bonds of the Cleveland Cable Railway. The court also ordered that \$3,000 be paid to the Society for Savings of Cleveland for semi-annual interest due Dec. 1 on \$100,000 indebtedness, secured by \$125,000 bonds of the Cleveland Electric Railway; that \$750 be paid to the Guardian Savings & Trust Company for quarterly interest due Dec. 15 on \$50,000 indebtedness, secured by \$63,000 bonds of the Cleveland Electric Railway, and that on or before Jan. 1, \$750 be paid to the Citizens' Saving & Trust Company, as quarterly interest on \$50,000, secured by \$63,000 bonds of the company. The question of interest subsequent to Jan. 1 will be considered further by the court. Judge Tayler has also ordered that the receivers be paid \$1,000 per month each until further order of the court.

The receivers of the company and Judge Tayler conferred on Dec. 23 with Mayor Johnson to secure the Mayor's views regarding a possible readjustment of fares that will at least meet the expenses. The Mayor criticised the schedules that have been prepared by the receivers as being better than are necessary. He said that the service on some lines where the profits are not heavy is too good, and is said to have asserted that a 3-cent fare with a charge of one cent for a transfer during the winter months will pay the operating expenses and meet the fixed charges, provided the service is kept strictly within the demands of traffic. He also pointed out the loss involved in long hauls. The receivers, Judge Tayler and the Mayor met again on Dec. 26 and considered the question of service in detail. It will have to be ascertained whether the franchises of the Woodland Avenue and the West Side lines of the Cleveland Railway have expired before a decision can be arrived at on the fare question. During the negotiations conducted between the Mayor and the Cleveland Electric Railway the members of the committee disagreed as to the dates of expiration. If the franchises have not expired, any fare up to 5 cents may be charged on these lines and on all the other lines whose grants have longer to run. If the grants to the Cleveland Electric Railway have expired, the ones made to other companies will hold, it is supposed. They provide for a 3-cent fare, with transfers to lines that were then operated by the new companies.

Receiver Warren Bicknell was in Philadelphia last week and looked into the merits of the Brill fare box. As a result one of the lines may be equipped with the box as an experiment.

Mr. Johnson has objected to certain matters appearing in the report of Ernst & Ernst, accountants for the receivers. He states that the claim against the city for balance of the cost of constructing the loops about the Public Square should not have been considered as worthless, as it can all be collected. He also objected to withdrawing the \$25,000 claim against the village of East Cleveland because that village enforced its contract for the same fare as is charged in the city, and protested against the increased service given that village by the receivers and the change of the division headquarters from Lake View to the Windermere car house, which is located half way between the east and west boundary lines of the village. The receivers state that traffic has been much heavier from that section of the line since better service was inaugurated.

Attorneys for the various claimants failed to agree upon rules for the classifications of claims when the hearing began before Special Master Belford on Dec. 28. Harry J. Crawford, representing the Cleveland Railway, objected to proceeding with the hearing on the ground that the court had not fixed the scope of the examination. He also objected to proceeding if the classification of claims, preferred or otherwise, would tend to prejudice the Cleveland Railway in any way. Judge Tayler stated that the special master should go into every claim before and after April 27, the date of the lease, and that he had instructed the receivers to have an accounting made between the Cleveland Railway and the Municipal Traction Company and that the special master should also go into this. Accountants have been instructed to begin this work at once.

H. J. Davies, secretary of the Cleveland Railway, and A. B. duPont, president of the Municipal Traction Company, who have been considering the classification of claims, have failed to agree in several instances. Ernst & Ernst will prepare a new report embodying the changes that have

been made and carrying the claims that have not been agreed upon.

Ernst & Ernst, expert accountants, filed their revised report of the classification of claims with the United States Circuit Court on Dec. 29. The changes in it from the original are based upon the agreements reached by H. J. Davies, secretary of the Cleveland Railway, and A. B. duPont, president of the Municipal Traction Company, and the totals are practically the same as the first ones, it is said. This classification will act as an aid to the master commissioner in the hearing on claims, but there is nothing final about the matter until that hearing has been completed.

Attorneys for the Cleveland Railway claim that rent should be paid that company during the time the Municipal Traction Company is in the hands of the receiver, and this matter has also been referred to the special master to be considered with the other claims.

The receivers have fixed Jan. 5 as the last day for giving former employees of the Cleveland Electric Railway preference over others applying for employment as motormen and conductors. Several hundred of the old men have already been taken back.

General Manager of Ohio Electric Railway to Have Headquarters at Springfield.—W. A. Gibbs, general manager of the Ohio Electric Railway Company, has made arrangements to move his office from Columbus to Springfield. The auditing department of the company will also be moved to Springfield from Cincinnati.

Proposed Traction Committee for Detroit.—Philip Breitmeyer, Mayor-elect of Detroit, has made public the names of 40 of the persons invited by him to become members of a committee of 50 to consider the readjustment of the franchise under which the Detroit United Railway operates, and who have agreed to accept places on the committee.

Philadelphia Rapid Transit Replies to Employees.—Representatives of employees have asked the board of directors of the Philadelphia Rapid Transit Company for a conference regarding the demands of the association for a new working agreement between the employees and the company. The contents of the company's reply have not been made public.

Yazoo Line to Be Operated by the City.—It has been decided by the City Council of Yazoo City, Miss., not to lease for private operation the electric railway recently built in Yazoo City by the city, and the property is now being operated under the management of T. W. Pocklington, who acted as superintendent of construction while the line was being built.

Court Will Apportion Cost of Making Crossings.—In the case of the Cincinnati Northern Traction Company against the Pennsylvania Railroad and the Cincinnati, Hamilton & Dayton Railroad, involving crossings in Butler County, the Ohio Supreme Court has handed down a decision to the effect that the costs shall be equitably distributed among the companies.

Increase in Wages in Indianapolis.—The directors of the Indianapolis Traction & Terminal Company voted on Dec. 21 on recommendation of Hugh J. McGowan, president of the company, who is in Europe, to increase the wages of all motormen and conductors who have been in the employ of the company for two years or more 1 cent an hour, the increase to date from Jan. 1.

Transit Committee Selected for Pittsburg.—The Chamber of Commerce of Pittsburg has selected D. P. Black, A. J. Logan, John M. Goehring, W. Clyde Wilkins and William Campbell as members of its rapid transit committee to consider the transit facilities of the city and to report to the Chamber at the earliest possible date plans for improving the present service. Mr. Black has been elected chairman of the committee.

Pennsylvania Tunnel Nearing Completion.—Within the next few weeks the four tubes of the Pennsylvania Railroad tunnel system under the East River between New York and Long Island City, which were built by Pearson & Son, will be turned over to the Pennsylvania Railroad for installing the operating equipment. The four tubes were joined about 10 months ago and later the rock work was finished and the air locks taken out. Since then the contractors have been at work lining the tubes.

Court Confirms New York Subway Route.—The First Department of the Appellate Division of the Supreme Court of New York has confirmed the report of the Public Service Commission of the First District of New York regarding

the Lexington Avenue subway. This action removes all legal obstacles to the building of the line. The commission will now prepare detailed plans for building the proposed line and will apply to the Board of Estimate of New York for an appropriation for construction.

Telegraph Lines Said to be Affected by Induction.—The Western Union Telegraph Company and the Lake Shore & Michigan Southern Railway have applied to the Porter County Circuit Court at Gary, Ind., for a permanent injunction to restrain the Chicago, Lake Shore & South Bend Electric Railway from operating its 6600-volt, single-phase line. The alternating current on the trolley at the voltage used is said to interfere by induction with the operation of the telegraph circuits.

New Jersey Conductor Convicted of Stealing Fares.—One of the two conductors arrested at the instance of the Public Service Railway, Newark, N. J., for stealing fares while in the employ of the company on its pay-as-you-enter cars has been convicted of larceny and is awaiting sentence. The other conductor will be tried on Jan. 18. The men are said to have withheld cash 5-cent fares paid to them by women who did not deposit the fares themselves in the fare boxes, and also, when making change, to have withheld fares which should have been deposited in the fare boxes.

Electric Signs on Elevated Railways in Chicago.—F. J. Gurnsey, superintendent for the Union Elevated Railroad, Chicago, is planning to install large illuminated electric signs on all of the elevated railroad stations located on the elevated loop. Large signs reading "Elevated Stations" will be installed on the elevated structure at the principal street corners, and smaller signs, reading "To All Trains," will be installed at the entrances to the elevated stations. Mr. Gurnsey's plans also include the installation of additional incandescent lamps on the platforms and in the waiting rooms of all elevated stations.

Port Arthur Municipal Railway.—The commission in charge of the municipal electric railway operating in Port Arthur and Fort William has voted to have the offices of the system in Port Arthur. The system was originally built by Port Arthur and was extended to Fort William, and that part of the system in Fort William was subsequently sold to that city. The question of management then came up and the Ontario Railway & Municipal Board, to which appeal was taken, decided that a joint commission of five members, one of whom was to be neutral, should manage the property.

New Commission Proposed for District of Columbia.—It is stated that as a result of the recommendations of one of the members of the Interstate Commerce Commission that the jurisdiction of the District Electric Railway Commission of Washington be extended to all the public service corporations of the District of Columbia, President Roosevelt will recommend the appointment of a public service commission for the District to be entirely independent of the Interstate Commerce Commission. Regulation of the street railways of the District of Columbia was entrusted to the Interstate Commerce Commission by act of May 23, 1908. That commission shortly afterward created a sub-commission, known as the District Electric Railway Commission.

Commendation for Rescuers.—The crew of a car of the Walkill Transit Company, Middletown, N. Y., who on Dec. 16 saved two boys from drowning in the Walkill River, received the following letter under date of Dec. 21 from William Venanee, receiver of the company: "The splendid judgment and energy manifested by you on Dec. 16 in rescuing two boys from death by drowning in the Walkill River is worthy of high praise. Such conduct is not only an inspiration to your associates, but it is an assurance to the public that you can be depended upon for fidelity, courage and sound judgment in any emergency. Not in any sense as a reward but simply as a mark of respect I desire that you spend Christmas at home with your families, your pay to run on as though you were in actual service."

Conference on Cambridge Subway Stations.—Mayor Wardwell, City Solicitor Pevey and City Engineer Hastings, of Cambridge, and President Bancroft and J. L. Pendergast, of the Boston Elevated Railway, considered the question of station designs for the Main Street subway on Dec. 28. A number of suggestions were presented to the company for consideration. The appeal of the company to the Railroad Commission from the adverse decision of the Mayor of Cambridge regarding the station designs was taken largely to preserve the company's rights in the matter. If the company and the city authorities are unable to agree the case will be placed before the Railroad Commission as a reviewing tribunal, with the introduction of such technical evidence as is required to prove the adaptability of the designs to the conditions of traffic.

Financial and Corporate

New York Stock and Money Markets

DECEMBER 29, 1908.

After a week of steady advances and activity, the market to-day received something of a check. While the net losses in the day's transactions were not important, the fact that this reaction was brought about by extensive selling in Europe indicated that those who had been instrumental in causing the recent advances were taking profits. As a whole, the stock market has been almost unreasonably buoyant for the last three weeks. The prosperity in commercial lines has not been sufficient to warrant great advances in stocks after the rise of the last few months. There has not been much outside buying, and yet the volume of transactions has averaged about 1,000,000 shares a day. The people who observe the stock market are wondering what will happen in January, when an enormous volume of investment funds seeks an outlet, resulting usually in the absorption of a large amount of securities.

The market for bonds continues to be strong and active. Every large bond offering recently has been oversubscribed, and the bond houses are diligent in searching for information as to new issues which are contemplated. It is now said that the Chicago & Northwestern road will issue \$10,000,000 in bonds to take up security maturing in 1909. It is also said that the Chicago, Burlington & Quincy road and one or two other Western lines contemplate new issues of securities.

Money rates continue at about the same figures, although contraction of the loan account, as shown in the bank statements, indicates that many loans have been called. Requests for money from Europe and the demand which always arises for dividend purposes at the first of the year has, in a measure, curtailed the offerings by the banks. Call money to-day was quoted at 2 to 3¼ per cent, and 90-day paper at 3½ to 3¾ per cent.

Other Markets

In the Boston market, activity has been shown in Boston Elevated stock and especially in the rights to subscribe to the new issue. The stock has been selling at 123 to 123½ and the rights at 3 to 3¾. There was very little trading in traction bonds.

Tractions were the feature of the trading in the Philadelphia stock market, but the net changes in price were unimportant. Philadelphia Rapid Transit was particularly active and the transactions for several days reached thousands of shares. Union Traction securities were traded in extensively.

In the Chicago market the traction issues were inactive. The various series of the Chicago Railways were offered to some extent, but the price changes were unimportant. Chicago Subway was in the market, the current price ranging from 29¾ to 30¼.

In Baltimore, as usual, the only interest that developed in tractions was in the bonds of the United Railways & Electric Company. These continue to be active with prices advancing. The 4s sold up to 85¼ and the "incomes" up to 51½.

Five shares of Rutland (Vt.) Railway, Light & Power Company stock were sold at auction in New York at 25.

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

	Dec. 22.	Dec. 20.
American Railways Company, Philadelphia.....	45¾	45½
Boston Elevated Railways.....	128½	123½
Brooklyn Rapid Transit Company.....	63½	67½
Chicago City Railway.....	180	180
Cleveland Railway.....	—	—
Consolidated Traction Company of New Jersey.....	276	276
Consolidated Traction Company of New Jersey, 5 per cent bonds.....	104½	104½
Detroit United Railway.....	53¾	53¾
Interborough-Metropolitan Company.....	19¾	18¾
Interborough-Metropolitan Company (preferred).....	46¾	47¾
Manhattan Railway.....	151¾	153
Massachusetts Electric Companies (common).....	12	11¾
Massachusetts Electric Companies (preferred).....	57	58
Metropolitan West Side Elevated Railway, Chicago (common).....	218	211
Metropolitan West Side Elevated Railway, Chicago (preferred).....	254	250
Metropolitan Street Railway.....	35	50
North American Company.....	73¾	74¾
Philadelphia Company, Pittsburg (common).....	44	44
Philadelphia Company, Pittsburg (preferred).....	44	44¾
Philadelphia Rapid Transit Company.....	21¾	23½
Philadelphia Traction Company.....	90½	90¾
Public Service Corporation, 5 per cent collateral notes.....	299½	299½
Public Service Corporation certificates.....	276	275½
Twin City Rapid Transit Company, Minneapolis (common).....	93	96¼
Union Traction Company, Philadelphia.....	49	50¾

* Asked.
* Last sale.

Reorganization of Mohawk Valley Lines

Special meetings of the stockholders of the Rochester Railway, Rochester & Sodus Bay Railway and the Rochester & Eastern Rapid Railway have been called for Jan. 18 to vote on the question of merging the companies into the New York State Railways, as the first step in accordance with the plan approved by the Public Service Commission of the Second District of New York for the reorganization of the Mohawk Valley Company. The plan is outlined in a circular addressed to the preferred stockholders of the Rochester Railway by the Guaranty Trust Company, New York, which is to act as depository for the stock. Of the \$20,000,000 stock of the Mohawk Valley Company 60 per cent is owned by the New York Central & Hudson River Railroad and 40 per cent by the unincorporated association known as the Central Railway Syndicate.

As a first step in the proposed reorganization, the Mohawk Valley Company will reduce its capital stock by distributing railroad stocks owned by it to the amount of \$17,065,800 par value pro rata among the stockholders. The New York Central & Hudson River Railroad being a stockholder to the amount of \$12,000,000, this stock would be reduced by the proposed operation, and it will receive in lieu thereof the stock of the various companies held by the Mohawk Valley Company to the amount of \$10,239,480.

As a second step the New York Central & Hudson River Railroad will purchase 29,987 shares of common stock of the Rochester Railway, having a total capitalization of \$6,000,000, of which \$3,000,000 is common stock. All of this common stock, except 13 shares, is owned by the Rochester Railway & Light Company. It is proposed to pay for such stock the sum of \$4,500,000 or substantially \$150 per share. It is provided that the purchase price shall not be paid until the stock is free from the lien of the mortgage of the Rochester Railway & Light Company by which it is covered, but that such purchase price shall be placed in escrow ready to be delivered whenever the proper arrangements can be made freeing the stock from its present lien.

The net result of the changes involved is that instead of owning the surrendered capital stock of the Mohawk Valley Company the New York Central & Hudson River Railroad will be the owner of the stock to the amount of \$10,239,480, and that instead of holding the indebtedness against the Mohawk Valley Company of \$4,500,000, it will own the capital stock of the Rochester Railway of the par value of \$2,998,700 and of the assumed value of \$4,500,000.

The following statement shows the balance available for dividends for the year ended Dec. 31, 1907, after deducting expenses and first charges, and also shows the proportion applicable to the stock of the companies entering into the consolidation or to be owned by the consolidated company:

Consolidated company, consisting of—		
Rochester & Eastern Rapid Railway.....		*\$16,793.66
Rochester Railway		566,856.66
Rochester & Sodus Bay Railway.....		39,060.12
Total		\$589,123.12
The consolidated company's proportion of net earnings available for dividends on account of stock ownership in the following companies:		
Utica & Mohawk Valley Railway.....	100%	\$260,653.20
Oneida Railway	96.13%	78,338.00
Syracuse Rapid Transit Railway..Pref.	28.85%	\$20,249.24
Syracuse Rapid Transit Company..Com.	72.01%	89,238.85
Schenectady Railway	50%	109,488.09
		91,228.23
Total		\$539,707.52
Total		\$1,128,830.64
Equal to 29.22% on \$3,862,500 first preferred capital stock.		

The following statement shows the balance available for dividends for the year ending Dec. 31, 1908, based upon actual figures, except December, which is estimated, after deducting expenses and first charges, and also shows the proportion applicable to the stock of the companies entering into the consolidation or to be owned by the consolidated company:

Consolidated company, consisting of—		
Rochester & Eastern Rapid Railway.....		*\$3,541.05
Rochester Railway		445,150.92
Rochester & Sodus Bay Railway.....		36,128.22
Total		\$477,738.09
The consolidated company's proportion of net earnings available for dividends on account of stock ownership in the following companies:		
Utica & Mohawk Valley Railway.....	100%	\$250,007.54
Oneida Railway	96.13%	56,606.97
Syracuse Rapid Transit Railway..Pref.	28.85%	\$20,249.24
Syracuse Rapid Transit Railway..Com.	72.01%	65,527.30
Schenectady Railway	50%	85,776.54
		72,465.56
Total		\$464,856.61
Total		\$942,594.70
Equal to 24.40% on \$3,862,500 first preferred capital stock.		

*Deficit.

Chicago & Southern Traction Company, Chicago, Ill.—At the annual meeting of the Chicago & Southern Traction Company the following directors were re-elected: Wm. H. Conrad, A. J. Law and V. R. Rink. The directors organized by re-electing the following officers for the year: Matthew Slush, president; Wm. H. Conrad, vice-president; V. R. Rink, treasurer; Francis Lowes, secretary.

Interborough-Metropolitan Company, New York, N. Y.—The suit of the Continental Securities Company to dissolve the Interborough-Metropolitan merger and to restore to the Interborough Rapid Transit Company the subway and the elevated systems, must be brought to trial, according to a decision handed down on Dec. 29 by Judge Ray in the United States Circuit Court. Judge Ray overrules the demurrer to the suit interposed by Paul D. Cravath on behalf of the defendants, the Metropolitan Street Railway, the Metropolitan Securities Company, the Interborough-Metropolitan Company, the Windsor Trust Company, the New York City Railway, Thomas F. Ryan, August Belmont, Edward J. Berwind, John D. Crimmins, Andrew Freedman, Thomas P. Fowler, Gardiner M. Lane and Cornelius Vanderbilt. Judge Ray, in overruling the demurrer, held that he was justified in dissenting from the position taken by the Appellate Division in spite of the rule that a Federal judge must follow the decisions of the highest State court in interpreting a State statute, because the Appellate Division was not the highest court, but had simply temporarily constituted itself as such by refusing to allow the motion to be carried to the Court of Appeals. He thought the State court had erred in holding that a monopoly could not be oppressive if under State regulation. The contrary position, he said, had already been taken by the United States Supreme Court.

Little Rock Railway & Electric Company, Little Rock, Ark.—The annual dividend on the Little Rock Railway & Electric Company common stock has been increased from 4 per cent to 5 per cent by the declaration of the semi-annual dividend of 2½ per cent on the \$1,500,000 outstanding stock of this issue, payable Dec. 31, 1908.

Macon Railway & Light Company, Macon, Ga.—W. J. Masee, president of the Macon Railway & Light Company, and his associates have purchased the holdings of common stock of the Happ estate and others, thus giving Mr. Masee and his associates control of the property. It is said, unofficially, that Mr. Masee will remain as president of the company and that negotiations are under way with the Central Georgia Power Company for a long-term contract to supply power to the Macon Railway & Light Company.

Mattoon (Ill.) City Railway.—The stockholders of the Mattoon City Railway have voted to decrease the capital stock of the company from \$500,000 to \$250,000. The stockholders will receive one share of new stock for every two shares now held of the par value of \$100.

Mexico Tramways, Mexico, Mex.—E. N. Brown and Julio Lemantour have been elected directors of the Mexico Tramways.

Miami & Erie Canal Transportation Company, Cincinnati, Ohio.—A conference was held recently between the Cincinnati stockholders of the Miami & Erie Canal Transportation Company and D. B. Spandauer and S. Spandauer, bankers, of Baltimore, and it is said that an application will soon be made to the courts for the sale of the canal property and the discontinuance of the receivership. The company was organized to build an electric railway along the Miami & Erie Canal between Cincinnati and Dayton for passenger service and for hauling canal boats.

New England Investment & Securities Company, Springfield, Mass.—The recent decree of the Supreme Court of Massachusetts, directing the New York, New Haven & Hartford Railroad to relinquish its interests in 16 electric railways in Massachusetts, was complied with on Dec. 29 at a meeting of the New England Investment & Securities Company, when Nathaniel Thayer, Boston, and William Skinner, Holyoke, who are directors of the New York, New Haven & Hartford Railroad, retired as trustees of the New England Investment & Securities Company. A Willard Damon, Springfield, and Henry L. Higginson, Boston, were elected to succeed them in the New England Investment & Securities Company.

Rochester, Corning & Elmira Traction Company, Rochester, N. Y. This company has filed with the Carnegie Trust Company, New York, as trustee, a mortgage to secure an issue of \$1,000,000 of 5 per cent 30-year gold bonds.

Rochester Railway & Light Company, Rochester, N. Y.—The Public Service Commission of the Second District of New York has authorized the Rochester Railway & Light Company to issue bonds to the amount of \$10,000 bearing interest at the rate of 5 per cent, payable July 1, 1954.

Traffic and Transportation

Holiday Service in Brooklyn

It is understood that the traffic records of the Brooklyn Rapid Transit Company were broken during the Christmas shopping period and that traffic has been very heavy for more than a month. Figures are not available of the actual number of passengers carried, but it is expected that the returns for the month will show an increase in earnings of approximately \$1,000 a day. In the early summer earnings fell off appreciably, but since the fall they have been improving steadily and, in fact, have advanced rapidly since Dec. 1.

This year the company's arrangements for handling shoppers were more thorough than ever before. Trunk line service was increased as much as 25 per cent in some instances during the afternoons in order to accommodate the shoppers, and the service on all the Eastern District lines was increased 10 per cent. Additional trippers were operated to Borough Hall, and the complete evening rush-hour service was continued for an hour each evening for several weeks before Christmas. The large Brooklyn department stores only kept open until 7 p.m., and so it was not necessary to increase the evening service materially.

In this connection the interesting announcement is made that an additional new time-table has been prepared for the Putnam-Halsey line and that hereafter an increased number of cars will be operated over this route in both the morning and evening rush hours, as well as in the middle of the day and at night. During the morning a new short-line service is to be operated over this route from Nostrand Avenue and Halsey Street to the Borough Hall. This will provide an independent increase in accommodations for patrons in the Bedford district and will act as an important feeder to the subway.

On the Greene-Gates line additional service has been provided between 7 p.m. and 12 p.m. Perhaps the most interesting schedule changes are those at the Atlantic Avenue subway terminal. In addition to the short-line service to this point by the Flatbush Avenue cars, new services have been established to and from that point during the morning and evening rush hours by the St. John's Place and Flatbush-Seventh Avenue lines.

The company also announces an increase in the main line through services of the Flatbush Avenue and the Flatbush-Seventh Avenue line, giving improved accommodations on these routes to and from Borough Hall and Park Row. In South Brooklyn the company has increased its surface car accommodations by running more cars on Fifth Avenue to and from Bay Ridge in connection with the elevated system at Thirty-sixth Street.

A Letter to Employees on Deportment

William Vanamee, receiver of the Walkill Transit Company, Middletown, N. Y., addressed the following letter to the employees of the company, under date of Dec. 21:

"Beginning Christmas, Dec. 25, 1908, hot coffee will be furnished, free, to motormen and conductors during the winter months between 6 a.m. and 9 a.m. and between 6 p.m. and 12 p.m.

"Motormen and conductors are expected to abstain entirely from the use of intoxicating liquors. This regulation constitutes no reflection upon the many excellent employees as to whom it is unnecessary. Like all rules, it is aimed at the few in respect to whom it is necessary. It is desired to bring them within the wholesome, restraining influence of public observation and official discipline.

"This regulation applies to the time when the men are off duty as well as to the time when they are on duty. They are never 'off duty' to the public. The use of alcohol while off duty is followed by its effects when on duty.

"The motorman who comes to the performance of his responsible duties with efficiency impaired or faculties benumbed by alcohol, already imbibed, is a dangerous public servant.

"I say public servant because all who are engaged in operating public conveyances under a public franchise sustain as direct a relation and duty to the public as though such utilities were owned and operated by the municipality itself.

"The experiments of Furer, Rudin, Kurz, Kraepelin and Aschaffenburg, as recently summarized by Dr. Williams, show that a single glass of beer involves a loss of 10 per cent in working efficiency.

"In the case of electric railway or railroad service, loss of efficiency means less safety for the public. Experience has shown that this requirement is a reasonable and neces-

sary one to insure the safety of the public. No motorman himself would be willing to ride upon a railroad train with a locomotive engineer who violates it."

Permission Asked to Sell Tobacco in Boston Tunnel.—The Boston (Mass.) Elevated Railway has petitioned the Massachusetts Railroad Commission for approval of the sale of cigars, tobacco, etc., at the news stands in the stations of the Washington Street tunnel.

Suggestions for Patrons and Employees.—The Scranton (Pa.) Railway had a half-page advertisement in the daily papers of Scranton just before Christmas in which were recounted the difficulties of handling traffic and the obligations of employees to the public and their employers.

Traffic Records Broken in New York.—The Interborough Rapid Transit Company, New York, established a new passenger record on Dec. 21. In all, 1,800,000 passengers were carried in 24 hours. Of this number 861,000 were transported in the subway and approximately 939,000 on the elevated lines.

Line to Railroad Terminals in Chicago.—Milton J. Foreman, chairman of the Committee on Transportation of the Chicago City Council has asked the Board of Supervising Engineers of Chicago to report on the feasibility of operating a new street railway line to all the railroad terminals in downtown Chicago.

Proposed Through Service Between Indianapolis and Michigan.—Tentative plans have been made by the Winona Interurban Railway, the Indiana Union Traction Company and the Chicago, South Bend & Northern Indiana Railway for establishing a through parlor car service between Indianapolis and Michigan City as soon as the Warsaw-Peru division of the Chicago, South Bend & Northern Indiana Railway has been completed.

Steam Railroad Will Test Indiana Commissioner's Authority.—Attorneys for the Cleveland, Cincinnati, Chicago & St. Louis Railway have notified the Indiana Railroad Commission that the company will disregard the order of the commission directing it to interchange freight with the Winona Interurban Railway in order to contest the order of the commission in the courts. The decision of the commission was published in the *ELECTRIC RAILWAY JOURNAL* for Dec. 26, 1908, page 1667.

Guide to New Orleans.—The New Orleans Railway & Light Company has published a tourist's guide to New Orleans for general distribution. It describes points of interest in and about the city, the railroad stations, places of amusement and the routes of the company's lines. A map of the city shows the street railway lines, the steam railroads and the railroad depots, and has the shopping, office and theater districts and such other sections as are concentrated, indicated by boundary lines in red.

Central Electric Traffic Association.—At the recent meeting of the members of the Central Electric Traffic Association to establish a tariff for 1909, and which was adjourned until Jan. 4 and 5, the following nominating committee was appointed to recommend a suitable person as chairman of the association for 1909: C. M. Paxton, general manager of the Dayton & Troy Electric Railway, chairman; F. D. Norveil, general passenger and freight agent of the Indiana Union Traction Company; C. C. Collins, traffic manager of the Western Ohio Railway. The committee on increased rates will also report at the meeting on Jan. 4.

Service in Cincinnati.—W. Kesley Schoepf, president of the Cincinnati (Ohio) Traction Company, has explained to the Board of Public Service of Cincinnati that the power system is being remodeled to furnish more current to the lines in the west end of the city, and that after this work has been finished service on all lines will be greatly improved. Mr. Schoepf says that conductors exercise their own judgment in regard to heating the cars. He also explained that it is absolutely necessary in case of delays to turn cars back on certain lines before the terminal is reached, but that cars are turned back only when long gaps would result if they were not rerouted.

Special Cars for Children's Christmas Festival in Los Angeles.—Howard E. Huntington, general manager of the Los Angeles Railway, placed 15 cars at the disposal of the organizers of a Christmas festival for the children of Los Angeles on Dec. 23. Mr. Huntington addressed the following note to those in charge of the celebration: "Noting the announcement of your Christmas festival and wishing to co-operate with you in giving the children of our city a Merry Christmas, the Los Angeles Railway desires to place at the disposal of all children under 16 years of age who are not able to pay fare, 15 special cars, to leave the *Examiner* Building between the hours of 12:30 p.m. and 1:15

p.m. on Thursday afternoon, Dec. 24, for the Chutes and return to the *Examiner* Building, leaving the Chutes between 4 p.m. and 6 p.m."

Brooklyn Rapid Transit Company Discontinues Express Service.—The failure of the American Express Company and the Brooklyn Rapid Transit Company to come to terms for a continuation of the lease to operate an electric express service in Brooklyn was announced on Dec. 28. The contract will expire at midnight on Dec. 31. With the discontinuance of the express trolley service the American Express Company will return to the wagon deliveries. The trolley express service was operated throughout Brooklyn proper and to such outlying suburban districts as Jamaica, Flushing and College Point.

Residents of Staten Island Object to Withdrawal of School Tickets.—Residents of Staten Island and representatives of the Board of Education appeared before the Public Service Commission of the First District of New York on December 28 to protest against the abolition of the \$2 monthly school rate by the Staten Island Rapid Transit Company on Jan. 1, under a decision of the Interstate Commerce Commission that such rates are discriminatory and illegal. Joseph P. Cotton, Jr., counsel and a director of the road, was asked by Commissioner McCarroll to make some statement as to the railroad's reasons for abolishing the school rate. He explained that the road had not been summoned to appear, so he was not present in any official capacity. Personally, he said, he believed the railroad was under the jurisdiction of the Interstate Commerce Commission, and that it could not avoid abolishing these reduced rates.

Holiday Shoppers' Excursion in Wisconsin.—The Merchants' Association of Appleton, Wis., conducted two very successful excursions over the lines of the Wisconsin Traction, Light, Heat & Power Company to Appleton from nearby towns just before Christmas as a means of increasing the sales of its members. As the association was prevented by law from giving free excursions or reduced rates, it bought 3300 car tickets, half of which were distributed among the members of the association and the other half to passengers boarding special cars of the association in certain cities along the lines on specified days, by men hired by the association to ride on the special cars. Each ticket given to a passenger was accompanied by a coupon redeemable for a return fare at any of the stores of the members of the association. The members of the association defrayed the expenses of the excursions by subscription.

Transportation Facilities to North of Boston to be Considered.—The Massachusetts Railroad Commission has been petitioned to investigate the relations existing between the Boston & Maine Railroad and the Boston, Revere Beach & Lynn Railroad, and the service between the Boston subway and territory to the east and north of the city, including additional transportation facilities between the Tremont Street subway and the South station, Boston. The petitioners, the Selectmen of Revere, claim that the Boston, Revere Beach & Lynn Railroad should be independently owned and operated; that grade crossings should be adopted where advisable; that the road should be electrified and changed to standard gage for local freight service; that a transfer agreement should be made with the Boston Elevated Railway and a tunnel connection provided between the Narrow Gauge terminal in East Boston and the city proper. The petition opens the question of local facilities between Boston and the East, on the lines of the Boston & Northern Street Railway and the Boston Elevated Railway.

Coney Island & Brooklyn Railroad Increases Service.—The Coney Island & Brooklyn Railroad has instituted a number of short trips during the rush hours of the evening which assure quick service to people desiring to leave from the vicinity of Borough Hall or the shopping districts. During the rush hours cars run from the intersection of High and Washington Streets under short headway. They leave High Street empty and run up Fulton Street, touching the Borough Hall subway station and passing through the shopping district, and through DeKalb Avenue to Broadway. During the crowded hours empty cars leave the junction of Fulton and Jay Streets and go up DeKalb Avenue to Broadway. Empty cars also leave DeKalb Avenue and Gold Street, and run to the depot at Covert Avenue. Shoppers' and business cars start empty from the junction of Fulton and Smith Streets on the Smith Street line every few minutes and go to the Park Circle. During the rush hours on the Franklin Avenue line the service has been increased by the institution of short-trip cars from South Eighth Street and the Eastern District ferries at the foot of Broadway and the Williamsburg Bridge to the depot at Franklin Avenue and Carroll Street.

Personal Mention

Mr. Harro Harrsen, general manager of the Mexican Tramway Company, City of Mexico, is in New York on a short trip. This is the first visit made to this country by Mr. Harrsen in two years. Mr. Harrsen was connected with the Toledo Railways & Light Company before going to Mexico.

Mr. John G. Honecker has resigned as vice-president and general manager of the New Jersey & Pennsylvania Traction Company, Trenton, N. J. Mr. Honecker has also retired as a director of the Trenton, New Hope & Lambertville Street Railway, Yardley, Morrisville & Trenton Railway, Trenton, Lawrence & Princeton Railway and the Trenton City Bridge Company.

Mr. Frank Burton, Jr., has just resigned his position as general superintendent of the Montgomery Traction Company, owing to a change in ownership of that property. Mr. Burton had been connected with the Montgomery Traction Company for 18 months. Previous to that time he was for eight years general superintendent of the Yonkers division of the Union Railway, New York City.

Mr. G. S. Shinnick, assistant to Mr. W. A. Gibbs, district manager of the Ohio Electric Railway, Columbus, Ohio, has been appointed general manager of the Mattoon Light, Heat & Power Company and the Mattoon & Charleston Railway, Mattoon, Ill. Mr. Shinnick has been connected with the Ohio Electric Railway for nine years, having been appointed secretary and treasurer of the Newark & Granville Railway, Newark, Ohio, in 1899. Mr. Shinnick is also secretary of the Licking Light & Power Company, Newark, Ohio.

Mr. Thomas F. Ryan has announced that hereafter he will be actively connected with the Morton Trust Company, the National Bank of Commerce and the American Tobacco Company, having withdrawn from official connection with all the other companies in which he is interested. Among the companies from which he has retired as a director are the Central Crosstown Railroad, New York; Thirty-fourth Street Crosstown Railway, New York; Union Elevated Railroad, Chicago; Metropolitan Street Railway, New York; New York City Railway; Consolidated Gas, Electric Light & Power Company, and the Electric Storage Battery Company.

Mr. E. T. Munger, heretofore superintendent of motive power and equipment of the Metropolitan West Side Elevated Railway, Chicago, Ill., on Jan. 1 assumed the duties of general superintendent of the Hudson & Manhattan Railroad, operating under the Hudson River between New York and New Jersey. Mr. Munger was graduated from the University of Wisconsin in 1892 and became connected with the Hall Signal Company as draftsman and construction foreman. In 1894, he entered the employ of the National Switch & Signal Company, but resigned a year later to become foreman of construction of the Metropolitan West Side Elevated Railway, in charge of wiring cars, stations and power houses. In 1898, Mr. Munger was appointed engineer of the Englewood & Chicago Railway in charge of the construction and installation of that company's storage battery surface line between Englewood and Blue Island. On the completion of the road, he became general manager of the Havana Telephone & Electric Light Company, Havana, Ill., but re-entered the service of the Metropolitan West Side Elevated Railway in 1903 as master mechanic, and continued in that position until March 14, 1908, when he was appointed superintendent of motive power of the company.

Mr. H. A. Johnson, engineer of car equipment of the Metropolitan West Side Elevated Railway, Chicago, Ill., has been appointed master mechanic of the company, assuming part of the duties of Mr. E. T. Munger, who as noted elsewhere in this issue of the *ELECTRIC RAILWAY JOURNAL* has been appointed general superintendent of the Hudson & Manhattan Railroad, New York. Mr. Johnson was graduated from Purdue University, with the degree of mechanical engineer, and immediately after graduation entered the employ of the Chicago, Burlington & Quincy Railroad as an apprentice, specializing in locomotive work. For the last 3½ years he has been connected with the Metropolitan West Side Elevated Railway in the inspection and electrical departments, the armature shop, the power house, and the drafting department and as engineer in charge of the Douglas Park extension, and as engineer of car equipment. With the resignation of Mr. Munger, Mr. J. T. Lovitt, chief engineer of power stations, will report direct to the general manager. Mr. E. J. Blair, engineer of substations, will also report direct to the general manager hereafter, and will have charge of all outside electrical work and the maintenance of distribution lines, lighting circuits, telephones and the third-rail.

Construction News

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

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

RECENT INCORPORATIONS

Fairburn & Atlanta Railway & Electric Company, Fairburn, Ga.—This company has been incorporated in Georgia to construct an electric interurban railway from Fairburn through Stonewall and Red Oak to College Park. From the latter place it is said that the lines of the Georgia Railway & Electric Company will be used into Atlanta, or some traffic arrangement will be made between the two companies by which they will exchange passengers. The road will be about 11 miles in length. Capital stock, \$75,000. Incorporators: J. F. Golightly, Atlanta; W. T. Roberts, J. H. Harris, W. H. Mims, L. M. Hobgood, J. E. Longino, J. H. Longino, W. H. McLarin, D. A. Carmichael and J. B. Carmichael, all of Fairburn. [E. R. J., Dec. 5, '08.]

***Bluffton, Berne & Celina Traction Company, Indianapolis, Ind.**—This company has filed articles of incorporation with the Secretary of State. Capital stock, \$50,000. It is the intention to construct and operate an electric railway from Bluffton, Ind., to Celina, Ohio, by way of Berne and other intervening towns. The principal office will be in Bluffton. Incorporators: Robert Saurer, B. A. Batson and Adolph Schurg.

Ohio & Michigan Southern Railroad, Toledo, Ohio.—Incorporated in Michigan with an authorized capital stock of \$1,000,000. This company will take over the property of the Toledo, Ann Arbor & Detroit Railroad, which has partially completed an electric road between Toledo and Ann Arbor. It is said that the new company will push the completion of the road as rapidly as possible. It is proposed to equip the road both for freight and passenger business. Headquarters, Toledo. Directors: Andrew E. Lee, Vermillion, S. D., president; De Courcy F. Niles, Duluth, Minn., vice-president; William E. Niles, Sioux Falls, S. D., secretary-treasurer and general manager; John O. Zabel, Toledo, general counsel, and N. A. Rees, Chicago, Ill. Curtis W. Stuedel, Chicago, Ill., superintendent of construction.

Somerset Street Railway, Rockwood, Pa.—Application will be made on Jan. 11 for a charter for this company which proposes to construct and operate a street railway from Rockwood to Somerset. The applicants for the charter are: John A. Berkey, Frank B. Fluck, Clarence L. Shaver, James C. McSpadden, John C. Lowry, A. L. G. Hay and A. K. Miller. [S. R. J., July 20, '07.]

FRANCHISES

***Globe, Ariz.**—A petition has been presented to the Globe City Council by George W. P. Hunt, asking that a franchise be granted for an electric street railway through Globe.

Berkeley, Cal.—The City Council has granted a franchise to the Southern Pacific Company for the operation of an electric road over California, Ninth and Ellsworth Streets, for which the company bid \$25,000. The franchise which Duncan McDuffie applied for, an extension of the present Grove Street line in Northbrae on Marin and Alameda Avenues, was sold to him for \$250.

Bristol, Conn.—Notices of an application to the General Assembly have been filed by the Bristol & Plainville Tramway, for an extension of time for its right to build between Thomaston and Terryville.

South Haven, Mich.—The City Council has granted a franchise to the Chicago, Benton Harbor & Grand Rapids Railroad Company for the building of an electric railroad through South Haven. Three trustees are the grantees of the traction franchise—Joseph W. Hosmer, William E. Dodson and George S. Hannaford, all of Chicago. [E. R. J., June 20, '08.]

Albany, N. Y.—The United Traction Company has presented a petition to the Common Council asking for an extension of one year in which to construct the proposed line across Arbor Hill.

Seneca Falls, N. Y.—The Town Board of Seneca Falls has granted a franchise to the Geneva, Waterloo, Seneca Falls & Cayuga Lake Traction Company to extend its road from the east line of Seneca Falls to the west shore of Cayuga Lake, along the highway. The company has also been granted a franchise to extend its line through Aurelius.

Kenmore, Ohio.—Thomas L. Childs, promoter of the Turkeyfoot Traction Company, Akron, Ohio, has made application to the Council of Kenmore, Ohio, for a franchise. It is proposed to build the line below grade at a point known as Wingerter crossing, just south of the business

center of the village, and carry the public highway with the line under the tracks of the Erie, Cleveland, Akron & Columbus and the Baltimore & Ohio roads.

Philadelphia, Pa.—The ordinance granting a franchise to the Delaware Tunnel Railroad Company has passed both branches of the Philadelphia Council. The company has already secured legislation on the New Jersey side of the river. Beginning at Market and Second Streets, on the Philadelphia side, one tube will extend south to Chestnut Street and will gradually curve toward the river. At the center line of Chestnut Street it will extend east to Third Street in Camden. The north tube will extend from Third Street, in Camden, diagonally to the river front, thence diagonally to Second and Arch Streets, on the Philadelphia side. It will then curve in Second Street to the south to join the first tube at Market Street. There will be spur tracks to Third Street in both Arch and Chestnut Streets. The combined mileage will be slightly more than 4 miles. [E. R. J., Dec. 19, '08.]

Rapid City, S. D.—The City Council of Rapid City has granted a street railway franchise to the Rapid City & Wyoming Railway. It covers the streets of that town generally and the line is to be several miles in length. It is authorized to use either gasoline or electric motors for operative power. L. A. Richards, president. [E. R. J., Oct. 3, '08.]

El Paso, Tex.—J. A. Happer has been granted a 50-year franchise to build a street railway to the Government Hill addition from the Fort Bliss electric line.

***Gainesville, Tex.**—The Gainesville City Council has granted a franchise for the construction and operation of a street railway to E. S. Alnut and C. R. Ball. Construction is to begin not later than April 15, 1909. It will be 4 miles long. It is the intention of the promoters to operate gasoline motor cars.

TRACK AND ROADWAY

Little Rock Railway & Electric Company, Little Rock, Ark.—This company is rebuilding 4 miles of double track and paving the line for a considerable distance. The work is being done under the direction of Ford, Bacon & Davis.

British Columbia Electric Railway, Vancouver, B. C.—Announcement is made that this company will soon begin the construction of a line extending to the eastern boundary of Hastings township.

Southern Colorado Power & Railway Company, Trinidad, Col.—It is stated that this company will build 2 miles of additional track in Trinidad this year.

Denver (Col.) City Tramway.—This company is said to be planning to extend one of its lines to Valverde. The extension will be about two miles long.

New London, Conn.—Petitions for charter amendments which will be asked at the coming session of the General Assembly are advertised by the New London & East Lyme Street Railway and the Groton & Stonington Street Railway. The change asked by the East Lyme Street Railway will permit it, if granted, to extend its tracks to the Connecticut River. The Groton & Stonington Street Railway asks for permission to lay its tracks through several of the streets of Groton borough and to Eastern Point. The Norwich, Jewett City & Voluntown Street Railway will also petition the General Assembly for an extension of time for the right to construct its line over the route named in the charter. This is up the east side of the Quinebaug to Jewett City and through Glasgow to Voluntown.

Norwich, Colchester & Hartford Electric Railway, Norwich, Conn.—This company is said to have begun making surveys for the electric railway which it is planning to build between Norwich and Hartford. It is intended to begin construction in the spring. [E. R. J., Dec. 5, '08.]

***Pensacola, Fla.**—The Pensacola Investment Company is said to be planning to build an electric railway from Pensacola to Magnolia Bluff. Negotiations are now said to be on with Stone & Webster, Boston, Mass., for the construction of the line. The road will connect with the present line of the Pensacola Electric Company at some point on Sixteenth Avenue and will run to Bayou Texar, crossing that body of water and running through selected streets of East Pensacola Heights to Magnolia Bluff. The company expects to apply for a franchise at the next meeting of the City Council.

***Lewiston, Idaho.**—It is said that Spokane and eastern capitalists, headed by Judge George W. Bolt and W. N. Bourke, Spokane, are organizing a company to build a city and interurban electric railway system and lighting plant at Lewiston, Idaho. The railway is to cover 90 miles.

Chicago, Blue Island & Joliet Traction Company, Chicago, Ill.—W. H. Conrad, promoter of this proposed line, announces that he has completed arrangements for building

an interurban line between Blue Island, Ill., and Oak Forest. This line will be about 4 miles in length and will be operated in conjunction with a line which will run from Blue Island to Midlothian, where the Midlothian golf links are located. At present steam trains are operated between Blue Island and Midlothian, but Mr. Conrad states that the Chicago, Blue Island & Joliet Traction Company will take this line over and equip it for the operation of cars by electricity. These lines will be used as feeders for the Chicago & Southern Traction Company's lines at Blue Island. Ultimately it is intended to extend the line from Oak Forest to Tinley Park and on southwest to New Lenox, where it will join with the Chicago Heights branch of the Joliet & Southern Traction Company's lines, and thus complete a direct route from Joliet, Ill., to Chicago. The project, it is said, has been financed and plans are now being made to begin construction work between Blue Island and Oak Forest early this spring, at which time the electrification of the Midlothian branch will also begin. Power for the operation of cars will be rented from the Chicago & Southern Traction Company.

Peoria Railway Terminal Company, Peoria, Ill.—This company expects to construct 2½ miles of additional track in Peoria this year.

Joplin & Pittsburg Railway, Pittsburg, Kan.—Announcement is made that this company will build from 10 to 30 miles of new track during this year. Two lines will be built, one from Pittsburg to Cherokee, Kan., and the other from Pittsburg to Mulberry, Kan.

Portland, Gray & Lewiston Railroad, Lewiston, Maine.—Charles C. Benson writes that the survey for the route of this projected electric railway has been completed and the rights of way secured. It is the intention to begin construction on the road early this spring. The line will extend from Portland to Lewiston through Falmouth, Gray and New Gloucester. Headquarters: 165 Main Street, Lewiston. Officers: E. W. Gross, Berlin, N. H., president; J. D. Clifford, Lewiston, vice-president; Charles C. Benson, Lewiston, treasurer; J. A. Jones, Lewiston, chief engineer.

Boston & Western Electric Railroad, Boston, Mass.—This company is stated to have requested the Railroad Commission to dismiss its petition for a certificate of exigency, on account of a technical error in the pending petition. It is said that a new petition will be filed.

Newton Street Railway, Newtonville, Mass.—The ELECTRIC RAILWAY JOURNAL is informed that this company is planning to double-track about 5 miles of its line this year.

El Dorado Springs, Tiffin, Monegaw Springs & Lowry City Railroad, Tiffin, Mo.—J. S. Harrison writes that this company is planning to begin construction within the next three months on its proposed electric railway, which is to connect El Dorado Springs, Tiffin, Oyer, Monegaw Springs, Chalklevel and Lowry City, Mo. It will be a standard-gage road, consisting of about 30 miles of track. It is expected that the overhead trolley system will be adopted. Mr. Harrison states that the power station will be erected on the Osage River. The repair shops will be built at El Dorado Springs. Officers: Dr. C. A. Edgar, El Dorado Springs, Mo., president; J. W. Kennerly, Tiffin, Mo., vice-president; J. S. Harrison, Tiffin, secretary and general manager; J. W. Reeder, El Dorado Springs, treasurer. [S. R. J., Dec. 7, '07.]

***Jefferson City, Mo.**—It is reported that A. T. Sparta, New York, N. Y., is interested in a plan to construct an electric railway from Jefferson City to Columbia via Fulton.

Oklahoma & Golden City Railway, Kansas City, Mo.—The ELECTRIC RAILWAY JOURNAL is advised that this company contemplates the construction of an electric railway, connecting Springfield, Mo., Pawhuska, Okla., and Jefferson City, Mo. No definite date has been set for beginning construction on the line. The overhead trolley system will be used. Officers: Winfield S. Pope, Jefferson City, Mo., president; E. W. Dempsey, Pawhuska, Okla., vice-president; F. A. Griessel, Golden City, Mo., general manager; W. K. Palmer, 717 Dwight Building, Kansas City, Mo., chief engineer. [S. R. J., Jan. 25, '08.]

Springfield (Mo.) Traction Company.—This company is making preliminary surveys for its proposed extension from Springfield to Carthage, Mo. The southern route parallels the Frisco line from Springfield to Carthage. The northern route runs north of Mount Vernon about 7 miles, and passes through Miller. After leaving Miller the road will extend to Avilla and then to Carthage.

Butte (Mont.) Electric Railway.—This company expects to construct about 3 miles of new track in Butte this year.

Central Western Railroad, Omaha, Neb.—This company, which contemplates establishing an electric railway between Kearney, Neb., and Holdredge, Neb., has completed

the surveys for one section of the route and has also secured a portion of the right of way. It is stated that the company will not award any contracts before next March. The road, which is to be standard-gage, will have about 38 miles of track. The company expects to handle both freight and passengers. Power for the operation of the road will be rented from a local power company. The company expects to erect its repair shops at Kearney. Capital stock, authorized, \$250,000; issued, \$50,000. Office, 600 Bee Building, Omaha, Neb. Officers: T. E. Brady, president; S. C. Nelson, treasurer and general manager; N. R. Denham, chief engineer, all of Omaha. [E. R. J., Sept. 5, '08.]

Morris County Traction Company, Morristown, N. J.—The ELECTRIC RAILWAY JOURNAL is advised that this company expects to place contracts during the next five weeks for the construction of 20 miles of new track.

Dunkirk, N. Y.—Passenger service over the Buffalo & Lake Erie Traction Company's road between Buffalo and Dunkirk and the adjoining village of Fredonia was begun on Dec. 24.

Lake Erie, Bowling Green & Napoleon Railway, Bowling Green, Ohio.—This company expects to build this year a 6-mile extension to its system, from Bowling Green to Tontogany.

Ohio & Southern Traction Company, Columbus, Ohio.—It is reported that this company is considering the extension of its line south from the Hartman farm to the Gould farm, a distance of about 2.5 miles.

Wheeling, Cadiz & Tuscarawas Traction Company, Cadiz, Ohio.—A. E. Townsend writes that the surveys for this line will be completed within a few days. Arrangements have been made for starting construction this spring. The following cities will be connected by this road: Uhrichsville, Dennison, Franklin, Laceyville, Cadiz, New Athens, Harrisville, Colerain, Georgetown, Adena, Martin's Ferry, Bridgeport and Wheeling, W. Va. It will be a standard-gage line and will have about 55 miles of track. It is planned to use the overhead trolley. The power station and repair shops will be built at Cadiz. Power for lighting and other purposes will be furnished to manufacturing concerns along the route. Capital stock, authorized, \$10,000. Officers: A. E. Townsend, president and general manager; Robert P. Scott, vice-president; George W. Grissinger, secretary; John E. Lacey, treasurer, all of Cadiz, Ohio. [E. R. J., Sept. 12, '08.]

Oklahoma City, Shawnee & El Reno Rapid Transit Company, Oklahoma City, Okla.—John W. Burchinal writes that rights of way are now being completed, estimates being prepared and arrangements made for the financing of the road. It will be 70 miles in length and will extend from Oklahoma City to Spencer, Horrah, Choctaw, McCloud, Yukon, El Reno and a number of smaller towns. The overhead trolley will be used. Capital stock, \$1,500,000. Officers: W. M. Sawyers, president; J. A. Niblo, vice-president; C. A. Huber, secretary; S. M. Niblo, treasurer; John W. Burchinal. [E. R. J., June 13, '08.]

Mount McKay & Kakabeka Falls Railway, Fort William, Ont.—G. R. Duncan writes that construction has been stopped on this road for the winter, but work will again be resumed early this spring. About 3 miles of track have been laid. The road will connect Kakabeka Falls and Fort William, a distance of about 20 miles. The overhead trolley system will be installed. An amusement park, located about 6 miles from Fort William, is owned by the company and will be reached by the road. Headquarters, Fort William. Officers: W. F. Hogarth, president; Joshua Dyke, vice-president; C. W. Jarvis, secretary; C. H. Jackson, treasurer, all of Fort William. G. R. Duncan, 413 John Street, Fort William, consulting electrical engineer. [E. R. J., June 20, '08.]

***Marshfield, Ore.**—M. M. Johnson, Portland, is said to be considering the possibility of an electric railway between Cuss Bay and Roseburg.

Royalton & Elizabethtown Street Railway, Philadelphia, Pa.—According to an official report, construction will begin on this road in about three months. It will connect Middletown, Royalton, Elizabethtown, Florin and Mount Joy, a distance of 40 miles. A branch line will also be built to Lebanon. The road will be a standard-gage one, and it is the intention of the company to adopt the overhead trolley system. Ten cars will be operated upon the completion of the line. Power from a station to be erected at Conewago will be furnished to towns along the route. The repair shops will be built at Elizabethtown. Headquarters, 1324 Real Estate Trust Building, Philadelphia, Pa. Wm. Trimble, Minneapolis, Minn., president; E. M. Raymond, Philadelphia, secretary and general manager.

Washington & Canonsburg Railway, Washington, Pa.—This company contemplates the construction of 6 miles of new track this year.

Sioux Falls & Sioux City Electric Railway, Sioux Falls, S. D.—The ELECTRIC RAILWAY JOURNAL is informed that this company is planning to begin construction on its projected standard gage line this year. The road will be about 90 miles in length, joining Sioux Falls, Worthing, Bensford, Elk Point, S. D., and Sioux City, Ia. Up to the present time about 50 miles of the right of way have been secured. It is probable that both electric and gasoline motor cars will be operated on the line. It is the intention of the company to build two power stations, one at Sioux Falls, S. D., and the other at Sioux City. The repair shops will be erected at Sioux Falls. Capital stock authorized, \$1,000,000. Headquarters, Sioux Falls, S. D. Officers: O. H. Smith, president; Charles Fantle, vice-president; E. D. Morcom, secretary and treasurer; Geo. W. Burnside, general manager; F. C. Whitehouse, superintendent, all of Sioux Falls, S. D.

Corsicana (Tex.) Transit Company.—This company is ballasting its track and will also relay a portion of it with larger rails. The company is also planning to establish a park and other attractions.

Puget Sound Electric Railway, Tacoma, Wash.—An extension of this company's line was recently opened for traffic from Tacoma to Puyallup. It is stated that it is the intention of the company to extend its line on to Sumner, McMillan, Orting and finally to South Prairie and other points.

Seattle (Wash.) Electric Company.—The ELECTRIC RAILWAY JOURNAL is advised that this company expects to construct 30 miles of new track this year. Approximately \$550,000 will be expended in street paving.

Spokane, Columbia & Western Railway, Spokane, Wash.—This company is at work securing the rights of way for its projected line which is to extend from Spokane to Rear-dan, Davenport and Peach. The road will be standard gage and it will be about 70 miles in length. When completed it will be operated as part of the Spokane & Inland Empire Railroad. Officers: Clyde M. Graves, Spokane, president; Waldo G. Paine, vice-president; W. G. Davidson, secretary; H. B. Ferris, treasurer; J. B. Ingersoll, electrical engineer; A. M. Lupfer, chief engineer. [E. R. J., Sept. 12, '08.]

Morgantown & Interstate Railroad, Morgantown, W. Va.—It is announced that this company will build 12 miles of new track this year. An extension will be built from Morgantown to Star City, W. Va., and Point Marion, Pa.

Wellsburg, Bethany & Washington Traction Company, Wellsburg, W. Va.—Announcement is made that this company expects to extend its line next year from Bethany to Washington, Pa., a distance of about 21 miles.

Central Wisconsin Transit Company, Kilbourne, Wis.—It is announced that this company expects to begin construction early this spring. The general contract for the building of the road has been awarded to Burns & Company, 705 Isabella Building, Chicago, Ill. Kilbourne, Portage, Friendship and Grand Rapids, Wis., will be connected by this line. It will be about 65 miles in length. Both steam and electricity will be used for motive power. The repair shops will be located at Friendship, Wis. Capital stock authorized, \$1,000,000; issued, \$25,000. Bonds authorized, \$1,000,000. Headquarters, 705 Isabella Building, Chicago, Ill. Officers: J. J. Burns, president and general manager; Clyde F. Burns, secretary and treasurer. [E. R. J., Aug. 15, '08.]

POWER HOUSES AND SUBSTATIONS

Pueblo & Suburban Traction & Lighting Company, Pueblo, Col.—The ELECTRIC RAILWAY JOURNAL is informed that this company has under consideration the installation of some additional boilers and possibly a coal conveyor. The company also expects to develop a lake for condensing purposes.

Boise & Interurban Railway, Boise, Idaho.—This company is said to have closed a contract with the Westinghouse Electric & Manufacturing Company, Pittsburg, Pa., for machinery to double the capacity of its substation at Pierce Park. The machinery is to be delivered March 1 and will be installed in time to give additional power to take care of the summer traffic to and from the park.

Morris County Traction Company, Morristown, N. J.—It is officially announced that this company will award contracts during the next six weeks for the construction of a new central power station together with three substations.

Pittsburg (Pa.) Railways.—The ELECTRIC RAILWAY JOURNAL is advised that this company contemplates installing three or four new boilers in its Glenwood power station.

Manufactures & Supplies

ROLLING STOCK

Tampa-Sulphur Springs Traction Company, Tampa, Fla., expects to purchase early in 1909 six 12-bench cars.

Los Angeles-Pacific Railway, Los Angeles, Cal., has fitted all of its interurban cars with locomotive pilot fenders.

Angelo Power & Traction Company, San Angelo, Tex., expects to purchase in 1909 six light, single-truck motor cars.

Humboldt Transit Company, Eureka, Cal., will be in the market in 1909 for two or four 34-ft. combination passenger cars.

Des Moines City Railway, Des Moines, Ia., is rebuilding at its shops a number of cars for pay-as-you-enter operation.

Portland (Ore.), Eugene & Eastern Railway has ordered two new cars, which will be delivered before the end of January.

Salt Lake & Ogden Railway, Salt Lake City, Utah, will be in the market soon for a number of new cars and equipment.

Milwaukee Northern Railway, Cedarsburg, Wis., will buy additional passenger equipment and a complete freight equipment early in 1909.

Ernesto Turco, 27 Vingaglio, Torino, Italy, is making inquiries in this country as to prices and utility of various electric car fenders.

New York & North Jersey Railway Company, Paterson, N. J., a line now under construction is sending out specifications for cars and other equipment.

Tacoma Railway & Power Company, Tacoma, Wash., has decided to install automatic gates on all of its city cars. The gates cannot be opened when the car is in motion.

Morgantown Interstate Railroad, Morgantown, W. Va., will be in the market in 1909 for four passenger cars. The specifications for these cars have not yet been determined upon.

Chicago & Southern Traction Company, Chicago, Ill., will purchase early in 1909 six or seven trailer cars for interurban operation. The specifications have not yet been completed.

Erie Railroad has sent out specifications for six new cars to be used on the Rochester division. Reference to this contemplated purchase was made in the ELECTRIC RAILWAY JOURNAL of Nov. 28, 1908.

R. D. Apperson, Lynchburg, Va., president of the Lynchburg Traction & Light Company, and several other public service corporations in the South, is asking for the names of the makers of rattan for snow sweepers.

British Columbia Electric Company, Vancouver, B. C., will build 24 semi-convertible cars 42 ft. long, two observation cars, two locomotives, 13 box cars and two flat cars. This equipment will be all that the company will require in 1909.

Rock Island Southern Railroad, Monmouth, Ill., which was reported in the ELECTRIC RAILWAY JOURNAL of Dec. 19 as being in the market for equipment, has placed an order for 17 combination baggage and passenger cars and eight trailers with the St. Louis Car Company, St. Louis, Mo.

Chicago, Blue Island & Joliet Traction Company, Chicago, Ill., announces through W. H. Conrad, one of the promoters of the railway, that it will purchase two or three interurban cars early in 1909. These cars will be used on the Oak Forest and the Midlothian branches of this road.

Springfield & Washington Railway, Washington, C. H., Ohio, has ordered one car from the Jewett Car Company, Newark, Ohio. It is intended for interurban service and will be equipped with American Locomotive Company trucks, and Westinghouse Electric & Manufacturing Company 112 B motors.

Indiana Union Traction Company, Anderson, Ind., is rebuilding a car at its shops to be used on the "Marion Flyer" run which operates on a fast schedule between Marion and Indianapolis. The car is to be 62 ft. in length and will be of the three-compartment type. Revolving chairs, upholstered in leather, will be used in the smoking compartment of this car.

Third Avenue Railroad, New York City, has contracted with the Westinghouse Electric & Manufacturing Company, for 200 two-motor car equipments, to be used on the 200 new cars referred to in the ELECTRIC RAILWAY JOURNAL of Dec. 19, 1908, for which specifications have been issued. The

motors will be the same special design No. 310, interpole, box type, that were built for the 127 cars of the Metropolitan Street Railway. They are to be delivered in June. The contracts for building the cars and for furnishing the other equipment have not been let as yet, the engineers of the company still having the specifications under consideration.

TRADE NOTES

Green Engineering Company has moved its St. Paul, Minn., office from room 510 to room 415 in the Pioneer Press Building.

National Brake Company, Buffalo, N. Y., reports that it has just closed one of the most successful business years in its history. During the last nine months of 1908 it sold more Peacock brakes than during any other previous nine months.

New York Car & Truck Company, Kingston, N. Y., announces the appointment of Giles S. Allison as general sales agent, with headquarters at 42 Broadway. The New York Car & Truck Company owns the plant, assets, patents and good will of the Peckham Truck Company.

American Blower Company, Detroit, Mich.—James Inglis, the president of this company, made an address to the employees just before Christmas, extending holiday greetings and expressing the satisfaction of the management at the continued cordial relations which exist between the company and its men. For several years the company has made cash presentations to its employees at Christmas time, but owing to the condition of the trade in 1907 and 1908 these contributions were necessarily foregone.

Falk Company, Milwaukee, Wis., reports that it is receiving many orders for its hardening center type railroad crossings. It has made a departure from the regular method of holding the inserts by binding the intersections with a mass of open hearth steel, thus preventing any possibility of loosening and consequent wear. A carload of crossings of this type has just been shipped to the Northern Electric Company, Chico, Cal., and several have been recently placed on the Chicago & Northwestern and Chicago, Milwaukee & St. Paul Railroads.

American Diesel Engine Company, Providence, R. I.—This company, which for some time has been manufacturing oil and gas engines in the United States, under foreign patents, has made an assignment to John L. Wilkie, 2 Wall Street, New York. The principal creditor of the company is Adolphus Busch, of St. Louis, who has claims aggregating \$200,000. This was for money loaned in the attempt to sustain the company's business. It was stated at the time the bankruptcy petition was filed that the total assets of the company were something more than \$100,000.

Elmer P. Morris Company, New York City, announces that as the result of the reorganization of the Eagle Iron Works (formerly Eagle Iron Foundry), Cory, Pa., it has arranged to place on the market a special mixture of gray iron brake-shoes which several New York and Philadelphia electric and steam railways are stated to have found unusually efficient and economical. The Morris Company is prepared to receive orders for both standard and special shoes made according to this secret formula and states that such orders will be filled promptly in view of the foundry's increased manufacturing facilities.

Bruce Peebles & Company, Ltd., Edinburgh, Scotland, announce that the company has been reorganized and is actively engaged in the manufacture of all the different classes of electrical machinery with which their name has for so long been associated. The business has been conducted without interruption, and its control is now in the hands of an entirely new board of directors. The new board consists of A. W. Tait, M. B. Mountain, C. J. Shiells, Alex. Mackenzie, Chas. H. McEuen and F. E. Andrews. The company owns the sole manufacturing rights in Great Britain and the colonies of the well-known Motor Converter.

Electric Service Supplies Company, Philadelphia, Pa., announces that E. R. Mason, who has been connected with the sales department of the Chicago branch for the past 11 years, has been appointed manager of the New York office of the company. He assumed his new duties on Jan. 1. He will retain the office at 50 Church Street. Mr. Mason is one of the best-known salesmen of electric railway apparatus in the Middle West, having traveled continuously in Indiana, Illinois, Michigan and Wisconsin. He succeeds, as manager of the New York office, Henry R. Swartley, Jr., who has been appointed special representative in the interest of the Pay-Within Car, for which the Electric Service Supplies Company is general agent.

Peter Smith Heating Company, Detroit, Mich., has recently received orders for heaters from the following roads: Rochester Railway Company, 50 heaters, 30 No. 3-C, 20 No.

2 Type C; Atlantic Shore Line Railway Company, Kennebunk, Maine, 20 No. 2-C heaters; Omaha & Council Bluffs Street Railway Company, 25 No. 2-C heaters; Illinois Traction System, 10 No. 1-C; Detroit United Railway Company, 10 No. 1-C; Mankato Traction Company, Mankato, Minn., six No. 3-B; North Ohio Traction Company, eight No. 1-C; Eastern Wisconsin Railway & Light Company, 10 No. 2-C; Pennsylvania & New Jersey Traction Company, four No. 2-C; Clinton (Ia.) Street Railway, two No. 3-B; Louisville & Southern Indiana Railway Company, three No. 1-C; Saginaw & Flint Railway Company, six No. 2-C; Sheffield Car Company, four No. 3-C; Western Ohio Railway Company, four No. 2-A; East St. Louis & Suburban Railway Company, two No. 1-C; Houghton County Street Railway, four No. 2-C; Green Bay Traction Company, two No. C; Nashville Interurban Railway Company, Nashville, Tenn., two No. 2-C; Valley City (N. D.) Street & Interurban Railway Company, six No. 2-C; Cedar Rapids & Marion City Railway Company, one No. 2-C; Sioux City Traction Company, two No. 3-C; Walsh Construction Company, Davenport, Ia., two No. 2-B; Walla Walla Valley Traction Company, two No. 2-B; Chicago & Milwaukee Electric, 10 No. 2-C; Windsor, Sandwich & Amherstburg Railway, two No. 2-B; Winnipeg Electric Company, eight No. 1-B; Inter-Mountain Railway Company, Denver, Col., four No. 2-B; McGrath Construction Company, Davenport, Ia., two No. 2-B. The Rochester Street Railway and the Atlantic Shore Line have supplanted electric heaters with Smith hot water car heaters after thorough tests.

ADVERTISING LITERATURE

General Electric Company, Schenectady, N. Y.—Bulletin No. 4628, just issued by this company, describes its new mercury arc rectifier.

Hess-Bright Manufacturing Company, Philadelphia, Pa.—This company is sending to its friends a New Year's souvenir in the shape of a vest-pocket celluloid calendar, which is so arranged with revolving disks as to be of perpetual service.

H. B. Underwood & Company, Philadelphia, Pa.—This company is sending to the trade a large wall calendar, printed in two colors, advertising the merits of its portable tools and machines.

Western Electric Company, New York and Chicago.—Bulletin No. 5910, which is devoted to the electrical equipment of textile mills, contains a description of the installation of motors at the plant of the Sanquit Silk Company, Philadelphia, Pa.

The J. G. Brill Company, Philadelphia, Pa.—"Brill's Magazine" for December 15 contains descriptions of Kuhlman sweepers, Brill pay-as-you-enter cars, semi-convertible cars, and a description of the steel underframe box cars recently ordered for South America and the yearly index.

Harrison Safety Boiler Works, Philadelphia, Pa.—"Cochrane Separator Talks," a recent leaflet issued by this company, treats of the first principles of separating water or oil from steam or gases, and contains a study of various devices and their action in taking water out of live steam.

Independent Pneumatic Tool Company, Aurora, Ill.—A new leaflet describing "Thor" air tools which are manufactured by this company, has recently been issued. It contains specifications for various sizes of drills, augers, hammers, chippers and other tools. The leaflet is thoroughly illustrated, showing many views of the apparatus at work.

Coleman Fare Box Company, Buffalo, N. Y.—A pamphlet issued by this company describes the operation of its hand fare boxes. The conductor presents the box to the passenger as he enters the car and the passenger drops his coin into the box. The catalog also contains a number of complimentary expressions from those who have used the collecting apparatus.

Utah Light & Railway Company, Salt Lake City, Utah.—James Kennedy has been awarded the contract by this company to build a conduit along Seventh East Street, from Tenth to Eleventh South Streets, to take care of the waters from the ditch bordering the company's lines on Seventh East Street and from the swamps in the neighborhood of that street and Eleventh South Street. The conduit is to be 3 ft. in depth and 6 ft. wide.

Pettingell-Andrews Company, Boston, Mass.—The January issue of "Juice," the house organ of this company, is a very interesting and instructive number. One of the leading articles is devoted to "Opalux" high-efficiency reflectors and "Opalux" tungsten fixtures. It is claimed for these reflectors that the patented inner surface gives an intense light and a brilliant, pearly luster. Another interesting article is devoted to the determination of the power factor of three-phase circuits by means of wattmeters.

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.

Table with columns: COMPANY, Period, Gross Income, Operating Expenses, Gross Income Less Operating Expenses, Deductions From Income, Net Income. Includes entries for AKRON, O., BELLINGHAM, WASH., BIRMINGHAM, ALA., CHARLESTON, S. C., DALLAS, TEX., DETROIT, MICH., DULUTH, MINN., E. ST. LOUIS, ILL., EL PASO, TEX., FAIRMONT, W. VA., FT. WAYNE, IND., FORT WORTH, TEX., GALVESTON, TEX., HOUGHTON, MICH., JACKSONVILLE, FLA., KANSAS CITY, MO., KNOXVILLE, TENN., LEXINGTON, KY., LITTLE ROCK, ARK., MEMPHIS, TENN., MILWAUKEE, WIS., MINNEAPOLIS, MINN., MONTREAL, CAN., NORFOLK, VA., OAKLAND, CAL., PHILADELPHIA, PA., PLYMOUTH, MASS., PORTLAND, ORE., ST. JOSEPH, MO., ST. LOUIS, MO., SAVANNAH, GA., SEATTLE, WASH., TACOMA, WASH., TAMPA, FLA.