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Amendment of Corporation Tax Law Urged

In the interest of amendment of the corporation tax law when Congress meets in December, the American Association of Public Accountants has addressed a letter to its members, directing their close attention to the importance of this measure. The law, under the construction of the attorney-general of the United States, is declared in the letter to be "a curious blending of the archaic and modern." J. A. Sterrett, president of the association which is thus

urging prompt action in this matter, states his belief that this law is the only one in any English-speaking country that attempts to levy an income tax upon the difference between cash receipts and disbursements. Among the various objections which the accountants of the country are requested to consider are the needless burden placed upon the corporations by the peculiar provisions and interpretation thereof and the ease with which unscrupulous men will be able to make returns that will enable them to evade the payment of the tax in whole or in part. At the Denver meeting the attention of electric railway managers was called to this law by President Shaw, of the American Street & Interurban Railway Association, and by A. L. Linn, Jr., general auditor of the New York State Railways; and it is evident that the movement for careful consideration of the effect of this added burden of taxation is spreading.

Preparing for Snow

The summer season is over and the first snow storm of winter may arrive any day or night, finding some laggard street railway companies unprepared to cope with it. No time should be lost in going over carefully, from the wheels to the trolley, all sweepers, snow plows and salt cars, and preparing them for the hard work to come. These preparations are just now more important than making ready the passenger cars for winter service. The crews to man the sweepers and plows and the track forces which may be called upon to aid in keeping the lines open with hand tools need to be organized and instructed in their duties. In each car house where the snow-fighting equipment is to be placed for the winter the track on which it is stored should be cleared and kept open to the street, so that there will be no delay in running the cars out of the house when called for. From now on this part of the equipment will play as important a rôle in maintaining schedules as the emergency wagons, and no details of preparation can be safely overlooked.

Thorough overhauling of the snow-fighting equipment in the shops is absolutely necessary at least once a year, and regular inspection should not be neglected during the winter. These equipments are subjected to the very hardest service when in use, and usually are stored after the last storm of the season in some out-of-the-way corner of a car house or in the open. The mud and salt brine are allowed to dry and rust on the trucks, motors, sprockets, chains and other parts of the running gear. Bearings are drained of oil, insulation on the exposed wiring rots, nuts work loose and are lost, and the wear-and-tear in general during the idle months is as severe as that resulting from actual operation. In overhauling, every worn part should

be adjusted or renewed, nuts tightened, wiring inspected and replaced if necessary, bearings lubricated, and the equipment restored to as nearly perfect condition as possible. Particular attention should be given to the chains and sprockets of sweepers to insure that they are not worn to the danger point. The motor resistances also need careful examination, as they must be ready to withstand much hard usage. It is essential to supply each sweeper or plow with a liberal stock of small repair parts and tools, such as extra links for the chains, motor brushes, resistance grids, wrenches and similar parts, so that the minor breakdowns on the street can be remedied at once, without calling for help, which sometimes cannot be given from the shops when the lines are tied up.

Comparison of New Haven Properties

The annual report of the New York, New Haven & Hartford Railroad for the year ended June 30, 1909, includes some figures in reference to the operations of the Connecticut Company and the Rhode Island Company, which operate the street railways controlled by the system in the States named. The detail in which the statements of these companies are presented permits some analysis of the distribution of operating expenses and of the sources of earnings.

According to the latest statements available showing the miles of track operated by these two properties, the Connecticut Company has a total of 755 miles and the Rhode Island Company of 319 miles. The variation in the extent of railway which these figures indicate is borne out by the gross earnings for the respective companies, but there is some discrepancy in the total revenue per mile of track of the two roads. With gross earnings of \$7,988,832, the average of the Connecticut Company per mile of track was \$10,581, and the Rhode Island Company, with a total revenue of \$4,160,785, did materially better. Its average per mile of track was \$13,043.

In each instance the large part of the total revenue was obtained from the passenger traffic, but the proportion of the gross earnings derived from this portion of the business was much smaller in the case of the Connecticut Company than with the Rhode Island Company. Earnings from passengers carried by the former company amounted to 80.3 per cent of the total, while the results reported by the Rhode Island Company show that its passenger earnings reached 93.2 per cent. Another difference in the sources of earnings is shown in the inclusion in the statement of earnings of the Connecticut Company of one item entitled "Miscellaneous, including gas, light and water," the revenue from which was \$1,178,782, which is equivalent to 14.8 per cent of the total operating revenue from all sources. The miscellaneous earnings of the Rhode Island Company aggregated only \$26,225. Express earnings of the Connecticut Company are stated as \$224,294, as compared with \$169,581 from the freight and express carried by the Rhode Island Company. These sums are respectively 2.8 and 4.1 per cent of the total operating earnings. Park earnings of the Connecticut Company are stated at \$62,116, but no reference to any revenue from this source appears in the Rhode Island report. Earnings from mail carried by the Connecticut Company were larger than the

sum reported by the Rhode Island Company, but the former company obtained a total revenue of \$39,778 from the sale of power as compared with a corresponding total of \$56,076 by the latter company.

Some discrepancy is shown in the operating ratio, which was 53.8 per cent for the Connecticut Company as compared with 55.5 per cent for the Rhode Island Company. Of the total percentages used in operating expenses the former property applied a little more than the latter in maintenance. The divisions, as between way and structures and equipment, in per cent of gross earnings, are as follows: Connecticut Company, way and structures 7.2 per cent, equipment, 5.6 per cent; total 12.8 per cent. Rhode Island Company, way and structures 4.8 per cent, equipment 6.3 per cent; total 11.1 per cent. Operation of power plants and operation of cars cost the Connecticut Company 9.4 and 20.3 per cent, respectively, of its gross revenue from operation. The corresponding expenditures of the Rhode Island Company amounted to 8.8 per cent and 24.2 per cent. General expenses were 7.1 per cent for the Connecticut Company and 11.4 per cent for the Rhode Island Company. These figures represent the total expenditure for the Rhode Island Company. The Connecticut road shows an additional \$337,345 for miscellaneous expenses. This sum is equivalent to 4.2 per cent of the gross revenue, and it may represent in part the operating expenses chargeable against the miscellaneous earnings.

While the Connecticut Company, therefore, expended a larger proportion of its gross earnings in maintenance and its cost of power plant operation was higher than with the Rhode Island Company, the Connecticut properties operated their cars for almost 4 per cent less than the Rhode Island lines.

Motor Bearings

The prevention of hot motor and journal bearings depends upon the use of suitable material for both journals and bearings, reasonably smooth surfaces between the bearing metals, proper design and fit of bearings to avoid excessive pressure on contact surfaces, and, above all, the constant maintenance of a sufficient quantity of lubricant between the bearing surfaces. The use of babbitt metal for motor bearings has become practically universal during the past few years, and excellent results are being secured with babbitt having a tin base. Even after motors are converted to oil lubrication it is desirable to continue using the more expensive tin-base metal than to adopt a cheaper lead base babbitt. Whatever the composition of the babbitt, it is important that the bearing metal should have sufficient mechanical strength to withstand the pressure to which it is subjected in service without displacement or crumbling. Tin base babbitt metal possesses this degree of strength, but it must be properly anchored or amalgamated to the bearing shell. Hence the shells should be carefully tinned before lining them with babbitt. Heating the shells to a proper temperature before pouring in the babbitt is also an important point. The slight increase in the cost of making bearings out of the best materials and with the greatest care is trifling in comparison with the cost of bearing failures in service.

It is now considered the best practice to roll the jour-

nals of steel shafts, to secure not only a smoother surface, but also to harden the steel and improve its wearing qualities. In this connection the matter of applying sleeves to worn armature shaft bearings deserves consideration. In former practice it was common to provide several diameters of bearings, so that when an armature shaft became worn down it could be used with a bearing bored to a smaller diameter. On large systems this was the cause of endless trouble. It frequently happened that when car houses received armatures with small shafts there were no bearings of suitable size to apply to them. To keep on hand a supply of bearings, often four sizes to each motor at a number of different houses, required a large surplus stock to be carried. Most progressive master mechanics now maintain armature shaft journals at a standard size, renewing when worn down by putting a sleeve on the journal. In many cases where the sleeves have not been made the proper thickness, the surfaces badly finished or poor shrinkage fits made, these sleeves have worked loose. It is necessary to apply sleeves with great care and to establish absolute limits of wear for armature journals in particular. There is little evidence, however, that loose sleeves are the cause of hot bearings. Sleeves bored to a smaller diameter than the journal and shrunk on by heating tend to become loose when the bearing itself overheats in service.

It is usual to machine babbitted bearings or to babbitt to the correct size around a core. The plan of forcing a mandrel through tin base babbitt or rolling it should be discouraged on account of the resulting crystallization and tendency toward breaking up of the thin shell of metal. In fitting bearings it is desirable to avoid clamping or pinching the journal. Armatures should be revolved by hand after the bearing caps have been tightened. Cylindrical bearings should be slightly larger than the diameter of the journals, to allow for differences in the expansion of the metals and to permit the oil film to be carried under the bearing surface. Oil channels are desirable at the tops of bearings likely to carry upward pressure, and another important point is to round off or cut the edges of bearings so that they do not wear to sharp, cutting corners. The edges should approach the journal at an angle which will permit the oil to be carried between the bearing surfaces. Lack of end play, loose journal box caps and poorly fitted dust guards are frequent causes of bearing troubles. Even a perfectly lubricated bearing may run hot if the end play is not right. In some cases good results have followed the plan of numbering bearings and armature shafts and so far as possible keeping journals and bearings together in operation. There is no doubt that the exercise of greater care in packing bearings and in inspecting them after initial trips on the road, following readjustments and replacements in the car house or shop, will in many cases result in decreased failures in service.

Sources of Interurban Patronage

Apart from their merits as transportation projects, the two high-speed electric interurban railroads for which applications for franchises are now being heard by the Massachusetts Railroad Commission afford interesting side lights upon the sources of passenger revenue in thickly populated territory. The engineers of the Boston & Eastern

and the Boston, Lowell & Lawrence electric railroads have presented comprehensive evidence to the commission regarding the traffic possibilities of the respective territories to be traversed. Without attempting to analyze the probable division of traffic between competing lines, certain fundamental facts relating to interurban earnings may be deduced from the testimony offered by the established and the proposed organizations. These points deserve the attention of electric railways wherever the keen edge of competition cuts into receipts.

The attraction of interurban patronage depends upon the speed, frequency, convenience, cost and comfort of the service rendered in comparison with similar facilities offered by competing lines. The road which combines these features best in the long run will secure the largest share of the traffic. Probably speed, with safety, is the most important quality of service, but this does not mean maximum speed between stations, nor in all cases maximum theoretical schedule speed, including stops. The final controlling factor is the total average time from origin to destination. Accessibility of electric railway facilities plays an important part here. The time of transit between home and office may be less by a trolley road of moderate schedule speed than by a steam line requiring two changes in the journey at the ends of the trip. The time required to traverse a large terminal station or to walk from a station to a certain point in the business center means far more to the suburban patron of a transportation system in relation to the total length of his journey than to the long-distance passenger.

It is unnecessary to emphasize the importance of frequent service in obtaining traffic for a new line or in stimulating new travel on an established line. In bad weather, particularly, frequent service is the best business getter. Making a special feature of any one service characteristic tends to create new patronage. Speed attracts the stream of commutation and commercial travel from slow routes; low fares appeal to the shopper, and comfort draws the pleasure rider. When these factors are fairly combined in the service offered a community the results are quickly apparent in the per capita expenditures for travel of the contributory population. The service must appeal to the entire riding public, taking into account the needs of numerous individual groups or classes of patrons.

Advertising for Traffic

Like any other commodity, electric railway transportation cannot be sold successfully unless the service is advertised. During the next few months most companies will be considering the issue of traffic circulars and other advertising matter for attracting patronage next summer. For this reason, and also because the elaborate display of advertising circulars which was made at the Denver convention is still fresh in the minds of those who inspected it, it may be appropriate at this time to consider some phases of the subject of advertising literature for electric railroads.

There has certainly been a great change during the past few years in the methods followed by the electric railway companies in advertising their service. Half a decade ago little thought was given to the subject by most companies,

other than occasionally to provide dash signs or issue a circular of very modest proportions. Now the electric railway publications often rival in size and typographical appearance those issued by the steam railroad companies which have gone most extensively into this method of traffic promotion. The circulars contain news of points of historic or scenic interest passed by the cars, often with many pages of text, and they are frequently printed in two or more colors and bound in artistic covers.

The profusion of circulars of this character at the Denver convention and the strong testimony there presented as to their value by many managers ought to be convincing to those who may be skeptical about the success of the plan as a general proposition. Undoubtedly, these circulars in a great many cases, possibly in the majority of instances where they have been tried, have brought good results and more than paid for their cost of publication. At the same time, it is worth while to call attention to the fact that this is a matter which can easily be overdone. It is difficult, if not impossible, to trace the direct returns of solicitation of this kind, and a passenger agent or firm of printers, ambitious to make the circular of a road excel that of the previous year or of a neighboring road, may easily run the printing bills up to a larger sum than the manager really wanted or planned in the first place to spend.

The conditions on the steam railroads, so far as this subject is concerned, are hardly analogous. It is true many of these lines publish very expensive booklets, which are sent free upon application to prospective tourists, and that they make large appropriations for this class of publications. But those companies which have gone most extensively into this method of traffic solicitation, like the trans-continental lines, are those which have long trips to advertise, and the selection of a particular route by a single traveler will pay for many circulars. The shorter the steam line and the lower the average fare, the less, as a rule, is the cost of each circular issued by the company's passenger traffic department.

Summer travel on most interurban lines is so much heavier than the winter travel that some traffic managers are misled into believing that opportunities for developing additional traffic occur only during the warm weather. Their advertising campaign begins in the spring and ends in the fall. The fact is often overlooked that the people who ride on the cars of the company for business purposes only during the day can be induced throughout the entire year by attractive, but not necessarily expensive, advertising to patronize the interurban line at night and on holidays when they are bent on pleasure only. A small poster at each station ticket window, giving a summary of all the theater bookings, amusement resorts and special social events, the cost of admission and carfare and the most convenient car to take, both going and returning, through the subtle force of suggestion would guide many seekers of amusement to select some one of the entertainments advertised, and incidentally patronize the cars of the railway company. These posters should be revised every week, and the traffic manager should be alert to obtain in advance notices of events which might attract patrons of any class from the cities or towns reached by the company's lines.

Newspaper advertising, while it may be very effective, is

usually so expensive that a small railway company does not feel justified in buying enough space to accommodate a large and comprehensive advertisement of its attractive features, schedules and fares. Where a number of companies interchange through business between cities some distance apart, or enter the same terminal city, co-operative newspaper advertising offers many advantages. Large descriptive advertisements of service given in connection with special events, such as fairs or conventions, or general advertising designed to promote electric railway travel, can be carried in the principal newspapers throughout a large territory at a comparatively small expense to each of the companies subscribing to the plan.

There is one class of advertising for which an electric railway company can afford to spend large sums. This is the advertising intended to secure new and permanent residents along an interurban line. Here every person influenced to build near the line by the advertisements of service means a regular patron who, instead of paying single fares at long intervals, will spend in traveling on the cars perhaps 10 cents or more every day during the year. This, of course, is a different proposition from attracting the single riders, and a company can afford to pay much more proportionately to secure this class of patronage.

While we do not mean to decry the growing use of expensive advertising mediums, such as descriptive folders and elaborate timetables, a note of warning should be sounded regarding the promiscuous publication of more expensive advertising matter than the profit in the traffic to be obtained will warrant. In planning next year's advertising expenditures the possibilities of the cheaper methods of advertising, such as utilizing the unoccupied space on the cars, both inside and out, small bill boards affixed to the poles supporting the overhead structure and similar places for displaying posters announcing special events or features of the regular service should not be overlooked.

The Pacific Coast Party

The Pacific Coast trip of the Massachusetts Street Railway Association, now just completed, constitutes a unique departure from all precedents in electric railway annals. The presence in the party of the president and of other officials of the American Street & Interurban Railway Association imparted to the tour an official character which it would otherwise have not possessed. In a sense the journey was a series of local conventions, not dissimilar to those formerly held by the American Street Railway Association when the attendance at the annual meetings of that body did not exceed 80 or 100. At that time one of the principal purposes of attending a convention was to inspect the street railway construction used and the operating methods employed in the city where the convention was held. A different locality was selected each year, and the choice was based largely upon the variety in railway conditions and character of the system in the convention city. This plan had to be discontinued in later years, when the attendance and exhibits grew to be so large and numerous that but few cities could accommodate both comfortably, and recently the selection has been dictated almost entirely by the available first-class hotel capacity and exhibit hall space.

The post-convention tour of the Pacific Coast party has had, however, as mentioned, most, if not all, the characteristics of the small convention, with the added merit that both visiting and resident delegations were from opposite sides of the continent. Far Eastern and Far Western practices have many points of divergence, and a comparison of these variations and the analysis of the extent to which they could or could not be justified by local conditions afforded instructive subjects for debate. Most, if not all, the Eastern visitors were familiar, through published descriptions, with the systems and methods of the properties visited, and so had a general acquaintance with them, but, as every one knows, this kind of knowledge is very unsatisfactory compared with that derived from a personal inspection. The space here available does not permit an extended analysis of the variations in Eastern and Far Western practice, but a few of the points which seem to stand out with especial prominence will be mentioned.

In rolling stock the almost universal practice on the roads from Denver west is toward a combination open and closed car, sometimes with one open compartment, sometimes with two. The latter is the direct successor of the old cable grip car, whose arrangement of lever and track brakes has in many instances been retained. The more usual form of car, however, is the half-open and half-closed design, with either end or center entrances, often protected by gates. The center-entrance car has the merit of centrally locating the conductor, but if the truck swings under the sills introduces complications in the design of the steps because, if the side sill is kept intact the steps have either to be rather high or else project beyond the contour of the car.

The general design of the combination car, however, seems well adapted to climates like those upon our Western slope, which are fairly equable throughout the year. The open compartment in the West is rarely too cool for some passengers or the closed compartment too warm for others. It is doubtful, however, whether the same car would prove desirable in the East, where the chances are that but half of it would be patronized for the greater part of the year. Nevertheless, the good features of the car impressed some of the visitors so favorably as to suggest to them the possible modification of the type for Eastern conditions as an "all the year" car by making the open compartment full-convertible and the closed compartment semi-convertible, while still preserving the center entrance. This change would give a half-open car in summer and a full-closed car in winter. The center entrance would constitute somewhat of a daring novelty in the East and might not be well adapted for use in cities with a dense vehicular traffic, as the car must occupy a part of the cross street while making a stop if the steps are brought opposite the crosswalk. The center vestibule would also probably have to be made larger than that used in Denver if the pay-as-you-enter plan is used. Nevertheless, the general idea of a center-entrance car has many good features and would seem at least to be worthy of trial by some Eastern roads.

Power station practice on the Pacific Coast differs from that on the Atlantic Coast and in the Mississippi Valley principally in the more extended use of water-powers and in the occasional employment of other fuel than coal,

notably crude oil and sawdust, the former in the oil district of Southern California and the latter in the lumber region. Owing to the high price of coal, available water-powers are keenly sought, and the low cost of obtaining rights-of-way for transmission lines through an unsettled country makes the proposition an inviting one. Moreover, the climatic conditions in the Far West permit higher transmission voltages, and hence longer transmission lines, than those common in the Eastern States, so that the electrical conditions are favorable. Two hundred and fifty miles and 120,000 volts are not classed in the Rocky Mountain district and on the Pacific Slope as without the present range of engineering possibilities or as being commercially impracticable. It will undoubtedly be in this region that the greatest development in the near future in hydro-electric plants and transmission lines will occur.

Very wisely, practically all of the long-distance interurban lines have been built with double track, and in Los Angeles four tracks are used on the most congested line. This provision for the future is worthy of commendation. In fact, it is safe to say that with a great majority of interurban lines, if they are not worth double tracking they are not worth building at all. But if we except this condition and the more general use of T-rail on city streets, the differences between the two sides of the continent in track construction are in detail only. It is true that several of the important city lines in the Far West are built with a 3-ft. 6-in. gage, but this condition can be classed more as an inheritance from earlier days, like the broad gages in Eastern Pennsylvania, Delaware and Maryland, than as a fixed engineering principle. The important interurban lines in the region under consideration are standard gage, one of the longest, the Los Angeles-Pacific, having been widened during the last few months.

In this cursory view of the Pacific Coast railway situation no attempt has been made to refer to details of equipment, such as the methods of controlling cars on grades, repair shop practice or operating methods. It is universally true that each railway system and each group of railway systems, no matter where situated, develops along lines of its own, so that an inspection of each reveals new methods which cannot but be instructive, even if not always adaptable to other conditions. So it is safe to say that each delegate from the East to Denver, and each member of the Pacific Coast party of the Massachusetts Street Railway Association, has returned with a broader horizon and with new ideas, and has perhaps left behind him with those railway men with whom he talked equally helpful suggestions. Of these latter one only will be mentioned here. The low fares charged on many of the Western roads were a frequent occasion of remark. With the cost of transportation added to that of manufacture for most of the supplies used in electric railway work, and with the existing high rate of wages, how can the Western roads carry passengers at an average lower fare than those elsewhere in the country? In many cases the schedule speed is higher, but still the rates charged, in many cases only 1 cent a mile for interurban service, look far too low. One of the important interurban lines on the Pacific Coast has already taken the step to raise fares. If Eastern experience counts for anything, at least some of the others must follow this precedent before many years.

NEW CAR REPAIR SHOPS OF THE ONEIDA RAILWAY COMPANY AT SYRACUSE, N. Y.

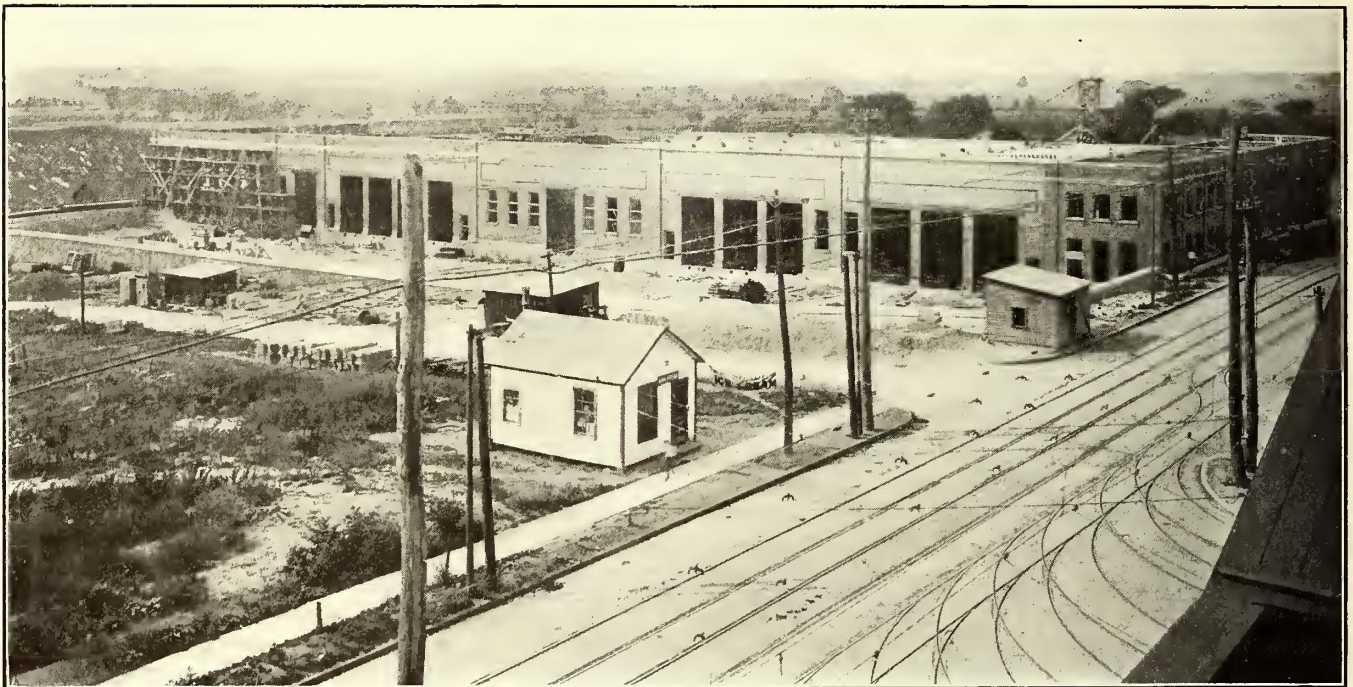
The Oneida Railway Company has under construction at Syracuse, N. Y., a car repair shop which embodies several new and distinctive features. The shop is intended to handle all of the car repair and maintenance work, including carpentry and painting, of the Oneida Railway Company, which operates the electrified division of the West Shore Railroad between Utica and Syracuse. It also will care for the repairs and maintenance of the city and suburban cars of the Syracuse Rapid Transit Railway Company. The Oneida Railway has never had a repair shop of its own, and as the Tallman Street shops of the Syracuse Rapid Transit Railway were outgrown, it was decided to combine in one new group of buildings in Syracuse, facilities for caring for all of the rolling stock of both companies, which are operated under practically the same management.

The lay-out of the shops and storage tracks was designed to accommodate maintenance and repairs on 200 cars, but space has been provided for adding a 75-ft. extension to one

vantageous therefore because this location will reduce the dead mileage of cars between the depot and the shops and will make available for shop use the large storage capacity of the car house and its adjacent tracks.

GENERAL DESIGN

The accompanying plan of the new shops shows a double transfer table lay-out. Extending around the entire property is a concrete retaining wall in which there are only two openings, each wide enough to admit a single track. A spur track of the New York Central & Hudson River Railroad runs along Free Street, thus giving the shops a connection with the steam railroad for receiving material and supplies in standard freight cars. This spur on Free Street forms a part of a loop track extending around the entire property. At the junctions of Fifth North and Sixth North Streets with the double-track line of the Syracuse Rapid Transit Railway, on Wolf Street, two wyes have been put in. A single-track branch-off from this loop track on Fifth North Street and a similar branch-off from the other side of the loop on Sixth North Street form the only track entrances into the shop property. These branch-off



Oneida Railway Shops—General View During Construction

end of all bays, which would give an ultimate capacity for maintaining 300 cars. It is believed, however, that the buildings now under construction will accommodate both railways for the next 10 years without making necessary the construction of the possible extensions.

LOCATION

The shops are located on the Wolf Street line of the Syracuse Rapid Transit Railway between Fifth North Street and Sixth North Street. The shop tract is bounded by Wolf Street on one side and by Free Street on the other. This site was selected chiefly because of its proximity to the Wolf Street car house of the Syracuse Rapid Transit Railway, which is diagonally across the street from the shop tract. The capacity of this depot was recently increased by the addition of 19 uncovered storage and lay-over tracks in an adjoining yard, thus making it the largest operating car house in Syracuse. The cars of the Oneida Railway also lay over at this car house. The erection of main repair shops near this car house was specially ad-

tracks lead to two transfer tables on opposite sides of the shop buildings. These two transfer tables are each 55 ft. wide and, as indicated in the plan, serve all of the tracks running into the shop buildings.

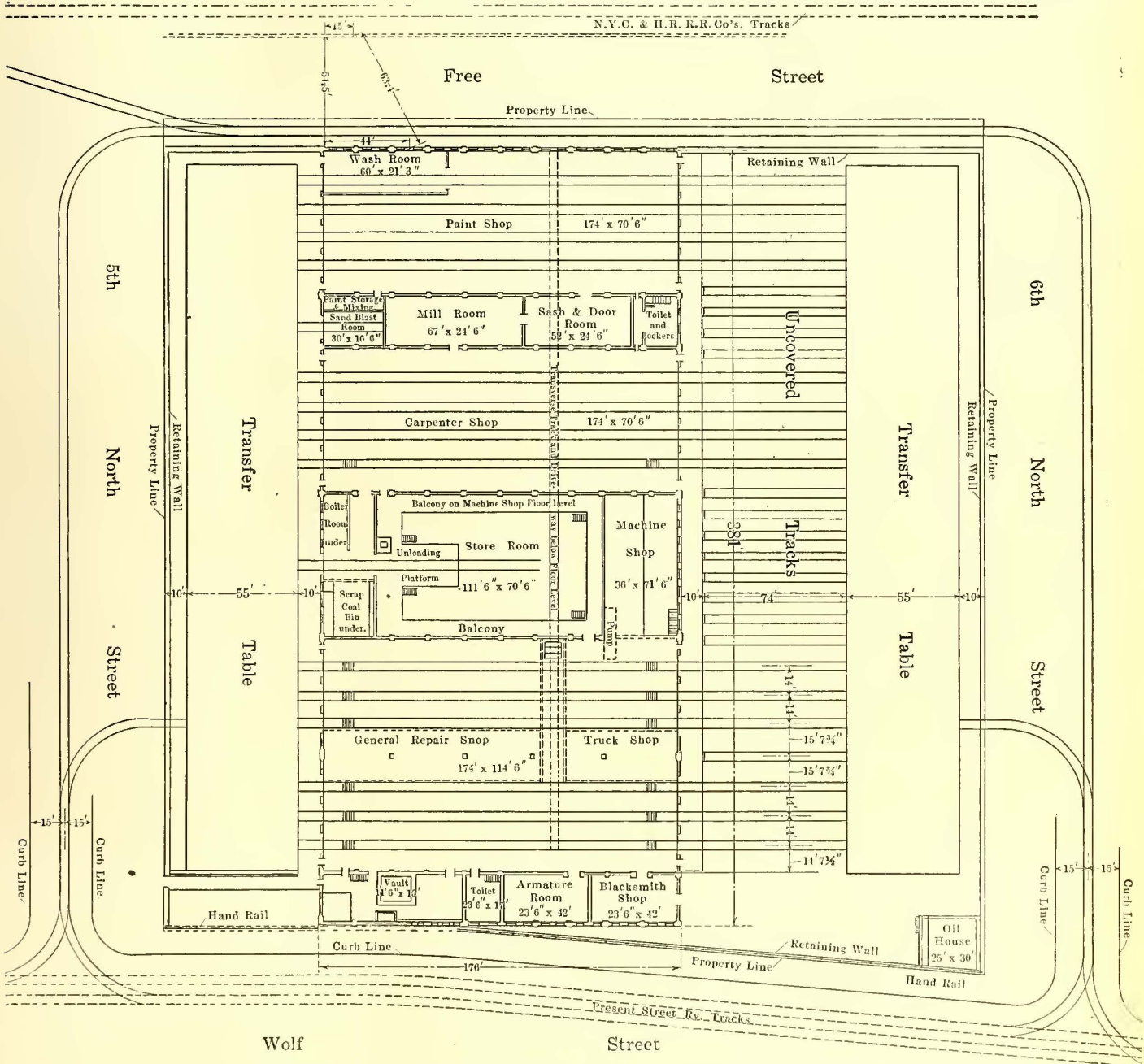
The shop buildings occupy a space 174 ft. wide and 381 ft. long between the two transfer tables. Between the Sixth North Street wall of the buildings and the parallel transfer table pit, there is a strip of ground 74 ft. wide. This space will be used ultimately for future extensions of the buildings toward the rear. Of the 27 tracks crossing this open space, 14 are extensions of shop tracks to the transfer table pit and the remaining 13 tracks are dead-end storage tracks which are available for storing cars about to be shopped or they may be used to facilitate the shiftings of cars. The plan for future enlargement contemplates covering only the 14 tracks which, at the present time, enter the shops. The 13 short storage tracks will not be covered and will still be available for open-air storage or switching cars between shop departments.

ADVANTAGES OF TRANSFER TABLES

The designers of the Syracuse shops made a careful study of the relative advantages of transfer tables and track entrance lay-outs. The most serious objection urged against the transfer table installation in a Northern climate was the possibility of the pit filling up with snow and ice and interfering with the movement of the table. This disadvantage is also present with a track entrance lay-out, as in numerous instances snow and ice have seriously interfered with the movement of cars over the switches and special work of

not result in delays or lost time. A shifting crew would be required for either a transfer table or a track entrance scheme. The only other possible disadvantage of a transfer table lay-out which the designers considered was the difficulty of getting cars out of the shops in case of fire. This objection was thought to be largely theoretical. The danger from fire has been minimized in these shops by fire-proof construction of the buildings and sectionalization of the different shop departments by fire walls.

The difference in cost of installation and maintenance of



Oneida Railway Shops—General Plan of Buildings and Tracks

shops entered by separate tracks and switches. It was thought that no more trouble would be experienced with a transfer table on this account than with a complicated special work track entrance. In designing the transfer tables for the Syracuse shops, the pits were made 2 ft. deeper than the run-ways on which the tables move, in order to prevent interference with the movement of the tables by a small accumulation of snow in the pit.

It is believed that the two transfer tables will meet all the needs of shifting cars in and out of the shops and will

transfer tables and a special-work track entrance was found to be all in favor of the transfer tables. The engineers estimated that the cost of the two transfer tables installed complete with the pits and foundations was approximately 50 per cent less than the expense of building ladder tracks and entrances. The cost of maintaining the tables, it is believed, will be much less than would be the repairs of overhead work and switches in a track lay-out. The transfer table plan also lends itself more readily to making provision for future extensions to the plant.

ARRANGEMENT OF BUILDINGS

In studying the shop facilities, it should be borne in mind that the plant was designed primarily as a repair shop and not as a manufacturing plant. It is the policy of the management of the Oneida Railway to make at its own shops only such parts and supplies as are absolutely necessary and to buy repair parts complete in the open market as far as possible. In this connection it will be noticed that no provision has been made for a foundry, although there is room in the shop tract to add such a department in the future if it is deemed advisable. The policy of buying in the open market also influenced the construction of a storeroom of unusual size. The storeroom has been made large enough to accommodate a complete stock of all the repair parts and supplies required. Another reason for providing such a large storeroom was the desire to permit the storekeeper to have a systematic and orderly arrangement of materials and supplies, so that the stock could be at all times easily reached and inventoried.

The ground on which the shops are erected slopes downward from Wolf Street to Free Street. This required a fill at the lower end of the transfer table pits, but advantage was taken of this grade to provide a basement under the buildings. The slope of the ground also permitted the construction of a transverse track running below the shop floor from the Free Street side and crossing the building at right angles to the shop tracks above. The space between the rails of this track is paved so that it can be used for handling material either by a small push car or by wagons.

FIRE PREVENTION

The buildings have been sectionalized by fire walls into a number of small fire areas, varying in size and shape according to the requirements of the work to be performed in each. These fire walls are carried up through and 3½ ft. above the roof. All openings through the fire walls from one area to another are protected by fire doors. Some of the areas can be entered only through a single opening, which, if closed, shuts them off completely. Sprinklers have

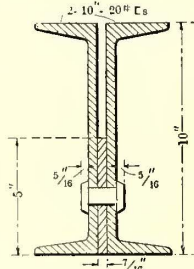
more adjacent stand pipe streams. There are city water main hydrants at each corner of the building tract. In addition to these there are three standard hydrants on the private fire system standing in the yard at one end of the building and four at the other end. Each hydrant is equipped with an underwriters' standard hose house. No special fire pumps or storage tanks have been provided. The openings of the track entrances to the buildings from the transfer table pits are closed by motor-operated Kinnear steel rolling doors.

SHOP DEPARTMENTS

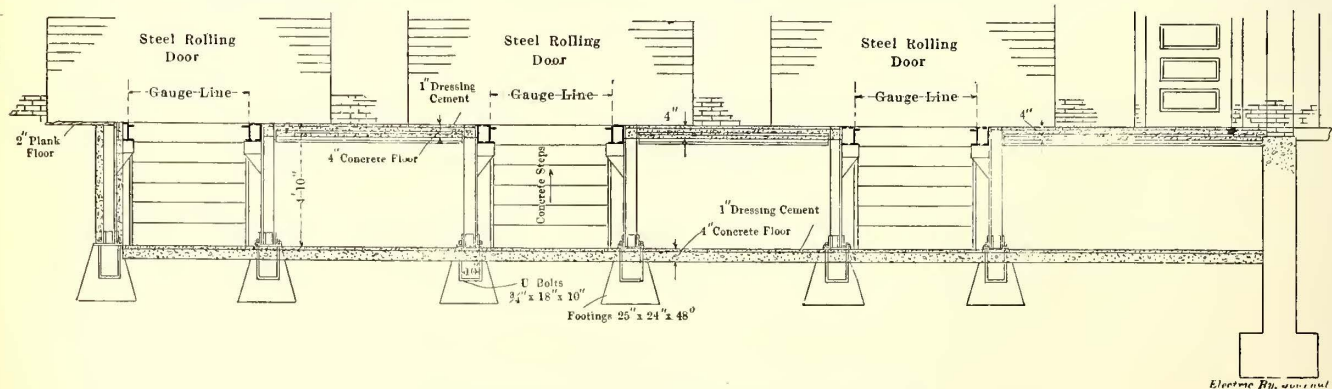
Beginning at the Wolf Street side of the buildings, there is first a narrow bay, 23 ft. 6 in. wide extending the full depth of the building, 174 ft. This bay, which is two stories in height, is divided by transverse fire walls into four rooms. The first of these rooms, facing Fifth North Street, will be used as an office by the electrical engineer and shop department clerks. In the rear is a motorman's instruction room, which also contains a fire-proof vault, 11 ft. x 15 ft., extending up into the second story. The ground floor compartment of this vault will be used for storing the shop and store keeper's records. The second story of the vault will be used for storing maps, tracings, and miscellaneous shop drawings. The second floor in this section will be a draughting room and blue printing room.

In the rear of the motorman's instruction room is a toilet room 23 ft. 6 in. x 17 ft., which will be connected with a locker room on the floor above, reached by an iron stairway. The toilet facilities provided in this room are for the exclusive use of the employees in the general repair shop. Similar accommodations for the employees of the carpentry and paint shop are provided elsewhere.

Back of the toilet room is the armature repair shop 42 ft. long, entered only through a single fire door leading to the general repair shop. This section is open to the roof, but a mezzanine gallery 15 ft. wide at one end of the room adjoins the locker room in the next section. This gallery will be used as a lunch and smoking room for the men. Openings have been provided in the fire wall between the armature room and the general repair shop, through which armatures and material can be passed on I-beam travelers running on the lower flanges of the transverse roof girders.



Section of Roof Beams



Oneida Railway Shops—Section Through Pits

not been installed, as it was not thought practicable to put in side line sprinklers and roof sprinklers alone were not believed to be effective in extinguishing fires which might originate in a car body. The recommendations of the National Underwriters Code have been followed throughout in installing stand pipes, sand pails and fire extinguishers. Stand pipes are provided in every bay to cover a radius of 50 ft., and in all instances the areas covered by a stream from one stand pipe overlap the areas covered by one or

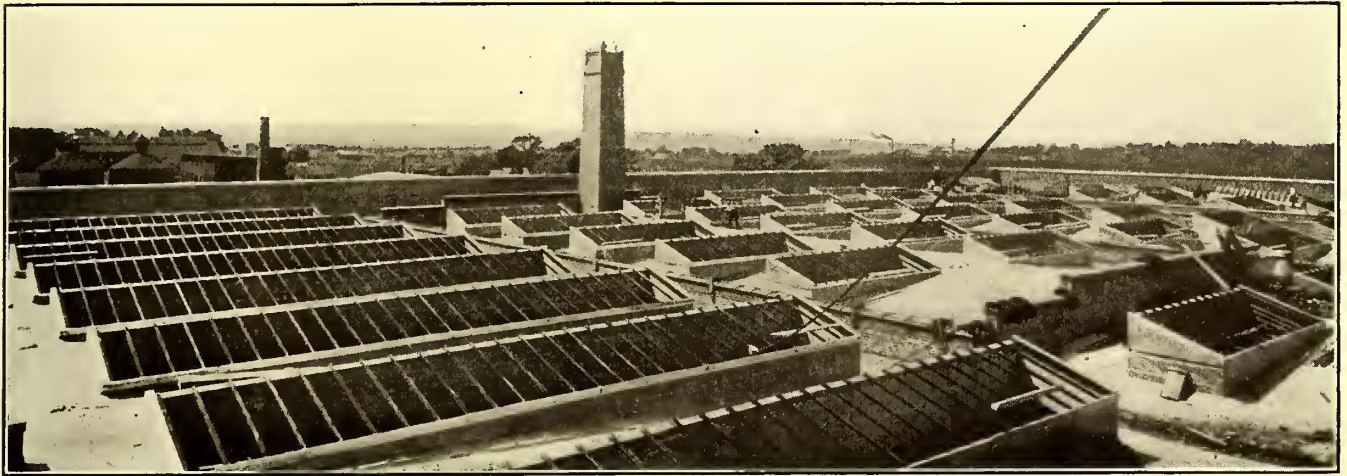
The last room in this narrow bay is occupied by the blacksmith shop, which covers an area of 23 ft. 6 in. x 42 ft. This room is open to the roof, and is entered through a door leading to the general repair shop and also through an outside door opening on the yard in the rear. Two chimneys have been provided to accommodate two or four forges. As in the armature room, openings have been provided in the fire wall through which material carried on travelers can be passed.

GENERAL REPAIR AND TRUCK SHOP

The second main bay from Wolf Street is to be used as a general repair and truck shop. This bay is 114 ft. 6 in. wide and extends the full depth of the building, 174 ft. At the rear of the building and extending the full width across the adjoining bay 71 ft. 6 in. is an L extension 36 ft. deep in which all machine tools will be located. The general repair and truck shop contains six tracks which will accommo-

tion and are carried on offset brackets riveted to the sides of the pit posts. The extra width gained in the pits by carrying the rails on offset brackets instead of on top of the posts or the pit walls, it is believed, will be found useful in handling large motors which could not be conveniently turned in a pit of limited width.

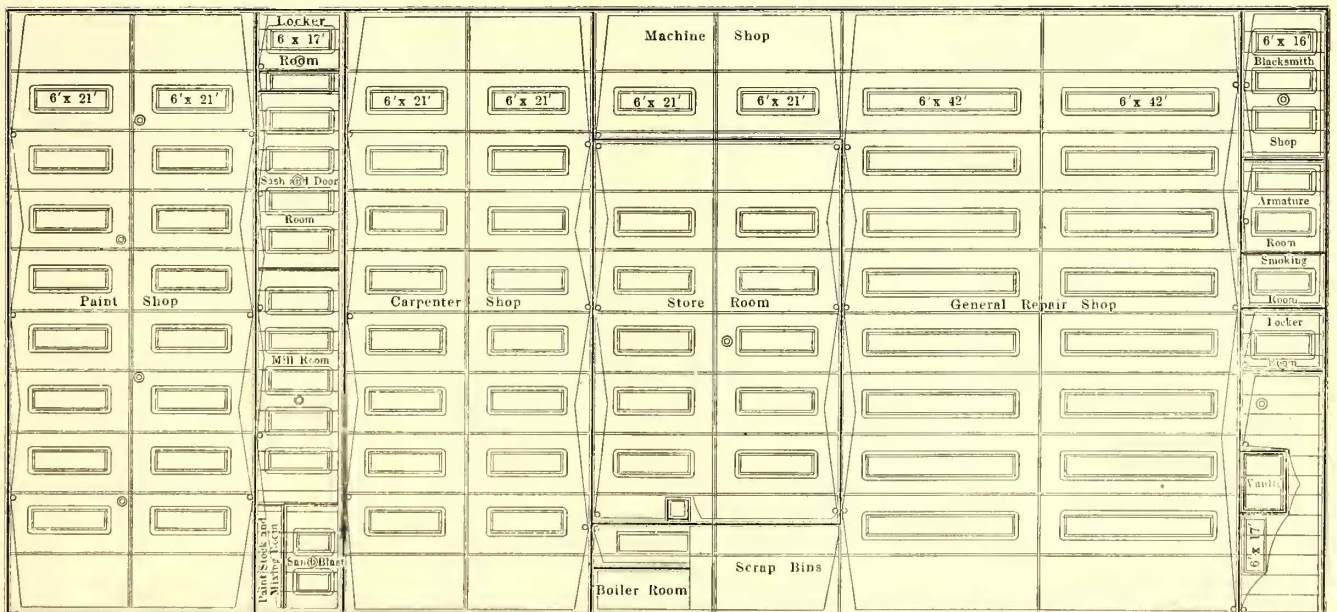
The reinforced concrete roof of this bay is supported directly on transverse girders roof composed of two 10-in. chan-



Oneida Railway Shops—General View of Roof, Showing Skylights and Fire-Wall Parapets

date 24 double-truck cars of average length or 30 single-truck cars. It is planned to use two of these tracks for overhauling, two for general repairs and track work and two for miscellaneous work. These tracks are arranged in two groups of three tracks each, the two groups being separated by an aisle floor space 25 ft. wide. The tracks in each group are spaced 14 ft. center to center, and a space 10 ft. wide has been allowed between the gage line of the outer

tracks riveted back to back. Each girder spans half the width of the bay and rests on a pilaster in the brick partition wall at one end and at the other end is carried by a single continuous built-up truss which runs the full depth of the building. This longitudinal truss is supported on but four columns, which offer a minimum obstruction in the center aisle between tracks. The transverse girders are not fastened to the partition walls, and in the event of a fire one or more



Oneida Railway Shops—Roof Plan, Showing Fire Walls and Location of Skylights

Electric Ry. Journal

track on each side of the bay and the adjoining wall. This arrangement gives a 5-ft. clear space between car bodies standing on adjacent tracks, while the 10-ft. strip along the walls will provide ample space for erecting work benches and light tools.

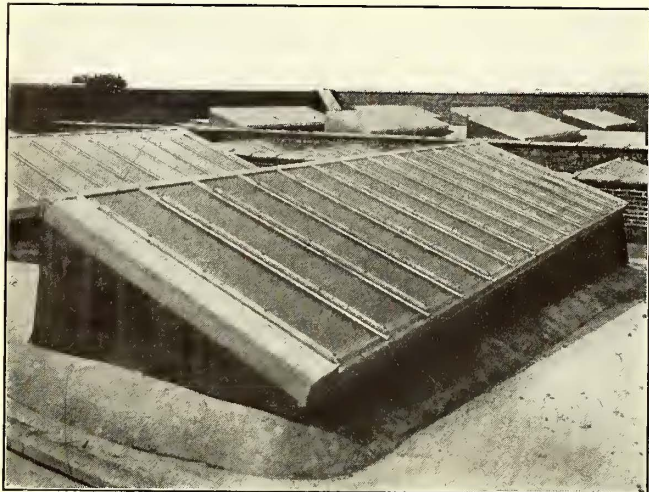
Open pits have been built under the entire length of each of the tracks in this bay. The reinforced concrete floor between the tracks is carried on an independent steel floor system. The rails of the pit tracks are of 9-in. girder sec-

tion of the girders might warp and fall without pulling down the walls or the roof.

The bottom flanges of the transverse roof girders form runways for trolley hoists and travelers crossing the full width of the bay. They are designed to support a concentrated live load of 5 tons in addition to the dead load of the roof. The four columns supporting the center truss are located so as not to interfere with the passage of any load ordinarily carried by a trolley running on the nearest

adjacent transverse girder. The machine shop in the rear of the store room is also served with a similar system of runways and carriers. A continuous overhead track is provided from the machine shop across the repair bay and into the blacksmith shop.

The machine shop, which occupies the rear of the third bay, is 8 ft. below the level of the main repair shop floor. On a level with the main repair shop floor, however, and extending over half the width of the machine shop, is a re-



Oneida Railway Shops—Skylight Construction

inforced concrete floor which forms a gallery above the basement floor. All the heavy tools, such as wheel lathe, wheel press and boring mill, will be mounted on the basement floor, but the lighter machine tools will be mounted on the gallery, which is at the same level as the main repair shop.

In the third bay at the front of the building is located the heating apparatus and coal storage space. This section is entirely surrounded with fire walls. Two return tubular boilers supply steam for heating the buildings by the low-pressure gravity-return system. These boilers are mounted in a pit below the basement floor level to permit the use of gravity-return in the heating system. Storage space for coal is provided in the east end of the boiler room.

A track enters the third bay from the transfer table at the main floor level, passes through the room over the boilers and continues into the store room. This track can be used for bringing in cars of coal, which can be dumped directly into the coal storage space below. It is used also for bringing cars containing material and supplies directly into the store room. The space on the main floor on each side of this track over the boiler room is available for the storage of second-hand material and scrap.

STORE ROOM

The store room occupies the greater part of the third bay and is noteworthy because of its size and because it is located almost in the exact center of the plant. Special facilities have been provided for bringing all material and supplies directly into the room with minimum handling and expense. The store room occupies a space 111 ft. 6 in. x 70 ft. 6 in. and is completely enclosed on all four sides by fire walls. The slope of the ground permitted the construction of a basement 10 ft. 6 in. deep under the store room, which will be used for the storage of heavy material and supplies, which will be brought in over the transverse depressed track from Free Street. This track extends beyond the store room under the general repair and truck shop and will facilitate the handling of heavy material from the

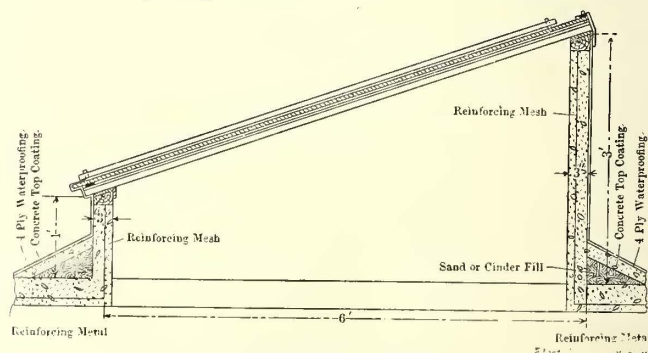
store room into the shop. Under the repair shop the transverse track is at such a level as to bring the platform of a standard push car on a level with the floor of the pits.

The store room is not floored over at the level of the main floor of the rest of the building, but a gallery 8 ft. wide is built around all four walls at this level. The entrance track from the transfer table permits a standard freight car to be brought into the store room for unloading and the gallery floor, which is on the same level as this track, is extended along each side of the track to form an unloading platform. On the gallery around the store room will be stored the lighter supplies and material. Fire-proof shelving and bins are built around the walls from the floor level up. A total of 6300 sq. ft. of wall space is available for shelving and bins on the gallery and 2100 sq. ft. of wall space is available in the basement. Four iron stairways lead from the basement up to the gallery floor.

Most of the supplies will be issued from the store room at the gallery floor level. It will be seen from the plan that the store room is immediately adjacent to the general repair and truck shop, machine shop and carpenter shop. These three departments use most of the supplies issued, and those parts most frequently called for by each of these departments will be installed in bins or shelves on the wall nearest that department. Supplies will be issued through small windows opening into the different departments. One window opens into the gallery of the machine shop, three windows open to the general repair shop and three to the carpenter shop. Bulky material can be passed out through fire doors at diagonally opposite corners of the store room. The same design of roof construction is used in the store room as in the main repair shop. A system of trolley carriers and hoists will be used for handling all heavy material.

CARPENTER SHOP

The carpenter shop occupies the next bay adjoining the store room and is 174 ft. deep x 70 ft. 6 in. wide. It contains four tracks having a total capacity for holding 16 double-truck cars of average length, or 20 single-truck cars. The same spacing between centers of tracks has been



Oneida Railway Shops—Section of Skylight

adopted in the carpenter shop as in the general repair shop. The tracks in the carpenter shop, however, do not have pits. A basement 11 ft. high is formed under the carpenter shop and this space is to be used for storing iron, steel, lumber and other bulky supplies.

MILL SECTION

The next bay adjoining the carpenter shop is 24 ft. 6 in. wide and is divided by fire walls into five rooms. At the front of the building in this bay is the sand-blast room, 30 ft. x 16 ft. 6 in. This room will be used for chipping glass, cleaning metal parts and other similar purposes. A short spur track enters the room, and it will be possible to push a car in on this track for half its length in order to sand blast and clean the dashes and other metal parts.

Adjoining the sand-blast room is a small paint-mixing room 30 ft. x 7 ft. Only sufficient paint and varnish for each day's consumption will be kept in this room, as the main storage of paint will be in a separate building in the yard where both paint and lubricants will be kept.

In the rear of the paint-mixing and sand-blasting rooms is the wood-working or mill room, 67 ft. long and the full width of the bay. All of the wood-working machinery required for the carpenter shop will be installed in this room and arranged for group driving.

Next is a room measuring 52 ft. x 24 ft. 6 in. which will be used for cleaning and varnishing sash, doors and signs.

Back of the sash and door cleaning and varnish room is a passageway 5 ft. wide which affords the only means of communication within the building between the paint shop and the carpenter shop. This passageway is closed at each end by a fire door. Opening off of it is a toilet and wash room for the exclusive use of the employees in the carpenter and paint shops. Above the toilet room and reached from it by an iron stairway is a smoking and lunch room for the carpenters and painters.

PAINT SHOP

The end bay adjoining Free Street will be used as a paint shop. This section of the building has the same dimensions and track arrangements as the carpenter shop. The paint shop has a reinforced concrete floor and drainage openings have been provided through this floor under each track so that the floor can be washed down at frequent intervals. At the other end of the paint shop, a part of one track long enough to hold one car has been enclosed with glass partitions for use as a wash room for cars.

MATERIALS OF CONSTRUCTION

All the footings and foundation walls of the building up to the level of the main floor are of concrete. The exterior and partition walls are of brick 12 in. thick, and all fire walls are extended 3½ ft. above the roof.

The roof throughout is of reinforced concrete. The steel reinforcement was designed and supplied by the Trussed Concrete Steel Company, Detroit, Mich. The concrete roof is covered with four-ply tarred felt roofing covered with slag. Most of the steel work and the transfer tables were designed and fabricated by the Archbold-Brady Company, Syracuse, N. Y.

SKYLIGHTS

Special attention was paid to the distribution and design of the skylights in the roof. The location of the skylights, with reference to the fire walls, is shown in one of the accompanying drawings. It will be seen that instead of providing a few long skylights running parallel to the tracks, the lights are divided into small units extending transversely across the bays. It is believed that this arrangement will throw more light between the cars where it is needed than would be the case if longitudinal lights were used. The skylights throughout are of the Anti-Pluvius type made by the G. Drouvé Company, Bridgeport, Conn. As this construction has been extensively used for skylights in a number of large buildings in other cities, it may be of interest to describe it briefly. Continuous clips are first placed on the upper and lower curbs to which are riveted angle brackets to give the proper spacing for the skylight supporting bars. The supporting bars are of a special channel section and are bolted to the angle brackets on the upper and lower curbs. Stirrups are fastened in the supporting bars at intervals of from 16 in. to 20 in., and into these stirrups are screwed brass studs having a shoulder at the upper end. Over the stirrups a flat strip of iron is placed and on top of this is a strip of cow-hair felt confined

in a sheet metal guide. The edges of the wire-glass plates rest on this strip of felt and are covered by another strip of cow-hair felt, over which is placed a top cap of sheet copper or other metal. Spiral springs are placed over the studs which project above this top cap, and on the shoulder of the studs is placed an inverted channel or U-bar known as a bridge. Nuts secure the bridge securely in place on the studs and slightly compress the springs, which give a firm elastic pressure on the metal cap to hold the glass in place. This type of skylight construction can be put together or taken apart with a wrench or screw-driver. It is claimed that it is perfectly water tight and has an exceptionally long life. The shops have a floor area of approximately 66,000 sq. ft., and there are 11,000 sq. ft. of skylight in the roof. This gives practically 1 ft. of skylight to each 6 ft. of floor space. The balance of the contracts are in the hands of local contractors.

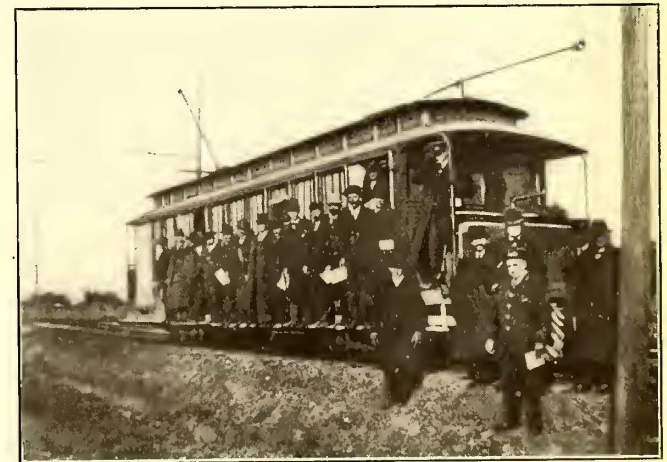
This paper is indebted to C. Loomis Allen, vice-president and general manager of the Oneida Railway, and to W. J. Harvie, chief engineer, for the information from which this article was prepared. Mr. Allen had general supervision of the preparation of the plans and Mr. Harvie was responsible for the details of the design and had general charge of construction of the building.

ANNUAL TRACK INSPECTION OF THE FORT WAYNE & WABASH VALLEY TRACTION COMPANY

Last February the Ft. Wayne & Wabash Valley Traction Company announced to its track foremen a plan for awarding cash prizes to the foremen having in charge the sections of track with the best line and surface and also prizes for general improvement in the condition of the track in their charge. The bulletin outlining the plan, which was issued under date of Feb. 27, 1909, follows:

TO TRACK FOREMEN:

Beginning March 1, 1909, records of work of section men and improvements made on their respective sections will be kept for the purpose of awarding during the month of



Fort Wayne & Wabash Valley Track Inspection—
Inspection Car and Party

October the following prizes, to be awarded upon the basis of track inspection rules attached hereto:

First prize for best line and surface	\$50.00
Second prize for best line and surface	40.00
Third prize for best line and surface	25.00
First prize for improvement in track during six months	50.00
Second prize for improvement in track during six months	25.00

TRACK INSPECTION RULES

The annual inspection shall be held during the month of October, in which the general officers of the company, road-

master and all track foremen will be requested to take part. These members of the track inspection party will be divided into committees to mark the different track sections, according to their judgment, on the following points:

Committee No. 1—Line, surface, level.

Committee No. 2—Joints and spiking, switches and frogs, ballast and ties.

Committee No. 3—Bridges, culverts and drainage; road

gents, want of uniformity of elevation on curves, or unequal gage. If the inspectors can detect no vibration or oscillation of the car due to unlevel track on tangents and want of uniformity of elevation on curves, they will record the condition as 10, and intermediate conditions must be recorded as already noted.

Joints and Spiking—A perfect joint is one that is fully bolted and tight, and should be marked 10. An absolutely imperfect joint is one that is lacking in bolts, or bolts very loose, with joints out of line and generally in very bad condition, and should be marked 0. True spiking consists of four spikes in each tie, the inside spikes being opposite each other, and all spikes driven home.

Switches and Frogs—A perfect switch is one which is carefully lined, particularly on the main track side, and which the car passes over without oscillations or vibrations. The switch rods, switch stands, guard rails and other apparatus must be in perfect condition. A perfect frog is one which is in perfect line, fully bolted, and, if a sliding or wing-rail frog, so oiled that it works freely, and one that is in such line and surface that it will permit a car to pass over without undue oscillation or vibration.

Ballast and Ties—Perfect ballast should be uniform and equally distributed, extending to within about 1/2 in. of the top of the ties and shaped off so as to give easy drainage, with sufficient shoulder to hold the track in alignment. Ties must be properly spaced and fully spiked. The ends of the ties on one side must be parallel with the rail.

Bridges, Culverts and Drainage—Perfect bridges are those which are in first-class condition as to alignment and surface and bridge ties and guard rails with abutments in good condition and waterway cleaned out for easy passage of water. Perfect culverts are those which are in first-class condition as to openings at each end and waterways

FIRST ANNUAL TRACK INSPECTION												
FT. WAYNE & WABASH VALLEY TRACTION COMPANY												
TUESDAY AND WEDNESDAY, OCTOBER 19 AND 20, 1909												
NAME OF INSPECTOR		POSITION		LOCATION								
SECTION No.	MILES		COMMITTEE No. 1			COMMITTEE No. 2			COMMITTEE No. 3			REMARKS
	Main Track	Side Track	1 Line	2 Surface	3 Level	4 Joints and Spiking	5 Switches and Frogs	6 Ballast and Ties	7 Bridges, Culverts and Drainage	8 Road Crossings and Fences	9 Buildings, Station Grounds, Signs		10 Neatness and Cleanliness of Track and Right-of-Way
1	44.0	2.00										
2	10.0	.26										
3	8.0	.30										
4	7.0	1.00										
5	8.0	.35										
6	8.0	.28										
7	8.7	.24										
8	7.0	.45										
9	8.6	.45										
10	8.0	.47										
11	16.7	.95										
12	8.0	.22										
13	8.0	.42										
14	8.0	.30										
15	8.0	.42										
16	24.0	1.36										
17	7.5	.13										
18	8.0	.13										
19	7.0	.13										

Fort Wayne & Wabash Valley Track Inspection—Card Used to Record Markings

crossings and fences; buildings, station grounds and signs; general neatness and cleanliness of track and right-of-way.

DEFINITIONS

Line—True line means straight line on tangent and uniform curvature on curves, as far as the eye can detect. When these requirements are fulfilled the condition must be represented by 10. Continuous and very apparent deviations from the true alignment over the entire length of one mile, which would limit the maximum speed for the safe passage of trains to 25 m.p.h., must be represented by 5. A condition of alignment which would be difficult for a train to pass should be recorded as 0. Conditions inter-

FORT WAYNE & WABASH VALLEY TRACTION COMPANY. RESULTS OF TRACK INSPECTION, OCTOBER 19 AND 20, 1909

Sec. No.	FOREMAN	Average of Com. No. 1. Final Insp'n 100% Basis Line, Sur. Level	General Ave. Preliminary Inspection 80% Basis	General Average Final Inspection 80% Basis	Increase	No. Miles	Maintenance Cost of Section	Maintenance Cost Per Mile	Add 20% For Lowest Cost Per Mile and Use This as Basis	Present Ave., Including 20% Basis and 80%	General Ave Preliminary Inspection 100% Basis	Improvement
1	J. Foley (a)	34.5757	41.6333	60.3272	18.6939	46.00	\$3,180.29	\$69.14	.....	68.6724	52.0417	.....
2	G. M. Frye	33.3333	40.6600	53.0433	12.3833	10.26	2,000.40	194.97	15.6291	68.6724	50.8250	17.8474
3	C. Edington	35.1777	39.1333	54.9094	15.7661	8.30	1,887.80	227.45	13.3972	68.3066	48.9167	19.3899
4	A. Warner	34.0277	37.2812	53.7314	16.4502	8.00	1,782.75	222.84	13.6753	67.4067	46.6016	20.8051
5	J. Goguel	39.1666	49.8000	63.3425	13.5425	8.35	1,606.70	192.42	15.8362	79.1787	62.2500	16.9287
6	J. Lewis	33.6111	42.5625	54.1388	11.5763	8.28	1,572.20	189.88	16.0480	70.1868	53.2031	16.9837
7	R. Evans (b)	33.8888	43.5333	53.6850	10.1517	8.94	1,358.10	151.91	20.0592	73.7442	54.4167	19.3275
8	L. Kindlesparger	36.8055	45.7187	56.6318	10.9131	7.45	1,440.56	193.36	15.7592	72.3910	57.1484	15.2426
9	C. Kindlesparger (c)	30.2777	38.2187	49.8714	11.6527	9.05	3,502.92	387.06	7.8727	57.7441	47.7734	9.9707
10	J. Elliot	33.9999	42.7333	51.7646	9.0313	8.47	1,651.05	194.92	15.6331	67.3977	53.4167	13.9810
11	J. Slagle (d)	32.4999	40.1333	51.7709	11.6376	17.65	3,270.53	185.30	16.4447	68.2156	50.1667	18.0489
12	E. Breeding	36.5277	46.9333	58.3146	11.3813	8.22	1,296.65	157.74	19.3179	77.6325	58.6667	19.9658
13	D. Welch	41.1111	47.5666	60.4374	12.8708	8.42	1,295.05	153.81	19.8115	80.2489	59.4583	20.7906
14	Wm. Smith	36.3333	46.7142	57.9926	11.2784	8.30	1,278.60	154.05	19.7806	77.7732	58.3928	19.3804
15	I. Akers (e)	37.9166	45.9062	60.1388	14.2326	8.42	1,282.85	152.36	20.0000	80.1388	57.3828	22.7560
16	D. Nelan (f)	35.8333	45.3571	51.7856	6.4285	25.36	2,272.60	89.61	.....	77.9020	56.6964	.....
17	O. S. Heminger	38.9999	45.3666	59.3758	14.0092	7.63	1,254.95	164.48	18.5262	77.9020	56.7083	21.1937
18	U. G. Russell	30.5555	40.8000	50.7985	9.9985	8.13	1,261.40	155.15	19.6403	70.4388	51.0000	19.4388
19	C. Crowl	34.4999	43.6666	53.2944	9.6278	7.13	1,357.86	190.45	16.0000	69.2944	54.5833	14.7111

(a) Ft. Wayne City Lines. (b) Includes Wabash City Lines. (c) Includes Peru City Lines. (d) Includes Logansport City Lines. (e) Lowest Maintenance per mile. Country Section. (f) LaFayette City Lines.

mediate between those described above shall be indicated in the proper ratio representing these conditions.

Surface—True surface means a uniform grade line between changes of grade, and the conditions must be noted as in regard to line.

Level—The inspectors must watch and must note any unusual oscillations of the car due to unlevel track on tan-

cleaned out for the easy passage of water. Ditches must be uniform and free from obstructions, and with sufficient incline to afford proper drainage.

Road Crossings and Fences—Road crossings must be maintained to the level of the rail, allowing sufficient clearance for the flangeways of the wheels, and must be clear and safe for the passage of vehicles and animals. Fences

must be in repair so as keep out cattle, and cross fences and cattle guards must be complete and clear of all grass and weeds, with wing fences whitewashed.

Buildings, Station Grounds and Signs—The general appearance of buildings, station grounds and signs in regard to the condition and neatness and cleanliness around them shall be taken into consideration.

General Neatness and Cleanliness of Track and Right-of-Way—Grass, bushes and weeds should be kept cut close to the ground within the limits of the right-of-way and should not be allowed to grow closer than 4 ft. 6 in. from the rail. Stumps and logs should be cleared from within the limits of the right-of-way. Cross-ties and iron should be piled neatly at prescribed points. Other general conditions of neatness and cleanliness are to be considered.

A mark of 10 shall indicate perfection, and a mark of 0 shall indicate unsafe or worst possible condition, intermediate marks being used to indicate intermediate conditions. The above marks so given are to be computed and averaged and used in part only in the determination of the prizes.

In addition to marks given as above the final determination of prizes shall rest with a committee composed of the general manager, roadmaster and auditor, and full and due amount of credit will be given the following points:

First—Conditions which foremen have to contend with, that is, if track is old, alignment crooked and with light rail, or if track is new, alignment straight and with heavy rail.

Second—Expense allowed each foreman per mile of track.

A preliminary inspection of the condition of all track was made on March 1 and the final inspection was made on



Fort Wayne & Wabash Valley Track Inspection—
A Good Piece of Track

Oct. 19 and 20, 1909. All of the track foremen, 19 in number, were ordered to report at the interurban station in Ft. Wayne at 12:45 p. m., Oct. 19. They were given blank cards on which to mark the records of the track sections inspected as they were passed over. One of these cards is reproduced. Besides the track foremen the party included: C. D. Emmons, general manager; H. E. Vordermark, auditor; J. J. Brennan, roadmaster; F. I. Hardy, superintendent of transportation, and J. W. Tompkins, interurban superintendent. A double-truck Narragansett type open car was used on the trip. A view of this car and the inspection party is shown in one of the engravings. The car left Fort Wayne at 1 p. m. on Tuesday, running to Bluffton, Ind., and returning to Fort Wayne; thence to Robison Park, on the outskirts of Fort Wayne, and returned late in the afternoon and ran over all of the city track in Fort Wayne.

On Wednesday, Oct. 20, the car left Fort Wayne at 6:30 a. m. and ran through to Logansport, Ind., over the main line. The city track in Wabash and Peru was also inspected before luncheon. In the afternoon the party inspected the

city track in Logansport, and then ran through to Lafayette, where the line to Battle Ground and the city track in Lafayette were inspected.

The track foremen were divided into the following committees:

Committee No. 1, line, surface and level, J. Goguel, C. Edington, William Smith, J. Elliot, C. Crowl and O. S. Heminger.

Committee No. 2, joints and spiking, switches and frogs, ballast and ties, G. M. Frye, S. R. Evans, A. Warner, L. Kindlesparger, J. Lewis, Edward Breeding.

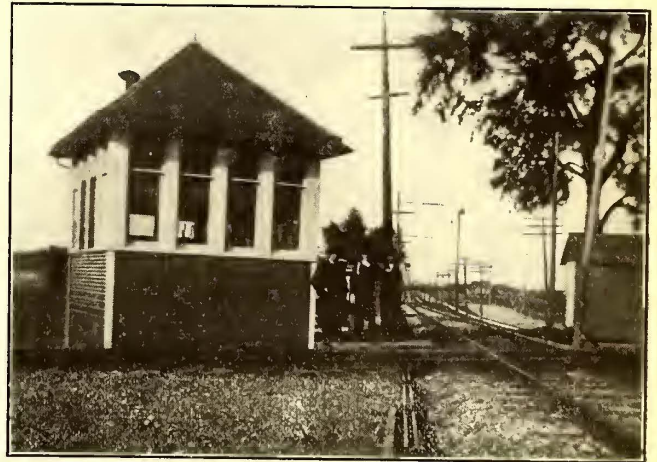
Committee No. 3, bridges, culverts and drainage, road crossings and fences, buildings, station grounds and signs, and general neatness and cleanliness of track and right-of-way, J. Foley, D. Welch, U. G. Russell, C. Kindlesparger, J. Akers, James Slagle, J. O'Brien.

The averages of the markings of each member of these committees are shown for each track section in the accompanying table. In awarding these prizes, not only were the results of the marks given on the inspection trip taken into consideration, but due credit was given for the original condition of each section and the amount of money which had been expended during the past six months for regular and extraordinary maintenance.

The awards made by this committee were as follows:

First prize of \$50 for best line and surface, to D. Welch, foreman of section No. 13, located at Rockfield.

Second prize of \$40 for best line and surface, to J.



Fort Wayne & Wabash Valley Track Inspection—
Interlocking Cabin at Bluffton, Ind.

Goguel, foreman of section No. 5, located at Andrews.

Third prize of \$25 for best line and surface, to O. Heminger, foreman of section No. 17, located at Yoder.

First prize of \$50 for improvement in track during last six months, to J. Akers, foreman of section No. 15, located at Buck Creek.

Second prize of \$25 for best improvement in track during the past six months, to A. Warner, foreman of section No. 4, located at Huntington.

The committee in its report made honorable mention of the following foremen who showed an improvement of 19 points or over:

E. Breeding, section No. 12, located at Clymers; U. G. Russell, section No. 18, located at Ossian; C. Edington, section No. 3, located at Roanoke; William Smith, section No. 14, located at Delphi; R. Evans, section No. 7, located at Wabash.

The company has announced its purpose to hold these track inspections annually and to continue the awarding of prizes.

THE STREET RAILWAY SYSTEM OF BOMBAY, INDIA

An electric street railway system built for a sub-tropical oriental city like Bombay, India, presents many novel problems in finance and engineering which in order to make the undertaking a success must be solved by the adoption of practices wholly different from those which have become more or less standard in the cosmopolitan centers of Europe or America. In a country where most of the inhabitants have a daily income of less than 25 cents it is obviously impracticable to think of charging five-cent fares. On the other hand this cheapness of labor makes it economical to have construction work done by hand in the most primitive way instead of by the use of machinery. Special varieties of wood for use in car and track construction are needed to withstand the ravages of the abundant plant and animal parasites which flourish in the warm moist climate of India. Even the overhead line must be modified for unique reasons, such as making allowances for clearance to permit the passage of the high transportable shrines used by the natives in their religious pageants.

The total population of Bombay is about 1,000,000 inhabitants, but in making the preliminary estimates for the street railway system it was assumed that in general the only source of traffic would be from the middle classes. The maximum ordinary fare for a ride up to seven miles was fixed at $1\frac{1}{2}$ annas (2 cents) and the average fare per passenger does not exceed 1 anna ($1\frac{1}{3}$ cents). First-class cars on which 50 per cent higher fares were charged were also provided for Europeans and natives of the upper

were taken off and a single class has now become the rule. The street railway system is now carrying annually about 1,500,000 passengers per mile of route.

Horse cars were operated in Bombay as early as 1874.



Bombay Tramways—Completed Track Ready for Paving

but it was not until 1906 that permission was finally secured from the authorities to convert the system to electric operation and to build several important extensions. The con-



Bombay Tramways—Bori Bunder Junction in Front of the Victoria Terminal Station

classes when the lines were first opened, but even in caste-ridden India the democracy of the trolley car has prevailed. The difference in the comfort of the accommodations did not justify the higher first-class fare, so that these cars

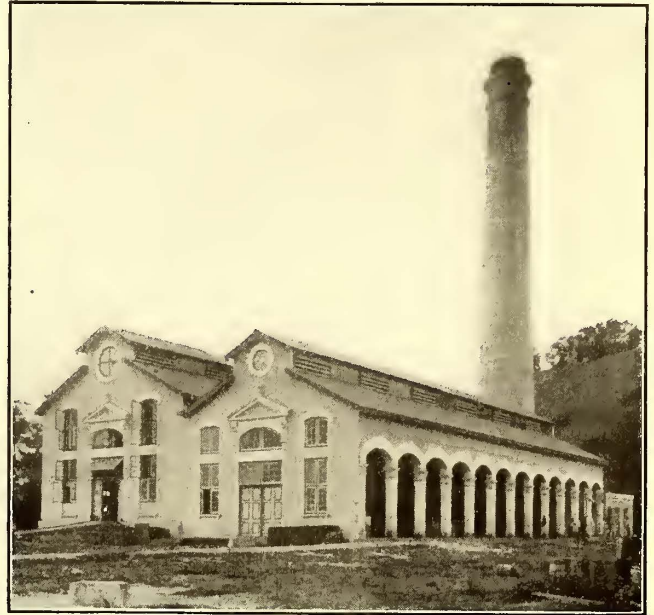
tract for construction of the track and overhead lines was taken by J. G. White & Company, Ltd., of London, England, and for the power equipment and rolling stock by the Brush Electrical Engineering Company, Loughborough,

England. The work of converting the lines to electric operation was completed in May, 1908. The total length of the several routes is $21\frac{3}{4}$ miles, almost all of which is double-track except in a few narrow streets. As shown in the cross-section of the standard track construction the

macadam paving. Most of the ballasting was done by female laborers who carried the broken stone in small head baskets. It will be seen in one of the accompanying engravings that even the roller used in laying the macadam



Bombay Tramways—Single Track Bracket Pole Construction in a Narrow Street



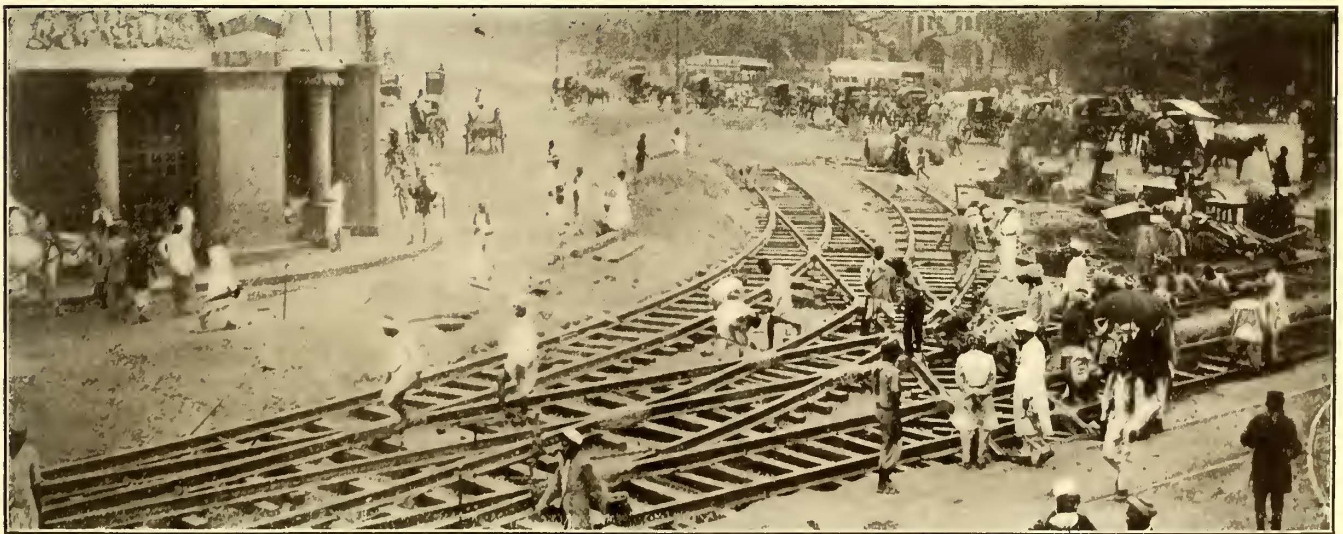
Bombay Tramways—Exterior View of Railway and Lighting System Power House

rails are of grooved section weighing either 90 lb. or 96 lb. per yard. They are connected by continuous rail joints except on curves. The joints are double bonded with concealed No. 0000 flexible, pin-type bonds 12 in. long. The same bonds are used for cross bonding every 120 ft. between both rails and between the two lines of track. The ties are of principally Indian teakwood 7 ft. 6 in. long by 6 in. x 4 in. spaced 2 ft. 6 in. center to center.

In laying the tracks a foundation consisting of a 6-in. layer of rubble stone was first deposited in the trench and well compacted by rolling. The ties were laid on this foundation with an intervening layer of sharp stone screen-

paving' was pulled by hand. While the roadbed described appears to be very light for city track so far it has been found ample to meet the conditions in Bombay. There are comparatively few vehicles on the streets other than private carriages and slow-moving ox-carts. The special work used in Bombay was furnished by Edgar Allen & Company, Sheffield, England. The switches are of cast steel with manganese steel tongues, and the crossings are of iron-bound construction with manganese steel insert hard centers.

Span construction is commonly employed for the overhead lines. A few bracket poles have been used for the



Bombay Tramways—A Complicated Special Work Layout in Front of Crawford Market

ings which was thoroughly tamped under the ties with beater picks. The space between the ties was thus filled with coarse rubble stone and the entire width of the track was brought up to a level with the top of the rail with

single-track lines in narrow streets and ornamental steel double bracket center poles have been used on a few of the wide streets. No. 00 grooved trolley wire is used throughout and it is carried at a height of from 21 ft. to 21 ft. 9

in. above the rails. This unusually high clearance for lines which operate only single-deck cars was adopted to avoid fouling by the large high shrines which are carried through the streets by the natives in their religious processions. Triple insulation was adopted throughout to avoid trouble during the three months' season of monsoons, when the rain storms are very severe, aggregating a precipitation of 78 in. At other periods during the year the humidity is also very high. The trolley wire is supported by mechanical cars attached to insulator bolts having steel pins. The span wires have Brooklyn strain insulators at each end and these are attached by galvanized steel wire slings to earthenware reel insulator feeders on the pole strap bolts. Section breaks are provided at least every half mile and at these points the feeder cables are brought down inside the poles on which the sectionalizing switches are mounted in water-proof boxes. The feeder pillars were especially designed to meet the weather conditions prevailing during the wet season. No un-insulated part of the switch gear is placed less than 2 ft. above the ground. The railway company has a complete telephone system paralleling all of its lines and this has been found very valuable in calling out the tower and emergency wagons.

The 5500-volt transmission cables connecting the substations are of Callender's paper insulated, lead-covered wire-

railway and lighting system of Bombay at the present time, has a total capacity of about 5000 kw. The largest units are two 1000-kw turbo-generators and one 1000-kw reciprocating engine set all generating 5500-volt three-phase alternating current at 50 cycles. This plant was originally built for lighting service and is located in a swampy region which has no good facilities for securing fuel or water. It is soon to be succeeded by a platform at Kussara Basin on the



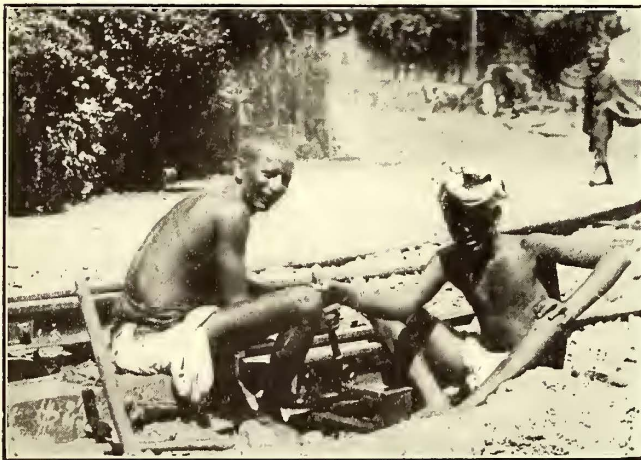
Bombay Tramways—Rolling Ballast with Hand Roller

harbor of Bombay. The initial installation in this plant, which will be completed in 1910, will consist of two 2000-kw turbo-generator sets to which will be added later the two turbo-generators now operating in the Wari Bunder plant.

The Esplanade substation contains one 250-kw and four 500-kw converting units. Each unit consists of a 5500-volt, three-phase synchronous motor with a 250-volt d.c. generator connected to each end of the shaft. These generators are used as shunt machines in series across the two outer circuits of the 460-volt three-wire lighting system while for the railway supply they are provided with series windings for compounding. This substation also contains a 50-kw starting set and three 50-kw negative boosters for the return circuits.

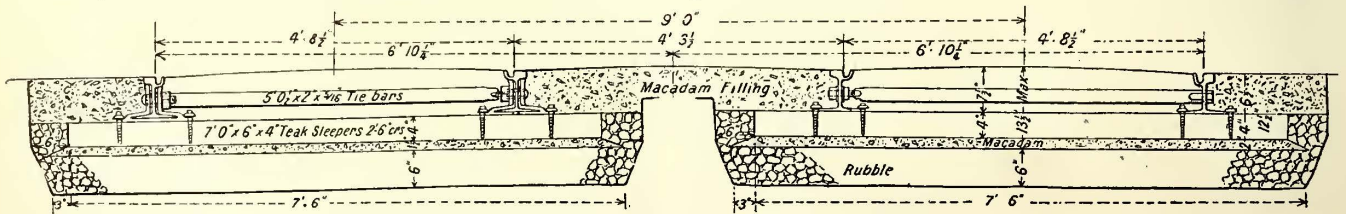
The present rolling stock includes 100 double-truck and 62 single-truck cars, all of the single-deck type. Half of the cars were built by the Brush company and the rest in the railway company's shops in Bombay. The larger cars are carried on maximum traction trucks fitted with Griffin steel-tired wheels 31 3/4-in. diameter and 4-in. axles.

The motors and controllers were furnished by the Brush company. Peacock brakes and Hudson & Bowring life guards are installed on all cars. In addition to destination



Bombay Tramways—Drilling Bond Holes

armored type and are laid underground in tile conduit, the cables being completely surrounded in the conduit with bitumen pitch. The low-tension feeders are insulated with



Bombay Tramways—Cross Section of Standard Track Construction

fiber tape. They are sheathed in vulcanized bitumen and are laid in tile conduit. The negative track return feeders are also laid in a similar manner.

The power station at Wari Bunder, which supplies the

signs lettered in English, the company uses plate color combinations in the day and different colored lamps at night for the benefit of the unlettered natives. The cars are stored in depots at Coloba, Taredo and Parel, which house

The principal dimensions of both types of cars follow:

	Double Truck	Single Truck
Length overall	40 ft.	27 ft. 11 in.
Length inside body.....	30 ft. 10 in.	17 ft. ¾ in.
Width overall	7 ft. 9 in.	7 ft. 9 in.
Height inside	6 ft. 7 in.	6 ft. 9 in.
Seating capacity	52	32
Approximate weight un-		
loaded.....	10 tons	7 tons.

The cars are stored in depots at Coloba, Taredo and Parel, which house 107, 45 and 31 cars, respectively. The Coloba depot has 15 tracks, all built with pits except two, which are used for car building.

During 1907 the revenue from the tramway service was £706,354, and from lighting £21,586, making a total of £727,920; the expenses were £87,040. In 1908 the tramway revenue had grown to £130,142 and that from lighting to £47,714, making a total of £177,856; the expenses were



Bombay Tramway—Tower Wagon and Car House

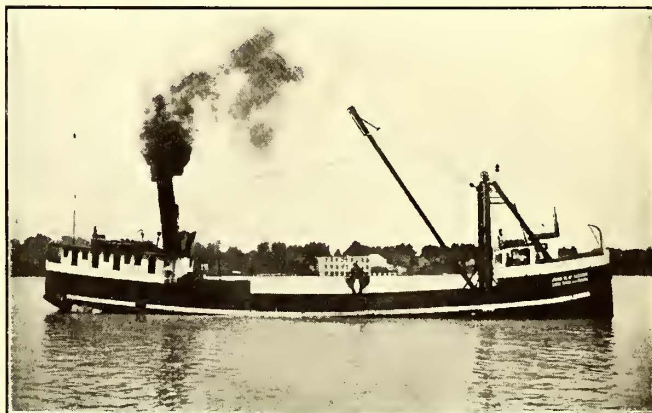
£110,786. It is estimated that for 1909, the first complete year of electric traction, the tramway revenue will be £142,000 and the lighting revenue \$64,000, making a total gross income of £206,000 derived from an investment of approximately £122,000.

A scheme is now on foot in London, England, to build an underground line from the Crystal Palace Parade, in the suburb of Upper Norwood, to the Elephant and Castle and Victoria station. The two city terminals mentioned would be reached by branching the main line at Camberwell. The line is to be 6¾ miles long, the fare 3½d. or 4d. and the running time 20 minutes. Connections are planned with the City & South London tube and the District Railway.

At the meeting of the American Institute of Electrical Engineers to be held in New York on Friday evening, Nov. 12, 1909, at 8 o'clock, a paper entitled "The Electric System of the Great Northern Railway Company at Cascade Tunnel" will be presented by Dr. Cary T. Hutchinson.

ROADBED AND TRACK REPAIRS IN DETROIT

The soil upon which the city of Detroit rests is a sandy clay, which upon being wetted and churned becomes almost a quicksand. In some localities, particularly where the traffic is light, a sufficiently solid track foundation can be made with crushed stone, but in a few years the track gradually sinks until in some cases it is from 2 in. to 6 in. below the

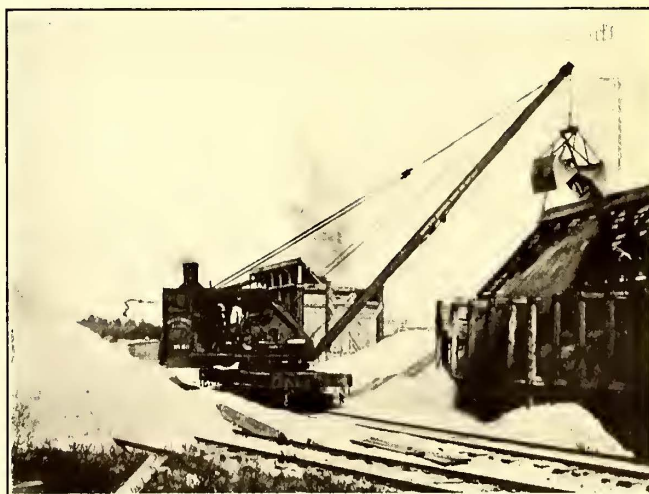


Detroit United Railway—Gravel Dredge

adjacent pavement. On the main thoroughfares, therefore, it is necessary to reinforce the regular foundation with a broad concrete mat of such thickness that the sub-structure will withstand the continued hammering of the heavy city cars and the still heavier suburban coaches which run over the lines. The roadway maintenance of the Detroit United Railway is in the charge of the superintendent of tracks, John Kerwin, who has devised the several interesting methods of repair and rebuilding described in the following paragraphs and shown in the accompanying engravings. Among the principal features are a concrete mixer and an improved method of applying cast-weld joints which are finished by a newly devised rail grinder.

CONCRETE MIXING AND INSTALLATION

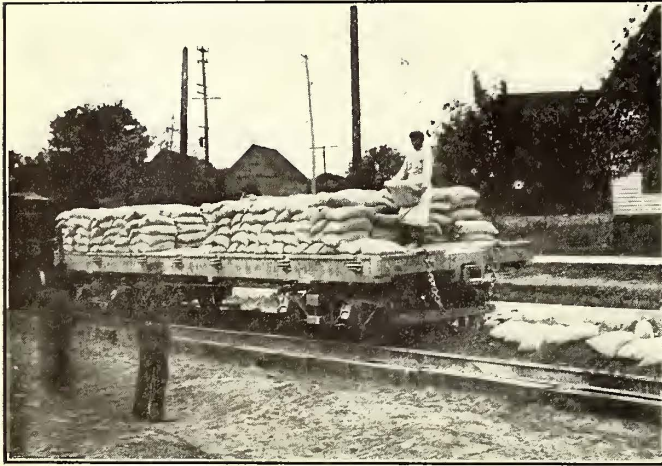
The concrete base for the roadbed is made of gravel and cement, the gravel being screened to the proper sizes



Detroit United Railway—Locomotive Crane Screening Gravel

as it comes from the boat. This gravel is dredged at Lake Huron and is delivered at the company's dock at the River Rouge, in the suburbs of Detroit. It is unloaded on the dock by a locomotive crane and thence reloaded by the same crane from the dock to the dump cars as needed. The sup-

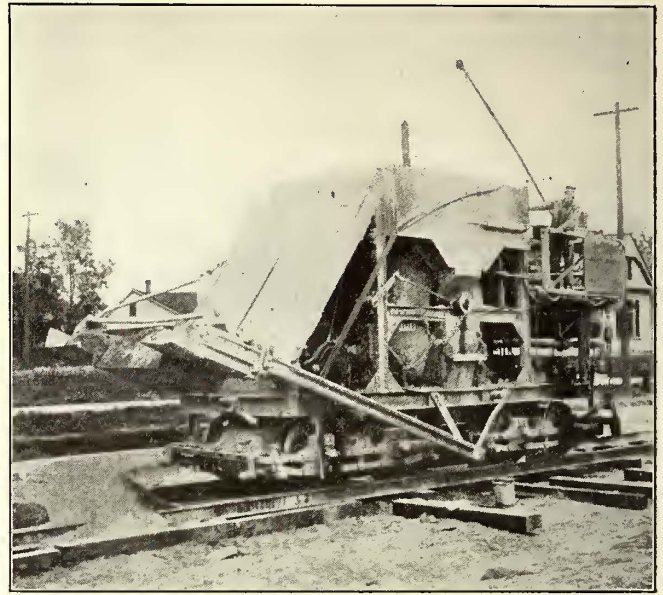
ply of gravel at the dock usually amounts to about 15,000 cu. yd. The dump cars carrying gravel are drawn to the place of use by an electric motor car, where the gravel is unloaded between the rails, the track previously having been excavated, the ties adjusted and the rails surfaced and aligned. Then a car loaded with cement in bags is run over the gravel pile and the cement is emptied on the gravel according to certain predetermined proportions. The con-



Detroit United Railway—Distributing Cement

crete mixer then comes forward, dips up a shovelful of the gravel and cement mixture, raises it over the machine and deposits it in the 5-cu. yd. hopper at the top. From this hopper a charge of 2 cu. yd. is delivered to the mixing drum and thoroughly mixed. Following this the machine, which during the mixing process has been run back to the point of delivery, drops the prepared batch of concrete wholly between the rails, part on one side, part on the other, or entirely on one side if desired. The concrete when delivered between the tracks is leveled off to the right height by dropping a leveling board in the rear of the machine and running forward slowly. The trimming and final leveling is done by the track crew of three or four men who follow up the mixer. The concrete is not handled by manual labor at any stage, except in emptying the cement bags and in the slight trimming following the deposit by the mixer. The

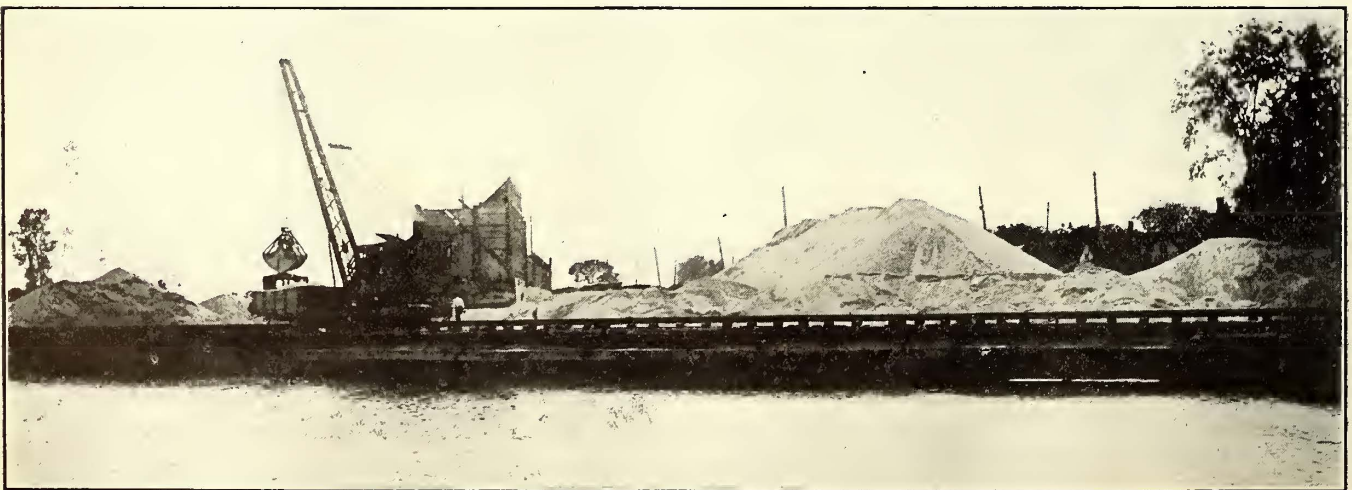
The locomotive crane previously mentioned is operated by steam and was built by the Industrial Works of Bay City, Mich. It weighs 70 tons and has two booms, one with an extreme radius of 12 ft., at which a load of 25



Detroit United Railway—Concrete Mixer Hoisting Charge

tons can be raised, and another having a 30-ft. radius, at which a weight of 5 tons can be lifted. This crane will propel itself and four loaded cars on a level track, and will haul two loaded cars up a 2 per cent grade.

The concrete mixer consists of a ridged platform of steel I-beams covered with a floor of $\frac{3}{8}$ -in. steel plate and resting upon two ordinary Peckham trucks, which are equipped with four 30-hp motors. The mixing drum, of the hollow rotating type, is mounted on rollers on this platform and is rotated by a motor geared to it and resting on the same platform. The shovel for raising the aggregate to place in the hopper is raised and lowered by another motor geared to a windlass drum, both resting on the same platform. The hopper is suspended on a steel frame over the mixing drum and delivers the aggregate to this drum in batches of 2 yd. as desired, and can fill the drum from either side of the bin.



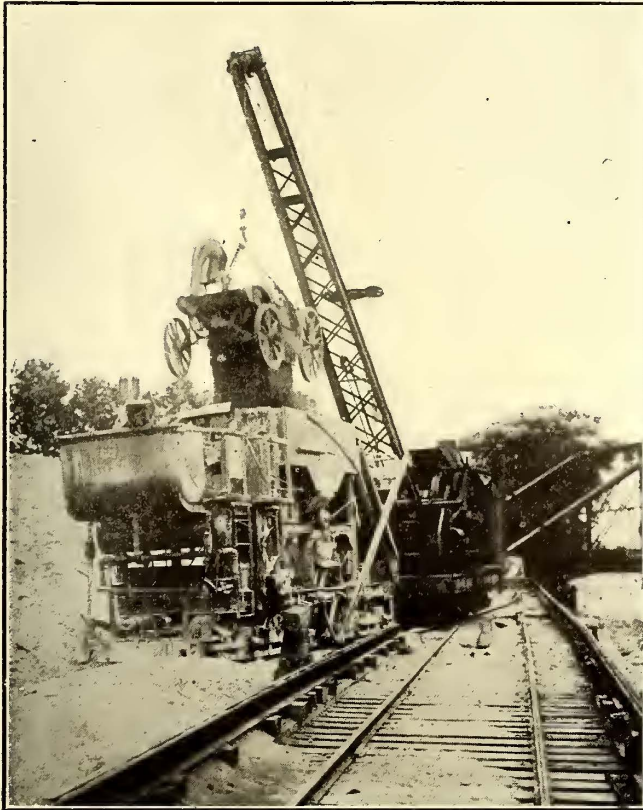
Detroit United Railway—Gravel Dock

process from the arrival of the gravel car to the final leveling in the track is all paid for by the cubic yard of placed concrete. The gang consists of eight men, two of whom handle the mixing machine or car.

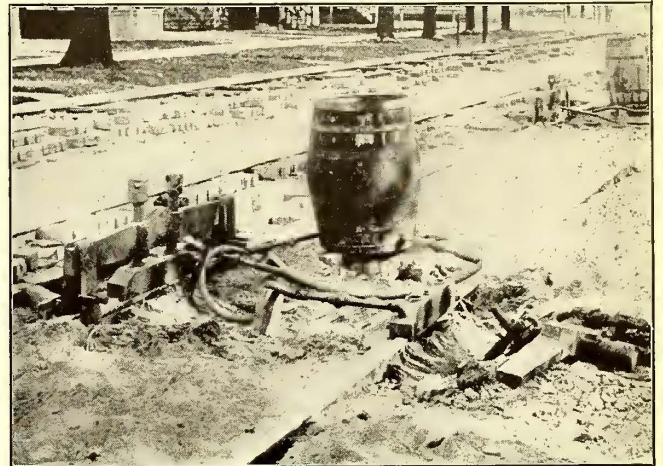
The mixing drum is similar to those used in Smith mixers, and is 6 ft. 6 in. in diameter by 4 ft. inside measurements. A tank holding water enough for six batches is carried in the rear of the control platform. The shovel for

loading the hopper is carried by two long channel bar arms on either side of the machine, one end of each bar being attached to the shovel and the other end being pivoted to a cast iron arm suspended from the side of the platform. The

The mixer is handled by two men, who stand on a platform high in the rear of the machine, where all the apparatus is located for the control of the drum and shovel and the progress back and forth of the car. Six other men handle all material from the car and finish leveling on the track. The capacity of the mixer is about 180 cu. yd. in 10 hours, or counting in the time of transfer from line to line, repairs, etc., about 300 cu. yd. in 24 hours. The entire cost of the plant for concreting, including the mixer, crane, 27 dump cars, 2 motor cars, gravel dock and miscellaneous tools, is approximately \$57,000. It is estimated that 40,000 cu. yd. of concrete will be laid during the season of 1909. The saving per yard on the lowest price that the company is now paying a contractor for laying concrete is \$1.25. Hence for 40,000 cu. yd. there will be a total saving



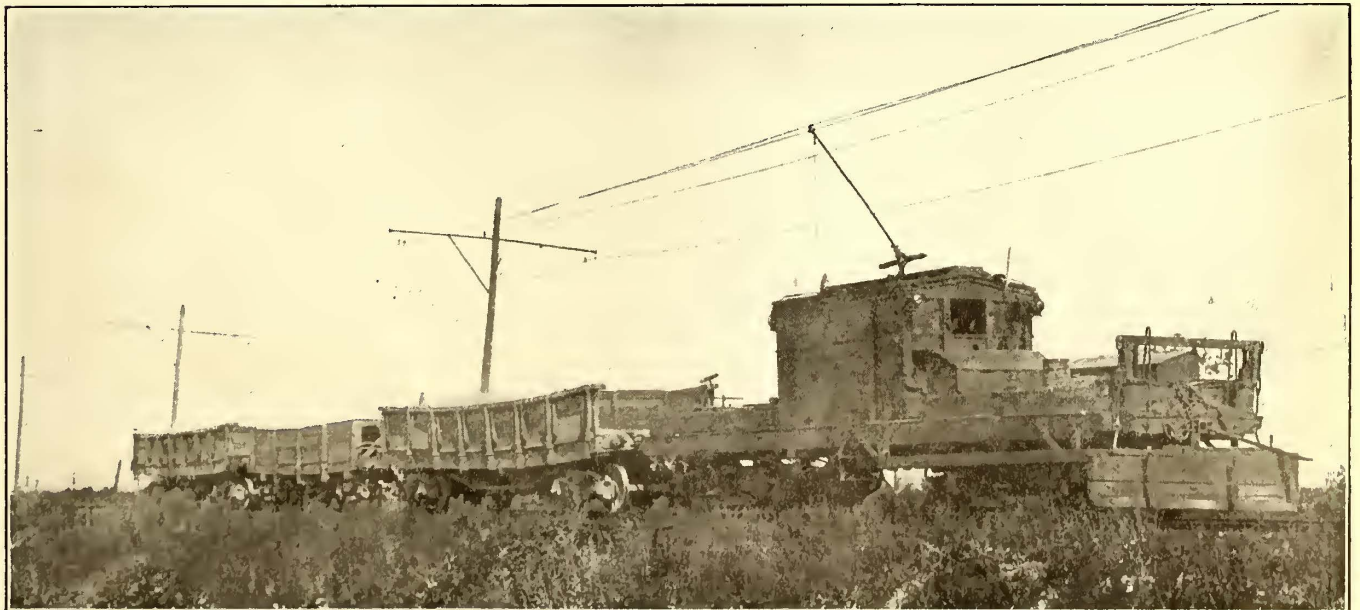
Detroit United Railway—Locomotive Crane Charging Concrete Mixer from Dump Wagon



Detroit United Railway—Method of Cooling Cast-Welded Joints

whole is low enough to get a good push into the gravel pile and the arms are long enough to swing the shovel clear of everything and to bring it to a vertical position over the

of \$50,000, or enough to pay for almost the entire plant in one season. This estimate includes interest and depreciation allowances.



Detroit United Railway—Work Train Hauling Gravel

bin, where its bottom is tripped and the contents drop into the hopper. In working it is customary to load the drum with a batch of 2 yd. first, then close the slides in the bottom of the hopper and load it to its capacity.

CAST-WELDED JOINT PRACTICE AND GRINDING

On adopting cast-welded joints some trouble was experienced from a depression located at the immediate point of junction of the rails. This trouble was traced to the

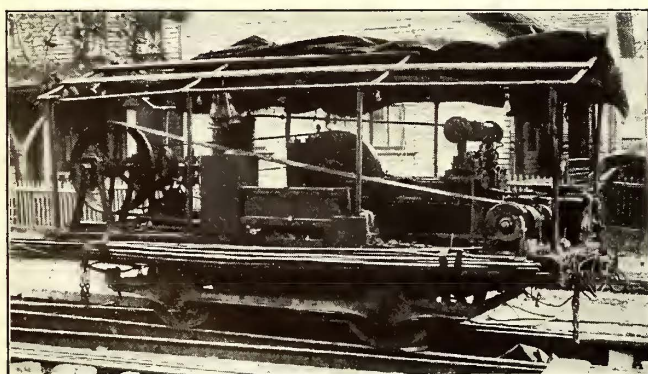
method of holding the rails during the pouring of the hot metal. A bar about 5 ft. long, having end clamps which hook underneath the rail, and a large screw at the center bearing down on the joint, apparently lifted the metal just



Detroit United Railway—Rail Joint Grinder

at the edge of the casting when it was hot. This caused a slight depression at the joint, which grew worse as cars ran over the track. Mr. Kerwin has overcome this trouble by using a hollow casting about 30 in. long, which is shaped to the rail-head on its bottom. The casting is recessed to receive two screws which are used with the clamping bar to keep it pressed in place. A barrel of water is placed near the clamp and connected to one end of the hollow casting by a hose, while a $\frac{1}{4}$ -in. rubber tube is connected to the pet-cock at the other end to guide the water away. The water is turned on when the hot metal is poured into the joint molds to keep the rail-head cool and leave it unchanged as to temper or hardness. Afterward the joint is trued up by the grinder to a perfect surface.

The grinder developed for this purpose is another of Mr. Kerwin's machines. It consists of a strong wooden platform mounted on two axles of a standard truck, which is drawn over the road by one of the motor work cars. One axle is equipped with standard gearing, which is connected to the motors through a planetary gear of the automobile type and suitable countershafts for reducing the speed. This planetary is operated by a lever which, when pushed



Detroit United Railway—Compressor Car for Track Drills

forward gives a slow forward movement to the whole car, and when pushed backward reverses the motion and starts the car slowly in the opposite direction. A countershaft overhead is driven by a 30-hp motor and furnishes power

not only to operate the forward and back motion of the car, but also to drive the two emery wheels, which are belted to a countershaft overhead in the front of the car frame. The two emery wheels, one for each track, are suspended over the rails by jointed arms, and the belts used are beveled and run on grooved pulleys.

The emery grinding wheels are mounted on angle iron frames directly over each rail. The frames are coupled together by two shafts mounted above and at right angles with the track. Each frame is equipped with a shoe at each end, the one nearest the car being pivoted by means of a bolt through the frame to the shoe and designed to slide on the rail. The forward shoes on the outer end of each frame are pivoted in the bottom end of a jaw, the stem of this jaw passing up through a sleeve which is threaded on its outside, to a socket on the frame itself. This screw is equipped with a hand wheel on top by which the operator adjusts the grinding wheels, raising and lowering them at will; this, together with the forward and back action of the car, levels off joints to perfection. This machine is also used in cleaning off corrugations when they occur and in grinding out old joints that have become recessed.

The open hearth rail seems to take the cast-weld joint better than does the Bessemer rail. Of course, the whole surface of the rails, except the bottom, is sand blasted before pouring. Joints of this kind sawed out in 1-in. sec-



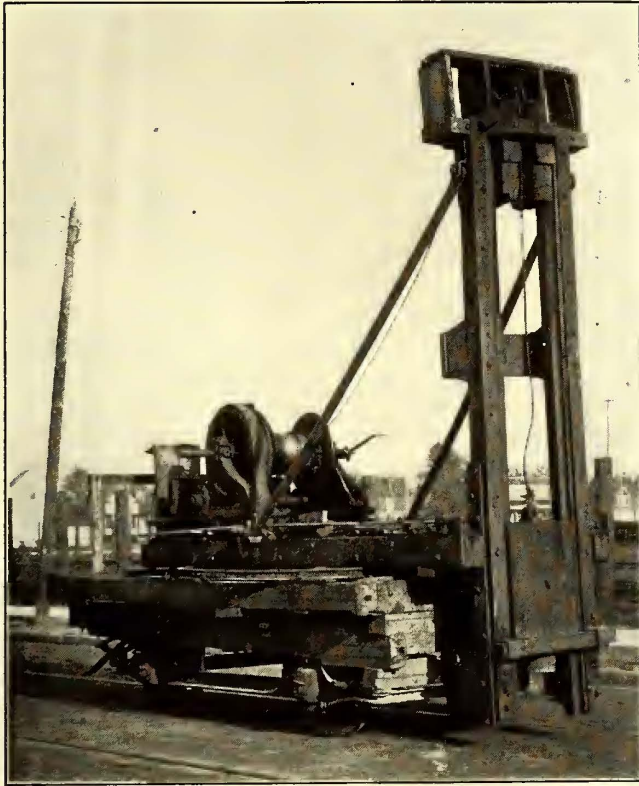
Detroit United Railway—Sand-Blast Compressor Car

tions show a perfect junction between the cast iron and the steel of the rail.

OTHER SPECIAL EQUIPMENT

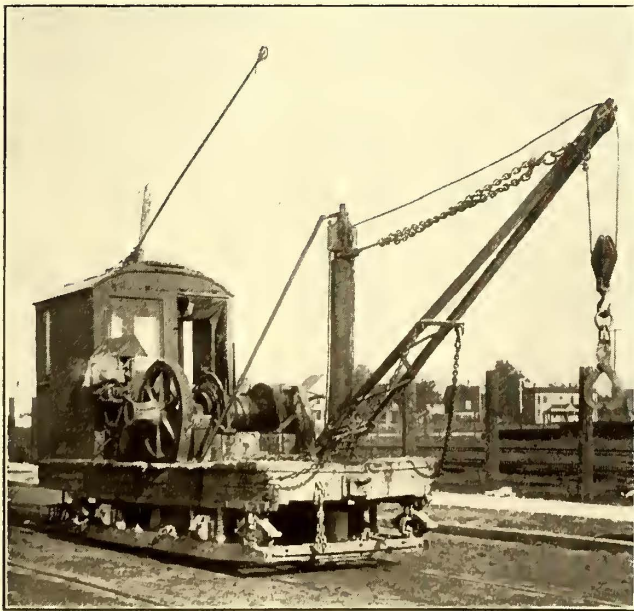
The Detroit United Railway uses in track repair and construction work two air compressor outfits mounted on flat car bodies, both of which are illustrated. The single-truck car is used for supplying compressed air for four Boyer pneumatic drills. The drills are useful in drilling holes for bolts, tie rods and bond terminals when putting in new special work. As many as 300 holes have been drilled on the street in placing one complicated layout. This car is light enough to permit being removed from the rails when it is necessary to keep it in one place for several days, and in this way it can be used without interfering with the traffic on any tracks. The air compressor is belt driven from a railway motor mounted on the platform of the car at one end. The motor shaft carries at its outer end a small emery wheel for grinding track drills. The large compressor car is used for sand blasting rail joints preparatory to welding, and is mounted on a standard flat car body with double trucks. One of the air compressors formerly used in connection with the storage air brake system supply of the company has been mounted over one truck and the driving motor, control apparatus and storage

tanks are mounted at the other end of the car. This car has a much larger reservoir capacity than the small car. Current for operating the compressor motors on both cars is supplied from the trolley wire by a pole and hook. Neither car is fitted with propulsion motors.



Detroit United Railway—Concrete Breaker

In rebuilding track, it is frequently necessary to break up large masses of concrete. To do this with drills and sledges is a slow process and the Detroit United Railway uses an improvised breaker resembling a pile driver, which

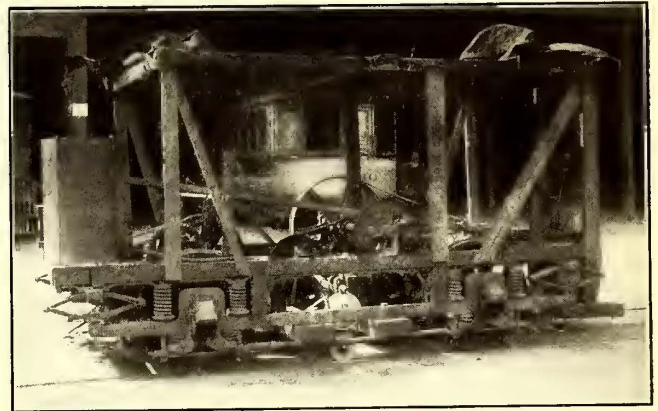


Detroit United Railway—Crane Car

is also illustrated. The shears and the hoisting winch are mounted on a revolving turn-table so that the drop weight can be swung in a complete circle around the body of the car. The weight is hoisted by a motor-driven winch and a

disconnecting clutch is used to drop it. The drop weighs 1400 lb. and carries a sharpened wedge 18 in. long on its under side. About four blows are required to penetrate a bed of solid concrete 18 in. thick. This machine will do the work of 75 men with sledges and chisels.

Handling rails and pieces of special work on the ground requires a large force of men. A crane car such as the one illustrated is very useful for this work. This car is mounted on a single truck and carries an operator's cab on the top of which is mounted the trolley pole. The hoisting drum is motor driven and the boom of the crane can be revolved through an arc of about 200 deg. The radius of the boom can be varied by lengthening or shortening the chain from the point of the boom to the top of the mast. This crane car is used in unloading rail, moving the rails into position and doing any moderately heavy lifting required in the construction of track or in loading cars in the material yards.



Detroit United Railway—Saw for Cutting Grooved Rail

Some of the older track of the Detroit United Railway was laid with girder rail having a very narrow groove. The flanges of wheels under interurban cars operating over this track completely filled the grooves, and if the wheels were not accurately pressed to exact gage on the axles severe strains were set up, which resulted in many broken axles. After trying unsuccessfully to chip off the lip of this grooved rail, the car shown in one of the engravings was devised. It consists of an old Brill single-truck on which are mounted the driving motor and the cold saw. The saw is mounted on an arbor approximately over the gage line of one rail. It is driven through a chain of gears by a shaft and universal joint which allows for variations in the depth of the cut. The driving shaft is in turn driven through double reduction sprocket wheels and chains by a railway type motor mounted low down on the frame of the car. This motor is operated by a current from the trolley and the speed is regulated by a water rheostat, the plates of which are immersed in a barrel of water carried at one end of the car. Longitudinal movement of the car at the rate of about 60 ft. per hour is effected by a dog and ratchet arrangement driven from the flexible jack shaft to which the saw is geared. An eccentric is mounted on this shaft and a reach rod on this eccentric gives a reciprocating motion to the end of a pivoted arm carrying a dog which engages with the driving ratchet wheel. The ratchet wheel is connected through double reduction spur gears to the forward axle. The saw is flooded with lubricant by a hose leading from a tank mounted on the end sill of the car frame as shown in the engraving. The saw cuts about $\frac{1}{4}$ in. deep and the lip is then broken off with a sledge.

PENNSYLVANIA ELECTRIC LOCOMOTIVES FOR THE NEW YORK TERMINAL SERVICE

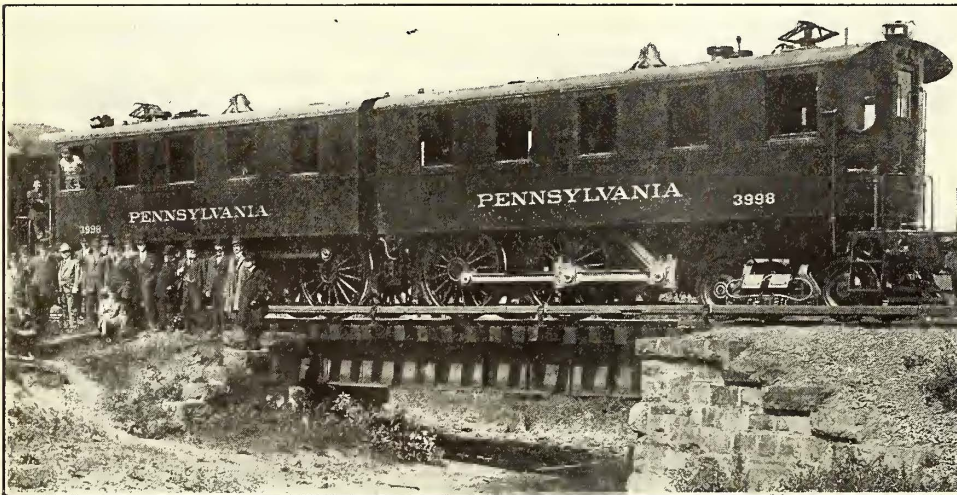
The first of the initial order for 24 articulated electric locomotives which are to be used for handling the Pennsylvania Railroad trains into the New York station and through to the yards on Long Island has been delivered and is in operation on the electrified tracks of the Long Island Railroad. This locomotive incorporates many novel features in electric locomotive design, and is the result of several years of co-operative development between the Pennsylvania Railroad Company and the Westinghouse Electric & Manufacturing Company. The Pennsylvania Railroad was represented in this work by a locomotive committee composed of the chairman, George Gibbs, chief engineer of electric traction; A. W. Gibbs, general superintendent of motive power; D. F. Crawford, general superintendent of motive power, Pennsylvania Lines West, and A. S. Vogt, mechanical engineer.

The new locomotive is distinctively a high-powered machine built for high-speed operation. In wheel arrangement, weight distribution, trucks and general character of the running gear it is the practical equivalent of two Amer-

of unbalanced reciprocating weights involved; all weights are revolving ones and directly counterbalanced, so that as far as pounding upon the track is concerned, the effect is precisely the same as though the whole were driven without any pins or rods.

The starting requirements of this locomotive are unusually severe, as it will be called upon to start a train of 550 tons trailing load upon the tunnel grades under the river, which are approximately 2 per cent. The guaranteed tractive effort of 60,000 lb. is amply within the capacity of the electrical equipment. The normal speed with load upon a level track is 60 m.p.h., but the locomotive is capable of speed much in excess of this. During some of the trial runs it made 72 m.p.h. The total weight of the locomotive is 332,100 lb., of which 208,000 lb. are carried by the drivers. The weights per driving axle are 52,000 lb. each and per pony axle 31,000 lb. each.

At maximum capacity this locomotive develops 4000 hp. for sustained heavy output. The motors are designed for forced ventilation, but the initial service will not require this provision. It will be seen that the locomotive is an articulated machine. Each half carries its own motor and has four driving wheels 68 in. in diameter and one four-wheel swing bolster swivel truck with 36-in. wheels. Each section has its own cab of sheet steel extending the length of the frame, communication between the two cabs being provided through a standard Pullman vestibule. The rigid wheelbase of each half is 7 ft. 2 in., and the total wheelbase of each half is 23 ft. 1 in., that of the whole locomotive being 55 ft. 11 in. The total length of the locomotive inside of the knuckles is 64 ft. 11 in. The running gear and mechanical parts of this locomotive were built by the Pennsylvania Railroad at the Juniata shops at Altoona. The air-brake equipment was built by the



Pennsylvania Electric Locomotive—Side View

ican type locomotives coupled permanently back to back. The motors are mounted upon the frame and side-connected through jack shafts to driving wheels by a system of cranks and parallel connecting rods, similar to steam practice. The connecting rods are all rotating links between rotating elements, and are thus perfectly counterbalanced for all speeds. The employment of this transmission permits the mounting of the motors upon the frame, secures their spring support, and, in common with the rest of the locomotive, the center of gravity at 79 in. above the rail, or approximately the same height above the rails found desirable in high-speed steam locomotives.

The same freedom of motion in the wheels and axles that is characteristic of the present steam locomotive designs is also secured. In these locomotives the variable pressure of the unbalanced piston of the steam locomotive is replaced by the constant torque and constant rotating effort of the driving motors, and the pull upon the draw-bar is therefore constant and uniform. It might to the casual observer appear that by this arrangement of driving a return has been made to steam locomotive practice as regards counterbalancing difficulties, but it will be seen upon examination that nothing of the kind is true. There are no questions

Westinghouse Air Brake Company, and the electrical equipment was built and the apparatus assembled by the Westinghouse Electric & Manufacturing Company at the East Pittsburgh works.

FRAMES

The locomotive frames are of cast steel of large cross-section and massive construction. In their design an unusually large factor of safety has been employed. The side frames are of sufficient strength to allow the engine to be raised by jacks applied at fixed points provided in the construction with all pedestal binders removed. The upper surfaces of the side frames are especially broad and furnish bases for the feet of the motor frames, which fit over the top members of the side frames with heavy flanges. There are five heavy cross-ties from side frame to side frame, consisting of bumper, articulation and jackshaft girders, body bolster and drive wheel cross-tie. Additional transverse strength is given by the steel motor frame which is bolted to the side frames as elsewhere described. The bumper and articulation girders are so proportioned that a bump equivalent to a static load of 500,000 lb. (150,000 lb. applied on center line of draft cylinder and 350,000 lb. applied on center line of platform buffer) will produce no stress exceeding

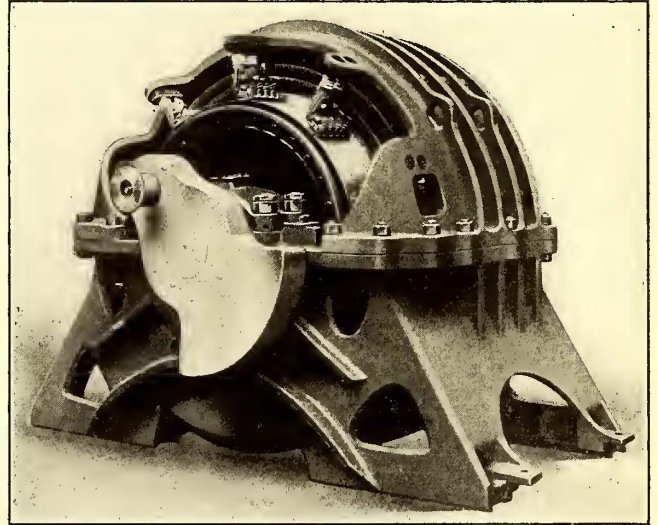
12,000 lb. per square inch in the frames. The jackshaft girder is of inverted U-section and arranged to give rigid support to the jackshaft bearing brasses. It also carries upon facings the driver brake cylinder and the brake lever fulcrums are integral with the girder. The cross-tie between the driving wheels is of diagonal design, especially fitted for stiffening the bottom members, and also providing a base for the front driver brake hanger pin. This tie fits between the upper and lower members of the side frames and assists in rigidly supporting the heel of the motor frame. The articulation girder is unusually rigid diagonally in the horizontal plane, and is designed to accommodate the articulation gear details. The body bolster carries the swivel truck center pin and is of ample strength to withstand all braking strains.

WHEELS, AXLES AND SHAFTS

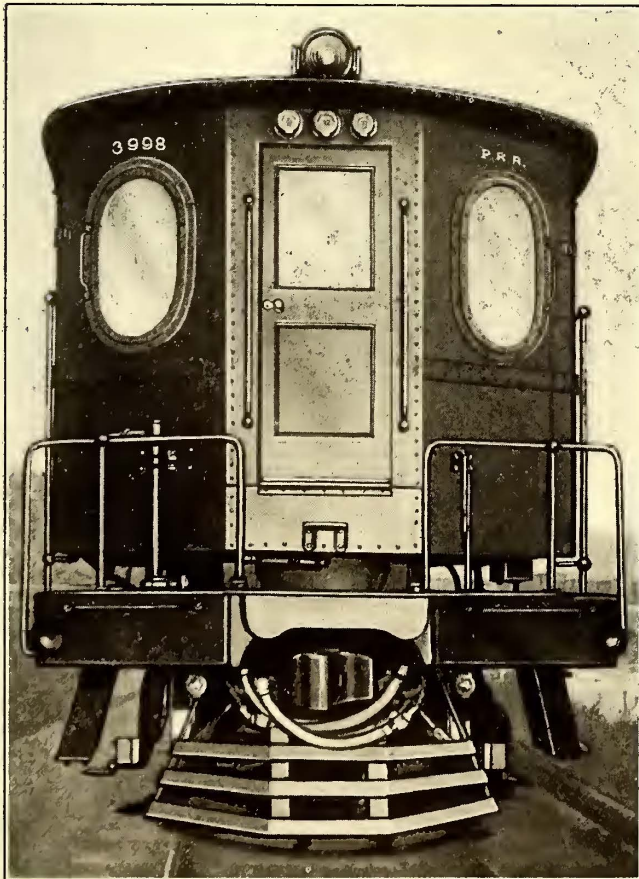
The driving wheels are 68 in. in diameter with tires 3 in. thick, have cast-steel centers and rolled-steel tires, and are fitted with retaining rings. The truck wheels are of rolled steel 36 in. in diameter. The driving-wheel centers are fitted with quartered crankpins and counterbalances; these latter are offset from direct opposition to the cranks to correct the transverse unbalance that would otherwise exist. The axles, jackshafts and motor shafts are of spe-

cial carbon steel, oil-tempered and annealed, bored axially and press-fitted to their respective cranks and wheels.

The connecting rods are also of special carbon steel, oil-tempered and annealed. Inasmuch as under the action of the brake shoes the wear of the axle and the take-up of the wedges in the pedestal tend to decrease the distance between



Pennsylvania Electric Locomotive—One of Two 2000-Hp Direct-Current Interpole Motors



Pennsylvania Electric Locomotive—End View

cial carbon steel, oil-tempered and annealed. They are of large diameter, finished all over, and each has an axial hole throughout.

CRANKS AND CONNECTING RODS

The motor shaft cranks are forged with integral counterbalances, accurately located in quartering positions and press-fitted and keyed to the shaft. The jackshaft cranks are forged integrally with the shaft in quartering position. Their counterbalances are keyed in position. As with the

driving wheels, the counterbalances of motor shafts and jackshafts are offset from direct opposition to the cranks in order to complete the balance. All the crankpins are of special carbon steel, oil-tempered and annealed, bored axially and press-fitted to their respective cranks and wheels.

The connecting rods are also of special carbon steel, oil-tempered and annealed. Inasmuch as under the action of the brake shoes the wear of the axle and the take-up of the wedges in the pedestal tend to decrease the distance between

the axle and the jackshaft, the main rod is adjustable at each end, so fitted that all take-up shortens the rod and furnishes compensation. The type of adjustable head is that employed on the Pennsylvania Railroad Class E-3 locomotives. All other rods are fitted with solid bushed ends.

DRAFT GEAR AND ARTICULATION

The bumper ends of the locomotive are fitted with Westinghouse friction draft gear, standard M.C.B. couplers and platform buffers of Pennsylvania Railroad standard type. The articulation ends are fitted with permanent couplings of long twin draw-bars and Westinghouse friction draft gears so designed that the leading half serves as a leading truck and the other half as a trailer in whichever direction the locomotive may be moving. The coupling gear is designed to oppose any possible "nosing" tendency or buckling action of the halves.

The main journals are similar to those of the Pennsylvania Railroad Class E-3 engine. The jackshaft and motor bearings are all fitted for oil and waste lubrication. The spring rigging is of suitable strength, composed of equalizing beams and semi-elliptic springs, links and hangers of the usual type are provided. All materials of the locomotive running gear were furnished under Pennsylvania Railroad standard specifications with the exception that the axles, shafts, rods and crankpins are of special carbon steel, oil-tempered and annealed, and were subject to special inspection.

CABS

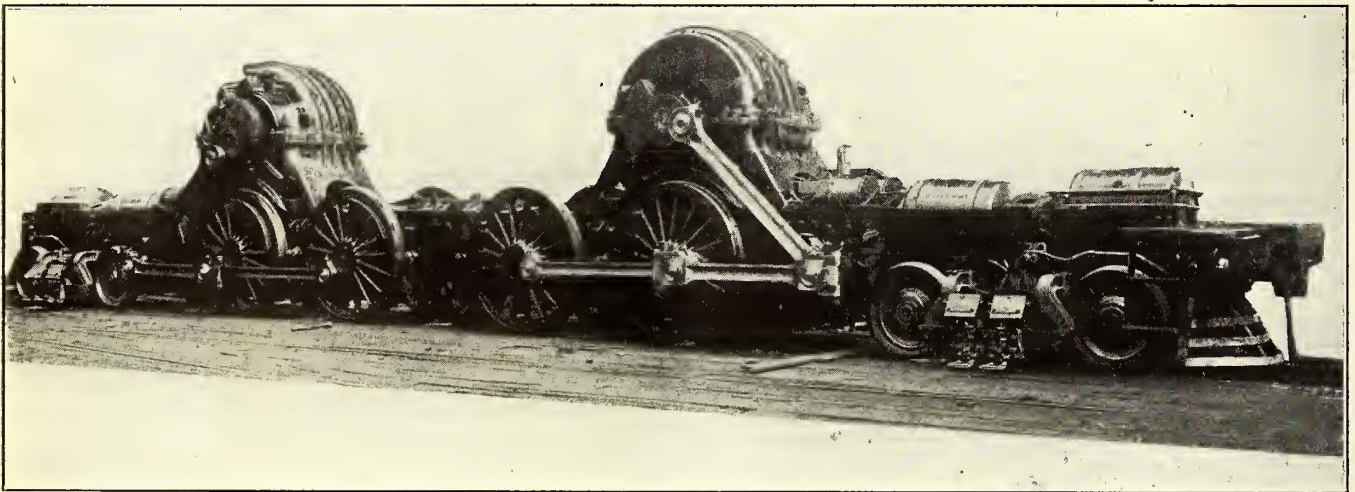
The cab of each half is an independent structure complete in itself. It is so constructed that it may be lifted bodily from the running gear with the floor and all auxiliary apparatus and set upon any convenient flat surface or trestle support without damage. This leaves the motor and running gear accessible for any desired overhauling and permits attention to be given at the same time

to the machinery in the cab. The cabs are identical in construction and fittings and are interchangeable. The location of the cabs in assembling is determined by dowels fitting in corresponding holes in the running gear. They are held in place by a number of bolts sufficient for security, but the locomotives would have to go beyond their centers of stability before the cabs would leave their seats. The cabs are amply lighted by electric lamps. The bulkheads and doors are so arranged that the motor and air compressor compartments, containing nearly all of the auxiliary apparatus, may remain lighted at all times with no intrusion of light in the controller compartment to affect the vision of the driving engineer. Provision is to be made for heating the cabs by steam furnished from electric flash boilers within the cabs.

Steps and hand rails are provided for safe and convenient access to all parts of the locomotive. Each cab is fitted with an appropriate bell for hand operation, a chime whistle, sand box and sanders, and also with a roof collector of pantograph type for power supply over third-rail gaps in the yards. The sanders and overhead collectors are operated by foot push buttons located near the master controller within easy reach of the driving engineer.

from two interpole motors on direct current at 600 volts. The design of these motors was governed by the necessity of commutating the heavy drafts of power required to accelerate long trains on the tunnel grades. For this purpose the design not only affords great electrical stability, but renders it possible to use the economical, flexible and efficient field control. Each motor will develop 2000 hp on a current of 2900 amp at 600 volts. The weight of each motor complete without the crank is 42,000 lb. The motor frames are cast-steel shells divided horizontally and bolted rigidly together. The motor is of open construction, affording easy access to all parts. It is especially provided with powerful self-ventilation. If the full power of the locomotive is to be used more frequently than contemplated, ventilation by air blast can be used to increase the output greatly.

Semicircular openings in the lower half of the frame provide seats in which the bearing housings are rigidly bolted. The lower half of the frame is provided with four feet for mounting and bolting on the side frames of the running gear and these feet have machined flanges fitting over the top members on the side frames and stiffening the structure against transverse movement on the part



Pennsylvania Electric Locomotive—Motors and Running Gear

Each cab carries on the roof, at the end, an electric headlight having for its illuminating element a 50-cp stereopticon lamp operated from the main current, with suitable resistances, on 240 volts. These headlights are not intended to be of high candle-power, or to have a searchlight quality, although they might readily have been made so, as the electric current is obviously at hand. It was considered of great importance to avoid the blinding effect on the motorman of a powerful light as signals are provided with color indication only in the tunnels and terminal yard.

AIR BRAKES

Each locomotive half is supplied with complete Westinghouse air brake equipment actuated by a motor-driven air compressor and 600-volt motor for both automatic and direct braking of locomotive and train. The compressor also furnishes air for the electro-pneumatic switches, and its displacement is 65 cu. ft. of free air per minute. The entire system is especially designed for these locomotives and the foundation brake rigging is suitably proportioned for the weights and arranged for delivery of 85 per cent braking power at 50 lb. cylinder pressure.

ELECTRIC EQUIPMENT

The motive power of this type of locomotive is delivered

of the motors. In addition to being securely bolted, the feet of the frame are firmly wedged in place.

The motors of these locomotives have 10 main poles and 10 interpoles, with heavy strap field windings. The main field is split in two halves, both being used together in slow speed operation. One of these sections is shunted in control. The armature core is built of soft steel punchings assembled with the commutator. The commutator bars are of hard drawn copper clamped by cast steel rings over mica insulation.

For the relief of the driving mechanism from excessive strains in the event of short-circuit in the powerful motors, an adjustable friction clutch of novel design and tested efficiency in action is provided between the armature spider and the motor shaft.

OTHER ELECTRICAL EQUIPMENT

The control of the locomotive motors is of the shunted field type, and by the utilization of the unit switch system the motors may be grouped in "series" or in "multiple" at will. Electro-pneumatic switches, actuated by air from the brake compressor and operated by magnets controlled from the master controller, are provided to regulate the field strength of the motors by shunting and by cutting out a portion of the field winding, in addition to the "series

parallel" grouping. This gives increased economy of operation and additional running points, greatly improving the facility and economy of operation.

The bridging system is used for passing from "series" to "multiple" connections. The motor fields are arranged to be reversed for changing the direction of motion and reversing is accomplished by unit switches.

The master controller is simple in operation and the cab is so arranged that the entire controlling mechanism of the locomotive and train is within reach of the driving engineer. When two or more locomotives are coupled together all may be operated simultaneously from any one of the master controllers. All switches are operated from the master controller entirely at the will of the motorman or engine driver. While it is not intended that the half units will be operated independently, the cabs are identically equipped and the windings, connections and control are such that in the event of the disabling of one motor the train may be operated under reduced power by the second motor, the same resistances being employed as for the two.

The resistances are of the three-point cast grid type. The grids have such capacity that when one motor is cut out of service the locomotive will operate with the remaining motor. Under such circumstances the locomotive will exert a tractive effort of 25,000 lb. with the train accelerating at a rate of 0.1 m.p.h.p.s. until the resistance grids are cut out.

Suitable receptacles and jumpers are provided to establish the necessary low voltage control circuits between the locomotive half units and between the adjacent locomotives. A duplicate set of small storage batteries is supplied in each half unit for operation of the control circuits; and relays with suitable resistances are provided for shunting part of the current of the compressor motor through the batteries for automatic charging. An exceptionally quick-acting circuit-breaker is supplied on each half unit and connected between the junction of the third rail shoe and overhead collector cables and the switch groups. The main switch is on the line side of the circuit-breaker.

Each half unit is supplied with two pairs of collector shoes, suitably connected and fused. One pair of these shoes is mounted in a hardwood beam on each side of the swiveling four-wheeled truck.

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GAS-ELECTRIC MOTOR CARS FOR THE SOUTHERN RAILWAY

The General Electric Company has sold to the Southern Railway Company two of its latest type of gas-electric motor cars. These cars will be equipped with standard commutating pole railway motors of 100 hp each. Two of these motors are located on the forward truck, giving a motor capacity of 200 hp to each car. The current is supplied from a 600-volt generator, which is direct-coupled to an eight-cylinder gas-engine in the forward compartment. A controller similar to that used on an ordinary trolley car is located convenient to the operator, and through this the current passes from the generator to the motors. Combined straight and automatic air brakes will be provided for the usual valves and accessories. The car bodies will be of steel, about 55 ft. long, with a seating capacity of 52 passengers. Both rear and center entrances are provided, thus furnishing a convenient means of dividing the two classes of passengers as required in the South. The order for these cars was placed after a thorough test of this type between Manassas and Strasburg last summer.

HOMEWARD JOURNEY OF THE PACIFIC COAST TRAIN PARTY

The special train of the Massachusetts Street Railway Association carrying the party of Eastern delegates who have been making a tour of the street railway systems of the Pacific Coast left Los Angeles over the Southern Pacific Railroad for El Paso, Tex., on Tuesday, Oct. 26. After leaving Los Angeles the party sent a telegram to Mr. Littell, chairman of the local reception committee, which read as follows:

Our visit of two days in Los Angeles will ever be memorable in the minds of every member of our party. The boundless hospitality of which we were the recipients can never be forgotten, nor can your magnificent electric railways, which we had the pleasure of inspecting under your guidance. You may well be proud of the beautiful homes and electric railways of your city, and of the enterprise of the citizens of Los Angeles. The good fellowship and royal hospitality of its electric railway officials will ever be remembered.

The accompanying group view was taken in front of the Hotel Maryland, Pasadena, Cal., Oct. 25, and shows the members of the Pacific Coast party and the reception committee of the Los Angeles railway companies. This committee was composed of the following gentlemen:

H. M. Littell, assistant to general manager, Pacific Electric Railway, chairman.

C. H. Burnett, manager, Los Angeles & Redondo Railway, secretary.

H. E. Huntington, president, Pacific Electric and Los Angeles railways.

L. T. Garnsey, president, Los Angeles & Redondo Railway.

E. P. Clark, president, Los Angeles-Pacific Company.

M. H. Sherman, vice-president, Los Angeles-Pacific Company.

J. McMillan, general manager, Pacific Electric Railway.

W. E. Dunn, general counsel, Pacific Electric Railway.

Howard E. Huntington, general manager, Los Angeles Railway.

R. P. Sherman, general manager, Los Angeles-Pacific Company.

Thomas McCaffery, general superintendent, Pacific Electric Railway.

A. D. McDonald, auditor, Pacific Electric Railway.

Col. G. E. Pillsbury, chief engineer, Pacific Electric Railway.

D. A. Munger, general agent, passenger department, Pacific Electric Railway.

W. F. Towne, general agent, freight department, Pacific Electric Railway.

A. E. Roome, superintendent telegraph and signals, Pacific Electric Railway.

J. Strang, master mechanic, Pacific Electric Railway.

S. H. Anderson, electrical engineer, Pacific Electric Railway.

J. J. Akin, superintendent, Los Angeles Railway.

E. L. Stephens, master mechanic, Los Angeles Railway.

J. L. Clark, superintendent of electrical repairs, Los Angeles Railway.

C. A. Henderson, auditor, Los Angeles Railway.

G. J. Kuhrts, electrical engineer, Los Angeles Railway.

L. O. Lieber, electrical engineer, Los Angeles Railway.

W. C. White, superintendent, Los Angeles-Pacific Company.

D. W. Pontius, traffic manager, Los Angeles-Pacific Company.

C. M. Warnecke, electrical engineer, Los Angeles-Pacific Company.

W. T. Maddex, superintendent and general freight and passenger agent, Los Angeles & Redondo Railway.

E. C. Thomas, general agent, passenger department, Los Angeles & Redondo Railway.

W. F. Goble, superintendent mechanical department, Los Angeles & Redondo Railway.

The party was accompanied from Los Angeles to El

Paso by C. D. Kellogg, Jr., manager, El Paso Electric Railway Company, and upon the arrival of the train at El Paso, about 2 p. m., on Oct. 27, the tourists were met by a number of other officials of the local street railway company, including H. S. Potter, general superintendent; C. L. Forsyth and A. C. Woehler. Special trolley cars and automobiles took the members of the party to the Country Club, where a luncheon was served and a concert provided by the military band from Ft. Bliss. The party was then taken across the Rio Grande River in special cars to the city of Juarez, Mex., in which the El Paso Electric Railway Company also operates the street railway service. After some time spent in viewing the foreign sights in this historical Mexican town, the party returned to El Paso and enjoyed a banquet at the St. Regis Hotel, provided by the local railway officials. Several informal speeches were made by representatives of the company and by some of the visitors. The train left for San Antonio about midnight.

San Antonio, Tex., was reached about 4 o'clock in the afternoon of Oct. 28. The visitors were met at the station by W. B. Tuttle, general manager; T. C. Brown, superin-

County of Galveston to prevent inundation of the city by the sea. After a shore luncheon at one of the restaurants on the Boulevard the train was taken' at 1.30 p. m. for Houston.

The special train reached Houston from Galveston about 4 p. m. on Friday. The tourists were accompanied on the trip from Galveston by David Daly, general manager of the Houston Electric Company, and by a number of his associates. At the Houston railroad station automobiles were in waiting to take the party on a tour around the city. Several of the principal residential streets were traversed. A trip was then made to a large cotton bale compressing plant, owned by the Cleveland Compressing Company. Afterward the Country Club was visited. The party returned to the Southern Pacific Railroad station at 6.45 p. m. and boarded the train for New Orleans, which was the next stopping place.

The party arrived at New Orleans early on the morning of Saturday, Oct. 30, and was met at the Southern Pacific Railroad station by E. C. Foster, vice-president, New Orleans Railway & Light Company. Mr. Foster had joined



Group View of Members of Pacific Coast Train Party and Representatives of Los Angeles Electric Railways, Taken at Hotel Maryland, Pasadena, Cal., Oct. 24

tendent of transportation; J. J. King, general superintendent; W. H. Thompson, Jr., assistant general manager, and T. J. Owen, of the San Antonio Traction Company. Special cars were waiting to take the members of the party to see the Alamo, an ancient Spanish mission and the scene of one of the famous battles in the war of Texan independence against Mexico. An opportunity was afforded later in the afternoon to inspect the irrigation works in connection with a large plantation in the suburbs of the city, and the trip concluded with a ride through the beautiful residential sections of San Antonio. A Mexican dinner was served in the evening at one of the famous Mexican restaurants in the city.

The party went directly from San Antonio to Galveston, which was reached about 8:30 a. m., Friday. They were met by H. S. Cooper, manager, Galveston Electric Company, and several of his associates and were taken to two ocean-going tugs. A trip was then taken about the harbor of Galveston, which with the exception of New York, is said to be the largest shipping point for foreign exports and imports in the United States. After landing, the party entered automobiles and carriages and were driven to the famous Sea-Wall Boulevard and had an opportunity of seeing the sea-wall erected by the city and

the party at Denver, but had been obliged to return to New Orleans directly from Seattle. Special electric cars carried the tourists to Bégue's restaurant, in the French quarter of the city, where a breakfast was served according to the French style. A visit was then made to the New Orleans Country Club in company with Mr. Foster and Hugh McCloskey, president, New Orleans Railway & Light Company. Afterward, the party returned to the city, and from the vantage point of the upper decks of a large river steamer witnessed the arrival in New Orleans by boat of President Taft and the party of delegates to the waterways convention, governors of several States, congressmen and others. Three large men-of-war were anchored opposite the landing, and saluted the President as he arrived. The effect of the sight was heightened by the elaborate decorations of the city and the crowds along the shore. It was a spectacle never to be forgotten. After leaving the river front the party again boarded their special cars and were conveyed to an attractive summer resort on Lake Pontchartrain, where an elaborate luncheon was served. The luncheon was followed by informal speeches by a number of those present. Mr. Foster presided and Mr. Peirce, of Boston, acted as toastmaster. After the return to the city the party divided, but most of them assembled later in the

evening to witness the presentation of "Les Huguenots" at the French Opera House, the performance being also attended by President Taft. The train left New Orleans at midnight for Memphis over the Yazoo & Mississippi Valley Railroad.

The tourists reached Memphis, Tenn., about 4 p. m., Oct. 31, and were taken by a special car provided by the Memphis Street Railway Company to Overton Park, where the city has recently installed an extensive zoological collection. B. H. Betts, of the transportation department of the Memphis Street Railway Company, accompanied the party. After a short visit at the park, the tourists returned to the station in time to start for Louisville at 7 p. m.

Louisville, Ky., was reached about 9 a. m., Nov. 1, and the party was met at the station by Thos. H. Minary, assistant to the president; R. R. Smith, traffic manager, and Jacob Fishback, superintendent of transportation, Louisville Railway Company.

The tourists rode first to the large distillery of the Sunnysbrook Distillery Company, where they were taken through the buildings. This is among the largest distilleries in the world, and the visitors were shown all of the various processes of the manufacture of whisky. They then rode to the Louisville factory, No. 27, of the National Tobacco Works branch of the American Tobacco Company, where they were escorted through the building by officials of the company. The stay of the party in Louisville was brief, as the special train was scheduled to leave at noon for Cincinnati, so that after these two visits the tourists returned to the railroad station. They left for Cincinnati on schedule time.

Cincinnati was reached about 4:30 p. m. on Nov. 1, and the party was met at the Union Station by Walter A. Draper, secretary, and Thomas Fitzgerald, assistant general manager, of the Cincinnati Traction Company and the Ohio Traction Company. Two handsome interurban cars of the latter company were waiting and took the tourists around the city and to Eden Park, but as it was raining no stop was made at the latter place. After a ride of about two hours, during which the visitors had an opportunity of seeing many of the interesting features of the city and of the Cincinnati traction system, the party returned to the train. Cleveland had originally been scheduled as the next stopping point, but owing to the desire of many of the party to spend as much time as possible at Niagara Falls, the train continued directly to Buffalo, which was reached about 10 a. m., Nov. 2. At Buffalo the party divided, many going to the Falls, others remaining in the city.

At 7 p. m. the train left for Boston, where it arrived at 9 a. m., Nov. 3. Before parting, the party passed resolutions extending its sincere thanks to F. A. McCormick, passenger agent, Boston & Maine Railroad, through whom the railroad arrangements for the trip had been made, and who accompanied the party.

SUMMARY OF THE TRIP

The tour of the Massachusetts Street Railway Association, which has just ended so successfully, was begun Sept. 30 and lasted five weeks. The idea originated with Charles S. Clark, secretary of the association, and was conducted under the direction of Mr. Clark, H. E. Reynolds, assistant general manager, Boston & Northern Street Railway, and H. L. Wilson, treasurer, Boston Elevated Railway. The special train in which the tour was made was composed of eight cars, consisting of a full baggage car, a café car, a dining car, a standard Pullman sleeping car, three compartment sleeping cars and a combination compartment and observa-

tion car. Most of the tourists were from Massachusetts, but a number of other States were represented among those who made the circuit from Cleveland and return. The delegates who left from and returned to Boston traveled nearly 10,000 miles. Twenty-two States and territories were crossed. In addition to the trip in the United States, the party spent three days in Canada, and at El Paso crossed into Mexico. Stops were made at 20 cities for a long enough time to allow the party to inspect the local electric railway system.

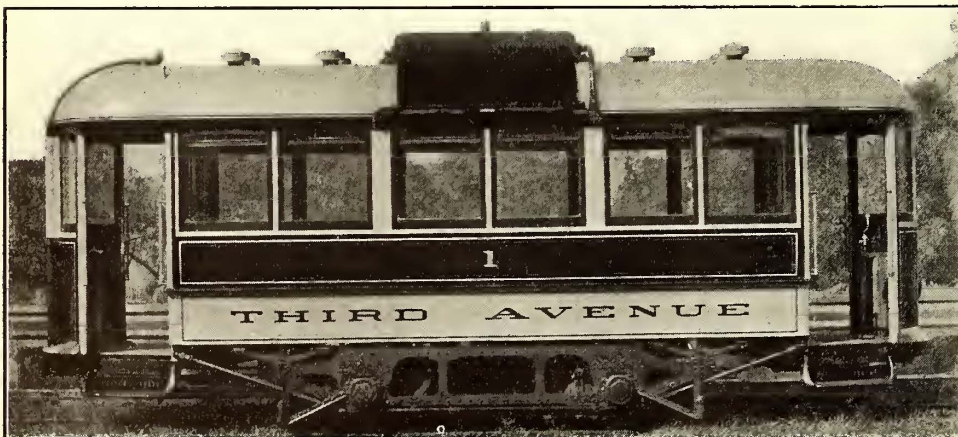
The following is a list of those who participated in either the entire trip or part of it. All of those who started from any part of Massachusetts or from New York and returned with the party are indicated in the list as having made the complete tour, although the train actually left from and returned to Boston.

Arnold, John A., president, Taunton & Pawtucket Street Railway (complete tour).
 Arnold, Mrs. John A. (complete tour).
 Bacon, Wm. H., Bacon & Co., Boston, Mass. (complete tour).
 Bright, Edgar, inspector of expenditures, Boston Elevated Railway, Boston, Mass. (complete tour).
 Birtwell, A. W., assistant treasurer Tacoma Railway & Power Company, Tacoma, Wash. (Denver to Seattle only).
 Blake, Henry W., editor, ELECTRIC RAILWAY JOURNAL, New York City (complete tour).
 Bliss, A. W., Brookline, Mass. (complete tour).
 Bliss, Mrs. A. W. (complete tour).
 Burns, John, Duxbury, Mass. (complete tour).
 Burns, Mrs. John (complete tour).
 Campbell, A. D., Seattle Electric Company, Seattle, Wash. (Denver to Seattle only).
 Carr, Geo. R., vice-president and general manager Dearborn Drug & Chemical Works, Chicago (Denver to San Francisco only).
 Clark, Chas. S., secretary, Massachusetts Street Railway Association (complete tour).
 Clark, Mrs. Chas. S. (complete tour).
 Clark, Miss Arabella (complete tour).
 Clark, Miss Mary F. (complete tour).
 Clark, Miss Anna M. (complete tour).
 Clark, Joseph F. (complete tour).
 Coates, F. R., Stone & Webster Engineering Corporation, Boston (Boston to San Francisco only).
 Corey, W., Standard Motor Truck Company, New York City (Denver to Seattle only).
 Coghlin, Gerald R., B. J. Coghlin & Company, Montreal, P. Q. (Complete tour).
 Colburn, Clifton, treasurer, Nahant & Lynn Street Railway, Lynn, Mass. (complete tour).
 Dana, Edward, inspector of service, Boston Elevated Railway, Boston (complete tour).
 Dana, Mrs. Edward (complete tour).
 DeHaseh, C. A., roadmaster, Seattle Electric Company, Seattle, Wash. (Denver to Seattle only).
 Dohn, A. F., Tacoma Railway & Power Company, Tacoma, Wash. (Denver to Seattle only).
 Davol, B. D., president, Mechanics Mills, Fall River, Mass. (complete tour).
 Davol, Mrs. B. D. (complete tour).
 Dozier, G. E., superintendent, Nahant & Lynn Street Railway, Lynn, Mass. (complete tour).
 Drake, L. J., Jr., Galena Signal Oil Company, Indianapolis, Ind. (Denver to Louisville, Ky.).
 Drake, Mrs. L. J., Jr. (Denver to Louisville, Ky.).
 Edwards, Chas. R., manager, Badger Fire Extinguisher Company, Boston (complete tour).
 Edwards, Mrs. Chas. R. (complete tour).
 Fallon, Nugent, Boston Elevated Railway, Boston, Mass. (complete tour).
 Farron, H. H., Adams Manufacturing Company, Pittsburgh, Pa. (Cleveland, Ohio, returning to Buffalo).
 Foster, E. C., vice-president, New Orleans Railway & Light Company, New Orleans, La. (Denver to Seattle only).
 Foster, Mrs. E. C. (Denver to San Antonio, Tex., only).
 Fletcher, J. F., Armstrong Dining & News Company, Boston, Mass. (complete tour).
 Fletcher, Mrs. J. F. (complete tour).
 Goodrich, E. S., Hartford, Conn. (complete tour).
 Green, H. B., Pennsylvania Steel Company, Los Angeles, Cal. (San Francisco to Los Angeles, only).
 Green, Mrs. H. B. (San Francisco to Los Angeles only).
 Johnson, F. H., Boston, Mass. (complete tour).
 Johnson, Mrs. F. H. (complete tour).
 Hall, Mr., Stone & Webster Engineering Corporation, Houston, Tex. (San Antonio to Houston only).
 Kellogg, C. W., Jr., El Paso Electric Railway, El Paso, Tex. (Los Angeles to Houston only).
 Kempster, A. L., superintendent, Seattle Electric Company, Seattle, Wash. (Denver to Seattle only).
 Laffin, R. T., Stone & Webster Engineering Corporation, Seattle, Wash. (Denver to Seattle only).
 Lindsay, S. R., Seattle Electric Company, Seattle, Wash. (Denver to Seattle only).
 McCabe, J. F., purchasing agent, Worcester Consolidated Street Railway, Springfield Street Railway and Berkshire Street Railway, Springfield, Mass. (complete tour).
 McCormick, F. A., agent, Boston & Maine Railroad, Boston, Mass. (complete tour).
 McCormick, Mrs. F. A. (complete tour).
 McCarter, Thos. N., president, Public Service Corporation, Newark, N. J. (Denver to Laggan, Alta.).
 McCarter, Mrs. Thos. N. (Denver to Buffalo, N. Y.).
 McDonald, A. L., Brockton, Mass. (complete tour).
 McDonald, Mrs. A. L. (complete tour).
 McKay, A. H., traffic manager, Puget Sound Electric Railway (Denver to Seattle only).

Meixwell, J. C., superintendent of transportation, Northern Electric Railway, Scranton, Pa. (from Utica, N. Y., and return).
 Milk, Mrs. E. L., Hoosick Falls, N. Y. (from Hoosick Falls and return).
 Morse, George, Taunton, Mass. (complete tour).
 Nash, George, Brown Brothers & Company, Boston (complete tour).
 Nash, Mrs. George (complete tour).
 Nash, Miss (complete tour).
 Odell, E. H., claim agent, Tacoma Railway & Power Company and Puget Sound Electric Railway, Tacoma, Wash. (Denver to Seattle only).
 Odell, Mrs. E. H. (Denver to Seattle only).
 Page, H. C., general manager, Worcester Consolidated Street Railway, Worcester, Mass. (complete tour).
 Page, Mrs. H. C. (complete tour).
 Peirce, Chas. C., manager railway department, General Electric Company, Boston (complete tour).
 Peirce, Mrs. Chas. C. (complete tour).
 Pierce, Harold W., Stone & Webster Engineering Corporation, Houston, Tex. (San Antonio, Tex., to Houston only).
 Potter, E. E., manager Seattle Electric Company, Seattle, Wash. (Seattle to Boston only).
 Reynolds, H. E., assistant general manager, Boston & Northern Street Railway, Boston (complete tour).
 Reynolds, Mrs. H. E. (complete tour).
 Rosengarten, J. C., Philadelphia, Pa. (complete tour).
 Rollins, J. R., Jr., president, Holbrook, Cabot & Rollins Corporation, Boston (complete tour).
 Rollins, Mrs. J. W. (complete tour).
 Rollins, Wingate (complete tour).
 Ruppe, S., Seattle Electric Company, Seattle, Wash. (Denver to Seattle only).
 Spillane, Maurice, attorney, Boston Elevated Railway, Boston (complete tour).
 Spillane, Mrs. Maurice (complete tour).
 Shaw, James F., president, American Street & Interurban Railway Association, Boston, Mass. (complete tour).
 Smith, Mrs. Alice Johnson (complete tour).
 Swenson, B. V., secretary-treasurer, American Street & Interurban Railway Association, New York City (complete tour).
 Schluss, K. C., Seattle Electric Company, Seattle, Wash. (Denver to Seattle only).
 Thayer, Chas. I., Brookline, Mass. (complete tour).
 Thayer, Mrs. Chas. I. (complete tour).
 Thornley, A. J., superintendent, Narragansett Machine Company, Providence, R. I. (complete tour).
 Thornley, Mrs. A. J. (complete tour).
 Wilson, H. L., treasurer, Boston Elevated Railway, Boston, Mass. (complete tour).
 Wilson, Mrs. H. L. (complete tour).
 Winsor, Paul, chief engineer of motive power and rolling stock, Boston Elevated Railway, Boston, Mass., and past president, American Street & Interurban Railway Engineering Association (complete tour).
 Wellington, E. I., Rindge, N. H. (complete tour).
 Wellington, Mrs. E. I. (complete tour).
 Wilde, E. S., treasurer, Union Street Railway, New Bedford, Mass. (Denver to Boston).
 Winter, H. M., General Electric Company, Seattle, Wash. (Denver to Seattle only).
 Wells, James R., Springfield, Mass. (complete tour).
 Wells, Mrs. James R. (complete tour).

GASOLINE-ELECTRIC CAR FOR THE THIRD AVENUE RAILROAD, NEW YORK

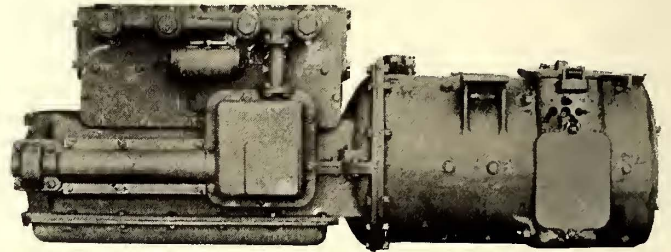
The Third Avenue Railroad Company, at the suggestion of F. W. Whitridge, receiver, has begun experimental operation of a gasoline-electric car to determine the possibilities of this type of vehicle for the lines which it now operates by horse traction. The car, which was built by



Third Avenue Railroad Gasoline-Electric Car

the General Electric Company, was received on Oct. 25 and is now in service on the 125th Street cross-town line where it is being operated on the same schedule as the electric cars which are running on this route. The 125th Street line is 2.1 miles long, and in this distance from 15 to 21 stops are made in each direction. The round-trip running time is 30 to 33 minutes and the headway is

2½ minutes, with no allowance for lay-overs. The gasoline-electric car, therefore, must have as good accelerating qualities as the electric cars to maintain its place in the schedule. The new car is being operated for 15 hours every day. The company believed that by putting the gasoline-electric unit in regular passenger service on a division with heavy traffic, it would discover any weakness in the design



Gasoline Engine and Generator Unit

much sooner than if the experimental runs were made on the lightly patronized routes for which self-propelled vehicles may ultimately be used. The specifications under which this car was purchased state that it should be capable of running on a 5 per cent grade and when on level track maintain a schedule speed of 8 m.p.h. with 10 stops per mile. These conditions have been met easily; in fact, shortly after the car was received it was run successfully on Amsterdam Avenue up an 8 per cent grade about 1000 ft. long.

As shown in the accompanying illustrations, the car is of the single-truck type with drop sash and vestibules. The platforms are about 4½ ft. long and are furnished with Pitt folding gates. The outlines of the body are rather unusual owing to the absence of the monitor roof. The top is shaped like a flat dome and carries eight hood-suction ventilators, which will prevent snow or rain finding its way into the interior of the car. The water-cooling radiators are carried on top of the roof near the center of the car. The exhaust pipes are brought up to the roof at one end of the car, as shown in the accompanying head-on view. The interior of the car is handsomely finished in mahogany and is illuminated by tungsten lamps which are

set in two rows of six each over the aisle. The semi-convertible windows are furnished with Pantasote curtains. Sufficient gasoline for 150 miles operation is carried in tanks under the longitudinal rattan seating.

The body, which was built by the Wason Manufacturing Company, Springfield, Mass., is 28 ft. long over all, 19 ft. long over the body end frames, 8 ft. wide and 12 ft. high from top of the rail to the roof. It seats 26 to 28 passengers, and as the total weight of body, truck and apparatus is 24,000 lb., the respective weights per passenger

are 923 lb. and 857 lb. These weights compare very favorably with the average electric double-truck car. It will be noted that no space is given up for the power equipment in the body of the car as the machinery is carried on the truck and the control equipment at both ends takes up no more room than the ordinary electric drum controller and brake handle.

The truck is of 7 ft. 6 in. wheelbase and was specially designed by the American Locomotive Company for gasoline-electric drive. As shown in one of the accompanying illustrations, the side frames are made of steel plates. The truck is provided with coil springs and also with half-elliptic springs at the ends. The gas engine, which is mounted on the truck, is of the four-cylinder, four-cycle type, direct-connected to a generator and exciter. The electric energy developed by this unit is transmitted to two railway motors mounted on the axles. The car is operated from either end by a P-15 controller in the same manner as with a standard K type controller. In fact, the trial car is being run by a motorman who had no special training for this work. The controllers on each platform connect the motors progressively in series and in parallel and

pensive heating is proving very effective and satisfactory as it avoids unequal distribution. It may be worth adding that the arrangement for taking care of the exhaust through the roof connection keeps the unpleasant odor of gasoline from entering the car. The mounting of the machinery on the truck not only saves space but prevents serious vibration of the car body. When the car is running the machinery cannot be heard, and when the car is standing still the noise is no greater than that made by a motor-driven air compressor in a car fitted with air brakes.

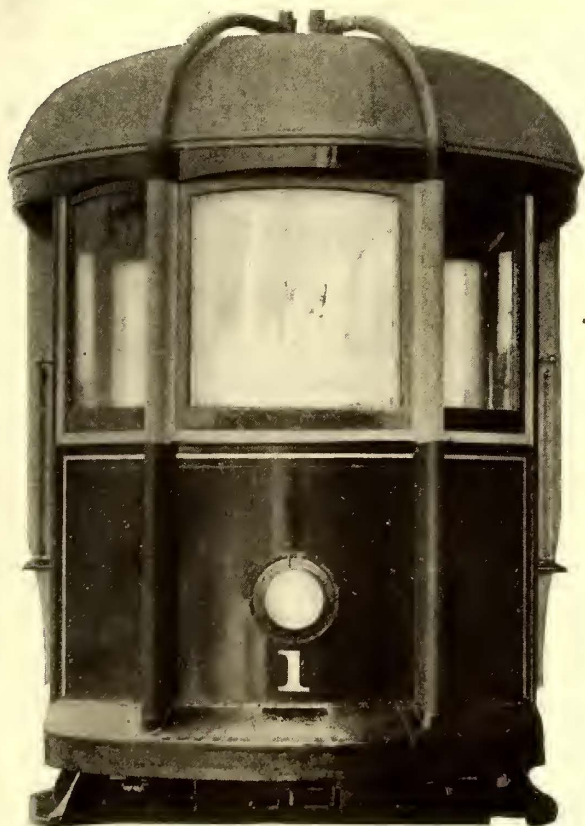
EXPERIENCES ON THE SEEBACH-WETTINGEN RAILWAY

During 1907 the Swiss government permitted the Seebach-Wettingen section of its standard gage lines to be electrified for single-phase operation at 15,000 volts. The contractors were the Oerlikon Company, which furnished two locomotives and overhead construction of its Huber side-contact type, while the Siemens-Schuckert Company furnished one locomotive and a section of double catenary construction. The line has now been in service since Dec. 1, 1907, and, according to a report made by an Oerlikon representative, has given the following results:

Not one accident or interruption which could be charged to the high tension has occurred on the line since its installation. Neither the weather nor the smoke from locomotives at stations has injured the insulation in any way. The average line loss over 20 km (12.4 miles) of trolley is less than 1-hp. It is interesting to note that of the various pole spacings tried for the multiple catenary, that of 100 m (328 ft.) has given better satisfaction than the 50 m (164 ft.) spacing more commonly employed. This longer spacing consists of five sections on a 600 m (1968 ft.) curve. The poles, which carry a single bracket, are A-frames composed of two channels. The messenger insulator is carried directly on the bracket. The change in span at one end is made directly from 48 m (157 ft.) at one end and goes over to a compromise span of 76 m (249 ft.) at the other end. The wires thus suspended consist of the following: Fig. 8, trolley of 100 sq. mm section carried at intervals of about 3 m (16 ft.) from the 6 mm (.23 in.) diameter steel auxiliary wire, which in turn is suspended at intervals of 6 m (19.5 ft.) by 5 mm (.19 in.) diameter hangers from a messenger cable of 35 sq. mm section.

The two Oerlikon locomotives each haul trains of 290 metric tons at 60 km an hour (37.2 m.p.h.). On the 1 per cent grades these machines develop a draw-bar pull of 4500 kg (9900 lb.) at 40 km an hour (24.8 m.p.h.). The required motor capacity is 660 hp per locomotive. It has been found that the average power consumption is 27 to 29 watt-hours per ton-km (43.2 to 46.4 watt-hours per ton-mile), as against a theoretical consumption of 23 watt-hours per km. The average quotient of the watt-hours divided by the volt-ampere-hours gave a 70 per cent power factor when 120 kw were taken from the line.

Despite two years' service, neither the commutators nor brushes have given the least trouble from sparking or undue wear. The commutators required no turning or lubrication of any kind. The motor bearings, gearing and connections to the driving wheels have also been found satisfactory. Both the motors and transformers are constructed for natural ventilation. These motors were built originally for 200-hp capacity, but each has frequently developed 330-hp in service. The electric control is two-fold—one by means of a large drum controller and the other by a.c. contacts. Both control systems have proved practicable.



End View of Third Avenue Railroad Gasoline-Electric Car, Showing Exhaust Pipes to Roof

regulate the voltage supplied by the generator as required by the speed of the car. In this way all mechanical connections between the gas engine and the driving axles are eliminated. The gas engine is provided with an automatic centrifugal throttle governor and runs at constant speed, regardless of the speed of the car, so that it operates at all times at high efficiency. The operator has no auxiliary levers for controlling either the gas engine or the car. A Bosch low-tension magneto supplies the ignition system, which is of the "make and break" magnet plug type. The engine is started by a crank direct from the magneto. The exciter used in connection with the generator supplies the current for the main generator field and also for lighting the car.

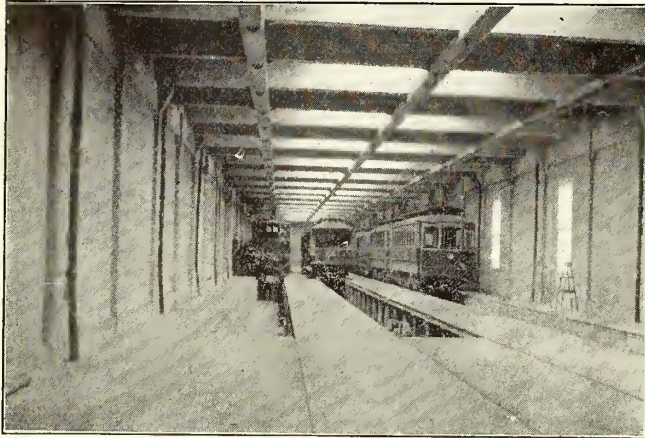
The water-cooling radiators, placed on the roof, are connected to the water jackets of the cylinders by pipes enclosed within the center posts of the car. The circulation is designed on the semi-syphon principle. Connections are also provided so that in cold weather the cooling water passes through heater pipes under the seats. This inex-

NEW REINFORCED CONCRETE CAR HOUSE IN HARRISBURG, PA.

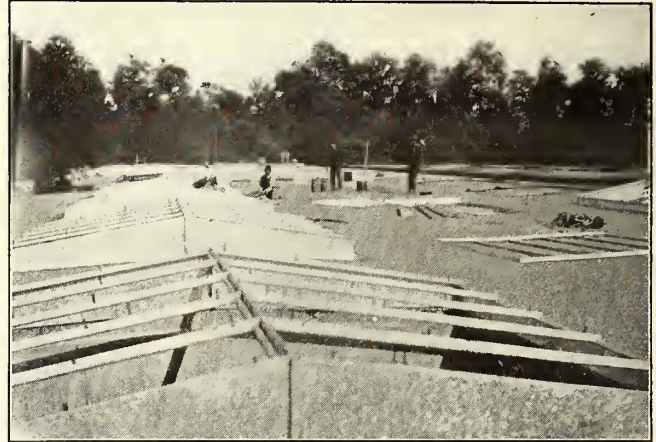
The Central Pennsylvania Traction Company, Harrisburg, Pa., has just completed an addition to its car house on North Cameron Street by the construction of a building 75 ft. wide by 360 ft. long, which doubles the car storage capacity of this depot. The new building is of reinforced concrete, and is identical in general dimensions and plan

every respect with the original house. The other bay, however, is intended for storage purposes only, and has no pits. The tracks are laid in a concrete floor, which was used as a casting yard for the columns, beams, wall and roof slabs, which were used in forming the building above the foundations.

The derrick used in erection was mounted on three trucks running on the tracks of the adjoining bay. It had a 60-ft.



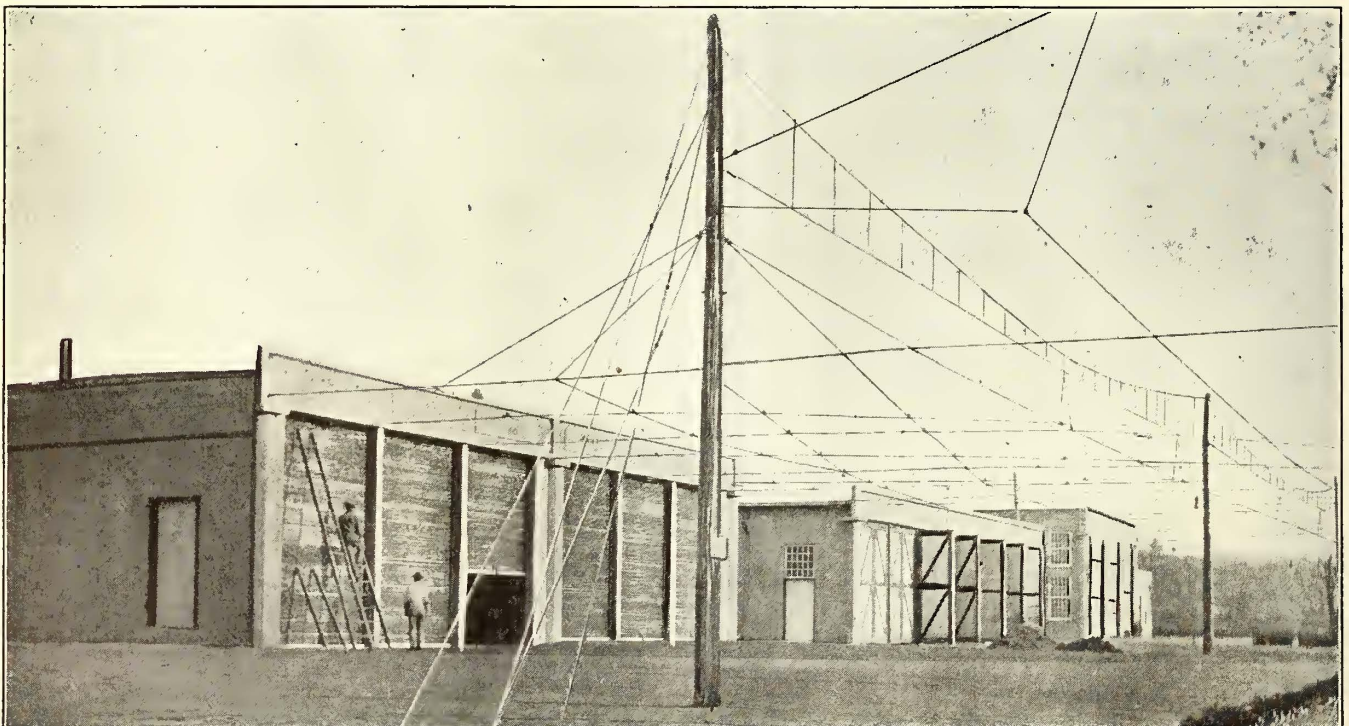
Interior of One Bay of Harrisburg Car House



Roof of Harrisburg Car House

with the car house built in 1904, which was fully described in the STREET RAILWAY JOURNAL for Sept. 2, 1905. An entirely different method of construction from that followed in erecting the original buildings was adopted for the new house. The plant built in 1904, which included a repair shop and storerooms, in addition to the car storage, was constructed in the usual manner, by erecting wooden

boom and was equipped with a two-drum Lidgerwood hoist, from which the engine was detached and power furnished by a street-car motor through a gear bolted to the flywheel of the driving shaft of the hoist. The motor was equipped with a controller and resistance boxes, and was operated by one of the company's regular motormen. This method of construction, although it involved the purchase of a der-



General View of Shop and Car Houses of Central Pennsylvania Traction Company, Harrisburg, Pa.

forms and casting the concrete in place. The house built this year was constructed of separately molded members cast on the ground and erected by means of a traveling stiff-leg derrick. One bay in the new house is equipped with washing facilities and inspection pits, identical in

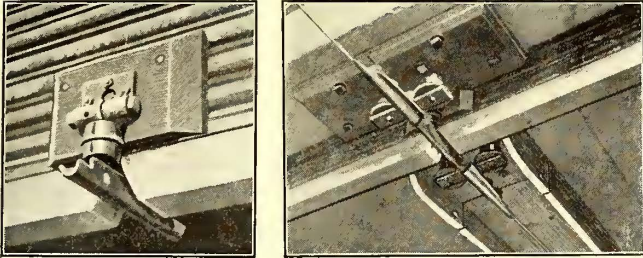
rick especially for the purpose, proved economical. The actual saving over the method used in the first construction amounted to over \$2.185 per cubic yard of concrete handled.

Aside from this, the only change made in the details of the original building was in the adoption of rolling steel

shutter doors in place of wooden leaf doors, which latter were found rather difficult to handle in windy weather, but which were otherwise entirely satisfactory. The cost of the steel doors was about twice that of the folding doors.

The main difficulty with a rolling steel door for car house purposes is the connection for the trolley wire. This was overcome in a very ingenious and novel manner by a device designed by the company's electrician, Frank Gerhart. It is shown in two of the accompanying engravings.

The new house was built with its first wall 37 ft. distant



Trolley Wire Connection for Steel Rolling Doors

from the wall of the original house, and the columns were provided with brackets, so that it will be possible in the future to add one more bay by simply roofing over the space between the two bays.

The original buildings, as well as the recent addition, were built by day labor from the plans of Mason D. Pratt, Mem. Am. Soc. C. E., Harrisburg, Pa., and under his direct supervision.

SOCIAL AND CO-OPERATIVE ORGANIZATION OF EMPLOYEES OF THE BERLIN STREET RAILWAYS

Organizations of electric railway employees for mutual helpfulness are not new in this country, but in most cases their activities are confined to the payment of sick and death benefits, and in some cases the headquarters of the organization are used for a permanent reading room. The societies formed by street railway men abroad are much more comprehensive. The greatest Continental organization of this kind is the Verein of the Grosse Berliner Strassenbahn, Berlin, Germany. Its objects are numerous, as will appear from the following paragraphs. In addition, the company has a sick benefit organization, which is entirely separate.

One purpose of the Verein is to provide death benefits. The latter amount to \$80 if the deceased person held membership for less than three years, and to \$87.50 if the membership period exceeded three years. Through a donation of \$25,000 made by the directors of the railway company an average of \$25 a year is distributed to the widows and orphans of deceased members.

One month after joining the society a member is entitled to free legal service in all civil and criminal cases arising in connection with his duties or in personal civil matters, such as taxes, etc. The organization also assists gratuitously members who are in great financial need. Money up to \$18.50 may be borrowed without interest for repayment in monthly installments of \$1.25. Such loans are often made to enable members to buy fuel at the most favorable season. The vacation department sends members or their children to vacation colonies for periods of four weeks, if it is apparent that they are in need of recreation.

Members can obtain instruction in all matters pertaining to their work by visiting the information bureau at the

headquarters of the society during certain days of the week. In addition, lectures on railway subjects are given on an average of once a week at each division headquarters. The social features are made prominent by an employees' singing club and band, which performs at all concerts and theatrical affairs. The admission prices are low, to promote sociability to the utmost extent.

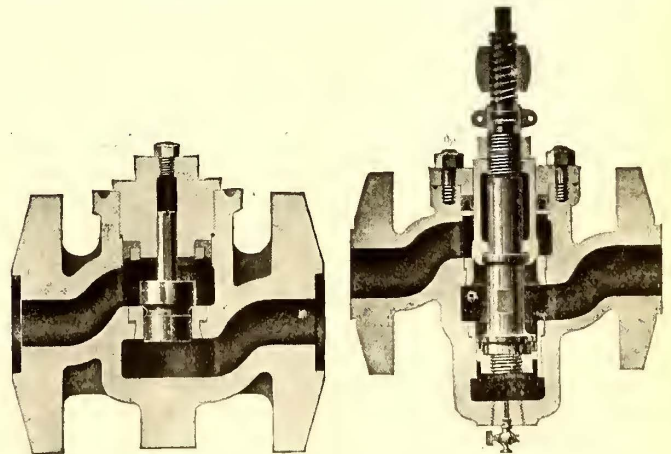
Co-operative purchasing is practised on a large scale. Fuel, in particular, is bought at the lowest possible prices, besides which the society has made arrangements with many merchants and amusement enterprises for discounts from the customary rates. Another important activity of the society is the publication and free distribution of a fortnightly house organ. This contains all the official regulations and personal news of the railway company and of the various societies as well as items of technical interest.

The dues for all of these advantages are only 15 cents a month, to which 9 cents per member is added by the Grosse Berliner Strassenbahn. Those who do not join the organization until after two years' employment must pay on joining 50 per cent additional for every month exceeding two years. The usual entrance fee is 12½ cents, which need not be paid if the application for membership is made within six months after employment. Those who leave the society after one year's membership receive part of what they paid in.

HYDRAULIC VALVES FOR TURBINE LUBRICATING SYSTEM

The New York Edison Company recently has installed the special types of Watson-Stillman hydraulic stop and check valves shown in the accompanying cuts. The installation comprises over 100 of these valves in 2-in., 2½-in. and 4-in. sizes for the forced feed lubricating system which serves the step bearings of the Curtis turbines.

The lubricating system is under a pressure of 1500 lb. per square inch and is provided with accumulators to deliver pressure in case of temporary failure, or stopping of the pumps. All joints in the lines are welded to prevent fail-



Section of Check Valve

Section of Stop Valve

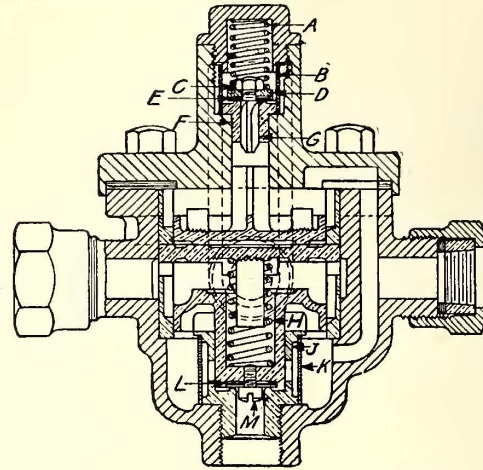
ure, and all parts are three or four times as heavy as ordinarily. The bodies of the valves shown above are made of steel and are also extra heavy, but strength was not the main question in discarding other valves for this service. It was found that ordinary rubber, hemp or leather packings would not stand up with oil and the heavy pressure, as they were subject to blowouts. These troubles were overcome in the stop valve in two ways; first, by using a special packing which would not soften, but would retain its elasticity;

and second, by a construction which would permit the system to be used even though a packing weakened. The improvement in the latter instance consists in the addition of the small pressure-tight chamber under the end of the valve stem. When running under ordinary conditions the small pet cock at the bottom is left open to act as a tell-tale if a packing starts to leak. Should the packing leak, the pet cock is closed and the valve used until such time as a repair may be conveniently made. Both the stop and the check valves have seats of a special metal which is spun into place. The check-valve stem is slotted, so that by removing the screw on top of the valve a screw driver may be used to regrind the valve seat.

QUICK-SERVICE VALVE FOR EMERGENCY STRAIGHT AIR BRAKE SYSTEM

The General Electric Company has incorporated a number of important improvements in its emergency straight-air brake system in order to obtain quicker brake application and release, with a resulting increase of safety and improvement in operating schedules. These advantages are obtained principally by means of a quick-service valve, which increases the rate at which air is admitted into the brake cylinder on application and exhausts the air more rapidly from the brake cylinder on release. With the improved brake equipment, when cars are operated singly, the brakes are applied and released as positively as with the ordinary straight-air brake system. By the addition of the quick-service valve, the motorman can apply and release the brakes in the minimum of time, so that fast schedules can be maintained with frequent stops. The equipment is designed to control trains consisting of a motor car and

service valve, so arranged that they can move in one direction only. When air is admitted to the train line from the motorman's valve to apply the brakes, the upper piston raises a lift valve off its seat and admits air from the main reservoir to the brake cylinder. The movement of this piston also uncovers leakage grooves which allow the air in the chamber between the pistons to flow into the chamber above the upper piston and thence to the brake cylinder.

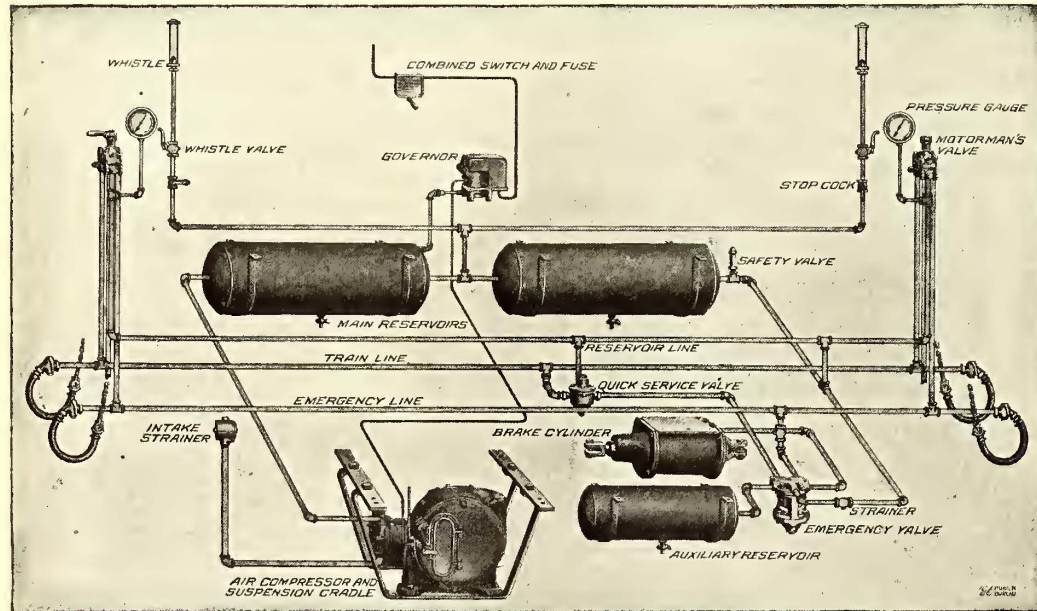


Section of Quick-Service Valve

When the motorman's valve handle is moved from the service position to the lap position in order to graduate the application of the brakes, the upper piston in the quick-service valve returns to the normal position and the supply of air admitted to the train line by the latter valve is shut off. That is, when an application of the brake is made, the volume of air from the train line is increased by air admitted directly from the

main reservoir by the quick service valve.

When a release of the brakes is made the air on top of the lower piston is exhausted to atmosphere through the motorman's valve. This piston is then moved upward. Air from the brake cylinder therefore flows to a t m o s p h e r e through a valve located on the lower side of the piston. Part of the air from the brake cylinder also flows through the leakage grooves which are uncovered when the piston is moved and escapes to atmosphere through the train line and motorman's valve.



Emergency Straight Air Brake Equipment, with Quick-Service Valve for Motor Cars

several trail cars or two or more motor cars equipped with multiple-unit control.

The brake equipment for a motor car is shown diagrammatically in the illustration.

The quick-service valve is located in the branch pipe from the train line to the emergency valve. Another connection leads from this valve to the main reservoir. In the trail car equipment this last connection is made to the emergency line. Two pistons are located in the body of the quick

When the motorman's valve handle is moved from the release to the lap position in order to graduate the release of the brakes, the piston in the quick service valve returns to its normal position shutting off the flow of air through the quick service valve to atmosphere. Hence the function of the quick service valve is to accelerate the application and release of the brakes and in trains of several cars a very material reduction is obtained in the time taken in making stops and in releasing the brakes.

LONDON LETTER

(From Our Regular Correspondent.)

The Town Council of Bournemouth has decided against the operation of cars on Sunday, as the members of the Council consider it would be against the best interests of Bournemouth, especially as the town contains a large number of residents seeking redress from physical ills who desire quiet. It was remarked at the meeting at which the subject was considered that cars are operated on Sunday on all other systems of municipal tramways in England but one. A limited service on Sunday had been proposed in Bournemouth and a tramway expert recently advised that the operation of cars on Sunday would result in a profit of from £4,000 to £5,000 annually.

Although the electrified South London line of the London, Brighton & South Coast Railway has received the approval of the Board of Trade, the Postoffice Telegraph Department has protested that the telegraph and telephone lines along the railway have been rendered unfit for use by the single-phase transmission systems of the railway. The general opening of the system to the public has therefore been postponed, although a certain number of trains are now running. It is hoped that the objections of the postoffice may be overcome at an early date. A similar complaint has been made by the postoffice against the Midland Railway with regard to the Morecambe and Heysham single-phase line. Action in this case has been postponed pending the substitution by the Midland Company of a specially designed telephone circuit. As the postoffice has rights in perpetuity over the railway systems of England, that branch of the Government service will always have to be reckoned with in installations of this kind.

In these days of decreases in tramway earnings throughout practically the whole of Great Britain, it is a pleasure to be able to record the very gratifying report of the financial results of the Bradford Tramways for the past half year. The gross receipts for this period increased £4,100, while the expenditures decreased £1,800 making the net profit £5,900. The car mileage is just about the same as the previous six months, but the average receipts per car mile are now 11.23d., a distinct increase. The report mentions that the sale of through sixpenny tickets to Leeds on the special cars provided for that purpose has increased from 4,750 to 55,208. This speaks well for the special cars adapted to run on both systems, which are of different gages.

The Leeds Tramway Committee persists in its effort to introduce trackless trams in Leeds, and has instructed the town clerk to take steps to promote a bill in Parliament for the construction of the system from the City Square to Farnley, with an extension to Drighlington if the line between City Square and Farnley is a success.

While on the subject of trackless trolleys, it might be mentioned that during the annual conference of the Municipal Tramways Association, about a month ago, an opportunity was afforded the members by the Railless Electric Traction Company to inspect two cars equipped with the Schiemann system, which were being experimentally operated at the depot of the Metropolitan Electric Tramways at Hendon. A number of improvements have been made in this system to comply with British conditions. The experimental line commended itself to the delegates who visited Hendon, and if Parliamentary powers can be procured it is likely that several trackless trolley lines will be introduced in England in the course of the next year or two.

On the District Railway between Mansion House and South Kensington stations, as many as 36 trains an hour are now operated, a service which could only have been made possible by the introduction of the most accurate automatic signaling and other improvements. The suburbs of London are, therefore, growing steadily in popularity, as journeys to the center of London which formerly were prohibitive on account of the amount of time consumed in making them can now be made readily. In the days of steam railways only 20 trains an hour were operated, and Albert Stanley, an American, general manager of the system, is certainly to be congratulated on the results which he has attained since taking charge of the London lines. The District Railway is the oldest railway in London and the greatest improvements have been made on it; but the results of Mr. Stanley's methods are also evident on the Piccadilly, the Bakerloo and the Hampstead tubes, three modern systems opened within the last three or four years. Express trains are now being operated on these lines and the service has been increased. In the Bakerloo tube a train will very soon be available every 1½ minutes. Specially long trains are being provided for theater service and later trains are being introduced.

With reference to the annual conference of the Municipal Tramway Association, of which mention was made in the last letter, at the business meeting which followed the conference, C. J. Spencer, Bradford, was elected president to succeed A. C. Fell, and J. C. Dalrymple, Glasgow, was elected vice-president. Bradford was selected as the meeting place of the association next year.

More experiments are being made with the idea of preventing the indiscriminate throwing away of tramway tickets, hundreds of thousands of which are dropped in the streets of the cities of Great Britain yearly. Most of the cars in Glasgow are equipped with a box in which passengers are requested to drop their tickets. The Bournemouth Tramways committee is providing boxes for a similar purpose, and passengers are requested to co-operate with the committee in an effort to stop the nuisance. The Manchester Corporation Tramways is also experimenting on one of its routes with similar boxes, as in a large city like Manchester it is considered that the throwing away of tickets at the tramway termini is actually a source of danger, as children frequently collect the tickets and have been injured in their anxiety to obtain the slips.

A report submitted to the London County Council by the highways committee states that the tramways system at the end of the period under review extended over a total length of 127½ street miles, being 85½ miles of electric lines and 42 miles of horse line. The capital expenditure on the undertaking up to March 31, 1909, amounted to £9,483,561 18s. 1d., of which £1,069,971 2s. 2d. represents expenditure during the year 1908-9. The debt outstanding on March 31, 1909, was £8,043,139 0s. 6d. The total receipts during the year from electric traction were £1,572,251 8s. 7d., and the operating expenses £896,286, a surplus of £675,965 4s.; and the corresponding figures of horse traction were £275,199 1s. 7d. and £305,402 0s. 2d., leaving a deficiency of £30,202 18s. 7d. After charges had been deducted there remained a net balance of £1,077,670. There were 344,705,937 passengers carried on electric cars and 68,207,004 on horse cars, a total of 412,913,841. The number of car-miles run was 31,962,784 miles by electric traction and 7,156,688 by horse traction, a total of 39,119,472 miles. The average fare per passenger was 1.05d.

The work of extending the London County Council Tramways continues. A new section between Queens Road, Battersea and Clapham Junction has been opened recently, and a further portion of the newly electrified system has also been placed in operation between Bloomsbury and Stamford Hill, the cars hitherto having gone only as far as Hackney Station. The section between Cambridge Heath and Aldgate is nearing completion, so that direct communication between Aldgate and Stamford Hill will soon be possible.

A dispute arose regarding the fares on the new trams across Blackfriars Bridge, an extra halfpenny being charged in most cases for crossing the bridge. It has now been decided that this increase of fare shall be cancelled, and all stages, other than halfpenny ones, which hitherto terminated at the south side of Blackfriars Bridge, will be extended across the bridge. Similarly, all fares which hitherto extended only to the south side of Westminster Bridge will now be extended to Westminster.

The London County Council has notified the Lambeth Borough Council that it proposes to apply to Parliament for permission to construct a tramway from Herne Hill to Brixton Hill, which, when completed, will connect the tramways of Brixton with those on the Herne Hill and Norwood route.

A point affecting tramway authorities throughout England has just been decided between the London County Council Tramways Department and the Post Office. By consent it was referred to a Board of Trade arbitrator to decide whether the cost of providing heat coils, fuses, etc., for the protection of telephone and telegraph wires near overhead tramway cables should be borne by the Post Office or by the tramway authority concerned. The arbitrator, whose award has just been issued, rules that the tramway authority should pay.

The depreciation allowances of the Glasgow Corporation Tramways for the last year are in addition to a sum for the sinking fund, which the corporation of necessity has to set aside. In addition the corporation has a special reserve fund, now standing at £70,631. The allowances for depreciation and renewals for the year 1908-9 were—£500 per mile of single track, equal to about 9 per cent, for the permanent way; 4.28 per cent on the electrical equipment of the lines; 6.91 per cent on power station and substation plant; 7.5 per cent on cars and their electrical equipment, workshop tools and sundry plant, and on office furniture and miscellaneous equipment; and 11.24 on rolling stock other than the passenger cars.

A. C. S.

News of Electric Railways

Mayor Johnson Defeated in Cleveland

Tom L. Johnson, for four terms Mayor of Cleveland, was defeated at the city election in Cleveland on Nov. 2 by Herman C. Baehr, Republican county recorder, who is the first Republican to be elected to that office in 10 years. Mr. Baehr has pledged himself to a settlement of the street railway question on the basis of a 6 per cent return on the stock of the Cleveland Railway, all earnings over that to go to the reduction of fare and the improvement of service. The City Council will be Republican. The acceptance by the voters of the proposed 75-year franchise for a subway system was indicated by the early returns. Mr. Johnson's defeat for Mayor is his fifth in a year at popular elections. He was defeated in the franchise referendum on Oct. 22, 1908, following his six months' control of the street car system; then in his campaign for the election of county officers; next in a referendum on the issue of bonds; again on the Schmidt street railway referendum; now he meets his own defeat for return to the Mayor's office. Incomplete returns indicated that the Democrats, who have long enjoyed control of the City Council, have elected only seven Councilmen out of 32.

Judge R. W. Tayler spent his time last week hearing testimony on the Cleveland valuation. In addition to Cleveland people, Bion J. Arnold, director of appraisals for the New York Public Service Commission, First District, and Frank R. Ford, of Ford, Bacon & Davis, were introduced to testify regarding valuation questions involved in the settlement. Mr. Arnold and Mr. Ford testified at the request of the officials of the Cleveland Railway.

Mr. Arnold, in testifying on Oct. 27, discussed the overhead charges allowed in the valuation of the Chicago street railways, with which A. B. duPont and others were connected. When asked regarding his experience with the valuation of the Coney Island & Brooklyn Railroad, Mr. Arnold introduced a copy of the *ELECTRIC RAILWAY JOURNAL* which contained a report of the hearing at which his testimony was presented. This was admitted and Judge Tayler announced that he would take the report as an expression of principles and information in interpreting the facts produced in this hearing. A copy of the *ELECTRIC RAILWAY JOURNAL* was made part of the record. Mr. Arnold said that the article contained an expression of his views but that the Public Service Commission would take action subsequently and he could not tell whether or not his ideas would be supported.

After giving his experience as an engineer and in the construction of electric railways Mr. Arnold was questioned on the general subject of overhead charges. He said that such charges must be added in every case but that the percentages would vary with different conditions and different properties. To arrive at an intelligent and definite conclusion on this subject in connection with the Cleveland situation would require special investigation. That was true also of other systems because of the varying features found. Many unexpected developments arose during the construction of a street railway system and the cost was almost always greater than the original estimate. It was a rule with engineers to make an allowance for such developments and they scarcely ever failed to need it. Mr. Arnold mentioned in detail the various contingencies for which provision should be made and referred to other expenses for which there ought to be an additional allowance.

On Oct. 28 an agreement was reached to the effect that the property of the old Forest City Railway shall be re-appraised upon the basis used in the valuation of the Cleveland Electric Railway. President Andrews made the request. He said that there was a large overhead charge in the Forest City valuation which should be applied to the property of the Cleveland Electric Railway. He said he thought the Cleveland Railway property should be valued higher, rather than that the Forest City property should be valued lower. The same engineers who valued the Cleveland Electric property, with the addition of E. W. Bemis and H. J. Davies, will do this work.

Mayor Johnson stated that some things had been allowed the Forest City company for the sake of peace in the settlement and that ordinarily they would not be granted. The schedules of valuation of the Forest City property show a strip of paving charged at over \$6,000, or the price when new. It is said that this pavement was laid 31 years ago and that when the Cleveland Electric Railway valuation was made as of Jan. 1, 1908, it was placed at scrap value, \$192. Mr. Andrews has been endeavoring to find who made these valuations, but so far has been unsuccessful.

Henry J. Davies, secretary of the Cleveland Railway, was on the stand for some time in the forenoon. His testimony related mainly to overhead charges. As some of the reports needed were not ready, there was no afternoon session.

On Oct. 29 the subject of cars and motors was taken up again. A. B. duPont gave it as his opinion that economy and service demanded large cars in place of some of the small cars now in use. He said that the small cars should be sold as second-hand cars and that this would reduce the Goff-Johnson valuation of the cars, \$480,700. Mr. duPont thought that fewer cars might be operated and the schedules lengthened if the large type was used. Mayor Johnson announced that he would contend that three types of old motors should be scrapped and that another type should be discarded. F. R. Phillips, master mechanic, presented a table showing the average cost of maintaining motors of various types.

Previous to the election the Chamber of Commerce of Cleveland decided to oppose the franchise to the Cleveland Underground Rapid Transit Company for these reasons: "1. Because its confirmation at this time will complicate the already complicated surface street railway situation. 2. Because there is no assurance, nor even probability that the subway lines will be built. 3. Because the free territory provisions of the ordinance are inadequate. 4. Because the forfeiture provisions do not sufficiently safeguard the city's control of the important terminals under the Public Square. 5. Because the provisions with reference to the operation of interurban cars are incorrect in principle, in that they define the exact bargain to be made between the interurban company and the subway company to the advantage of the subway company, but not necessarily to the public advantage."

Final Hearing on Boston & Eastern Electric Railroad

The Massachusetts Railroad Commission and the Boston Transit Commission gave a hearing on Oct. 26, 1909, for the presentation of concluding arguments in relation to the proposed Boston & Eastern Electric Railroad, the plans of which have been printed in preceding issues of the *ELECTRIC RAILWAY JOURNAL*. The joint board is to report upon the terms, if any, under which the road may build a tunnel under Boston Harbor to the Legislature of 1910 early in January. Frederick C. Dumaine, of the Boston Railroad Holding Company, was the first speaker. He protested against the granting of the right to build the road, stating that the company he represented has secured a majority of the stock of the Boston & Maine Railroad and intends to see that every point served by the road is provided with adequate facilities. For the New York Central & Hudson River Railroad Woodward Hudson argued that the proposed line would interfere with plans of his company for the development of the water front at East Boston, objected to the building of the tunnel by a private corporation and criticized the route as somewhat uncertain in the bill which has been drawn up for the approval of the Legislature.

William H. Coolidge, counsel for the Boston & Maine Railroad, stated that the Boston & Eastern Electric Railroad is not designed to develop new territory and that the Boston & Maine Railroad is better prepared to handle traffic than in 1907, when it was claimed that the existing facilities were inadequate. Since the laws in Massachusetts relative to the issuance of securities for needed railroad improvements have been modified, the Boston & Maine Railroad has expended about \$6,000,000 for equipment and \$11,000,000 for other improvements. The railroad laws of Massachusetts provide that the Railroad Commission shall advise the railroad whenever in its judgment betterments are necessary, stating in writing what kind of improvements it deems necessary, and Mr. Coolidge said that no such advice has been given the Boston & Maine Railroad. He commented on the absence of local subscriptions to the project, and closed with the argument that the needs of the territory can be handled by the present facilities, developed as may be necessary to meet expansion in the district served.

Bentley W. Warren, counsel for the Boston & North-ern Street Railway, called attention to the report of the Metropolitan Improvement Commission of 1909, which stated that, following the electrification and the consequent improvement of the suburban traffic facilities around Boston, the effective commutation radius will be increased to 25 or 30 miles. This will increase the rate of growth of suburban traffic beyond that which may be looked for strictly from the normal increase in the population. It is

also probable that as the rapid transit system of the Boston Elevated Railway is extended many of the working class in the immediate suburbs of the city who now enter Boston via the steam lines will use the projected elevated or subway lines. He cited another portion of the report which stated that the lines and branches at present serving the suburban districts are considered adequate and emphasized the point that the proposed road should utilize the existing rapid transit system or the proposed suburban distributing system recommended by the Improvement Commission. Quoting from the report of the Metropolitan Improvement Commission, Mr. Warren said:

"All future passenger lines within the terminal district which may be authorized by the Commonwealth should enter one or the other of the city distributing systems, as these systems may be improved and extended; namely, the rapid transit system or the suburban system. The best public service would not result by the operation of future lines to independent terminals within the city. One double-track tunnel under the harbor would serve as an entrance for both the Revere Beach road and the projected Boston & Eastern Electric Railroad into the proposed suburban distributing system of the city proper. It would seem an unwise expenditure to provide separate tunnels—a course which would result in an unwarranted duplication of items of great expense. Before the plans of the projected road receive final approval the joint project of entering the two lines should receive a thorough and exhaustive study. As the electrification of the present lines becomes urgent, in order to meet increased traffic requirements, as well as to render possible the operation of subsurface facilities in the city, this change in motive power will be gradually realized. Coincident with the prosecution of work entailed in this change of motive power, physical revisions and improvements of the existing railroad properties in the way of four tracking, grade crossing elimination, additional stations, etc., will be carried on. In the ordinary course of events under conservative management these improvements will be carried on only as warranted by the traffic, not necessarily as it exists, but in anticipation of a more or less rapid growth. The construction of any new lines parallel to existing roads and serving the same territory, unless warranted by traffic requirements, will defer the date when improvements upon existing lines may be justified."

Mr. Warren said that the Boston & Eastern Electric Railroad hopes to tap the business of companies operating in the territory in which it proposes to build, and that the route of the proposed line does not touch the undeveloped part of Lynn. The new road will cut into the business of the Boston & Maine Railroad at Lynn, Salem and Beverly and into the Boston, Revere Beach & Lynn Railroad, and will cut off the business of the Boston & Northern Street Railway at Chelsea and cripple existing agencies. In conclusion Mr. Warren said that if the road is to be built it should be a part of the subway system of Boston in its entrance into the city. All the investigations and surveys should be made by the Boston Transit Commission at the expense of the Boston & Eastern, and the tunnel should be built by the Transit Commission at the company's expense, becoming the property of the city at once and being rented to the road for 40 years. No part of the road should be begun until the money for the tunnel is in the hands of the Transit Commission.

Frederick E. Snow, counsel for the Boston Elevated Railway, made a brief statement to the effect that the management of that company desires to have the Boston & Eastern Electric Railroad use the Boston Elevated Railway terminal at Sullivan Square or other terminal facilities that may be established in connection with the elevated lines.

Moorfield Storey, counsel for the Boston & Eastern Electric Railroad, then presented the closing argument. He said that the promoters of the road come before the commission with a new plan to serve the public, and hope to make money by it. The question of public convenience and necessity has already been decided in the road's favor by the Railroad Commission and is not now the issue. The present point is the relation of the proposed road to the existing and future facilities of the territory. The Legislature in 1906 recognized the necessity for a new type of railroad, electrically operated, and the Railroad Commission said that public convenience and necessity call for enterprise in this field, suggesting a tunnel under the harbor as a desirable connecting link and disapproving the plan of entering the city through the present terminals. A distinct entrance is needed, with a foot passage connecting with the existing rapid transit system.

Mr. Storey contended that the project will not interfere with any existing service or plans for its development, and that the question of overcoming the objections of the New York Central & Hudson River Railroad in East Boston is merely one of engineering. He said that for 20 years the

present companies have had opportunities to improve conditions in the territory, and that the apprehension which they feel is the result of a realization that the present facilities are inadequate. He did not favor bringing the road into Sullivan Square after the commission's previous discussion of the situation there. Mr. Storey said that the Boston & Northern Street Railway earns \$7 per capita over its entire system, and that in the most thickly settled portion an estimate of \$7 per capita for the Boston & Eastern Electric Railroad is by no means excessive. The Boston & Maine Railroad and the New York, New Haven & Hartford Railroad are committed to expend \$30,000,000 in improvements within the next few years, and there is little chance of their affording the needed facilities through the Boston Railroad Holding Company at present, even if it were possible to operate all kinds of traffic on limited tracks. He said that the Boston & Eastern Electric Railroad would not interfere with the earnings of the East Boston tunnel, as the East Boston tunnel is showing a surplus each year, the total surplus for 1908 being \$10,124. The streets will not be needlessly disturbed, as feared by counsel for the city of Boston at the previous hearing. The main question is the method by which the project can be put into effect. The hearing was then closed and the matter taken under advisement.

Transit Affairs in New York

The Public Service Commission has adopted a resolution, by a vote of three to two, modifying the Broadway-Lexington Avenue subway plan, so as to include a branch up the White Plains Road, from its junction with Westchester Avenue and the West Farms Road to where the new line will join route 18, previously laid out, running from West Farms Road up White Plains Road to East 241st Street, near the city line. This change will give the Broadway-Lexington Avenue system three branches in the Bronx, instead of two. The new line will be five miles long and add about \$4,000,000 to the estimated cost of \$60,000,000 for the Broadway-Lexington Avenue line. In addition, there is \$7,000,000 cost for the Canal Street crosstown section.

The Court of Appeals of New York has rendered a decision sustaining the Appellate Division of the Supreme Court in its finding that the Public Service Commission of the First District of New York exceeded its powers when it undertook to revise the terms of the franchise granted to the South Shore Traction Company over the Queensboro Bridge. The South Shore Traction Company secured a franchise from the City of New York, its line running from Sayville to Belmont Park, and later applied for permission to cross the Queensboro Bridge. The Public Service Commission agreed that public convenience and necessity required the proposed extension and granted the application; and the Board of Estimate and Apportionment concurred in the grant and prescribed the payments of money to be made to the city by the company in return for the privilege. The commission then refused to agree to these terms and contended that this refusal operated to hold up the franchise. The Appellate Division of the Supreme Court upheld the Board of Estimate and the company. The Court of Appeals sustains the lower court, ruling that in the Board of Estimate alone is vested the power of fixing the terms on which franchises shall be granted and that the authority of the Public Service Commission is limited to passing on the need and the utility of new transit lines or the extension of existing ones.

The Hudson & Manhattan Railroad has obtained from Justice Bischoff of the Supreme Court a writ of certiorari returnable on Nov. 15, 1909, to review the assessment of the current year, amounting to \$1,700,000. The company claims that the present assessment is too high, for the reason that the State Board of Taxation has assessed the company's special franchise at \$8,000,000.

The Monoroad Construction Company, of which Bion L. Burrows is president, has begun work on the monorail road that is to connect Bartow Station, on the Harlem River branch of the New York, New Haven & Hartford Railroad, with City Island.

The Board of Estimate and Apportionment of New York, by unanimous vote on Oct. 29, 1909, authorized the bond issues necessary to begin work on the Fourth Avenue subway, which is to extend from the entrance to the Manhattan Bridge in Brooklyn to Forty-third Street and Fourth Avenue, Brooklyn. While the entire subway project involves the expenditure of \$15,886,381 for construction work, the Public Service Commission, which approved the contracts for the first six sections on June 5, 1908, has asked for only \$2,850,000 at present, as the engineers of the commission believed that not more than that amount could be expended in one year. The Court of Appeals, however, held that the entire amount became a city liability as soon

as the contract was confirmed by the Board of Estimate. The resolution passed called for the sale of corporate stocks to the amount of \$2,850,000 needed to go ahead with the work. For convenience in construction the line was divided in six sections, and the total of the lowest estimates for each of these sections was \$14,886,764. J. P. Graham was the lowest bidder for the construction of the first section of the line, extending from the Manhattan Bridge to Willoughby Street, his estimate being \$1,020,477.

On Oct. 30, 1909, the Public Service Commission received a certified copy of the resolution adopted by the Board of Estimate, authorizing the money needed for the construction of the Fourth Avenue line in Brooklyn, and at once summoned the successful bidders to the offices of the commission to execute the contracts. Unless they do so within 10 days the certified checks will be forfeited. In addition each contractor must put up a bond of \$150,000 on each section of the work that he has undertaken, and must begin work within 60 days.

Meeting of Central Electric Railway Association

The regular meeting of the Central Electric Railway Association will be held at the Claypool Hotel, Indianapolis, Ind., on Nov. 18, 1909. In view of the fact that this is the last meeting of 1909 and the first one after the Denver Convention, the officers of the association request that every member who can possibly do so be present. It is suggested to members who live at a distance that the trip be made in special interurban cars, which will tend to increase the interest and make the trip one of value by personal observation. The program of the meeting follows:

MORNING SESSION, NOV. 18, 1909

10:00 a. m.—Business session and reports of special committees.

10:00 a. m.—“A Centralized Testing Organization, Its Function in the Management of Electric Railways,” by J. G. Callan, Arthur D. Little, Inc., Boston, Mass.

11:15 a. m.—“Publicity,” by A. D. B. Van Zandt, publicity agent of the Detroit (Mich.) United Railways.

12:00 m.—Adjournment for lunch.

AFTERNOON SESSION

REPORTS FROM THE DENVER CONVENTION

1:30 p. m.—“The Claim Adjusters’ Association,” by Ellis C. Carpenter, claim adjuster of the Indiana Union Traction Company, Anderson, Ind.

2:00 p. m.—“The Transportation and Traffic Association,” by J. B. Crawford, superintendent of the Winona Interurban Railway, Warsaw, Ind.

2:30 p. m.—For the good of the order.

Resolution Fixing Terms of Temporary Operating Permit Passed in Detroit

A draft of an ordinance providing for the renting of the streets of Detroit, Mich., on which franchises of the Detroit United Railway are said to expire on Nov. 14, as mentioned on page 952 of the *ELECTRIC RAILWAY JOURNAL* of Oct. 30, 1909, to that company for \$300 a day pending for granting of new franchises was introduced in the Common Council on Oct. 26, and was passed by that body on Oct. 27 without comment. That portion of the resolution setting forth the terms of rental follows:

“Resolved, That consent, permission and authority is hereby granted to the Detroit United Railway to continue from day to day after Nov. 14, 1909, to operate its cars upon the streets and portions of streets above set forth under the same terms and conditions, except as to percentages on gross receipts, now prevailing in the city of Detroit whether due to contract agreement or not upon the payment weekly by the Detroit United Railway to the city treasurer of the sum of \$300 for each day that the streets and portions of streets above set forth are used by said company in the operation of its railway or railways; and be it further

“Resolved, That this resolution is subject to revocation at any time at the will of the Common Council or of the people of the City of Detroit.”

J. C. Hutchins, president of the Detroit United Railway, is reported to have expressed the following opinion regarding the proposal:

“The proposition is entirely new. So far as I know, there is nothing exactly like it in the street car world. There are companies that pay certain rentals, a license for each car, for instance, and there are different means of paying taxes. I cannot say off-hand whether the proposal would seem agreeable to us or not, or whether we would feel ourselves properly protected and safeguarded under it. I shall have to look it all over and consult others about it. The exact form of the resolution and its precise bearing on all the

other factors in the Detroit situation would have to be studied.”

Association Meetings

Alabama Light & Traction Association—Birmingham, Ala., Nov. 15 and 16.

National Association of Railway Commissioners—Washington, D. C., Nov. 16.

Central Electric Railway Association—Indianapolis, Ind., Nov. 18.

Central Electric Accounting Conference—Dayton, Ohio, Dec. 11.

Pennsylvania Street Railway Association—Harrisburg, early in December.

Street Railway Association of the State of New York—Rochester, N. Y.; date not selected.

Ohio Supreme Court Decision Favorable in Dayton Franchise Case.—The Supreme Court of Ohio has decided that the franchise granted the Oakwood Street Railway, Dayton, Ohio, under a special act of the Legislature is valid.

New Canadian Line Opened.—The Montreal & Southern Counties Railway placed its line between Youville Street, Montreal, and St. Lambert in operation on Oct. 31, 1909. It is proposed to continue the road to Longueuil, Chambly, La Prairie and St. Johns, which is 15 miles from Montreal.

Meeting of New York Railroad Club.—A meeting of the New York Railroad Club will be held at the building of the United Engineering Societies, 29 West Thirty-ninth Street, New York, N. Y., on Nov. 19, 1909, at 8 p. m. H. McL. Harding, vice-president of the International Lecture Institute, will present a paper entitled “The Handling of Freight at Terminals,” illustrated with lantern slides.

Conference Regarding Betterment of Property of Chicago Consolidated Traction Company.—Charles G. Dawes, president of the Central Trust Company of Illinois, has requested Mayor Busse to arrange a meeting with the reorganization committee of the Chicago Consolidated Traction Company for the purpose of considering the betterments to be made to the property of the company. The matter has been referred to the committee on local transportation. The reorganization plan of the Chicago Consolidated Traction Company has been tentatively accepted.

License Ordinance Affecting Motormen in Omaha.—The City Council of Omaha has passed over the veto of the Mayor an ordinance requiring that hereafter every motorman submit proof that he has had 14 days’ training in Omaha under a motorman with three years’ experience in the city, and secure a license at a fee of \$1. Two ordinances which provide for a reduction of fare on street railways operated in Omaha from 5 cents to 6 tickets for 25 cents with special provisions for reduced rates to children and students in the public schools, have been referred to the committee of the whole.

Report to Washington Commission on Denver Convention.—H. C. Eddy, executive officer and secretary of the District Electric Railway Commission of Washington, D. C., who attended the convention of the American Street & Interurban Railway Association at Denver, has reported to the commission the detailed happenings of the convention and observations made in cities which he visited en route to Denver. In his report Mr. Eddy discussed the subjects of fenders, headlights and seats, and complimented the Denver City Tramway on the physical condition of its system, referring particularly to such practices in operation and equipment as are distinctive either of the Denver system or others in the West.

Balloon Anchor Causes Trouble.—In one of the daily issues of the *ELECTRIC RAILWAY JOURNAL* during the convention in Denver it was mentioned that the high-tension line of the Indianapolis, Columbus & Southern Traction Company, Columbus, Ind., had been damaged by the trailing anchor rope of a balloon which started from Indianapolis on a pleasure trip before entering the recent competition in St. Louis. The high-tension line was broken by one contact and was hit by the trailing rope at two other places, causing trouble in the power house and on the line. A. A. Anderson, general manager of the company, says that the anchor was one of the most peculiar sources of trouble with which he has had to deal in an experience covering more than 30 years in street and electric railway work.

Inspection of Ohio Electric Railway.—Members of the Railroad Commission of Ohio and officers of the Ohio Electric Railway, Cincinnati, Ohio, spent the early part of the week commencing Oct. 25, 1909, in a tour of the lines operated by that company. Special attention was given the roadbed, tracks, stations and terminals. The party started

from Cincinnati on Oct. 25 and reached Toledo late on Oct. 26, after a side trip over the Fort Wayne division from Lima. The return to Lima was made on the evening of Oct. 26 and the next day the Columbus-Springfield division was inspected. The commission was represented by J. C. Sullivan, O. P. Gothlin and O. H. Hughes, members; O. F. McJunkin, Dayton, deputy inspector, and John Hussey, Columbus, inspector. The company was represented by the following officers: W. Kesley Schoepf, president; J. B. Foraker, Jr., vice-president; B. J. Jones, Springfield, district manager; H. G. Gilpin, Lima, superintendent, and J. W. Edson, Van Wert, tax agent. Several business men from Cincinnati and other points were also members of the party.

Meeting of New England Street Railway Club.—The first fall meeting of the New England Street Railway Club was held at the American House, Boston, on Oct. 28, 1909, with W. D. Wright, president, in the chair. The speaker of the evening was Howard MacSherry, general counsel of the Public Service Corporation of New Jersey. His subject was "Our Cities." Mr. MacSherry congratulated the club membership upon the spirit with which the commissions and courts of Massachusetts consider public utility matters, and emphasized the important work of the modern corporation in civilized affairs. He reviewed the sources of corporate criticism along the lines of his address at the recent Bluff Point convention of the New York State Street Railway Association, touching the unfair criticisms of the press, labor organizations, the traveling public, executive officials of the State and persons of abnormal characteristics. Concluding, he emphasized the values of true Americanism and the necessity for a more thoughtful appreciation of the privileges conferred by citizenship.

Boston, Lowell & Lawrence Railroad Hearings Continued.—Reference to the continuation of hearings by the Massachusetts Railroad Commission on the petition of the Boston, Lowell & Lawrence Electric Railroad for a certificate of exigency was made in the ELECTRIC RAILWAY JOURNAL of Oct. 30, 1909, page 949. Following the testimony of James C. Boyd, of Westinghouse, Church, Kerr & Company, on Oct. 12, J. W. Farley, counsel for the railroad, submitted an estimate by George G. Clapp, Boston, Mass., of the valuation and damages of land buildings to be taken on each of the proposed routes. The assessed valuation of the property to be taken on the preferred route via Winchester, including the Lawrence branch, was \$455,424, the estimated value \$774,731, and the damages \$179,910. For the route via Lexington, including the Lawrence branch, the assessed valuation was \$442,510, the estimated valuation \$774,414, and the damages \$99,235. The estimate is from 70 per cent to 75 per cent above the assessed valuation, without any allowance for salvage. Counsel for the opposition suggested that the estimated damages should be subdivided according to townships, in order to give the local people a chance to judge whether the figures were high or low; counsel for the Boston, Lowell & Lawrence Electric Railroad objected to the subdivision on the ground that it would seriously prejudice the cost of property taken in specific neighborhoods, and was sustained by Chairman Hall. The subsequent hearings of the week were devoted to the taking of testimony of witnesses living along the route of the proposed road.

Officers of the Colorado Light, Power & Railway Association.—At the meeting of the Colorado Light, Power & Railway Association held in Denver on Oct. 7, 8 and 9, the following officers were elected: President, W. T. Wallace, Colorado Light & Power Company, Cannon City; vice-president, H. L. Corbett, United Hydro Electric Company, Georgetown; secretary and treasurer, J. C. Lawler, Colorado Springs Electric Company, Colorado Springs; executive committee, additional members, George B. Tripp, Colorado Springs Electric Company; J. F. Dostal, Denver Gas & Electric Company; advisory committee, W. J. Barker, Denver Gas & Electric Company; J. F. Vail, Pueblo & Suburban Traction & Lighting Company; John A. Beeler, Denver City Tramway; L. M. Cargo, Westinghouse Electric & Manufacturing Company, Denver, Col.; John A. Clay, Animas Power & Water Company, Silverton, Col.; finance committee, W. G. Matthews, Denver City Tramway, J. C. Davidson, Hendrie & Bolthoff Manufacturing & Supply Company, Denver, Col.; F. C. Caratarphen, Caratarphen Electric Company, Denver, Col.; membership committee, J. J. Cooper, Mountain Electric Company, Denver, Col.; George Wooley, General Electric Company, Denver, Col.; C. K. Durbin, United States Traction & Lighting Company, Denver, Col.; committee on insurance, George B. Tripp, Colorado Springs Electric Company, J. F. Vail, Pueblo & Suburban Traction & Lighting Company, C. K. Durbin, United States Traction & Lighting Company, Denver, Col.; committee on meters, F. P. Cummings, Denver Gas & Electric Company, W. N. Clark, Pueblo Suburban Traction & Lighting Company, H. J. Buell, Northern Colorado Power Company, Denver, Col.

Financial and Corporate

New York Stock and Money Markets

November 1, 1909.

The enforced liquidation in evidence when the rates for money advanced so suddenly a few weeks ago has disappeared, and the recovery reflects the prosperous condition of trade. Interborough-Metropolitan during the last week has been more extensively traded in than at any time since it was listed. Both the common and preferred were strong and made substantial advances. There have been rumors of reorganization plans for the Metropolitan system upon terms more favorable to the shareholders than had been anticipated.

The money market has been easier and the bankers have been more liberal to borrowers. Rates have declined and the whole situation is more favorable to the buying side. Rates to-day were: Call, 3/4 to 5 per cent; 90 days, 4 3/4 per cent.

Other Markets

Trading in Subway stock upon the Chicago Exchange has been very much less active during the past week and the heavy pressure to sell has been eliminated. The price, however, is still around 7/4. Other tractions are dull.

In the Boston market, Massachusetts Electric issues, both preferred and common, have been active and each has advanced about 2 points. There has also been some trading in Boston Elevated and in Suburban preferred.

In Philadelphia, Rapid Transit has again been quite active, the sales for the short week amounting to about 35,000 shares. The price has been practically unchanged. Union Traction has been in the market at the old figures.

In Baltimore, the bonds of the United Railways continue to sell at former prices.

At the auction of securities in New York last week the following were sold: \$1,000 Brooklyn City & Newtown Railroad 5 per cent bond, 99 3/4; \$9,000 Coney Island & Brooklyn Railroad 4 per cent bonds, 80 1/2; \$3,000 Brooklyn Rapid Transit 5 per cent bonds, 105 3/8.

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

	Oct. 26.	Nov. 2.
American Railways Company.....	245 1/2	245 1/2
Aurora, Elkin & Chicago Railroad (common).....	245	245
Aurora, Elkin & Chicago Railroad (preferred).....	295	295
Boston Elevated Railway.....	130	130
Boston & Suburban Electric Companies.....	18 1/4	18 1/4
Boston & Suburban Electric Companies (preferred).....	75	77 3/8
Boston & Worcester Electric Companies (common).....	212	212
Boston & Worcester Electric Companies (preferred).....	254	253
Brooklyn Rapid Transit Company.....	74 1/2	75 7/8
Brooklyn Rapid Transit Company, 1st pref., conv. 4s.....	85	85
Capital Traction Company, Washington.....	*139	2139
Chicago City Railway.....	*2180	2190
Chicago & Oak Park Elevated Railroad (common).....	*2	*2
Chicago & Oak Park Elevated Railroad (preferred).....	*10	*10
Chicago Railways, pteptg, ctf 1.....	2105	2106
Chicago Railways, pteptg, ctf, 2.....	236	236
Chicago Railways, pteptg, ctf, 3.....	224	224
Chicago Railways, pteptg, ctf, 4s.....	210	210
Cleveland Railways.....	*81	*81
Consolidated Traction of New Jersey.....	276 1/2	276 1/2
Consolidated Traction of N. J., 5 per cent bonds.....	2106	2106
Detroit United Railway.....	267	270
General Electric Company.....	161	164
Georgia Railway & Electric Company (common).....	209 1/2	209 1/2
Georgia Railway & Electric Company (preferred).....	288	287
Interborough-Metropolitan Company (common).....	18	19 1/2
Interborough-Metropolitan Company (preferred).....	49 1/4	50
Interborough-Metropolitan Company (4 1/2s).....	82 1/2	83 3/8
Kansas City Railway & Light Company (common).....	240	240
Kansas City Railway & Light Company (preferred).....	*282	*282
Manhattan Railway.....	140 1/2	141
Massachusetts Electric Companies (common).....	16 3/4	218
Massachusetts Electric Companies (preferred).....	80	283
Metropolitan West Side, Chicago (common).....	217	217
Metropolitan West Side, Chicago (preferred).....	251	254
Metropolitan Street Railway.....	224	*224
Milwaukee Electric Railway & Light (preferred).....	*110	*110
North American Company.....	77 1/2	79
Northwestern Elevated Railroad (common).....	220	220
Northwestern Elevated Railroad (preferred).....	270	268
Philadelphia Company, Pittsburg (common).....	248 1/2	249
Philadelphia Company, Pittsburg (preferred).....	245	244 1/8
Philadelphia Rapid Transit Company.....	225 1/2	226 1/2
Philadelphia Traction Company.....	290	289 1/2
Public Service Corporation, 5 per cent col. notes.....	2100 1/8	*100 1/8
Public Service Corporation, ctf, 5.....	297	*97
Seattle Electric Company (common).....	114 1/8	115 1/4
Seattle Electric Company (preferred).....	104	103
South Side Elevated Railroad (Chicago).....	252	252
Toledo Railways & Light Company.....	8	*8
Third Avenue Railroad, New York.....	19 3/8	20
Twin City Rapid Transit, Minneapolis (common).....	107 1/2	108
Union Traction Company, Philadelphia.....	252	252 1/2
United Rys. & Electric Company, Baltimore.....	213 1/4	213 1/4
United Rys. Inv. Co. (common).....	40	42
United Rys. Inv. Co. (preferred).....	68 1/4	73 1/4
Washington Ry. & Electric Company (common).....	*47	*47
Washington Ry. & Elec. Company (preferred).....	*94	204
West End Street Railway, Boston (common).....	93	92 1/2
West End Street Railway, Boston (preferred).....	103 1/2	103
Westinghouse Electric & Manufacturing Company.....	*86	86 1/2
Westinghouse Elec. & Mfg. Company (1st pref.).....	2140	*2140

a Asked. *Last Sale.

Annual Report of Montreal Street Railway

Gross earnings of the Montreal Street Railway for the year ended Sept. 30, 1909, aggregated \$3,874,839, an increase of \$197,406, or 5.37 per cent over the preceding year. Operating expenses increased 4.48 per cent and the gain in net earnings was 6.63 per cent. To the net earnings there was added \$55,607 interest from the Montreal Park & Island Railway, making the total income \$1,675,426. From this amount there was deducted \$445,749, comprising the city percentage on earnings, interest and the rental of leased lines. The net income available for distribution was \$1,229,677, from which a dividend of 10 per cent was paid, leaving a surplus of \$253,344. There was then appropriated \$175,000 for contingent account and \$25,000 for the fire insurance fund, leaving a surplus of \$53,344.

The following table gives some of the results during the last 12 years:

	1909.	1908.	1898.
Gross Earnings.....	\$3,874,838.51	\$3,677,432.45	\$1,471,939.65
Operating Expenses.....	\$2,255,019.20	\$2,158,394.09	\$764,884.35
Expenses % of Earnings.....	58.20	58.69	52.15
Net Earnings.....	\$1,619,819.31	\$1,519,038.36	\$707,055.30
Passengers Carried.....	95,376,373	90,746,032	35,353,036
Car Earnings per passenger....	3.96c.	3.96c.	4.15c.
Transfers.....	32,285,208	30,343,113	10,508,603
Total passengers carried.....	127,661,581	121,089,145	45,861,639
Car Earnings per pass. total carried.....	2.96c.	2.97c.	3.20c.

L. J. Forget, the president, states in his remarks to shareholders:

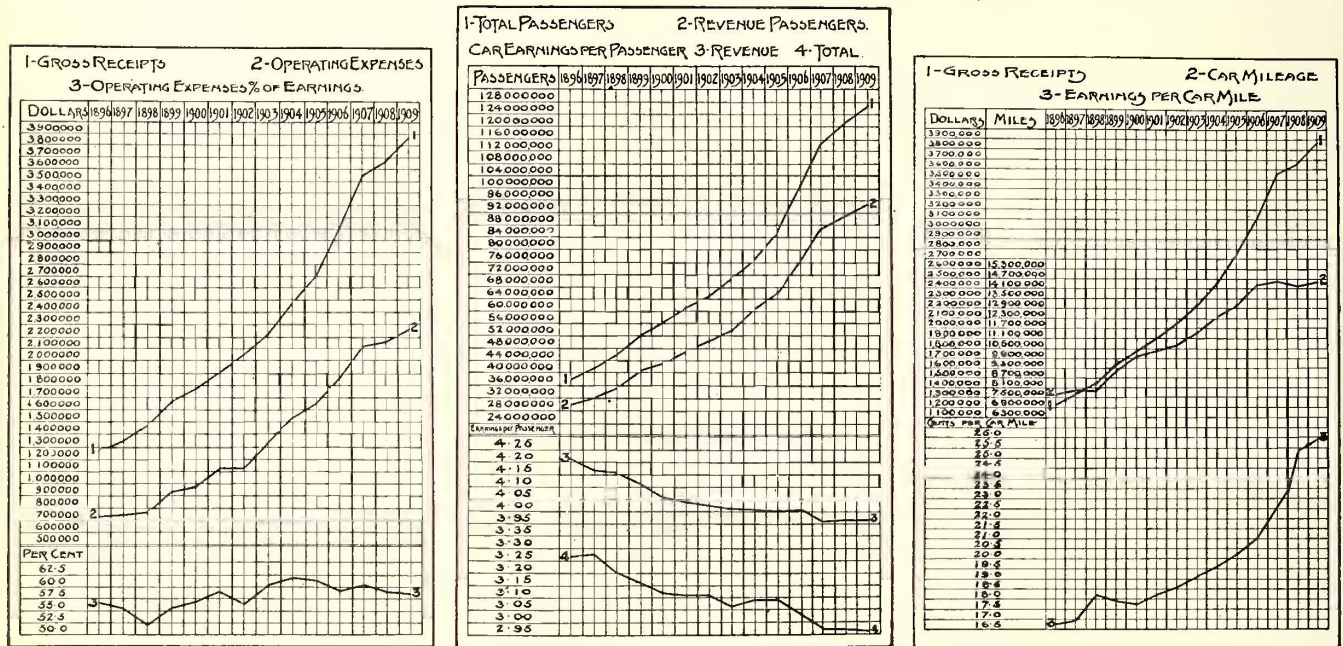
"The gross earnings continue to show satisfactory in-

"Owing to the increase of the system the present shops at Hochelaga are inadequate to take care of the repairs and construction work of the company, and as there is no further property adjoining that can be had, your directors have purchased 75 acres of land in the North East end of the city, on which it is proposed to erect the new shops. The purchase of this land will secure for many years to come ample room for all extensions that may have to be made from time to time.

"The company was again obliged to refuse payment of a portion of the city's accounts for snow removal, owing to the wasteful manner in which the work was carried out. The snow fall according to the McGill records was nearly 2 ft. less than the previous year, but notwithstanding this the city claims to have expended the sum of \$208,436, an increase over the previous year of \$5,901, and an increase over two years ago of \$77,799, with 20.2 in. less snow fall. The increase in street mileage during this latter period was one mile, which at the average cost would only amount to \$4,222.

"The company has paid to the City of Montreal the usual property taxes and percentage on earnings, amounting to \$286,086, on account of snow removal \$83,158 and taxes on poles, rails, wires and machinery for the year \$16,941, a total of \$386,185, being an increase of \$45,653 over the previous year.

"The earnings of the Montreal Park & Island Railway Company have been somewhat disappointing during the year, owing chiefly to the effect of last year's depression in business in the various factories, etc., situated on this com-



Diagrams Showing Operations of Montreal Street Railway

creases. The per cent of expenses to gross earnings is 58.20, against 58.69 per cent for the previous year.

"The increased payment to the City of Montreal for the percentage on earnings was \$17,772, an increase of 7.33 per cent over the previous year.

"Your directors appropriated during the year from the surplus earnings of the company, the sum of \$175,000 for renewals to the company's property. This amount added to the balance of \$29,353 carried forward from previous years, made a total credit to the account of \$204,353. Against this amount there has been charged during the year \$173,816.

"Your directors appropriated the sum of \$25,000 from the surplus earnings of the company as a credit to the fire insurance fund. The interest on the investments for the year amounted to \$21,732. The amount now at the credit of this fund is \$470,109.

"The premium on the last issue of new stock paid up during the year, amounting to \$142,684, has been credited to the general surplus account of the company. The amount of \$59,027, representing the taxes on poles, rails, wires and machinery due the City of Montreal, in accordance with the recent judgment up to 1907, has been debited to this account. The amount due for the last two years has been charged against operation.

"The company has expended during the year on construction account, \$121,866, on equipment account, \$43,837 and on real estate and buildings, \$23,745, a total of \$189,448.

pany's lines. The gross earnings remained about the same as the previous year, and did not show the usual increase.

"The operating expenses were higher owing to a larger amount being spent on the maintenance of the property of the company, and to the new extensions that have been constructed and operated during the past year. It was not expected by your directors that these extensions would prove immediately profitable, but owing to the growth of the suburbs, and the building up they have and will induce, it is only a matter of a short period when they will show good earning capacity for the company.

"The gross earnings show a gross increase of \$2,859, the operating expenses an increase of \$16,947, the net results being \$57,058, against \$71,146 for the previous year.

"The gross earnings of the Montreal Terminal Railway Company increased \$11,261, the operating expenses increased \$308, and the net surplus for the year was \$5,477, against a deficit in the previous year of \$5,162."

Receivers Appointed for Washington, Baltimore & Annapolis Electric Railway

The Washington, Baltimore & Annapolis Electric Railway was placed in the hands of George T. Bishop, Cleveland, Ohio, president of the company, and George Weems Williams, Baltimore, Md., counsel for the company, as

receivers by Judge Morris of the United States Circuit Court at Baltimore on Oct. 28. They will operate the property under the direction of the court without interruption to the service, and for the present, at least, with the same operating force. The application for the receivership was made by George A. Craig, Toledo, Ohio, a stockholder and creditor of the company, through his attorneys. Mr. Bishop has issued the following statement in explanation of the appointment of the receivers:

"The receivership for the Washington, Baltimore & Annapolis Electric Railway was decided by the officers of the company to be necessary for the protection of the security holders, upon it becoming apparent that all of the reconstruction changes, made necessary by the adoption of the direct-current power system and the acquirement of new cars suitable for use in Washington, would not be completed so as to enable the company to operate its cars in Washington by Nov. 15, as had been expected and relied upon by the company in making plans to care for its obligations. It now seems probable that all of said changes cannot be completed before Feb. 15, 1910, owing to delays which the officers of the company and the several contractors doing the work were unable to foresee. A considerable portion of the cost of such changes necessarily has been paid by the company from its current earnings, necessitating a delay in the payment of pressing accounts, which would otherwise have been made from the earnings.

"It has been believed up to this time, and in our opinion such belief has been justified, that the decreased operating expenses and increased earnings which will result from the changes would have furnished sufficient funds to provide for the company's urgent and unusual requirements. Accounts which the company is unable to pay are pressing, and under the plan decided upon these can be taken care of from earnings, which would not be sufficient to pay the May 1, 1909, interest on first and second mortgage bonds, now in default, and the interest on the same bonds, due Nov. 1, 1909, a total of \$200,000.

"Under the receivership, which should not be of long duration, all the reconstruction work can be continued, and the cost thereof which has not already been paid can be provided for. A plan for the funding of the accrued and accruing interest and other indebtedness will soon be submitted to the security holders, but it is the belief of the officers of the company that no drastic action will be necessary. It should be borne in mind by the security holders that the company has no questions of expiring franchises to bother it; its rights are secured; its property is intact and in first-class physical condition, and within a short time it will begin operating cars from the business center of Baltimore to the business center of Washington.

"Without giving a detailed statement of the company's obligations, the cause of the present condition can be summed up by stating that the amount of the company's present liabilities, for which it has not been able to issue securities, is made up entirely of the amount which it has been required to put into its construction account, and the deficit caused by the large percentage of operating expenses under the alternating-current system."

Report of New Haven Subsidiary Properties

The annual report of the New York, New Haven & Hartford Railroad for the year ended June 30, 1909, contains statements showing the results of operation of the Rhode Island Company and the Connecticut Company, as follows:

Year ending June 30, 1909:	Connecticut Co.	Rhode Island Co.
Earnings:		
Passenger	\$6,416,338	\$3,876,746
Mail	9,408	3,313
Express	224,294	*169,580
Chartered cars	28,428	11,998
Sale of power	39,778	56,076
Park earnings	62,116	.....
Advertising	29,687	16,847
Miscellaneous, including gas, light and water	1,178,782	†26,225
Total earnings	\$7,988,831	\$4,160,785
Operating expenses:		
Maintenance of way and structures.....	\$ 572,107	\$ 198,113
Maintenance of equipment.....	450,556	265,071
Operation of power plants.....	753,010	368,120
Operation of cars.....	1,624,209	1,008,586
General expenses	568,376	474,984
Miscellaneous expenses	337,345	.....
Total operating expenses.....	\$4,305,603	\$2,313,954
Net earnings	\$3,683,228	\$1,846,831
Income from other sources.....	.....	32,172
Total income .....	.....	\$1,879,003
Taxes, rentals, etc.....	38,913	1,409,797
Net income	\$3,644,315	\$469,207

* Stated as "freight and express."

† Stated as "miscellaneous."

The Connecticut Company used for operating expenses

53.8 per cent of its gross revenue, while the proportion required by the Rhode Island Company was 55.5 per cent.

Charles S. Mellen, president of the New York, New Haven & Hartford road, in his statement to shareholders makes the following reference to matters affecting the electrically operated properties.

"Work is now in progress at Glenbrook, Conn., on the erection of approximately one mile of 4 and 6-track catenary construction, beginning at the easterly terminus of the present overhead construction, a short distance east of Stamford. Contract has been awarded for two electric freight locomotives. This work is for experimental purposes to determine future standards in connection with a proposed extension of our electric service.

"The litigation in which the New York, Westchester & Boston Railroad was involved, has been terminated and full authority given for the prosecution of the work of construction, in accordance with plans satisfactory to your company.

"By a decree of the Supreme Judicial Court of the Commonwealth of Massachusetts of May, 1908, in the suit of the attorney general against the New York, New Haven & Hartford Railroad, your company was enjoined from holding directly or indirectly the stock of any Massachusetts street railway after July 1, 1909.

"In consequence of this decree it became necessary to sell the stocks and indebtedness of the Worcester & Webster Street Railway Company and of the Webster & Dudley Street Railway Company, which came into the treasury of your company through the merger with the Consolidated Railway Company of May 31, 1907, thus closing out the last financial interest of your company in Massachusetts street railways.

"The only interest not eliminated is the endorsement upon the shares of the Springfield Railway Companies and the New England Investment & Security Company. These endorsements under decrees of the courts thus far rendered, we must apparently continue until the liquidation of the trusts they represent, but the earnings of the properties owned by both trusts seem to be ample to enable them to meet all obligations without calling upon your company to make any payments under the terms of its guaranty.

"The obligation may therefore be considered more a nominal than a material one.

"By reason of the substitution of electric motive power for steam within the limits of the city of New York, required by law, and the need for larger facilities at the Grand Central terminal involving the expenditure of a large amount of money, it was deemed advisable to join with the New York Central & Hudson River Railroad in a new agreement for the use and occupancy of the terminal. This agreement is now in effect, and, while it entails an additional expense to your company for its use of the terminal, it is recognized as a natural sequence to legal requirements and the changed conditions."

Auburn & Turner Railroad, Turner, Mass.—The property of the Auburn & Turner Railroad was sold under foreclosure on Oct. 29, 1909, at Auburn to R. G. Fessenden, president of the American Trust Company, Boston, Mass., representing the bondholders, for \$60,000.

Central Park, North & East River Railroad, New York, N. Y.—Lewis B. Franklin has been elected a director of the Central Park, North & East River Railroad to succeed John W. Castles, deceased.

Columbus, New Albany & Johnstown Traction Company, Columbus, Ohio.—It is reported that A. L. Richmond, Jr., Pittsburgh, Pa., has secured control of the Columbus, New Albany & Johnstown Traction Company through the purchase of the stock of the company held by George B. Cox, Cincinnati, Ohio. The Dominion Construction Company, of which Mr. Richmond is president, has qualified to do business in Ohio, and it is believed that the line will be extended from its present terminus at Gahanna to Johnstown at an early date.

Des Moines (Ia.) City Railway.—W. B. McKinley, president of the Illinois Traction System, Champaign, Ill., and his associates are reported to have obtained from N. W. Harris & Company, New York; G. B. Hippee, president of the Des Moines City Railway and general manager of the Interurban Railway; H. H. Polk, vice-president of the Des Moines City Railway and president of the Interurban Railway, and others an option on a majority of the stock of these companies, the option to be exercised only if Mr. McKinley secures a favorable franchise extension from the city of Des Moines. As an inducement for the Council to grant a new franchise Mr. McKinley has offered to make certain improvements in Des Moines and to extend the interurban lines.

Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.—W. T. Durbin, chairman of the board of trustees, representing the bondholders of the Indianapolis & Cincinnati Traction Company, expects soon to present to the court for approval a plan for the reorganization of the company which has been sanctioned by the board of trustees and by Charles L. Henry, receiver of the company. Mr. Durbin is said to have expressed the opinion that the reorganization of the company can be effected by April 1, 1910.

Metropolitan Street Railway, New York, N. Y.—The petition of the Metropolitan Securities Company, New York, for a writ of certiorari in the case of that company against William W. Ladd, receiver of the New York City Railway, was presented to the Supreme Court of the United States at Washington on Nov. 1. The case involves a judgment for about \$5,000,000 for damages alleged to have been suffered by the New York City Railway on account of a breach of certain agreements in connection with the lease of the railway to that company by the Metropolitan Street Railway. The case was decided in the New York Federal courts in favor of the New York City Railway, and the Metropolitan Securities Company asks the Supreme Court to review the entire records. Petitions for writs were also presented in behalf of the Guaranty Trust Company in the case of that company against the Metropolitan Street Railway and the Morton Trust Company against the Guaranty Trust Company, involving the foreclosure of the Metropolitan Street Railway's mortgage of 1897 for \$12,500,000 to secure its bonds.

Missouri & Kansas Interurban Railway, Kansas City, Mo.—J. A. Edson has been discharged as receiver of the Missouri & Kansas Interurban Railway by Judge J. C. Pollock of the Federal Court of Kansas at Kansas City, Mo. During Mr. Edson's incumbency as receiver the motive power of the line was changed from gasoline to electricity and other improvements were made to the property which brought the expenses for rehabilitation up to \$107,000.

New York, New Haven & Hartford Railroad, New Haven, Conn.—At the special meeting of the stockholders of the New York, New Haven & Hartford Railroad on Oct. 27, 1909, it was voted to issue 500,000 shares of new stock at \$125 per share, which will yield about \$62,500,000. The stock is to be paid for in four instalments, at intervals of six months. It had been expected that the capital stock would not be increased by more than \$40,000,000 at this time, but it has been explained that the larger amount is necessary to meet the floating debt of the road and pay for the improvements that have been planned. All the retiring directors were reelected and John L. Billard was elected to succeed the late Frank W. Cheney.

Northwestern Elevated Railroad, Chicago, Ill.—The report of the Northwestern Elevated Railroad for the year ended June 30, 1909, shows earnings as follows: Gross receipts for 1909, \$2,540,883 as compared with \$2,463,188 for 1908; operating expenses for 1909, \$995,819 as compared with \$965,117 for 1908; net earnings for 1909, \$1,545,064 as compared with \$1,498,071 for 1908; total charges for 1909, \$1,189,280 as compared with \$1,147,183 for 1908; surplus for 1909, \$355,776 as compared with \$350,883 for 1908. The ratio of operating expenses to earnings (excluding loop net earnings) was 49.82 for 1909 as compared with 50.22 for 1908; the ratio of operating expenses, loop account and taxes to earnings (excluding loop net earnings) was 68.24 for 1909 as compared with 66.64 for 1908.

Ohio Valley Traction Company, Cincinnati, Ohio.—The directors of the Ohio Valley Traction Company have declared an initial dividend of 1 per cent on the \$7,500,000 of common stock of the company, payable, together with the regular quarterly dividend of 1¼ per cent on \$8,500,000 of preferred stock, on Nov. 1, 1909, to holders of record of Oct. 25, 1909.

Pensacola (Fla.) Electric Company.—The Pensacola Electric Company, which deferred the dividends due June and December, 1908, and June, 1909, on \$300,000 of 6 per cent cumulative preferred stock, has resumed the semi-annual dividend of 3 per cent, payable Dec. 1, 1909, and has also declared a dividend of 3 per cent per share on account of accumulations.

Port Jervis (N. Y.) Traction Company.—The Port Jervis Traction Company has applied to the Public Service Commission of the Second District of New York for permission to issue a mortgage for \$50,000 and bonds to the same amount and also \$28,812.50 in common stock.

Third Avenue Railroad, New York, N. Y.—Judge Lacombe, in the United States Circuit Court, has granted a postponement of the sale of the Third Avenue Railroad until Jan. 11, 1910, as the Public Service Commission of the First District of New York has not yet approved the reorganization plan of the bondholders' committee.

Traffic and Transportation

Tacoma Companies Increase Fares

The Puget Sound Electric Railway and the Tacoma Railway & Power Company, Tacoma, Wash., of which Stone & Webster, Boston, Mass., are general managers, put into effect on Oct. 17, 1909, a number of changes in the rates of fare on their suburban and interurban lines. Patrons of the companies were notified of the changes by the following notice:

"On Oct. 17 all regular rates on the Puget Sound Electric Railway will be increased to practically 2 cents per mile. Round trip tickets at reduced rates, which have been in force heretofore, will be abandoned, except between Tacoma and Seattle, and in lieu thereof a commutation book will be sold with a 30 per cent reduction from the new regular rates. This book will contain tickets covering 50 rides, good for 30 days, to be used only by the purchaser of the book; said commutation books will be sold only at the company's ticket offices, in Seattle and Tacoma. While the regular rates are increased for passengers who ride infrequently, this commutation book will permit passengers riding daily to do so at a 30 per cent reduction over the regular rates; or, in other words, practically obtain the same rates that now exist, and in many cases they will be found lower than the present tariffs. The through rate of \$1 for the round trip which has been in force heretofore between Seattle and Tacoma will be changed to \$1.25.

"On all suburban lines of the Tacoma Railway & Power Company, round trip tickets, which have been in force, will be abandoned and the regular rate of 15 cents will be charged between Tacoma, Spanaway, American Lake and Steilacoom. The rate between Tacoma and Puyallup via the old line will be 5 cents within the city limits of Tacoma; 5 cents within the city limits of Puyallup, and 10 cents between the city limits of Tacoma and Puyallup, divided into two 5-cent zones of equal distance; total fare, Tacoma to Puyallup, 20 cents; rate from Tacoma to Puyallup via new line, 20 cents. Transfers will be issued to all lines of the Tacoma Railway & Power Company within the city limits, as heretofore."

Subsequently Jacob Furth, president of the Puget Sound Electric Railway, offered the following explanation of the reasons which prompted the company to make the changes:

"The Tacoma Railway & Power Company was purchased and the Puget Sound Electric Railway opened for traffic in 1902. With a desire to give the public the benefit of low rates under the belief that the population of the valley would increase to a point where traffic would be profitable, the lowest rates on any interurban railway at that time were put into effect and have been in force for the past seven years. During this period a large number of interurban railways have been built throughout the country (and in Washington), and in each case where low fares have been introduced they have in time been increased, from the fact that they were found unprofitable.

"Throughout Indiana and Ohio rates have been increased on the majority of interurban and suburban railways, and recently the Spokane & Inland Empire Railway, operating out of Spokane and receiving 2.4 cents per mile per passenger, found such rates would not pay a reasonable return upon the investment, and has increased its rates to 3 cents per mile. On city and suburban lines in Massachusetts, where the rates were 5 cents, they have been increased to 6 cents in several instances by order of the Railroad Commission, with a view of placing the roads on a paying basis.

"Hence, experience has convinced the railway investors that rates less than from 2 cents to 3 cents per mile on high-speed interurban lines will not pay, and there is nothing left for the company to do but increase the rates to prevent inevitable failure (which would do the country more harm than good).

"During the last seven years there has been a continual outlay for broad gaging the Tacoma Railway & Power Company's system, reconstructing the tracks with heavier rails, ballasting, etc. Miles of pavement have been constructed at an enormous cost, wherein the benefit to the company is exceedingly small and will not be realized until the paved districts are more thickly populated. The interurban line has been partly double tracked, the entire road-bed ballasted, and the company intends to give better and safer service between Seattle and Tacoma by completing the work of double tracking the line as soon as funds can be raised to proceed with the improvement. Modern cars have been introduced on all lines for the comfort of the passengers.

"During this period the cost of all materials and labor used in the operation and construction of the roads has

been increased and in many instances doubled. State, county and city taxes have almost doubled, and in the face of all this the companies have heretofore not increased the rates introduced, but have even decreased them on the suburban lines of the Tacoma Railway & Power Company by giving transfers from the suburban to all city lines.

"With expenses continually increasing on every side, although the most rigid economy has been practised in the management of the companies, a point has been reached where an increase in suburban fares has become necessary to enable the company properly to perform its duty as a public carrier. The managers hope the public will, through this explanation, understand the situation and realize that the increase in rates is a necessity. The percentage of increase is much less than the increased percentage of expenses and much less than the increase every member of the public is paying for necessities furnished by private producers in every line."

Omaha Employees Rewarded for Difficult Service

The employees of the Omaha & Council Bluffs Street Railway, Omaha, Neb., who remained faithful to the company during the recent strike, have been rewarded by the company with extra compensation for the 15 days that the operation of cars was made difficult by defections from the ranks of the men. A considerable number of the men operated cars every day for the 15 days and received the sum of \$150 extra compensation. Others who operated cars some of these days and held themselves in readiness for service also received extra compensation. The communication announcing the determination of the company to reward those who served it faithfully was addressed to the conductors and motormen under date of Oct. 4 and was signed by R. A. Leussler, assistant general manager, and L. C. Nash, superintendent of transportation. It follows:

"The board of directors, at a meeting this day, has decided upon the following extra compensation for conductors and motormen who remained in the service of the company during the recent strike, or who returned to work on or before Oct. 2.

"All conductors and motormen in the employ of the company on Sept. 17, 1909, who reported for work and held themselves in readiness to operate cars between Sept. 18 and Oct. 2, 1909, both dates inclusive, will receive the sum of \$5 per day for each day on which they so reported, and all conductors and motormen in the employ of the company on Sept. 17, 1909, who actually operated cars between Sept. 18 and Oct. 2, 1909, both dates inclusive, will receive the additional sum of \$5 per day for each day on which they so operated cars. This extra compensation will be paid on Nov. 1, 1909.

"Conductors and motormen having regular runs and operating cars, or reporting for their runs, will be credited with the schedule time for such runs, and conductors and motormen on the extra list will be credited with the schedule time of all runs which they took during the above dates.

"Men who were breaking in on Sept. 17, 1909, will be considered as having been in the employ of the company on said date.

"Conductors and motormen who failed to report on Sept. 18, 1909, or later, and who have since returned to work will receive the same rate of wages each was receiving on Sept. 17, 1909."

Ten Accident Pointers

The bureau for the prevention of accidents of the Philadelphia (Pa.) Rapid Transit Company has reprinted in Bulletin No. 70, dated Oct. 25, 1909, 10 pointers on accidents selected from the written discussion by Francis J. Ryan of the Syracuse (N. Y.) Rapid Transit Company of the topical subject "What Are the Best Means of Preventing Collisions of Cars, as Well as with Vehicles and Pedestrians" considered at Denver by the American Street & Interurban Claim Agents' Association.

The pointers which the Philadelphia Rapid Transit Company has selected to call to the attention of its employees follow:

"1. Have the motorman understand the importance of knowing that his brake, gong, sand and car are in proper condition before starting on his day's work.

"2. Have him understand that imperfection of equipment will act as no excuse for a collision if such trouble might have been known by him (in the exercise of proper care) before the collision occurred.

"3. Have him understand that the man who takes chances is a dangerous motorman.

"4. Have him understand that the keeping of his car on time is of secondary importance when he can prevent a collision.

"5. Have him understand that the time to change lights, signs, side rails, etc., is when the car is standing.

"6. Have him realize the necessity and importance of keeping his car a sufficient distance from the car ahead.

"7. Have him make sure that all points, switches, signal lights, and orders are fully understood before proceeding with his car.

"8. Have him understand the importance of having his car under perfect control when he is about to cross lines running at right angles.

"9. Have him understand the reasons why he should have his car under perfect control when passing standing cars.

"10. Have him understand his duty at railroad crossings."

Fare Complaint in Pennsylvania.—The Railroad Commission of Pennsylvania will consider at an early date the complaint of the authorities of Collegetown against the Schuylkill Valley Traction Company, Norristown, Pa., that the fare of 15 cents charged between Collegetown and Norristown is excessive.

Denver & Interurban Railroad Resumes Service.—The Denver & Interurban Railroad, which as stated on page 635 of the *ELECTRIC RAILWAY JOURNAL* of Oct. 2, 1909, discontinued the service on the line between Denver and Boulder owing to the necessity of replacing the viaduct out of Denver to the north with a new steel structure, resumed service on this line on Oct. 28, 1909, work on the viaduct having been completed.

Pay-as-You-Enter Cars on Broadway, New York.—About 90 pay-as-you-enter cars, constructed under license from the Pay-As-You-Enter Car Corporation, New York, N. Y., were placed in service on the Broadway and Amsterdam Avenue line of the Metropolitan Street Railway, New York, N. Y., on Oct. 31, 1909. Cars of this type will gradually be substituted for the ordinary closed cars on both the Broadway and Amsterdam Avenue and the Broadway and Columbus Avenue lines of the company, and it is expected that by Dec. 1, 1909, the equipment of both of these lines will be composed entirely of pay-as-you-enter cars.

Handling State Fair Traffic Over Illinois Traction System.—Officials of the Illinois Traction System are pleased with the showing made in handling the crowds that visited the State fair at Springfield recently, 125,000 people having been carried in and out of Springfield during the week. This is about 30,000 more than were transported in 1908. Every effort possible was made by the advertising department, under the direction of J. H. Ryan, to interest the public in the fair. The newspapers were used freely and posters and other advertising matter were distributed. The centennial at St. Louis, which occurred at the same time that the fair was held, complicated matters, but the increase in traffic on the southern division was also handled expeditiously.

Precautions to Prevent Accidents Between Freight Trains on Spurs and Interurban Cars.—Under date of Nov. 1, 1909, the Railroad Commission of Indiana addressed the following communication to all steam railroads operating in Indiana: "The commission has ascertained that it has been the practice on the part of steam railroads having industrial tracks intersecting the railways of interurban lines, not to stop their freight trains or freight cars before crossing such interurban lines. This practice the commission considers dangerous. It is therefore, recommended and ordered, that, from and after Dec. 1, 1909, all steam railroads operating in Indiana shall bring their freight trains and freight cars to a full stop before passing over an interurban line, provided such freight trains or freight cars are being operated over an industrial switch or spur which crosses the track of such interurban railway. All of which is ordered and directed by the commission."

Letter from Pennsylvania Commission Calling Attention to Front Platform Rule.—The Railroad Commission of Pennsylvania has addressed a communication to a number of street railways in that State relative to their compliance with the regulation of the commission forbidding the companies to carry passengers on the front platforms of closed cars and limiting the carriage of passengers on the front platforms of open cars to those who can be accommodated on the benches thereon provided. The commission states that it intends to insist upon the observance of this regulation, which was made after conferences with representatives of the railways at which it was agreed that such regulation was desirable and could be enforced. With regard to the contention now that the rule can not be enforced at periods of heavy travel, the commission states that it has recently observed rigid adherence to the rule in Pittsburgh in rush hours, and had been informed that the regulation was effective even during the heavy travel incident to the recent championship baseball series in Pittsburgh.

Personal Mention

Mr. Henry B. Seaman, chief engineer of the Public Service Commission of the First District of New York, has been appointed by Mayor Brooks of Boston to act in a consulting capacity in connection with the Cambridge subway.

Mr. Harry S. Calvert, secretary of the Pennsylvania State Railroad Commission, was on Oct. 27 appointed one of the receivers of the Land Trust Company and the Mercantile Trust Company, Pittsburgh, Pa., by Judge Kunkel of the Dapuhin County Court. Mr. Calvert, who was appointed secretary of the State Railroad Commission when that body was organized, will resign from that office.

Mr. Louis C. Fritch has resigned as consulting engineer of the Illinois Central Railroad, Chicago, Ill., to become chief engineer of the Chicago Great Western Railroad. During the last year Mr. Fritch has had in charge the preliminary studies which the engineering department of the Illinois Central Railroad has made with a view to ascertaining the conditions governing the electrification of that company's suburban trunk line service. Mr. Fritch entered railway work in 1884, and has been connected with steam railroads in the Central States ever since that time. A short biographical sketch of Mr. Fritch was published on page 309 of the *ELECTRIC RAILWAY JOURNAL* for Feb. 13, 1909.

Mr. J. L. Greatsinger has been elected president of the Elmira, Corning & Waverly Railroad, Elmira, N. Y. Mr. Greatsinger began his railway career in 1869 with the Erie Railroad. Since that time he has been connected with the Utica, Ithaca & Elmira Railroad; Ithaca, Auburn & Western Railroad; Cazenovia, Canastota & De Ruyter Railroad; Canal Railroad; the Chicago & Indiana Coal Railroad; the Chicago & Eastern Illinois Railroad, and the Duluth & Iron Range Railroad. He was in turn master mechanic, general superintendent, general manager and president of the Duluth & Iron Range Railroad. Mr. Greatsinger was president of the Brooklyn (N. Y.) Rapid Transit Company from March, 1901, to February, 1903, and since that time has been identified with real estate development in Brooklyn and railway work in Central New York State.

Mr. J. J. Riley, whose appointment as general inspector of the surface lines of the Brooklyn (N. Y.) Rapid Transit Company was announced in the *ELECTRIC RAILWAY JOURNAL* of Oct. 30, 1909, was born in Oswego, N. Y., in 1873, and was educated in the public schools of Montreal, Quebec. He began his railroad career in the traffic department of the Grand Trunk Railroad. He next became connected with the foreign freight department of the Erie Railroad and later entered the employ of the Lehigh Valley Railroad. Mr. Riley's practical experience in railroad equipment was obtained as superintendent of the works of the Peckham Car Wheel Company, Kingston, N. Y. Mr. Riley entered the employ of the Brooklyn Rapid Transit Company as special inspector to the general superintendent and was subsequently made assistant trainmaster of the Southern Division of its elevated lines. He was next transferred from the elevated to the surface lines of the company and made district superintendent of the Southern Division. In the recent reorganization of the staff of the surface lines the office of district superintendent was abolished, but Mr. Riley's abilities were recognized by his appointment as general inspector of surface lines, a newly created position. In his new office Mr. Riley will have direct charge of the heavy volumes of traffic through lower Fulton Street and across both the Brooklyn and the Williamsburgh bridges. The entire staff of inspectors of the company will report direct to him.

Richard McCulloch, vice-president and assistant general manager of the United Railways, St. Louis, Mo., in an illustrated lecture on the development of the street railways before the St. Louis Chapter of the American Institute of Banking at the Missouri Athletic Club on the evening of Oct. 26, 1909, said that travel in subways is noisy and uncomfortable and that elevated railways greatly decrease the value of a street for the building of residences. He praised the surface car of the pay-as-you-enter type now operated on the lines of the United Railways and contrasted pictures of that type of car with pictures showing the evolution of cars from the old English stage coach. Mr. McCulloch also spoke about the social benefits of the city electric railway and the interurban lines. In concluding his remarks he referred to the substitution of electricity for steam as motive power on the lines of the New York Central & Hudson River Railroad; the New York, New Haven & Hartford Railroad and the Pennsylvania Railroad out of New York and to the probable use of electricity as motive power by the Pennsylvania Railroad on its lines between Philadelphia and New York.

Construction News

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

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

RECENT INCORPORATIONS

***Interurban Railway, Helena, Ark.**—Incorporated to build an electric railway in Helena. Capital stock, \$10,000. Incorporators: E. C. Hornor, John S. Hornor and C. H. Purvis.

Vallejo & Northern Railroad, Vallejo, Cal.—Incorporated with a capital stock of \$25,000,000, to build an electric railway from Vallejo to Sacramento. The route will be the same as that planned by the Vallejo & Northern Railway, with the exception that the charter calls for a straight line between the two points. The old company's route called for a branch near Elmira to Woodland via Winters. There will be four branches on the new line, one connecting Susan and Fairfield, another leaving the main line at Cement and running to Woodland via Vacaville and Winters, and a third running between Woodland and Davis. A steamship line between Vallejo and San Francisco is also projected. Directors: T. C. Gregory, William Pierce, John W. Mauman, Ernest D. Holly, Suisun and Winfield R. Madden, Oakland. [E. R. J., Oct. 23, '09.]

***Gooding, Soldier & Boise Interurban Railway, Boise, Idaho.**—Incorporated to build a railway, steam or electric, to extend between Boise and Gooding, a distance of 34 miles, to connect with the Idaho Southern Railroad in the Twin Falls country. Preparations are being made for grading and construction of a portion of the proposed railway as far as Soldier. Capital stock, \$1,000,000. Incorporators: Attorney Sullivan, Boise and other capitalists of Camas Prairie, Soldier and Gooding.

St. Louis-Kansas City Electric Company, St. Louis, Mo.—Incorporated to build an electric railway 295 miles long through the counties of St. Louis, St. Charles, Lincoln, Warren, Montgomery, Calloway, Boone, Howard, Saline, Lafayette and Jackson to Kansas City, with a branch from Gladgou through Chariton and Brookfield in Linn County. Headquarters, New Bank of Commerce Building, St. Louis. Capital stock, \$5,000,000. Incorporators: W. D. Nevin, Denver, Col.; W. H. Chase, B. F. Gray, Edgar R. Talton, St. Louis; Daniel F. Miller and Charles A. Loomis, Kansas City. [E. R. J., Aug. 21, '09.]

***Tennessee Traction Company, Memphis, Tenn.**—Incorporated to build an interurban electric railway from Memphis to Nashville. Capital stock, \$50,000.

FRANCHISES

***Jonesboro, Ark.**—Preston Hatcher, of the Home Telephone Company, on behalf of a number of capitalists has applied to the City Council for a franchise to build a street railway in Jonesboro with interurban connection to Nettleton, 3 miles distant.

Los Angeles, Cal.—A franchise for the extension of the street railway tracks on West Adams Street, from the present terminus, has been granted to W. M. Bowen by the Board of Supervisors. The successful bid was \$100.

Oakland, Cal.—The City Council has granted a 50-year franchise to the Oakland Traction Company to extend its electric railway along Grand Avenue. The company paid the city the sum of \$500 for the franchise.

Delphi, Ind.—The Commissioners of Carroll County have ordered an election to be held Nov. 9 to vote on the proposition of Monroe Township voting a subsidy of \$20,000 in aid of the construction of the Delphi, Flora & Burlington Traction Company's line. E. W. Bowers, president. [E. R. J., Oct. 30, '09.]

Logansport, Ind.—The Indiana Northwestern Traction Company, Monticello, has filed a petition with Commissioners of Cass County, asking for a franchise to build and operate an electric railroad through the county. The Town Board has granted a 75-year franchise to the company to build its proposed electric railway over Main and Marion Streets, Monticello. W. F. Brucker, Monticello, president. [E. R. J., Oct. 23, '09.]

Des Moines, Ia.—William B. McKinley, president of the Illinois Traction System, Champaign, Ill., and his associates who have secured an option on the property of the Des Moines City Railway and the Inter-Urban Railway have agreed to make the following improvements to the lines in Des Moines in return for a 25-year extension of the franchise grants to the companies in that city: To remove all present unused tracks, rebuild at once 10 miles of line with 129-lb. girder rail on paved streets and 80-lb. T-rail on unpaved streets, install 50 new cars, build 50 miles of the

new line within the city, cast or electrically weld all joints on new track, construct a new power house to cost \$250,000, place all feed and transmission wires under ground in the fire district and use iron poles wherever there is permanent construction and paved streets. The questions of fare, the division of gross receipts and the right of the city to purchase the property in the future are points that have not yet been agreed to.

Granville, Ia.—The Sioux City & Spirit Lake Railway, Sioux City, has been granted a franchise to build its proposed electric railway through the streets and roads of Granville Township. [E. R. J., Jan. 16, '09.]

Marshalltown, Ia.—The City Council has fixed Nov. 29, as the date of the special election at which the people will be called upon to vote gas, electric light, and street railway franchises, asked in the names of H. W. Darling, and Louis H. Schroeder, Chicago. [E. R. J., Sept. 11, '09.]

***Kansas City, Kan.**—George Hall, Milwaukee, Wis., has submitted a franchise to the Wyandotte County Commissioners asking for a 35-year grant to operate an electric railway over 4½ miles of the county road. It is proposed to start the new line on Greystone Avenue in Rosedale, at the point of intersection of the Kansas and Missouri State lines, and then to proceed west on the ridge about half way between Argentine and Rosedale to the junction of the county road, about 2 miles west of Argentine.

New Orleans, La.—An ordinance has been passed by the City Council directing the comptroller to sell at public auction at the City Hall on Nov. 11, 1909, to the highest bidder, a 47-year franchise to construct a street railway from Lafayette Avenue and Villere Street to Franklin Avenue and St. James Avenue.

***Virginia, Minn.**—V. M. Pindle, Duluth, representing W. M. Pindle, Duluth, and W. D. Chapman, Chicago, Ill., has applied to the City Council for a franchise to build an electric railway in Virginia. The company intends to construct an electric railway from Virginia to Eveleth and Gilbert and later to Hibbing.

Patchogue, N. Y.—The Suffolk Traction Company has forfeited \$60,000 bonds because of non-compliance with the conditions of its franchise to have completed and in operation within two years the cross-island railway from Patchogue to Port Jefferson. The company will endeavor to secure an extension to its franchise.

Chattanooga, Tenn.—The City Council has granted an electric street railway franchise to the Mountain Railway. D. J. Duncan is interested. [E. R. J., July 3, '09.]

***Mabton, Wash.**—J. A. Humphrey and associates have applied to the City Council for a 50-year franchise to construct a street railway in Mabton.

Monroe, Wash.—The Everett & Cherry Valley Traction Company, Everett, which proposes to build an electric railway between Snohomish and Fall City, has been granted a franchise in Monroe. J. T. McChesney, president. [E. R. J., Aug. 21, '09.]

TRACK AND ROADWAY

Capitol Traction Company, Washington, D. C.—This company has opened two extensions of its railway. One is the line from Seventh Street to the Navy Yard, via Florida Avenue and Eighth Street East, and the other is the extension of the Fourteenth Street line from the Union Station Plaza to Eighth Street East.

Birmingham & Edgewood Electric Railway, Birmingham, A.—This company has awarded a contract to Dunn & Lalande for the construction of 3¼ miles of track. An order has also been placed with the Tennessee Coal & Iron Railroad Company for 400 tons of steel open-hearth rails. Stephen Smith, president. [E. R. J., Sept. 18, '09.]

Chicago, Ill.—George W. Jackson, Inc., which was announced on page 413 of the *ELECTRIC RAILWAY JOURNAL*, Sept. 11, 1909, as being prepared to submit a proposal for the construction of an underground railway system in Chicago, has offered to submit to the City Council a draft of an ordinance under which it would be willing to build the lines it has in contemplation.

Murphysboro & Southern Railway, Murphysboro, Ill.—It is announced that this company, which is building an electric railway connecting Murphysboro and Carbondale, has awarded the contract for grading to Leonard Griffin, Murphysboro.

Gary & Southern Traction Company, Crown Point, Ind.—F. M. Clark, 615 Rookery, Chicago, Ill., secretary and treasurer, writes that this 12-mile electric railway from Gary to Crown Point is under construction and grading is nearly completed, although the company is not fully financed. Power will be furnished by the Chicago, Lake Shore & South Bend Railway. Officers: H. W. Seaman, president;

Warren Bicknell, vice-president, and I. W. Troxel, chief engineer. [E. R. J., April 10, '09.]

Atlantic Northern & Southern Railway, Atlantic, Ia.—This company is in the market for material for the construction of 58 miles of railroad. The material will be purchased by the engineering firm of Rattenborg, Ross & Judd, Atlantic.

Centerville Light & Traction Company, Centerville, Ia.—This company has begun the work of laying rails on its proposed electric railway from Centerville to Mystic, 7 miles. The company is using the 70-lb. rails for construction.

Saginaw & Flint Railway, Saginaw, Mich.—It is unofficially announced that this company plans to lengthen its Frankenmuth spur to Cass City, taking in both Caro and Vassar.

Wahpeton-Breckenridge Street Railway, Breckenridge, Minn.—F. L. Strum, general manager and purchasing agent, advises that this company expects to commence construction about May 1, 1910, on its electric railway from Breckenridge to Wahpeton, N. D. For the present only 1 mile of track will be built. The company intends to operate two cars. The power will be furnished by the Otter Tail Power Company, Fergus Falls, Minn. The shops will be located at Breckenridge, and the amusement park at Island Park. Officers: A. J. Divet, president, and Henry Connolly, vice-president, Wahpeton, and D. J. Jones, secretary, and J. H. Ehlert, treasurer, Breckenridge. [E. R. J., Oct. 9, '09.]

Kansas City, Independence & Southeastern Electric Railway, Independence, Mo.—It is stated that this company has revived its plan of building an electric railway from Independence to Blue Springs and thence southeast to Holden and Warsaw. It began last year but has lain dormant several months. A preliminary survey has been made from Independence to Warsaw by E. M. Stayton. A proposition is said to have been made to J. Allen Prewitt, one of the promoters, by a financing company to build the railway provided that the business men of Independence will furnish \$50,000. [E. R. J., Feb. 20, '09.]

Missouri & Cameron Railway, Kansas City, Mo.—The Jackson County Circuit Court on Oct. 23, dissolved the temporary injunction obtained in Kansas City two months ago by the Interstate Railway Company, restraining the Missouri River & Cameron Railway from prosecuting its work on the interurban right-of-way between St. Joseph and Kansas City. Both companies propose to construct a double-track electric interurban railway between St. Joseph and Kansas City, and their rights-of-way parallel the greater part of the distance. [E. R. J., Jan. 30, '09.]

Gallatin Valley Electric Railway, Bozeman, Mont.—It is reported that the first section of this electric railway, from Bozeman to Ferris, Hot Springs and Salesville, a distance of 18 miles, has been completed. The company intends to handle both freight and passengers, and has installed sidings at every crossroad for the convenience of farmers. It will connect with the Northern Pacific Railroad at Bozeman and with the Chicago, Milwaukee & Puget Sound Railway at Salesville. H. S. Buel, Bozeman, president. [E. R. J., May 8, '09.]

Missoula (Mont.) Street Railway.—This company advises that its electric railway, which is to be a 10-mile urban system, is under construction, and that the material for the first 10 miles has been ordered. Officers: W. A. Clark, 49 Wall Street, New York, N. Y., president; A. H. Wethey, Butte, vice-president; J. M. Bickford, secretary, and S. R. Inch, general manager and treasurer, Missoula. [E. R. J., Sept. 18, '09.]

Texas, New Mexico & Pacific Railroad, Las Cruces, N. Mex.—This company advises that construction work on this proposed electric railway from Las Cruces to Sunny Slope, 3 miles, will commence in about two months. The power station and repair shops will be located at Sunny Slope. Officers: Jas. T. Smith, president and treasurer; A. J. Papen, vice-president, and F. A. Jones, secretary. [E. R. J., Oct. 16, '09.]

Albany Southern Railroad, Albany, N. Y.—This company has awarded the contract for grading in connection with the double tracking of its railway from Rensselaer to Electric Park, a distance of 14 miles, to the Ennore & Hamilton Construction Company. J. C. White & Company, New York, will have charge of the new work.

Yates County Electric Railway, Dundee, N. Y.—E. L. Bailey, owner of this railway and also the Dundee Electric Lighting Plant, writes that this railway will be constructed next spring. It will extend from Dundee through Starkey to Starkey Point, Seneca Lake, 4 miles distant, to connect with the steamers for Geneva and Watkins Glen. The company intends to operate two cars. The shops will be located at Dundee and the amusement park, which is

partially controlled by the company at Starkey Point. The company intends to purchase short ties, 50-lb. rails and all overhead material including hard-drawn wire, feeder cable and bonds. Officers: C. D. Rapalee, chief engineer; Jephtha Gibson, engineer power station, and L. J. Bullock, master mechanic. [E. R. J., Oct. 23, '09.]

Elizabethtown Terminal Railroad, Elizabethtown, N. Y.—This company has applied to the Public Service Commission of the Second District for authority for a certificate of convenience and necessity to construct a railroad from Westport, where it will connect with the Delaware & Hudson Railroad, to Elizabethtown, a distance of 8 miles. Combination passenger motor cars operated by gasoline will be used. The company was incorporated last month and is capitalized at \$80,000. The commission will hear the application on Nov. 16. [E. R. J., Oct. 23, '09.]

New York & Queens County Railway, Long Island City, N. Y.—The Public Service Commission of the First District has adopted an order requiring the New York & Queens County Railway to double track its line between Flushing and College Point, and also in Flushing. Between Flushing and Jamaica it is required to lengthen the turnouts or switches, so as to maintain a headway of five minutes during the rush hours.

New York, Westchester & Boston Railway, New York, N. Y.—It is announced that this company has awarded contracts to the Ferguson Construction Company and to Henry Steers for the construction of a branch line from Mount Vernon to White Plains, a distance of 10 miles.

***Alliance, Ohio.**—It is announced that an electric railway is to be built between Alliance and Ravenna and that grading will be started this fall. The new railway, which will be 20 miles long, will parallel the Cleveland & Pittsburgh Railroad, giving a direct connection from Alliance to Cleveland. C. R. Morley, of the Stark Electric Company, and Henry M. Everett, of the Lake Shore Electric Company, and the Northern Ohio Traction Company are said to be interested.

Western Ohio Railway, Lima, Ohio.—It is stated that this company will extend its line from Minster to Loramie, a distance of 3 miles, and the work will be started in the early spring.

Lawton & Fort Sill Electric Railway, Oklahoma City, Okla.—D. L. Sleeper, vice-president, writes that this company, which was recently incorporated, will commence construction on its electric railway within 60 days. The railway will connect Lawton, Medicine Park and Fort Sill, a distance of 15 miles. The company intends to operate about four cars. The power station will be located at Medicine Park. Officers: Simon Smith, president, and W. H. Pattie, secretary. [E. R. J., Oct. 30, '09.]

Oklahoma (Okla.) Railway.—W. A. Haller, general manager, advises that this company expects to build about 25 miles of new city and suburban track within the next six months. Contracts for this work will probably be placed within four weeks.

Oklahoma Union Traction Company, Tulsa, Okla.—G. C. Stebbins, secretary, advises that this company has 2½ miles of its electric railway from Tulsa to Orcutt Lake under construction and that the company is in the market for good relaying rails and other material. The railway will extend from Tulsa, via Red Fork to Sapulpa, a distance of 15 miles. Capital stock, \$100,000. Officers: A. A. Small, president; E. F. Tucker, vice-president; S. A. Orcutt, treasurer, and L. Cox, superintendent. [E. R. J., Sept. 18, '09.]

Oregon Electric Railway, Portland, Ore.—This company is to begin construction on an extension of the Willamette Valley system at an early date, as the sale of \$2,000,000 of bonds, which is to be used for the extension, was ratified at a meeting of the stockholders of the company on Oct. 15.

Rapid Transit Subway Company, Pittsburgh, Pa.—This company has been authorized to extend its lines in Pittsburgh a distance of about 900 ft. from Fifth Avenue and Grant Boulevard, under Grant Boulevard to Forbes Street, and to a point in Schenley Park about 200 ft. south of Frobes Street.

Waynesburg & Blacksville Street Railway, Waynesburg, Pa.—This company, which was chartered Oct. 14, to build a 14-mile railway extending from the Pennsylvania-West Virginia State line to Waynesburg, Pa., has been granted authority by the Governor to build almost 50 miles of extensions as follows: Eastward from the State line from a point near the mouth of Roberts Run to a point on Dunkard Creek, in Wayne Township, Pa., a distance of 2 miles; from the same starting point in a westward direction, following Dunkard Creek to a point near the mouth of Tom's Run, Wayne Township, a distance of 3 miles; from a point at the mouth of Smith Creek at Waynesburg, through that

town to the following towns, Ten-Mile, Lone Pine, Eighty-Four, Wylandville, Gambles, Linden, Hills, Marshalsea, Bridgeville and Mount Lebanon, traversing Washington and Allegheny Counties, a distance of 44.2 miles; total distance covered by above extensions, 49.2 miles, all over private rights-of-way. Samuel Eakin, Wadestown, W. Va., president. [E. R. J., Oct. 23, '09.]

Ogden (Utah) Rapid Transit Company.—It is reported that this company has commenced construction on its extension in Logan, from the Logan depot to the Agricultural College, a distance of 3 miles. David Eccles, president.

Rutland Railway, Light & Power Company, Rutland, Vt.—It is announced that this company has decided to extend its electric railway from Castleton to Poultney, a distance of 6 miles. Ultimately this branch is to be extended to Granville, N. Y.

Richmond & Henrico Railway, Richmond, Va.—This company contracted with the Blake Construction Company, New York, N. Y., for the laying of the tracks and the construction of the viaduct between College to Twenty-first and Marshall Streets. The Blake Construction Company will sublet its contract to Winston & Company, and W. O. Burton, Richmond. It is specified that the work shall begin immediately and be completed by July 1st next year. W. S. Forbes, president. [E. R. J., Oct. 2, '09.]

***Independent Seattle-Tacoma Electric Railway, Seattle, Wash.**—This company has been organized for the purpose of constructing an electric railway between Seattle and Tacoma. The following temporary officers have been chosen: F. R. Burch, president; E. N. Chase, New York, N. Y., vice-president; I. P. Calhoun, Kent, secretary; R. R. Spencer, Seattle, treasurer.

SHOPS AND BUILDINGS

Lake Shore Electric Railway, Cleveland, Ohio.—This company has arranged to move its car shops from Norwalk to Sandusky, where the operating office has been located for some time and where there is also a power house and large car sheds. The shops will be located in a portion of the car house.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—This company is preparing plans for improvements to its car house at Hazelton. A new sand house will be erected which will have a capacity of three carloads of sand. A new paint shop will also be erected in the near future and the yards and tracks are to be extended from the west end of the car house a distance of about 300 ft. At least 10 tracks will be extended approximately that distance.

Peoria Railway Terminal Company, Peoria, Ill.—This company's car house, together with six cars, was destroyed by fire a few days ago. The loss is estimated at \$60,000.

Municipal Street Railway, Yazoo City, Miss.—This company expects within four weeks to build a small addition to its car house, 80 ft. x 12 ft.

POWER HOUSES AND SUBSTATIONS

British Columbia Electric Railway, New Westminster, B. C.—T. R. Nickson & Company have secured the contract for the erection of the substations along this company's extension from New Westminster to Chilliwack.

Gulfport & Mississippi Coast Traction Company, Gulfport, Miss.—This company wishes to correspond with manufacturers of coal-handling machinery. It is intention of the company to install a system at its power plant.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—G. W. Wattles, president of this company, is said to have announced that plans are being prepared for the erection of a new power station in Omaha, which with complete equipment, it is estimated, will cost \$1,000,000. The new plant will be located at the foot of Jones Street, opposite the present power station.

Buffalo & Williamsville Electric Railway, Williamsville, N. Y.—This company is in the market for a 200-kw converter and three 100-kw transformers.

Oklahoma (Okla.) Railway.—This company expects to contract during the next month for stokers and coal-handling apparatus for boilers having 1600 hp.

Hull (Que.) Electric Company.—The power station of this company located on Lake Deschenes was partially destroyed by fire on Oct. 19. Arrangements for a temporary supply of power were made with the Ottawa Electric Company.

Quebec Railway, Light & Power Company, Quebec, Que.—This company has purchased a 500-kw motor generator set from the Canadian General Electric Company. The company expects to place contracts this year for the erection of a substation at St. Anne de Beaupré, Que.

Manufactures & Supplies

ROLLING STOCK

Spokane & Inland Empire Railroad, Spokane, Wash., is reported to be planning to purchase several parlor cars.

Chicago & Joliet Electric Railway, Joliet, Ill., is in the market for two double-truck cars and two single-truck cars.

Pittsburgh, McKeesport & Westmoreland Railway, McKeesport, Pa., is considering the purchase of three double-truck cars.

Cincinnati (Ohio) Traction Company recently ordered 50 city cars from the Cincinnati Car Company for pay-as-you-enter service.

Erie Railroad, New York, N. Y., will soon be in the market for six motor cars for use on its electric division between Rochester and Avon, N. Y.

Quebec Railway, Light & Power Company, Quebec, Que., has purchased a single-truck snow sweeper from the McGuire-Cummings Manufacturing Company, Chicago.

North Jersey Rapid Transit Company, Paterson, N. J., will purchase 10 interurban cars within the next two weeks. Address Willis Fertig, Paterson, N. J.

New York State Railways, Rochester, N. Y., has placed an order for two snow sweepers with the McGuire-Cummings Manufacturing Company, Chicago.

Municipal Street Railway, Yazoo City, Miss., has purchased one single-truck Brill semi-convertible car for Dec. 1 delivery from the American Car Company.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has ordered 5500 Schoen steel wheels from the Carnegie Steel Company for replacement.

Omaha & Council Bluffs Street Railway, Omaha, Neb., is completing 15 cars in its shops which will be duplicates of the pay-as-you-enter cars ordered from the American Car Company.

Peoria (Ill.) Railway Terminal Company suffered a loss by fire recently of its car house. Six cars were destroyed. The company expects to be in the market for five new cars within the next two weeks for replacement.

Hammond, Whiting & East Chicago Electric Railway, Chicago, Ill., is asking prices on two 47-ft. 2½-in. semi-convertible cars, fully equipped. The order for these cars will be placed through A. L. Drum & Company, Chicago.

Saunders Motor Car Company, Lancaster, Pa., is having one car body built by The J. G. Brill Company. The rear truck will also be furnished by The J. G. Brill Company. The front truck is being constructed by the company, with gasoline motor equipment.

Dayton, Springfield & Xenia Southern Railway, Dayton, Ohio, has placed an order with the Jewett Car Company, Newark, Ohio, for six semi-convertible cars of the following dimensions: Length of body, 20 ft.; over vestibules, 29 ft.; over all, 30 ft.; seating capacity, 32. The cars are to be finished in mahogany.

Port Arthur (Tex.) Traction Company has just ordered 12 standard Barber cars from the Barber Car Company, York, Pa. Six of these cars are for immediate delivery, to be equipped with GE-219, 50-hp motors. Mention that this company would purchase cars was made in the *ELECTRIC RAILWAY JOURNAL* of April 3, 1909.

Columbus, Marion & Bucyrus Railroad, Marion, Ohio, which was reported in the *ELECTRIC RAILWAY JOURNAL* of Oct. 30, 1909, as planning to purchase two interurban cars, has specified that these cars shall be 50 ft. in length, of the three-compartment type and mounted on Curtis trucks. The company is also in the market for a 45-ft. utility car.

TRADE NOTES

Forsyth Brothers Company, Chicago, Ill., announces the removal of its sales department to the home office, 213 to 231 Institute Place, Chicago, Ill., and requests that all communications to the company be forwarded to that address.

Lyon Metallic Manufacturing Company, Aurora, Ill., has opened an office at room 1369 Hudson Terminal Building, New York, N. Y., in charge of B. L. Waters, secretary and treasurer of the company. Mr. Waters will handle the steel factory equipments.

Planet Company, Chicago, Ill., has recently secured patents on a sanitary soap shaker for use on Pullman and private cars. The shaker is of a very compact and artistic design, and is intended for use in lavatories where hot and cold water are supplied.

C. H. Hughes & Company, 115 Broadway, New York, N. Y., announce that they have moved from 120 Broadway,

New York, N. Y., where they have been located for the last five years to the U. S. Realty Building, 115 Broadway, New York, N. Y., and will continue as engineers for electric railway and lighting companies.

New England Engineering Company, New Haven, Conn., announces that it has established an office at New Haven, Conn., for the conduct of a general engineering and contracting business. This department is under the management of L. L. Gaillard, formerly electrical superintendent, Interborough Rapid Transit Company, New York, and recently electrical engineer of the Connecticut Company, New Haven, Conn. A corps of engineers and experts will be maintained for the execution of contracts for the design and construction of steam-electric and hydro-electric power plants and substations for railway, light and power purposes; design and construction of electric transmission and trolley lines; examinations of the physical and financial condition of electric properties, and preparation of reports.

Allis-Chalmers Company, Milwaukee, Wis., announces that the Connecticut Company, New Haven, Conn., has ordered 30 type A-A-6 air-brake equipments to be used on new double-truck cars and that the Chicago (Ill.) City Railway has ordered 50 type A-A-6 air-brake equipments which are being delivered to The J. G. Brill Company, Philadelphia, Pa., for use on additional pay-as-you-enter cars for the Chicago City Railway. This order by the Chicago City Railway is the first made on a contract recently entered into whereby the Allis-Chalmers Company is to furnish all air-brake equipment used by the Chicago City Railway for a period of years. A similar contract for the same term of years as that between the Chicago City Railway and the Allis-Chalmers Company has been entered into by the International Railway, Buffalo, N. Y., and the Allis-Chalmers Company.

ADVERTISING LITERATURE

Coin Counting Machine Company, Chicago, Ill., has published a small folder describing the meritorious features of the J. M. Johnson automatic registering fare box for prepayment type cars.

Vulcan Steam Shovel Company, Toledo, Ohio, is distributing an illustrated catalog of steam and electric locomotive cranes and combined cranes and shovels. Complete specifications of each type of machine are given.

Gulick-Henderson Company, Pittsburgh, Pa., has published a 14-page booklet in which some of the advantages of its engineering inspection department are pointed out. It also contains a price list for the analysis, assaying and physical testing of various materials, and directions for submitting the different samples for testing. Two pages of the publication are devoted to remarks on foundry melting systems. The Gulick-Henderson Company has also printed a catalog in which are presented a number of views of its laboratories and test rooms in Chicago and Pittsburgh, also a dozen micro-photographs of axle steel under various heat treatments.

J. G. Brill Company, Philadelphia, Pa., in *Brill's Magazine* for Oct. 15, 1909, continues the series of articles describing in a general way the standard type of cars in many of the largest cities of the world. The installment in the current issue is Number 10 and in it the subject of city service in Denver is considered. Other interesting features of the publication this month are a description of the semi-steel, semi-convertible cars for the Blue Hill Street Railway, the passenger cars for light-package service on the Cairo Railway & Light System, the exhibit of The Brill Company at Denver and the Brill standard journal box for M. B. C. Journals and biographical sketches and portraits of the winners of the Brill thesis prizes which were offered in 1908 to the senior students of the technical schools of the United States for essays on the subject of "Design of Electric Car for City Service."

Pay-as-You-Enter-Car Corporation, New York, N. Y., has issued a publication illustrated with types of pay-as-you enter cars adopted for use in different cities throughout the United States, and presenting floor plans of typical pay-as-you-enter-cars showing that the system is unlimited in its adaptability to platform and seating arrangements. A feature of the publication is a list of 32 companies now operating pay-as-you-enter cars which totals 4605, including nine companies operating more than 100 pay-as-you-enter cars, the Chicago Railways leading with a total of 1,278, followed by the Chicago City Railway with 830, the Public Service Railway of New Jersey, with 457, the Third Avenue Railroad with 450, the Montreal Street Railway with 400, the New York City Railway with 305, the United Railways of St. Louis with 210, the International Railway with 150 and the Milwaukee Electric Railway & Light Company with 100 in the order named.

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. ‡Increase due to special attraction in St. Joseph. †Includes Ferry earnings up to April 1, 1909.

Company	Period	Gross Income	Operating Expenses	Gross Income Less Operating Expenses	Deductions From Income	Net Income	Company	Period	Gross Income	Operating Expenses	Gross Income Less Operating Expenses	Deductions From Income	Net Income
AKRON, O. Northern Ohio Tr. & Light Co.	1m., Sept. '09 1 " " '08 9 " " '09 9 " " '08	202,156 172,675 1,634,172 1,420,552	102,990 91,650 887,730 822,042	99,166 81,025 746,442 598,511	42,928 43,412 393,342 394,743	56,239 37,613 353,100 203,768	MILWAUKEE, WIS. Milwaukee Elec. Ry. & Lt. Co.	1m., Sept. '09 1 " " '08 9 " " '09 9 " " '08	375,426 339,132 3,154,103 2,909,950	178,407 160,078 1,537,172 1,486,615	197,019 179,054 1,616,930 1,423,335	111,552 100,810 952,841 893,670	85,467 78,244 664,089 529,665
BELLINGHAM, WASH. Whatcom Co. Ry. & Lt. Co.	1m., Aug. '09 1 " " '08 12 " " '09 12 " " '08	36,841 29,417 390,818 359,739	19,175 17,268 222,204 205,266	17,667 12,149 168,614 154,472	8,064 7,976 101,903 93,877	9,603 4,173 66,711 60,596	Milwaukee Lt., Ht. & Trac. Co.	1m., Sept. '09 1 " " '08 9 " " '09 9 " " '08	144,942 139,169 1,112,207 1,068,064	37,699 34,665 291,925 280,548	107,244 104,504 820,283 787,666	69,152 62,802 580,850 538,296	38,091 41,701 239,432 249,310
BIRMINGHAM, ALA. Birmingham Ry., Lt. & Power Co.	1m., Sept. '09 1 " " '08 9 " " '09 9 " " '08	188,364 177,388 1,646,825 1,581,763	105,753 107,566 917,679 928,148	82,611 69,822 729,146 653,615	..... ..... ..... .....	..... ..... ..... .....	MINNEAPOLIS, MINN. Twin City Rapid Transit Co.	1m., Aug. '09 1 " " '08 8 " " '09 8 " " '08	641,062 592,702 4,531,223 4,181,925	262,472 281,708 2,162,532 2,095,436	378,583 310,995 2,368,690 2,086,489	140,251 128,667 1,108,259 1,006,456	238,332 182,328 1,260,431 1,080,034
CHARLESTON, S. C. Charleston Con. Ry., Gas & Elec. Co.	1m., Sept. '09 1 " " '08 7 " " '09 7 " " '08	60,008 58,125 451,425 445,096	42,003 40,269 285,295 285,971	18,005 17,856 166,130 159,125	13,917 13,817 97,417 95,582	4,088 4,039 68,714 62,584	NASHVILLE, TENN. Nashville Railway & Light Co.	1m., Sept. '09 1 " " '08 9 " " '09 9 " " '08	154,540 151,055 1,257,641 1,159,583	71,624 68,821 625,354 596,474	82,916 82,234 632,287 563,109	....................	....................
CHICAGO, ILL. Aurora, Elgin & Chicago Railroad.	1m., Aug. '09 1 " " '08 2 " " '09 2 " " '08	163,698 153,895 331,312 302,643	76,448 71,175 154,343 143,383	87,250 82,720 176,969 159,260	29,351 27,624 143,920 55,402	57,899 55,095 118,719 103,857	NORFOLK, VA. Norfolk & Portsmouth Trac. Co.	1m., Sept. '09 1 " " '08 9 " " '09 9 " " '08	158,234 d162,938 1,436,199 d1,395,234	88,373 94,834 833,363 835,271	69,861 68,104 602,836 559,963	63,058 67,187 583,273 592,583	6,803 9,917 19,563 132,620
Chicago Railways.	1m., Aug. '09 1 " " '08 8 " " '09	1,088,209 980,166 8,068,552	650,633 650,128 5,260,726	437,576 330,038 2,807,826	..... ..... .....	..... ..... .....	PADUCAH, KY. Paducah Traction & Light Co.	1m., Aug. '09 1 " " '08 12 " " '09 12 " " '08	19,930 19,852 222,988 233,839	11,281 11,695 130,335 140,191	8,649 8,157 92,653 93,648	6,618 6,851 81,929 83,708	2,031 1,306 10,725 9,940
CLEVELAND, O. Cleveland, Painesville & Eastern R. R.	1m., Sept. '09 1 " " '08 9 " " '09 9 " " '08	31,361 27,971 242,206 225,229	*16,278 *18,742 *120,580 *126,576	15,083 9,229 121,626 98,653	8,784 8,132 75,605 72,394	6,299 1,097 46,021 26,259	PENSACOLA, FLA. Pensacola Electric Co.	1m., Aug. '09 1 " " '08 12 " " '09 12 " " '08	22,205 19,562 235,626 213,875	12,515 13,142 136,388 152,483	9,691 6,421 99,237 61,392	4,371 4,488 51,881 51,130	5,319 1,933 47,356 10,263
Lake Shore El. Ry.	1m., Sept. '09 1 " " '08 9 " " '09 9 " " '08	108,207 104,073 835,062 787,210	*49,842 *49,649 *439,691 *439,498	58,365 54,424 395,370 347,712	34,804 34,013 309,093 287,720	23,560 20,411 86,277 59,992	PHILADELPHIA, PA. American Rys. Co.	1m., Sept. '09 1 " " '08 3 " " '09 3 " " '08	255,598 240,752 827,636 785,043	....................	....................	....................	....................
DALLAS, TEX. Dallas Electric Corporation.	1m., Aug. '09 1 " " '08 12 " " '09 12 " " '08	112,802 94,739 1,265,739 1,144,892	72,271 63,553 791,835 770,061	40,532 31,186 473,901 374,831	28,648 28,329 341,711 353,844	11,883 2,857 132,189 20,986	PLYMOUTH, MASS. Brockton & Plymouth St. Ry. Co.	1m., Aug. '09 1 " " '08 12 " " '09 12 " " '08	17,912 16,515 129,734 119,733	11,195 9,275 88,254 91,775	6,717 7,240 41,480 27,959	1,661 2,213 22,963 27,491	5,056 5,027 18,517 468
DETROIT, MICH. Detroit United Railway.	1m., Aug. '09 1 " " '08 8 " " '09 8 " " '08	813,794 696,446 5,308,056 4,696,394	507,003 *443,939 3,224,682 *2,972,116	306,791 252,507 2,083,374 1,724,278	*162,999 134,859 *1,251,383 1,083,811	143,792 117,648 831,991 640,467	PORTLAND, ORE. Portland Ry., Lt. & Pwr. Co.	1m., Sept. '09 1 " " '08 9 " " '09 9 " " '08	420,778 373,288 3,547,647 3,222,103	193,437 173,342 1,651,228 1,597,121	227,341 199,946 1,896,419 1,624,982	128,924 114,207 1,111,334 1,038,434	98,417 85,739 785,085 586,548
EAST ST. LOUIS, ILL. East St. Louis & Suburban Co.	1m., Sept. '09 1 " " '08 9 " " '09 9 " " '08	176,402 170,028 1,481,078 1,487,855	87,324 87,161 818,006 781,239	89,078 82,867 663,072 706,616	49,345 48,216 445,111 436,645	*39,733 34,651 217,961 269,971	ST. JOSEPH, MO. St. Joseph Ry., Lt., Heat & Pwr. Co.	1m., Sept. '09 1 " " '08 9 " " '09 9 " " '08	88,266 194,971 722,808 672,232	40,809 39,905 374,530 342,778	47,477 55,086 348,278 329,454	22,058 20,368 192,080 184,542	25,419 34,718 156,198 144,912
EL PASO, TEX. El Paso Elec. Co.	1m., Aug. '09 1 " " '08 12 " " '09 12 " " '08	46,447 41,399 567,906 531,943	28,546 30,889 369,541 372,864	17,901 10,510 198,364 159,079	8,259 7,076 93,326 81,639	9,642 3,434 105,038 77,440	ST. LOUIS, MO. United Railways Co. of St. Louis.	1m., Sept. '09 1 " " '08 9 " " '09 9 " " '08	929,329 887,344 8,226,385 7,860,625	*589,357 *554,164 *5,217,704 *5,073,068	339,972 333,180 3,008,681 2,787,557	232,132 234,380 2,101,632 2,097,332	107,840 98,800 907,049 690,225
FAIRMONT, W. VA. Fairmont & Clarksburg Tr. Co.	1m., Sept. '09 1 " " '08 9 " " '09 9 " " '08	47,695 41,934 346,441 309,142	15,094 12,470 119,312 107,963	32,601 29,464 227,129 201,179	12,655 12,344 111,148 104,262	19,946 17,121 115,981 96,917	SAN FRANCISCO, CAL. United Railroads of San Francisco.	1m., Aug. '09 1 " " '08 8 " " '09 8 " " '08	642,120 587,733 4,832,778 4,497,944	363,951 356,028 2,805,509 2,923,604	278,169 231,705 2,027,269 1,574,340	....................	....................
FT. WAYNE, IND. Ft. Wayne & Wabash Valley Tr. Co.	1m., Aug. '09 1 " " '08 8 " " '09 8 " " '08	133,412 125,586 905,614 856,257	74,255 66,420 537,475 492,496	59,157 59,167 368,139 363,762	..... ..... ..... .....	..... ..... ..... .....	SAVANNAH, GA. Savannah Elec. Co.	1m., Aug. '09 1 " " '08 12 " " '09 12 " " '08	53,931 51,544 610,720 596,288	36,385 30,858 387,043 401,540	17,547 20,686 223,677 194,748	15,477 17,502 209,247 205,297	112 3,184 14,430 10,549
FORT WORTH, TEX. Northern Texas Elec. Co.	1m., Aug. '09 1 " " '08 12 " " '09 12 " " '08	109,422 92,503 1,203,508 1,058,200	57,893 53,530 667,601 617,009	51,529 38,973 535,907 441,191	17,190 17,434 197,997 183,122	34,339 21,539 337,910 258,070	SEATTLE, WASH. Seattle Elec. Co.	1m., Aug. '09 1 " " '08 12 " " '09 12 " " '08	610,816 382,742 5,409,933 4,398,998	312,119 219,660 3,142,929 2,606,723	298,697 163,082 2,267,003 1,792,275	108,588 94,834 1,207,198 1,043,877	190,109 68,248 1,059,805 748,399
GALVESTON, TEX. Galveston-Houston Elec. Co.	1m., Aug. '09 1 " " '08 12 " " '09 12 " " '08	111,295 101,708 1,181,351 1,065,863	62,976 55,101 682,277 626,700	48,319 46,607 499,074 439,163	21,679 20,527 254,495 240,614	26,640 26,080 244,579 198,349	SYDNEY, N. S. Cape Breton Elec. Co.	1m., Aug. '09 1 " " '08 8 " " '09 8 " " '08	22,005 22,958 148,388 159,838	11,504 11,886 94,396 94,247	10,501 11,472 53,992 65,591	5,071 4,969 41,092 40,169	5,430 6,103 12,900 25,422
GRAND RAPIDS, MICH. Grand Rapids Railway.	1m., Sept. '09 1 " " '08 9 " " '09 9 " " '08	97,626 89,899 776,022 708,569	43,200 40,618 362,961 356,985	54,426 49,281 413,061 351,584	18,958 18,806 170,770 165,296	35,468 30,475 242,291 185,288	TACOMA, WASH. Puget Sound Elec. Railway.	1m., Aug. '09 1 " " '08 12 " " '09 12 " " '08	194,383 158,595 1,785,615 1,625,058	113,867 95,845 1,190,781 1,018,993	80,516 62,750 594,834 606,065	48,800 42,928 548,091 507,747	31,716 19,822 46,743 98,319
HARRISBURG, PA. Central Penn. Trac. Co.	1m., Sept. '09 1 " " '08 9 " " '09 9 " " '08	62,979 60,868 564,747 533,118	44,045 46,578 418,639 422,599	18,934 14,290 146,108 110,519	..... ..... ..... .....	..... ..... ..... .....	TAMPA, FLA. Tampa Elec. Co.	1m., Aug. '09 1 " " '08 9 " " '09 12 " " '08	48,468 45,474 579,095 542,907	28,804 29,723 351,939 371,063	19,665 15,751 227,156 171,844	4,594 5,138 55,862 24,631	15,070 10,613 171,294 147,213
HOUGHTON, MICH. Houghton County Tr. Co.	1m., Aug. '09 1 " " '08 12 " " '09 12 " " '08	32,925 25,952 305,706 257,651	15,588 12,772 165,775 148,644	17,337 13,180 139,931 109,007	6,216 4,603 69,556 56,877	11,122 8,577 70,375 52,130	TOLEDO, O. Toledo Rys. & Lt. Co.	1m., Aug. '09 1 " " '08 8 " " '09 8 " " '08	236,119 212,454 1,765,538 1,644,941	127,863 113,870 1,012,270 907,924	108,256 98,584 753,268 737,017	75,642 71,879 576,718 563,767	32,614 26,705 176,550 173,250
JACKSONVILLE, FLA. Jacksonville Elec. Co.	1m., Aug. '09 1 " " '08 12 " " '09 12 " " '08	38,782 36,271 460,587 413,226	21,293 19,142 262,356 251,142	17,490 17,129 198,231 162,084	9,521 9,230 111,370 106,806	7,970 7,898 86,861 55,278	TORONTO, ONT. Toronto Railway Co.	1m., Sept. '09 1 " " '08 9 " " '09 9 " " '08	379,981 354,095 2,857,291 2,629,221	180,835 160,942 1,449,636 1,396,744	199,146 193,153 1,407,653 1,232,478	....................	....................