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Of this issue of the ELECTRIC RAILWAY JOURNAL 9,500 copies are printed.

Housing the Line and Track Departments

The line and track departments, because they deal with rough, heavy material, have too often been neglected in the matter of proper housing and equipment. For this reason the extensive new quarters provided for these two important branches of the service by the Brooklyn Rapid Transit Company, which are described in this issue, have a particular interest. It is an axiom that to do good work requires good tools and, it might be added, good tools re-

quire good care. The term tools embraces men, horses, wagons, apparatus and stores. In planning this group of buildings the aim has been to provide comfortable and attractive quarters for the men and offices for the heads of departments; adequate and proper storage for wagons, tools and supplies; and a well-equipped shop for repairing and maintaining the apparatus used as well as carrying on such repair work as can be brought in from the field. As in all other structures recently erected by this company architectural beauty has been combined as far as possible with considerations of strict utility and fire protection. In contrast with the old quarters, which were no better or no worse than those of many other large and small roads, this new plant with its sanitary stables, commodious stock rooms, light shops and labor-saving track arrangement is a distinct advance which does credit to the management and to the officers who designed and represented its erection.

President Goodrich's Address

The presidential address of President Goodrich, of the American Street & Interurban Railway Association, was heard at Atlantic City by a comparatively small number of delegates, as it was presented at one of the executive sessions. It contained so many interesting points, however, and so ably described the present condition of the railway industry that President Shaw, with the consent of ex-President Goodrich, decided last week to release it for publication. It appears elsewhere in this issue. The topics principally considered are the question of fares, State and municipal regulation and the organization of the association. On the two first subjects Mr. Goodrich clearly points out that many companies, through the extension of their lines, are now carrying passengers at a loss, a fact which can easily be proved by a thorough examination, and that none is making extravagant profits. If this is the case, what would the companies lose by publicity and investigation? As regards changes in the organization of the association, the suggestion of Mr. Goodrich, so far as the division of the times of meeting of some of the associations are concerned, is not greatly different from those which have been made before at meetings of the main body and of the Accountants' and Claim Agents' associations. Up to this time, however, it has not been considered wise to adopt this plan and at the Atlantic City convention sentiment seemed strongly to favor the retention of practically the same date for the meetings of all of the associations and certainly the retention of the exhibits. The duty of reporting on Mr. Goodrich's suggestion, however, was entrusted to a committee which will present the matter to the association at its next meeting and this will give plenty of time for all to consider thoroughly whether any change of policy is desirable.

The Acute Fare Situation in Massachusetts

The material pertaining to the Massachusetts fare situation, which has been gathered by the *ELECTRIC RAILWAY JOURNAL*, is extensive in amount and its value to the railways is undeniable. A study of the situation showed that proper treatment of the subject would require: First, an introductory article; second, articles explaining the methods followed by the various street railways in placing increased fares in effect and, so far as possible, the results thereof; third, a statement in which conclusions should be drawn and the obvious lesson to the railways in other communities pointed out.

In pursuance of this plan the opening article of a series was published in our issue of last week. It merits careful consideration on account of the facts which it contains respecting the conditions in Massachusetts and for the additional reason that some of the potent causes why relief has been extended to struggling lines in Massachusetts are existent in other communities of this country. While some of the reasons set forth are appropriate especially to the street railway development in the State of Massachusetts, others—notably those relating to the increased costs of labor and materials—are felt wherever street railways are operated.

Taking the changes in the costs of certain classes of material in seven years, presented in the article published last week, it was shown, for instance, that the price of girder rails had advanced 43.4 per cent; the price of T-rails rose 45.9 per cent. As the statement indicated, the costs of the principal materials used in the construction and operation of electric railways, based on the experience of one large buyer, had risen in proportions varying from 17.8 per cent to approximately 100 per cent. Such changes as these affect the expenditures of electric railways for operating as well as for construction purposes: That is, they add to the expenses of operation which should be met as the necessity for them accrues, from operating revenues; and they increase the initial cost of a new investment for additional lines of road or equipment and, by so doing, make it necessary for the company to earn a larger amount if it is to show a reasonable return on the investment.

Now, we do not know that any one has claimed, or even suggested in seriousness, that the manufacturers were not justified in increasing prices. The values of all raw materials have increased largely and the other costs which manufacturers have to meet, for labor as well as materials, have risen. Such being the fact, it may seem strange that more complaint was not heard at an earlier day regarding the burdens which the railways have been obliged to assume on account of the increased costs of materials. Over-optimism has prevented proper consideration of the subject. In the last seven years great improvement has taken place in the efficiency with which the railways are operated. By better and more consistent operation, by careful study of methods, waste service has been reduced and economies have been instituted that have helped to overcome the effect of the rapidly increasing costs of materials. The period of seven years constitutes over one-third of a generation and unless electric railways were failing to keep time with the progress of the world, they would gradually

improve the personnel of their department heads. Improvement of this nature is evident in the industry.

No single tendency, affecting all classes, is more clearly defined in this country to-day than that of the rapidly increasing cost of living. It has been considered systematically in Massachusetts, but has not been weighed elsewhere with as much care, followed by action, as is justifiable. If this condition constitutes a logical reason why fares should be increased in Massachusetts, it is an unanswerable argument why similar advances should be made in other localities.

The continuation of the Massachusetts articles, published elsewhere in this issue, describes the increases in fares from 5 cents to 6 cents on various properties controlled by the Boston Suburban Electric Companies and the charge of 1 cent for transfers imposed with the approval of the Board of Railroad Commissioners, on one road. The financial results and the statement of Mr. Brush concerning the outcome of the change and the operating difficulties are of distinct and great interest.

The Telephone in Railway Service

Mr. Fowle's paper on this topic, which is printed elsewhere in this issue, takes on added value and interest when one considers the strong tendency now in evidence toward using the telephone for general train dispatching purposes. The relative merits of the telephone and the telegraph for dispatching have been thoroughly thrashed out in the steam and electric technical papers as well as before technical associations. The steam railroad, with its combined waiting and telegraph stations, is particularly well adapted to the use of the telegraph in dispatching service, and certain old steam railroad managers look somewhat askance at the telephone as not possessing the same elements of reliability. With the precautions, however, which can be placed around checking and recording the spoken order, there seems to be no reason why the telephone should be not only much more expeditious than the telegraph, but in some respects more safe, because the telegraphic order is transmitted through a third person, whereas in telephone dispatching the crew which carries out the order is in direct communication with the dispatcher. At all events, the telephone has taken a position in electric railway work for dispatching purposes which can never be seriously disturbed.

We are decidedly disposed to agree with Mr. Fowle that in the form of the circuits and apparatus used the best is none too good. The costs are not really burdensome when one considers the good that may be done, and a line once well put up is not likely to require heavy maintenance. As to portable versus stationary installations, statistics published in our convention issue indicate that practice is somewhat in favor of the stationary sets, but many companies use portable telephones only, while others employ both systems. The question largely narrows itself down to number of cars versus length of line. With a small number of cars and a long route fewer portable sets would, of course, be required. With many cars, as on a suburban system, jack boxes would probably be the more desirable. The chief consideration is good construction, and no electric road will ever regret its investment in a well-built and reliable telephone system.

Car Studies in New York

The increasing attention which is being given to city car design is illustrated in the elaborate study on this subject recently made by the manager and consulting engineers for the receivers of the Metropolitan Street Railway Company, of New York, preparatory to the recent order for new rolling stock equipment in that city. The car was considered not only from the traffic standpoint, which is sometimes taken as the sole criterion, but from every other phase of operation in which car service is a factor. Thus all of the present types of cars now in use on the Metropolitan system were carefully weighed and the effect of the weights on power consumption and upon track and shop maintenance was given a series of values which were made the basis for the final choice of cars. The elements which determine the question of speed were also given studious consideration. These factors are platform design as affecting quick ingress and egress of passengers and motor and brake equipment which govern the rate of acceleration and deceleration, the motor equipment in turn having an influence on the power consumption and the cost of maintenance. Finally the relations of car design to freedom from accidents, of truck design to each of the phases of car operation which they affect, and of the initial cost of the car, were embraced in the final conclusion which expressed the operating merits of each type considered.

The examination covered the car standards of some 20 large American cities, and so was not confined to the types of cars previously used in New York. If this had been the case the problem would have been much simpler, because up to a year ago, when the new pay-as-you-enter cars were put in operation, the New York company had in service but two types of closed cars and two types of open cars, and these types had been in use for some 10 years. The study was based, however, entirely upon the conditions of speed, track and traffic existing in New York City, so that the verdict would not necessarily apply to companies operating in other cities.

It is interesting to note that the car finally selected differs radically from any of those at present in use either in New York or elsewhere. It is also instructive to learn that the receivers have already placed an estimate upon the monetary saving which will be secured by the purchase of this type of car over that of the last type of car adopted. As stated in the report submitted by them to the court, Sept. 25, and printed in the issue of this paper for Oct. 10, the reduction in initial outlay, compared with the four-motor pay-as-you-enter equipments last bought for the Madison Avenue line, amounted to \$220,000 on 125 cars, while the cost of operation should be less and the convenience of the car from the standpoint of the public should be greater. Much of the reduction in initial cost and maintenance comes, of course, from the use of two motors instead of four.

The car itself is fully described elsewhere in this issue, and as will be noticed, combines the prepayment feature with a novel arrangement of bulkhead doors. It is of practically the same dimensions as the present pay-as-you-enter car; that is, the body length over corner posts is 33 ft. in each case and the length over bumpers is 1 ft. 1 in. less

in the new car than in the earlier form. On the other hand, by reversing the maximum traction trucks to secure a shorter overhang, by reducing the number of motors used, and by changes in car construction, the weight has been reduced 4.93 tons. This corresponds, after the addition of five more seats, to 809 lb. per seat or only 19 lb. more per seat than the former standard double-truck closed car.

Flat Wheels

Under heavy cars run at high speeds flat wheels are a source of damage to track and rolling stock, the extent of which is sometimes underestimated. Professor Hancock, of Purdue University, has recently developed a formula expressing the kinetic energy of the blow delivered on the rail by a wheel with a flat spot, which throws some new light on this interesting subject. According to this formula the energy of impact varies directly as (1) the weight of the wheel and its load; (2) the square of the velocity; (3) the square of the length of the flat spot, and, inversely, as (4) the square of the diameter of the wheel. This formula assumes a perfectly flat spot with sharp corners and disregards some minor considerations in the mechanics of the problem which probably do not affect materially the values obtained. With a 33-in. wheel having a flat spot $2\frac{1}{2}$ in. long and carrying a load of 6000 lb. the kinetic energy of the blow delivered to the rail at a speed of 30 m.p.h. is more than 1000 ft.-lb. This assumption of speed and weight corresponds roughly to the extremes of heavy city service. Under an interurban car weighing 55 tons and running at a speed of 60 m.p.h. the blow delivered by a wheel of the same diameter with a flat spot of equal length would be nearly 9500 ft.-lb. A flat spot $2\frac{1}{2}$ in. long can be produced by wearing off less than 0.05 in. of metal in the center of the tread and such spots are sometimes worn in making one stop on a bad rail.

The effect on both the track and the rolling stock of these heavy blows repeated many times per minute is very severe. The damage to the rail is not likely to extend much below the surface, but experience has shown that even surface indentations may cause rail breakages if the finishing of the rails in the mill has not been properly carried out. The shock is borne equally by the wheel, the axle and all parts attached thereto which are not spring supported, including the motor. Breakages of axle-bearing lugs on motor casings and other truck and motor parts are due no doubt, in many instances, to the crystallization of the metal produced by the constant pounding of flat wheels and low joints. In open-ballasted track, where the structure is to some extent yielding, much of the impact is absorbed by the elasticity of the rails and ties, but in the rigid track of paved streets the full force of the blow is absorbed locally by the metal in the rail head and the parts of the truck not carried on springs. Fortunately the conditions under which there is the least absorption of energy are also the conditions of comparatively slow speed and light loads which produce the least kinetic energy. Nevertheless, the damage done by even small flat spots on a wheel running at moderate speed may in their cumulative effect prove serious after a time and their prevention or prompt eradication should receive careful consideration.

The London Traffic Situation

History is being rapidly made in traffic affairs in other cities in the world as well as in those in this country. Each locality has its problems and those of London, while of a different character, are as serious as any which are present in America. In some respects they are more difficult of solution because of the narrow and irregular streets in the center of the city, the absence of broad arterial highways in the suburbs and the fact that political conditions have been adverse to a full development of the tramways. On the other hand, the present decade seems to have been coincident with a tremendous increase in London of demands for transportation with which the existing means have not been able to cope. Underground construction is particularly easy in the British capital owing to the nature of the soil, but seemingly, as in New York, the limits to the carrying capacities of all the transportation systems have practically been reached and the problem is as great now as it was before the pioneer tube was installed.

It was with a realization of these conditions that the Royal Commission on the means of regulation of traffic in London was appointed by Parliament in 1903. This commission, as will be remembered, visited this country about five years ago and its report, which fills nine ponderous volumes, was submitted to Parliament in 1905 and is the most elaborate discussion of the transportation conditions in any one city which has ever been issued. One of its conclusions was that the subject should be taken up by a permanent body which would report to Parliament.

This suggestion was adopted and the work was assigned to that department of the British Government which is known as the Board of Trade and is concerned with many of the most important internal affairs of the Empire. A branch of this board, known as the London Traffic Branch, was established early in August, 1907, to collect information and prepare a report on the whole subject of London traffic for presentation to Parliament. This has been done in a very conscientious manner. The report shows that the number of passengers carried by the railways, tramways and principal omnibus companies in London has been increasing rapidly not only in volume, but in proportion to the population. Between 1881 and 1901 it grew 220 per cent, while between 1901 and 1907 it had increased 51 per cent, or over 8 per cent per year. Based on the estimated population of Greater London in 1907 of 7,218,000 inhabitants, the annual journeys per capita were 177.5, exclusive of the cab traffic and the suburban traffic of the trunk line railways. Including these latter means of transit, the rides are estimated at about 312 per capita per year.

The account of the congestion of the existing lines of traffic contained in the report is the story of other cities repeated. Relief secured from improved methods is outgrown almost before the lines are completed and the board considers the time is now ripe for a comprehensive plan of development by which the transportation facilities in London will not only be greatly increased, but will be laid out along lines which will permit a greater improvement in subsequent years.

The intra-mural traffic situation in London differs from that in every other large city in the small proportion of passengers carried by the tramways. It is estimated at

about 27 per cent of the whole, compared with 27 per cent on the underground and tube railways, 20 per cent on the omnibuses, 34 per cent on the suburban branches of the steam railways and 2 per cent by the cabs. The omnibus business, particularly that of motor omnibuses, is exceedingly large, but it is interesting to note that there does not appear to be any immediate prospect of a considerable increase to the number of motor omnibuses in the city. The chief complaints against these vehicles from the standpoint of the public have been noise, vibration and smell, and house property is said to have depreciated in value along their routes.

The street cars, which number only about twice as many in London as the omnibuses, are divided into three systems, which the report considers could well be amalgamated. As regards their finances the report says that the competition in street railway service "is seldom effective and may be wasteful and in London it has unquestionably been carried to mischievous lengths." Here, as in most cities in this country, the authorities are awakening to the fact that a fair service can be given only when a fair return is obtained on capital invested. "The price of transportation," says the report, "like that of any other commodity, cannot long be kept below its commercial value, while the failure to earn a reasonable return checks enterprise and hinders the provision of new facilities for locomotion, which, if not required for the moment, cannot fail to be required in the near future."

The underground railways have suffered greatly from the competition by the tramways and motor vehicles, as well as by burdensome taxation, which is particularly illogical because the underground railways not only do not entail any burden of expense upon the localities through which they run, but add to their assessed value, and by taking off traffic from the street diminish the wear on pavements to some extent and relieve the municipality from the expense of street widening. With the exception of the London, Brighton & South Coast Railway none of the many trunk railways which serve London and its suburbs has electrified any line and, perhaps largely owing to this cause, show considerable loss of patronage. The reduction on the five principal lines taken altogether since 1903 is nearly 10 per cent, of which more than one-half occurred during the past year. This may force electrification, but the English roads, as is well known, are very heavily capitalized at present and railroad managers have never been known to be particularly keen, at least nominally, for the short-haul passenger business.

It will be remembered that the conclusions of the Royal Commission were very favorable to an increase in the tramway systems and that that step was expected, more than any other, to help solve the London transportation problem, although all other means were to be employed as auxiliaries. Evidently the situation has not changed during the past three years. Tramway extension on a large scale is the main recommendation contained in the latest report to be made possible by the construction of wide radial roads on the outskirts on which the tramways can be laid. This should supply the suburbs up to a distance of 8 miles to 10 miles from the center of London with at least partly adequate transportation. Beyond this circle

the field is open for the trunk railways with which the tramways could not compete effectively for through service. Meanwhile the traffic of the center area may be largely left to underground railways and omnibuses.

Introduction of Rules in Accident Cases

The law, as is well known, prescribes for and expects from each of the parties in negligence cases, the exercise of that degree of care and caution which an ordinarily prudent person would follow under similar circumstances. The Appellate Division, Second Department, Supreme Court of New York, however, in a case decided Oct. 22, has held that if a company or individual requires of its servants a greater degree of care than that called for by the common law mentioned above, this action creates a new duty and a higher standard of conduct, and that a negligent disregard of this duty on the part of the servant will make the master responsible in case of accidents. In taking this position the New York court has practically followed the precedent established by the Massachusetts courts in the case of *Stevens vs. Boston Electric Railway Company*, 184 Mass., 476; 69 N. E., 338. Here an electric car ran into the plaintiff, the driver of a carriage, and it was held that a rule of the defendant requiring the sounding of a gong when passing carriages and other vehicles was admissible to show negligence on the part of the motorman. The court said:

A rule made by a corporation for the guidance of its servants in matters affecting the safety of others is made in the performance of a duty by a party that is called upon to consider methods and determine how its business shall be conducted. Such a rule, made known to its servants, creates a duty of obedience as between the master and servant, and disobedience of it by the servant is negligence as between the two. If such disobedience injuriously affects a third person, it is not to be assumed, in favor of the master, that the negligence was immaterial to the injured person, and that his rights were not affected by it. Rather ought it to be held an implication that there was a breach of duty toward him, as well as toward the master, who prescribed the conduct that he thought necessary or desirable for protection in such cases. Against the proprietor of a business the methods which he adopts for the protection of others are some evidence of what he thinks necessary or proper to insure their safety.

The New York case was *Sullivan vs. Richmond Light & Railroad Company*, 112 New York Supplement, 648, and was in an action for negligence in which a child was injured by one of the cars of the defendant company. At the time of the accident the car was being operated by a clerk regularly employed in the company's office, although the car's regular motorman was also on the front platform. The evidence showed that one of the rules of the company was that motormen must not permit any persons on the front platform except certain designated officials, of whom the clerk was not one, and that motormen must not allow others to operate their cars except students when under instruction, which the clerk was not.

The company protested against the admission of this evidence, not only because the rule required a higher degree of care on the part of the motorman than the law imposed upon the company itself, but also that the plaintiff from her tender years could not have known about the rule nor relied upon it. The court held, however, that the purpose of the rule was to insure safe and careful opera-

tion of the cars of the defendant, and that, following the Massachusetts precedent, if the motorman negligently disregarded the duty which he owed the company, it was an issue in the case. It made no material difference whether his negligence was that of his legal obligation or of his master's instructions.

A somewhat similar case, although involving a different result, was decided Oct. 2 by the Appellate Division, Third Department, Supreme Court of New York, in the case of *Cox vs. Delaware & Hudson Company et al.*, in which the conductor on one of the cars of the United Traction Company was injured in a collision between a steam locomotive and an electric car while the latter was crossing a series of tracks of the steam railroad in Green Island. The rules of the electric company required its cars to stop before crossing the steam railroad, and a signalman was regularly employed by the electric railway company to go on the tracks and signal the motorman before he was permitted to start his car. A towerman in the employ of the steam railroad was also stationed at the crossing, which was protected by gates operated from the tower. The signalman gave the proper signal to cross the track, and the towerman raised the gates, but owing to the steam from some locomotives which were standing on a neighboring track, the approach of the train which caused the collision was not discovered until too late to avoid the accident. The plaintiff claimed as to the Union Traction Company that the signalman was a vice-principal of the company and exercised the functions of a superintendent in signaling the motorman to cross the track, and as to the steam railroad that the towerman had raised the gates.

The court held that the signalman did not in any proper sense exercise control or supervision over the motorman; his signal merely meant that he saw no danger, and that the motorman was then not required, but permitted, to proceed. His functions were largely mechanical and he was clearly a fellow-servant of the motorman, and for his negligence the United Traction Company was not liable.

The status of the towerman was somewhat different. The railroad company offered in evidence a lawful agreement between it and the electric railway company, authorized under one of the sections of the railroad law, that the steam railroad company should be "under no obligation to guard, warn, and protect the cars and servants employed thereon" of the electric railway company when on the premises of the steam railroad company, and that such cars and servants should "at all times proceed thereover solely at their own risk." This agreement was excluded on objection of the plaintiff. But the court considered such exclusion erroneous. It held that while the clause was not conclusive against the plaintiff, as he had not signed it and it did not appear that he was aware of its existence, the steam railroad company had a right to show the manner of doing business at that crossing and all of the precautions it had taken to guard against accidents, one of which was that the electric company should give the warnings at the crossings. In consequence, owing to the exclusion of this evidence, a new trial was granted to the Delaware & Hudson Company and the United Traction Company was held blameless.

THE LINE AND TRACK DEPARTMENT HEADQUARTERS OF THE BROOKLYN RAPID TRANSIT SYSTEM I.—GENERAL FEATURES OF ARRANGEMENT AND CONSTRUCTION

The Brooklyn Rapid Transit System has just completed and placed in service a group of buildings constituting in their construction and arrangement an ideal headquarters for the line and track departments. In view of its purpose, this installation is exceptionally interesting in many ways, for while electric railways generally recognize the importance of permanent, well-equipped buildings for power generation and for car maintenance and storage, few have given any consideration toward furnishing proper offices, shops, stock and storeroom facilities for the two important departments which keep an electric railroad in an operative condition.

GENERAL SCOPE

The object of the Brooklyn Rapid Transit System in planning this headquarters was properly to house the line

3. Facilities for overhauling, repairing and storing electric arc lamp clusters, bell fixtures and quarters for the electric wiring force.

4. Quarters for the horses, wagons and automobiles required for duty by various departments of the railway company.

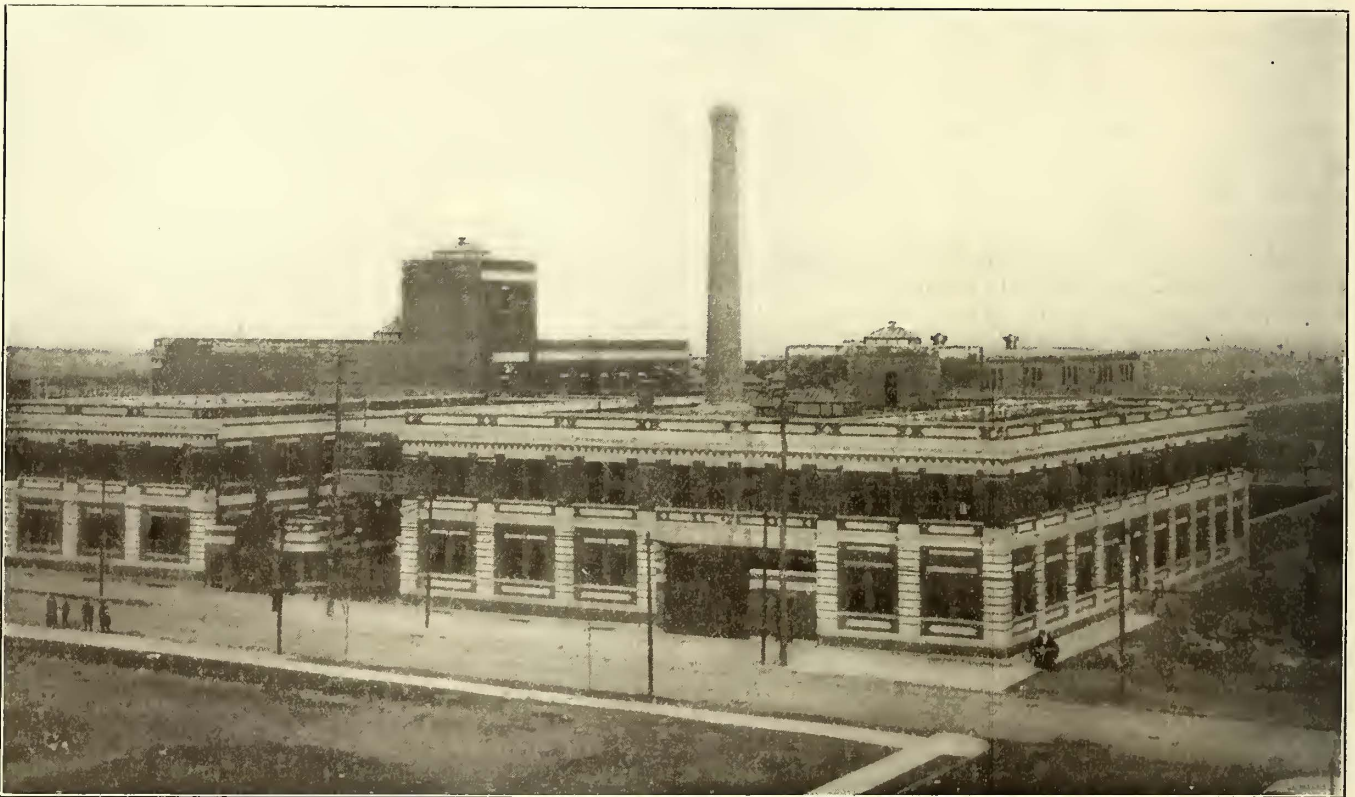
5. Quarters for the railway company's printing plant, which previously was crowded into a part of the old cable power house on State Street.

6. Space for sorting, filing and storing the valuable records of the railway company in fireproof and agreeable quarters.

7. Emergency crew facilities to serve the immediate neighborhood, consisting of a wagon floor, living rooms for the crew and for the captain's family.

8. The necessary track arrangements and connections to serve both departments and the stock building.

A glance at the general plan will show how well the whole scheme was worked out to suit the conditions and the ground. It represents a combination which permits the



Brooklyn Line and Track Department Headquarters—General View, Taken from the Brooklyn Jesuits' College

and track departments in commodious offices and move them from the antiquated horse-car stable buildings at Herkimer Street. Having concentrated these two important departments at one point, though in separate buildings, it has provided at the same time:

1. A stock building for economically handling, checking, receiving and delivering all classes of materials used by the two departments, located conveniently for both departments and for the shops, together with a storage building for reels of trolley wire, feeder cables, trolley poles, etc., with necessary cranes and elevators for handling the same; this stock and storage building being in charge of the general storekeeper of the purchasing department.

2. Commodious shop facilities for performing the machine shop, blacksmith, carpenter and painting work required by each department.

work to be handled on a large and economical scale in buildings especially designed for each of the peculiar wants involved. The chief engineer's department of the railroad company under the direction of W. S. Menden, assistant general manager and chief engineer, and C. L. Crabbs, principal assistant engineer, designed and carried out the installation. The design of the plant, architectural and engineering features, and the construction of all buildings were under the direction and supervision of Henry J. Kolb, assistant engineer for the railroad company. The design and installation of the heating plant, machine shop, elevators, cranes and printing plant were under the supervision of J. G. Walker, mechanical engineer for the company. The design and installation of the electric lighting, power wiring and other electrical installation were under the supervision of H. H. Hilborne, super-

intendent of the line department of the company. The general contractors were A. Pasquini & Son, New York.

The headquarters are located on Nostrand Avenue, between President and Carroll Streets, having a frontage on Nostrand Avenue of 200 ft., a frontage on Carroll Street of 300 ft., and a frontage on President Street of 275 ft. The buildings are arranged in three groups running at right angles to Nostrand Avenue, in the following order:

The first group comprises the line department basement and offices, with the printing plant on the second floor, all fronting on Nostrand Avenue. Back of this is the wagon storage, with stable over and record storage on third floor, and the emergency crew building in the rear, facing on President Street. The second or center group contains the stock building, the basement of which is partly taken up by the general heating plant and the second floor of which is used for shop purposes; back of this is a three-deck storage building. The third group, facing on Nostrand Avenue and running along Carroll Street, consists of the track department offices, with painting and lamp repair shops on the second floor. There is a driveway with two tracks between the first and second groups, and this is spanned by a 24-ft. wide covered wagon bridge running from the stable and main wagon elevator to the shops.

The track arrangement consists of two single left-hand branch-offs, with a crossover on Nostrand Avenue, one for each driveway, which is double-tracked to allow cars to pass while others are loading or unloading at the platform on either side of the stock building. A loop track connects the two systems through the rear of the stock building, the track passing directly beneath an overhead electric traveling crane, which serves to handle the heavy reels of trolley wire feeder cables, poles, etc., and place them in the storage building. In the main driveway one stub track serves the 100-ton track scale, while the other runs beneath the manure room of the stable, and the manure is loaded directly on cars for disposal.

ARCHITECTURAL AND CONSTRUCTION FEATURES

The plant being located in a rapidly growing residential district close to the Eastern Parkway Boulevard and other fine residential streets, and directly opposite the Brooklyn Jesuits' College, it was considered desirable to design the buildings so that they would be an ornament to the locality. Although designed strictly for utility purposes, the buildings have been given the dignified artistic treatment worthy of structures of such importance to the railroad company. In the immediate neighborhood there are a



Brooklyn Line and Track Department Headquarters—Elevation Along President Street, with Emergency Building at the Left End

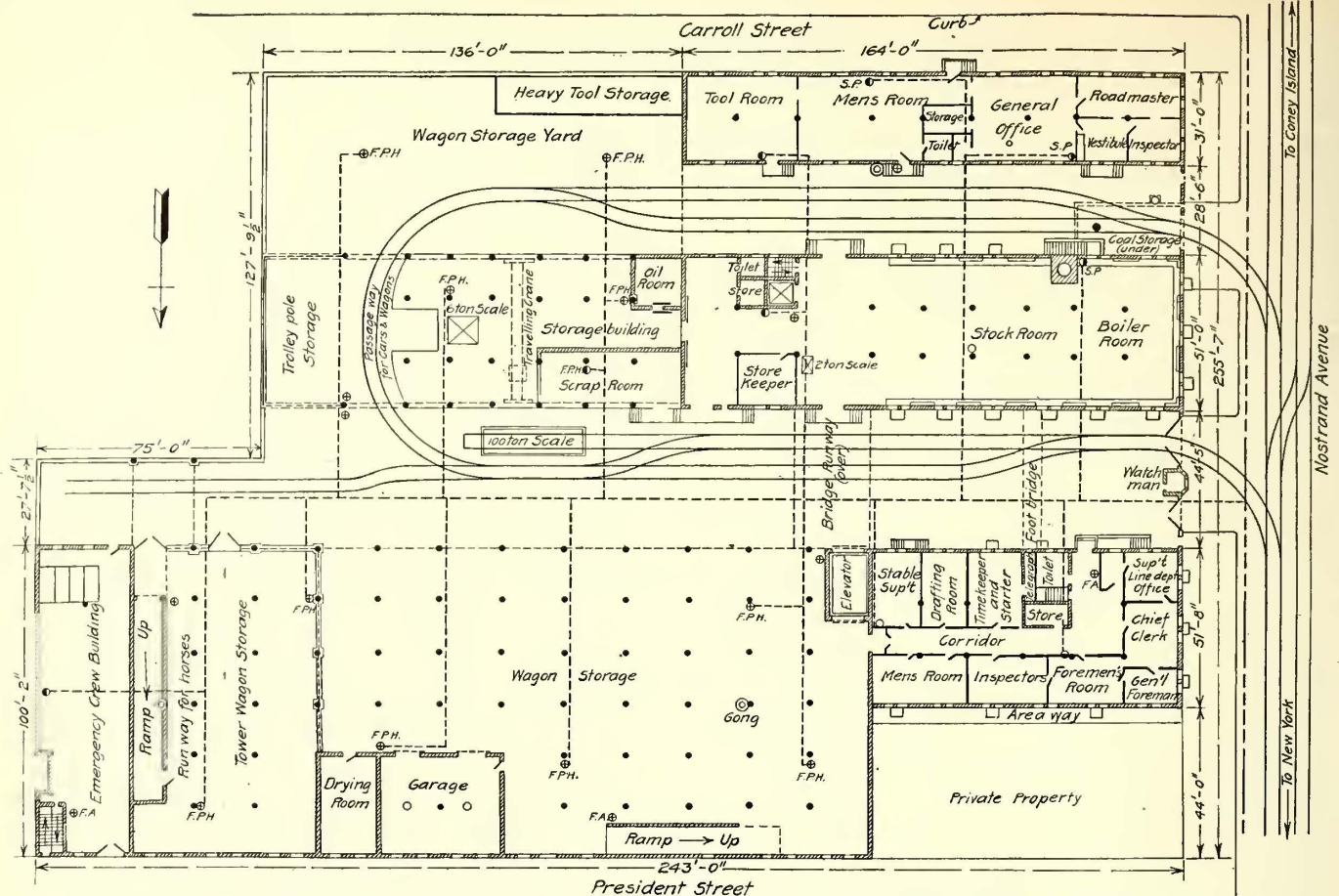
There is also a 6-ft. wide covered foot bridge spanning this driveway from the head of the stairway in the line department office building to the shops. The wider bridge is used by horses and wagons brought up in the elevator and from the stables, and the latter by employees who pass in and out of the shops through the main office building. The second and third groups are connected by a common second floor over a 30-ft. track and wagonway.

The roadways above mentioned are an important part of the general layout, as will be seen from the plan. They form the main entrance and exit for both wagons and cars for the receipt and delivery of all materials, and are paved with granite blocks on cinder concrete foundation, with grouted joints. The rest of the yard room, together with the wagon storage area, is paved with granite blocks on sand foundation.

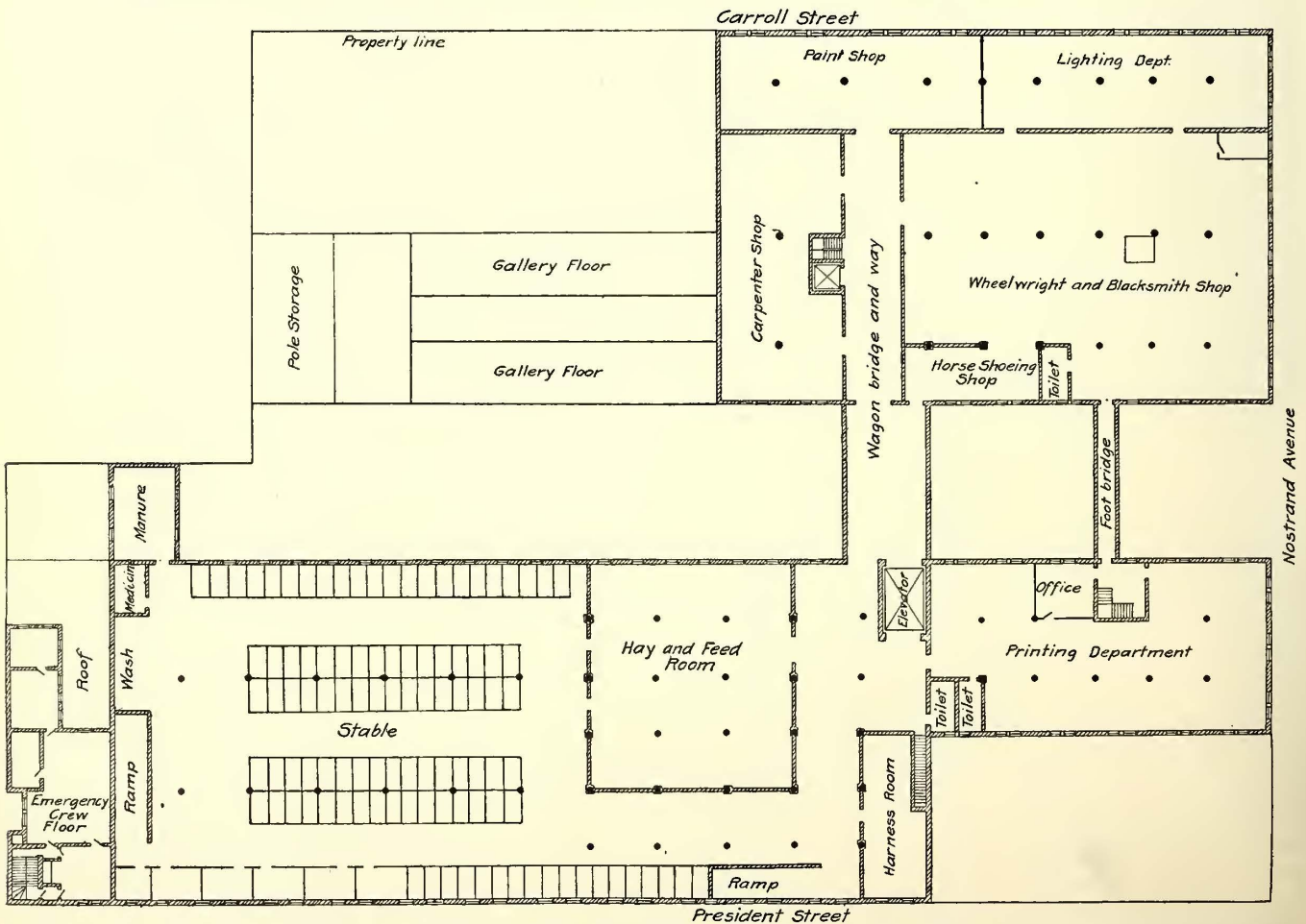
number of old wooden houses, and the contrast between them and this finely designed group of buildings cannot fail to impress the public with the progressiveness of the Brooklyn Rapid Transit System in adding its share to beautifying this part of the city.

The buildings, except the heavy storage, are constructed of dark red and buff pressed face brick on all exposed walls, with blue stone and terra cotta trimmings on the three street elevations.

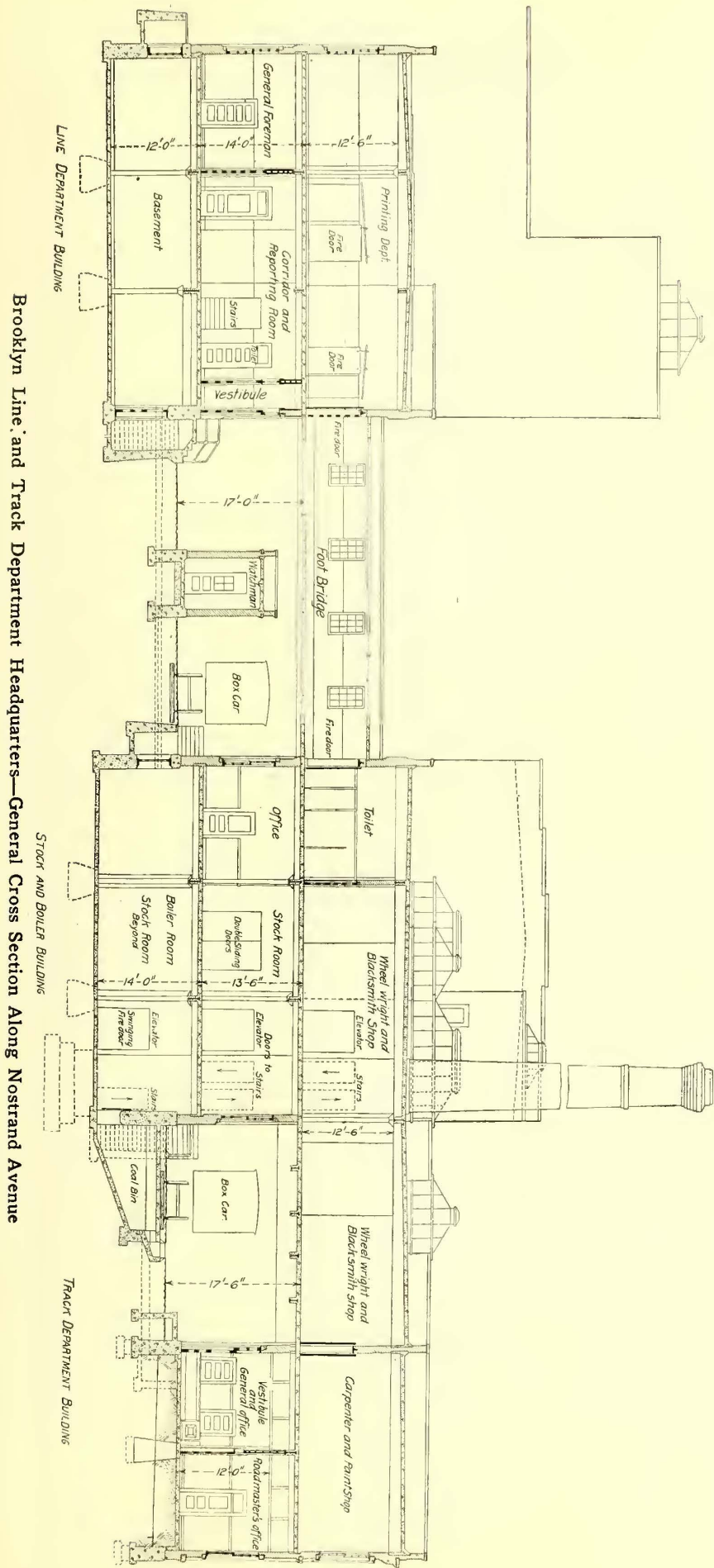
Paneled walls and pilasters of buff and red are carried up with ornamental brick and blue stone cornices and with blue stone coping. The faces of the interior walls are of the same class of brick, with cornices of simpler design and coped with mold concrete coping. The bridges spanning the main roadway have brick side walls of similar construction.



Brooklyn Line and Track Department Headquarters—General Plan of the Installation on Nostrand Avenue, Between Carroll and President Streets, Showing Arrangement of Facilities and Track Layout



Brooklyn Line and Track Department Headquarters—Plan of Facilities on the Second Floor Level of all Buildings



The watchman's building, situated in the center of the main entranceway, is treated to harmonize with the general architectural features of the main buildings. It is flanked on the right by an ornamental iron gate to close the track entrance, and similar gates close the wagon roadway on the left and the track entrance between the stock and track department buildings.

All the foundations are of concrete mixed in proportions of one part cement, three parts sand and six parts $\frac{3}{4}$ -in. broken stone. The basement walls are also of concrete 24 in. thick. The original profile of the ground sloped from a point 150 ft. east of Nostrand Avenue, from its level to a depth of about 35 ft., which had been filled in during the last decade. As the expense of securing solid foundations over the entire area by sinking concrete piers to a solid footing would have been too great, it was decided to make liberal use of Raymond concrete piles. Three hundred and eighty of these piles, or 7000 lin. ft., were employed for the rear column and wall foundations. The steel shells for these piles were first driven and then filled with concrete and whatever further reinforcement was required.

Above the foundations the floors are constructed on a steel framework supported on double-shelled concrete-filled steel columns with cast-iron lug and seat connections for floor and roof beams. These columns vary in size from 10 in. to 5 in. in diameter. They are designed with a special view for their fire-resisting qualities, and are classed by the city building department and the insurance companies as a fireproof column, requiring no additional fireproofing. This type of construction was used in all buildings except the reel and pole storage building, which is constructed entirely of structural steel, including the floors of the various decks, which are of steel plates. This building, which is in the rear of the stock building, is sheathed with $2\frac{1}{2}$ -in. corrugated galvanized iron.

All floors on the steel framework of the brick buildings consist of reinforced concrete slabs at least 5 in. thick, with a 1-in. granolithic finish. The reinforcement consists of Clinton electrically welded fabric. Floors of the stock and shop buildings were designed for 200 lb. live load; stable and line departments and record storage, 150 lb. live load; emergency crew building, 100 lb. live load; and all roofs 50 lb. live load per square foot. All the beams are thoroughly encased in the same

class of concrete, the haunches enclosing all steel to a depth of at least $1\frac{1}{2}$ in. The steel girders supporting the south wall of the stable over the wagon storage and the girders spanning the driveway carrying the wagon and foot bridges

Toilet rooms are located in convenient places in each building, and are constructed in the most approved sanitary style. The fixtures are porcelain enameled, with nickel-plated connections. The floors are tiled and a capped slate wainscot 7 ft. high is constructed around each room.



Brooklyn Line and Track Department Headquarters—Looking Along Roadway Toward Watchman's House, with Wagon Storage and Wagon Bridge in the Foreground

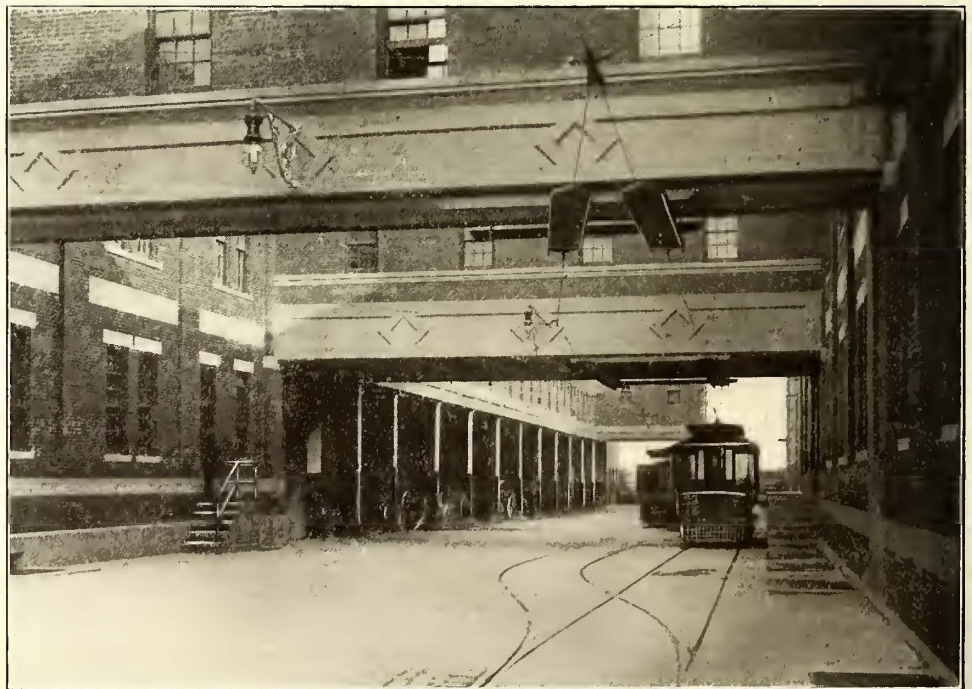
are encased in concrete paneled and have a smooth cement finish.

In the office buildings the interior brick walls are constructed of red face brick to a height of 7 ft. for a wainscot and capped with a double course of red molded brick. From the top of this course to the ceilings the walls are faced with buff pressed brick. The interior office partitions are constructed of 4-in. Phoenix construction hollow tile, plastered with Keene superfine cement to a 7-ft. wainscot line. Above the wainscot and including the ceilings the plastering consists of King's Windsor cement, with smooth white finish.

The interior trim of all doors and windows in all offices consists of quarter sawed oak with a dull varnish polish. All wood and glass partitions are of the same materials. An oak molding to match the molded brick course is placed on the plastered walls at wainscot height. A 5-in. slate base set on top of the $2\frac{1}{2}$ -in. floor cove surrounds all offices and halls. Plastered walls are painted to wainscot height a dull red to match the brick wainscot. The hardware is of a substantial type of solid bronze.

ceilings, is very pleasing to the eye, and the wainscot does not soil easily.

The concrete slabs of the roofs of all the brick buildings



Brooklyn Line and Track Department Headquarters—Roadway Between First and Second Groups, Showing Wagon Storage Under Stable, Unloading Platforms, Bridges, Etc.

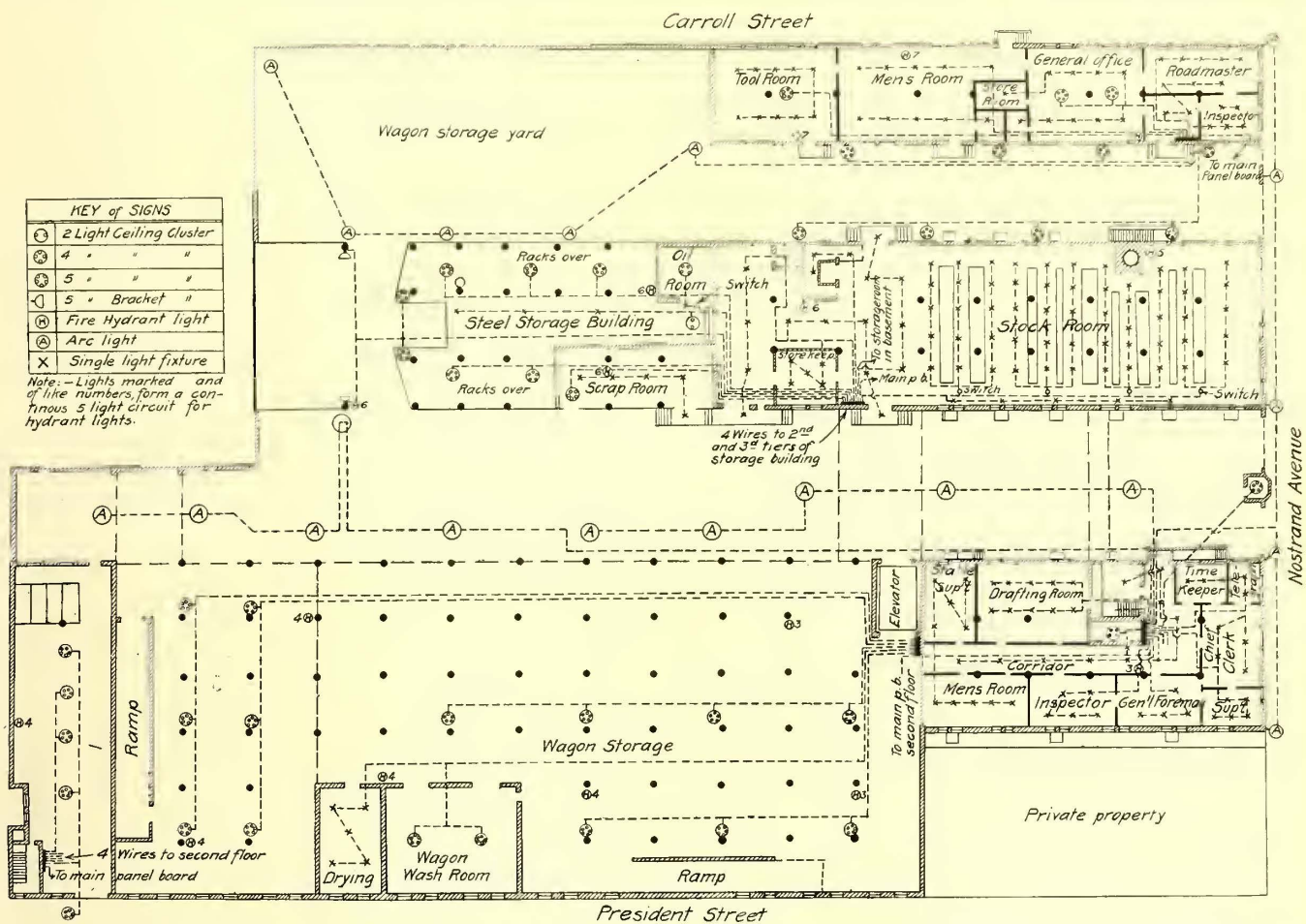
are covered with a five-ply tar, felt and slag roofing. Water cants are formed by haunching the concrete, and the roofing is flashed and counterflashed with 16-oz. hard

copper throughout. The skylights are of the reinforced copper bar monitor type, with pivoted side ventilating windows, together with circular cowl ventilators on top, all constructed of 16-oz. copper, with condensation gutters. The wooden roof of the steel storage building is covered with extra heavy Johns-Manville Brook's brand asbestos roofing.

All interior stairways are built of wrought-iron stringers, with cast-iron treads and risers, and each tread is equipped with Mason safety tread and nosings. The exterior stairs to the landings and to the basement of the line department office building and to the boiler room are of reinforced concrete, with similar safety treads and nosings. Heavy wrought-iron pipe railings protect the stairwells and run up to the landings of the office buildings. The interior partitions in the stable and record storage loft are built of 4-in.

boilers is stored in a concrete bin built under the trackway, the roof of the bin being strengthened by 20-in., 65-lb. I-beams to permit heavy coal cars to unload by gravity. The opening of this bin directly in front of the boilers is covered by a sliding steel door. The ashes are removed from a pit in front of the boilers by a Jeffreys elevator which takes it from the pit in front of the boilers and through a 3-hp Crocker-Wheeler motor driving a sprocket chain and gear elevates it to a telescopic chute, which is swung outward over the ash car when in use. Valve and hose connections are provided for ash cooling.

Returns are fed to the boilers by two 5¼-in. x 3½-in. x 5-in. Blake automatic feed pumps and receivers installed in duplicate and connected to a Cochrane separator. The blow-down tank discharges into a sump 5 ft. diameter by 6 ft. deep and the water is delivered to the higher level



Brooklyn Line and Track Department Headquarters—General Lighting Plan, with Key to Character of Lights

hollow tile, Phoenix banded construction, with brick pilasters around the columns.

HEATING

The buildings are heated throughout by the direct radiation system. Steam for this purpose is supplied from a boiler plant occupying 50 ft. x 32 ft. on the Nostrand Avenue end of the stock building basement. The central position of the stock building made this location preferable as it kept the amount of piping to a minimum. The steam-raising equipment comprises two 100-hp Erie boilers of the locomotive type fitted with return flues and burning No. 3 buckwheat coal. No brick is used in setting these boilers, but each is covered completely with 85 per cent magnesia blocks 2 in. thick. Natural draft is supplied by a Custodis radial brick chimney 39 in. in diameter at the top and 100 ft. high above the grates. Coal for these

sewer main by a Fairbanks centrifugal pump driven by a 1-hp Crocker-Wheeler motor.

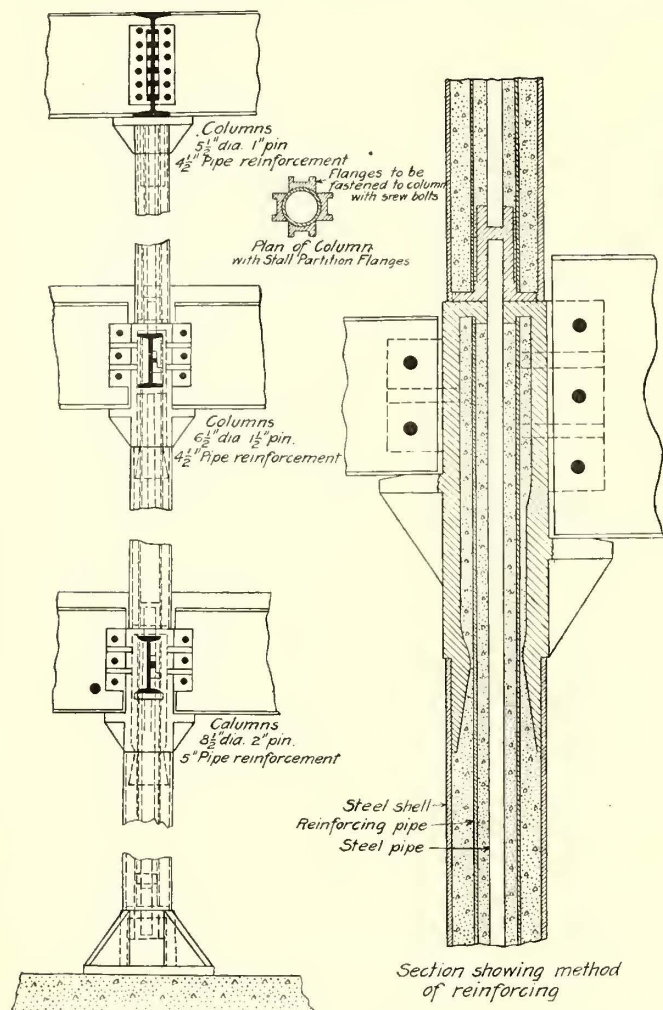
Hot water for toilets is furnished by a Mott "Efficient" heater with thermostat and a "Sunray" sectional tank heater with smoke pipe connected to the steel flue of the boilers. In winter when the heating plant is in operation the "Efficient" heater is used with steam from the system and in summer the "Sunray" heater is to be employed.

Most of the wrought-iron mains with copper expansion bonds are carried by hangers from the floor I-beams and to save labor were installed before the concreting and plastering. There are four separate circuits, namely, to the line department, emergency crew, stock and track department buildings. Each circuit is controlled by a valve in the boiler room. Keeping in mind economy of fuel consumption, all mains and pipes down to 1 in. diameter have

an asbestos-sponge felted sectional pipe covering 1 in. thick and all flanges have removable molded asbestos cement coverings. Valves and fittings are covered with 1 in. asbestos cement. The returns are also insulated. All piping has an outer covering of sewed duck treated with white

with enamel shade, as required. The large size of conduit used permits drawing well-insulated wires into the fixtures. The conduit is painted to match the prevailing color of the rooms.

All wire is of the company's standard and no twin wire



Brooklyn Line and Track Department Headquarters—Construction Details of Double-Shell Floor Columns

oil paint except the return pipe under the stables which has two coats of waterproof paint. The piping between buildings is carried in iron ducts.

The buildings are heated with the American Radiator Company's standard radiators, ranging in capacity from 20 sq. ft. for toilets to 60 sq. ft. units for the larger rooms. They are designed for safe operation at 40 lb. pressure. In all there are 142 radiators with a total rating of 6844 sq. ft. distributed as follows: Line department, 39 units, 1830 sq. ft.; stock building, 40 units, 2070 sq. ft.; track building, 33 units, 1592 sq. ft.; emergency crew building, 18 units, 780 sq. ft., and stable building, 12 units, 572 sq. ft.

The radiators in the basement of the line department basement of the stockroom, the stable runways and the ground floor of the emergency building are of the single column wall type; all others are two column radiators with a base 12 in. high to facilitate cleaning.

LIGHTING

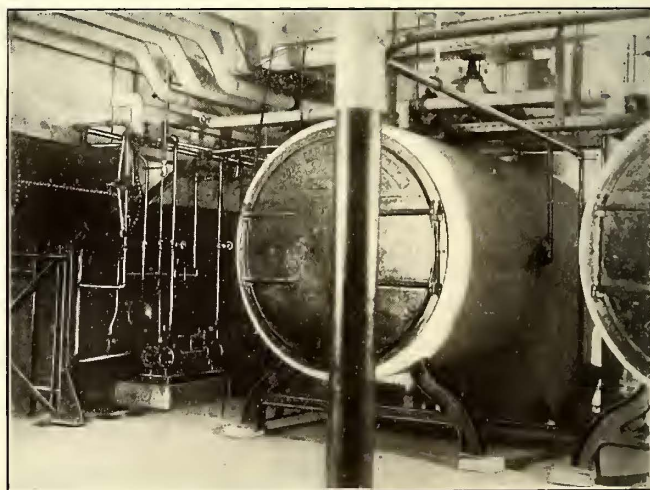
All the lighting, excepting the foreman's quarters, which are piped with gas service, is in 550-volt, d.c. series circuits. The work is in conduit and concealed wherever possible. Three-quarter-inch galvanized conduit or larger is used. Single drop lights are composed of 1/2-in. galvanized conduit terminating in a keyless socket or Benjamin wireless cluster



Brooklyn Line and Track Department Headquarters—Five-Lamp Vapor-Proof Cluster

was allowed and no joints permitted except taps from the feeders, all circuits being pulled from lamp to lamp without joints. Where taps are made special care in insulation was required, and to that end liberal use was made of rubber tape. The circuits are controlled from panel boxes, no snap switches being permitted.

The current is brought into the building through a 1,000,000-circ. mil aerial feeder to the main switchboard on the second floor of the shop, provision having been made in the outlets and on the board for a duplicate feeder. The board consists of a 2-in. slate panel, containing a 300-amp GE automatic breaker with fuse and a double-throw, single-pole, quick-break switches controlling the various lighting and power panels. All switches are of 50-amp capacity or



Brooklyn Line and Track Department Headquarters—Steam Plant for Heating all Buildings

larger, that being the smallest size having the desired mechanical strength. All the negative wires are brought to the main board and connected to the negative bus, which is located at the back of the board and near the bottom. This bus is fitted with a switch and fuse and is entirely

enclosed with a slate barrier, and no negative connections appear on the front of the board; this is very desirable in 550-volt work.

The negative conductor run from the board to the tracks below is bolted and sweated to the rail. A small service box has been built in the pavement to permit inspection and tests of this track connection. The power consumed on the premises is recorded by a Thomson-Houston wattmeter mounted on the main board.

The lighting panels have one or more 50-amp quick-break, single-pole switches placed vertically and connected to the positive bus extending horizontally across the board. The negative bus is similarly placed and separated from the rest of the board with a deep slate barrier. Each negative wire is brought back to the negative bus to its binding post properly numbered to correspond with its switch. Each

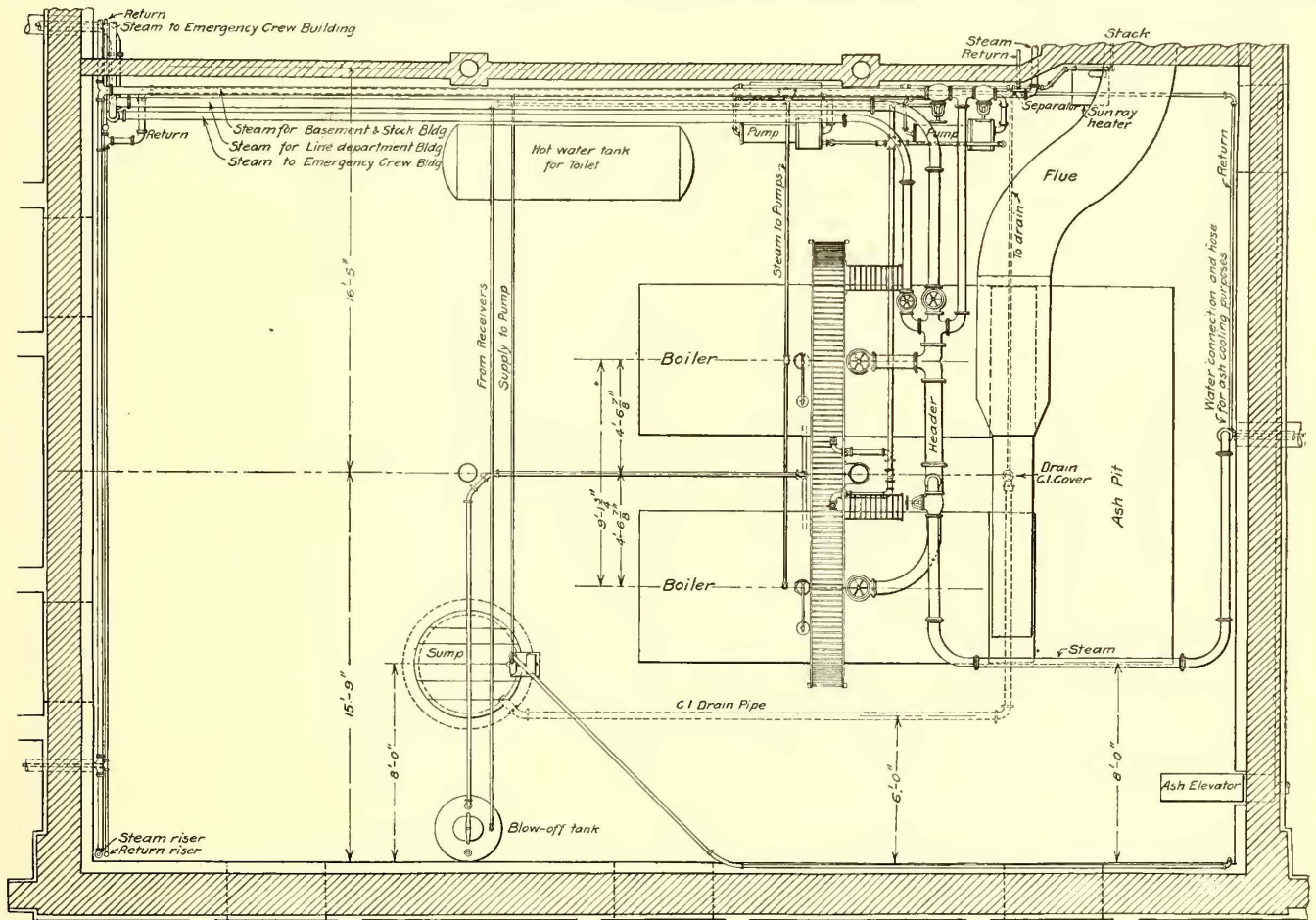
and a five-light vapor-proof cluster and outlet box specially designed.

A total of 985 16-cp lights and 25 arc lights is used in the yards and buildings.

FIRE RISKS AND PROTECTION

In designing this installation the engineers gave a great deal of thought to the matter of fire protection, which naturally is important in a plant covering so great an area and used for such various purposes. It is doubtful whether a more extensive division of fire risks and system of protection could have been devised without impairing the economic operation and use of the facilities maintained.

There are six distinct fire risks, separated by solid brick walls from basement or ground to at least 3 ft. above the roof, and any and all openings are protected by the most improved types of automatic Kalamein fire doors or auto-



Brooklyn Line and Track Department Headquarters—Plan and Equipment of Heating Plant

switch has connected to it from 5 to 25 lights, depending on the individual requirements.

The yard and front sidewalk are brilliantly lighted by 20 arc lights suspended from brackets and placed as shown on the plan. This lighting is both an excellent protection against thieving and a splendid advertisement for the company. Five arc lights with concentric diffusers have been installed in the shops in addition to the incandescent lamps.

Over the fire hydrants there are installed blue lights, wired six in series and allowed to burn continuously. A red light has been placed over each fire-alarm box. This light also burns continuously. It is located at such a height as to be readily seen at a distance. To minimize the danger of cut-outs these fire-alarm and hydrant lights are on an independent circuit.

Each light in the paint room has a vapor-proof globe

matic rolling steel fire shutters, as approved by the National Board of Fire Underwriters. The fire risks, as will be seen from the ground plans, consist of the following:

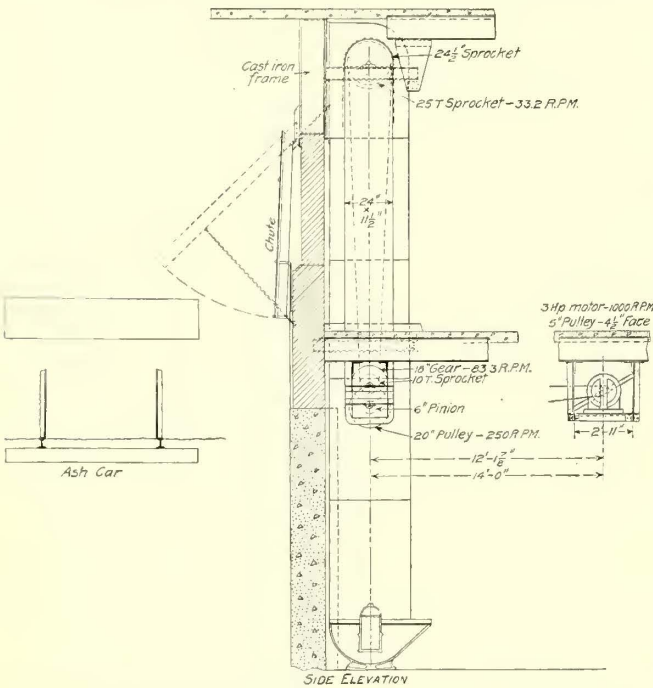
1. The line department office building with printing plant over.
2. Stable building, which includes the wagon storage area and record storage rooms on third floor.
3. Emergency crew building.
4. Stock building with shop over.
5. Steel storage building in rear of stock building.
6. Track department offices and painting shop over.

Besides the above divisions of fire hazard the openings of all stairways and elevator shafts and the ramp approaches to the stable are also protected either by automatic rolling steel shutters, Peelee automatic closing elevator doors or Kalamein swing fire doors. The use of

wood in the construction of all buildings was eliminated as far as possible. All oils and paints are kept in a brick enclosure in the steel storage building which is ventilated through the roof. Light is obtained from electric lights in vapor-proof globes, the same class of globes in five-light clusters being used in the paint shop.

There has been installed throughout the plant a system of water mains connected to the city main in Nostrand Avenue with a 6-in. connection. This connection is supplied with the necessary Kennedy-Gale valves, and the water consumption of the whole plant, which is supplied through this main, is measured by a 6-in. Worthington standard piston meter of full capacity. There are 12 4-in. R. W. Wood fire hydrants located about the plant and 27 stand-pipes with the necessary hose and nozzles. These stand-pipes are supplied by eight rising lines which are equipped with controlling valves similar to the valves at each fixture. All water supply pipes are of galvanized wrought iron guaranteed for a pressure of 500 lb. per square inch. Over each hydrant and standpipe is located a blue electric light which burns all the time.

There has also been installed for further fire protection a complete fire-alarm system. This consists of an open multiple circuit in separate galvanized conduit connecting up 15 boxes located at convenient points throughout the



Brooklyn Line and Track Department Headquarters—Conveyor for Delivering Ashes from Boiler Room to Car

plant. These stations are designated by a continuous burning red light.

NOTE

The next article on this installation will describe the first group of structures embracing the line department, stable, wagon and record storage and emergency crew quarters.

During the past seven years only one passenger has been accidentally killed on the railways of New South Wales, says an English contemporary. The total number of passengers carried during that period was 258,620,836. The non-fatal accidents have increased, but they are generally trivial, and 92 per cent are said to be due to the carelessness of the persons injured.

THE REASONS FOR INCREASED FARES ON MASSACHUSETTS STREET RAILWAYS—II

The most important systematic increases in fares by groups of companies in Massachusetts have been made by properties controlled by the Boston Suburban Electric Companies. The changes in fares and transfers established by these companies were, in brief, as follows:

Name of company.	Date of increase of fare unit from 5 to 6 cents.	Date of inaugurating charge of 1-cent transfer.	Miles of track operated.
Newton Street.....	.....	Sept. 1, 1908	44.605
Newton & Boston.....	Apr. 1, 1908	.....	11.902
Lexington & Boston.....	Feb. 1, 1908	.....	32.728
Natick & Cochituate.....	Mar. 1, 1908	.....	18.758
Middlesex & Boston.....	Mar. 1, 1908	.....	16.067
Westboro & Hopkinton.....	Mar. 1, 1908	.....	6.431

The unit of fare was advanced from 5 cents to 6 cents on the Waverly line (4.66 miles) of the Newton Street Railway on April 1, but on account of a rerouting of cars on Sept. 1 this fare was restored to 5 cents. The line was cut in two at the middle, the parts being made parts of separate lines with 5-cent fares, and it was therefore impracticable to continue the higher rate.

The through line from Watertown to Needham, shown on the accompanying illustration as a solid line, comprises two 6-cent fare limits. The line from Waverly to Roberts' Crossing is the line on which the fare, established at 6 cents on April 1, was reduced on Sept. 1 on account of the rerouting of cars.

Some indication of the results of the changes is furnished by the following figures of car-mile gross earnings for the years ended Sept. 30, 1907 and 1908, the former representing a period before the industrial recession:

Name of company.	Year ended Sept. 30	
	1907.	1908.
Newton Street.....	23.24	24.17
Newton & Boston.....	16.28	19.63
Lexington & Boston.....	21.72	21.41
Natick & Cochituate.....	18.95	19.91
Middlesex & Boston.....	23.58	23.85
Westboro & Hopkinton.....	17.61	18.10

The changes in passenger traffic and the gross earnings therefrom on three of the properties were as follows:

Company.	Passengers carried,		Passenger earnings,		Per cent increase or decrease.
	1907.	1908.	1907.	1908.	
Natick & Cochituate..	2,128,364	1,862,767	\$98,264.31	\$95,856.11	2.45 Dec.
Middlesex & Boston..	1,854,608	1,653,551	88,913.59	87,564.16	1.52 Dec.
Westboro & Hopkinton	273,125	253,609	13,369.60	13,806.49	3.27 Inc.

It is not an over-statement of the truth to say that in making these advances the companies invited publicity. While the regulation of fares on Massachusetts street railways is under the jurisdiction of the board of directors, subject to the disapproval of the Railroad Commission, the law affecting transfers is different. The law provides that "a street railway company shall not withdraw or discontinue the use of any free checks or free transfers from one car or line of cars to another without the approval of the Board of Railroad Commissioners." The method adopted by the companies in the Newton system, that of advertising thoroughly the proposed changes of fares, were introduced in spite of predictions by some students of the situation that failure would result if the plan was subjected to widespread and critical discussion. Notwithstanding such misgivings, the changes in the fares on all lines affected as well as the proposed charge of 1 cent each for transfers on the lines of the Newton Street Railway were announced, with the reasons therefor, so far in advance that all patrons could have abundant notice of the new plans of the companies. Widespread circulation of the announcements for public circulation was not required by law.

Permission to impose a charge for transfers was asked of the Board of Railroad Commissioners in a petition in which the company represented:

That, owing to the conditions under which it is obliged to operate its railway, in order to secure a proper and just return upon capital actually invested it has become necessary to increase its net revenue by some change in fares; that to make such change as light a burden upon the traveling public as possible, it is proposed to make every fare, in connection with which a transfer is secured from one car or line of cars to another, 6 cents.

Wherefore your petitioner asks approval of such change in fares insofar as it constitutes to any degree a withdrawal or discontinuance of the use of free checks or free transfers.

THE POLICY OF PUBLICITY

The methods followed were distinctly those of modern publicity; the officials of the companies stated their position, awaited the protests which it was felt were inevitable and appeared before the commission at the resultant hearings with success; the changes were upheld.

The broad policy of publicity followed by these companies is in accordance with that which has been laid down by James L. Richards since his accession to the presidency.

The views of Mr. Richards on the subject of publicity respecting corporate affairs are well known. He has made no secret of his belief that public service corporations should not only submit to publicity regarding their affairs, but should encourage it. When the companies were pre-

vinced that the position assumed was fair and just. Before any public steps were taken George M. Tompson, consulting engineer, Boston, was employed to appraise all of the properties, and his figures were available for publication or inspection. Mr. Tompson was not associated in any way, directly or indirectly, with the street railway properties.



Massachusetts Fare Increases—
Samples of 6-Cent Tickets

Some of these figures will be published in the *ELECTRIC RAILWAY JOURNAL*. When public announcement of the changes was made selectmen and members of the boards of aldermen of all the towns through which the companies operate were invited to meet President Richards. At the meeting which was held for this purpose Mr. Richards explained the situation in which the properties were found to be and invited criticisms and recommendations from any of those present.

Subsequently a report was prepared showing many operating and financial statistics of each property concerned for every year since its construction. This report, accompanied by an announcement regarding the date on which the unit of fare would be advanced, was sent to every voter in the towns through which the road that specially concerned him operated. Posters in the cars and advertisements in the newspapers gave information pertaining to the changes.

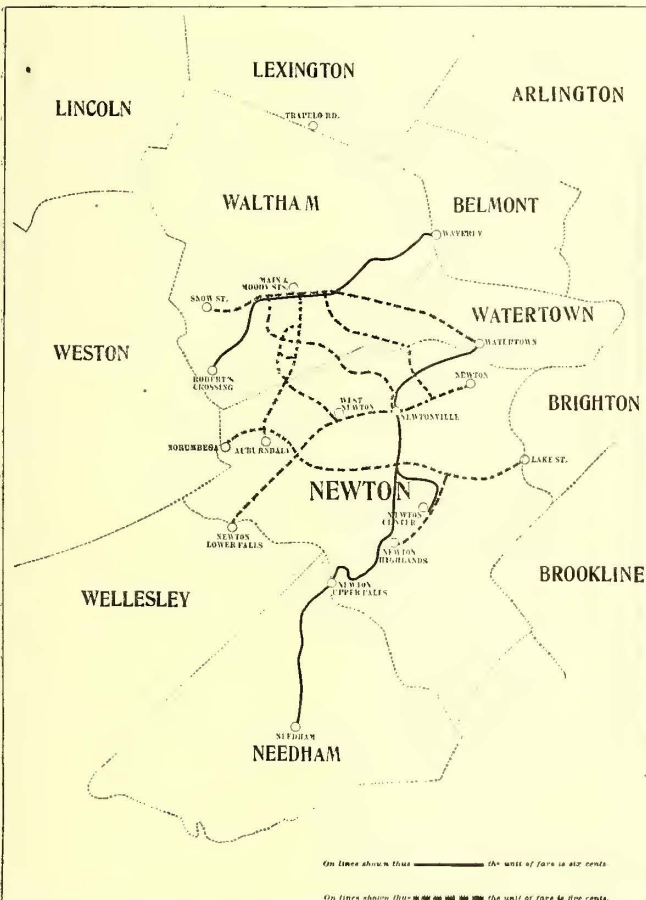
The statistical material which was circulated freely on behalf of the various companies entered so fully into the financial condition of the lines that it attracted much attention.

EDITORIAL FROM BOSTON TRANSCRIPT

One of the most interesting parts of the material submitted to every voter was a reprint of an editorial published in the *Boston Transcript* on Jan. 28, 1908. This editorial was entitled "Six-Cent Fares," and stated, in discussing the subject:

Two principles should guide the Railroad Commissioners in their recommendations on the appeals which are now coming before them for increased rates, either through a 6-cent charge or a shorter fare limit. No road which is earning 4 per cent should be permitted to increase its charges.

While this is not a high rate of return, and the Massa-



Massachusetts Fare Increases—Map Showing Newton Properties on Which Fares Were Changed

paring for the increases in fares indicated, as well as on numerous other occasions, Mr. Richards has expressed his views freely on this subject.

The increases in fares made by the railways controlled by the Boston Suburban Electric Companies were made, as stated, with full realization of the fact that the Board of Railroad Commissioners would probably have to be con-

chusetts trolleys have been financed under our rigid anti-stock watering laws, it should be remembered that an investor who goes into an undertaking takes some chances; and if he is earning 4 per cent he has no reason to ask for higher rates than were contemplated when the line was

which a single fare sufficed. In this respect fares have fallen below the original expectation. Those were days of light repairs; the cost of power proved surprisingly cheap by comparison with the horses which had been supplanted and the sudden growth of the business made its managers

Newton Street Railway Co. Division 1. This transfer is issued with the approval of the Massachusetts Board of Railroad Commissioners to a passenger desiring transfer privileges only UPON PAYMENT BY SUCH PASSENGER OF ONE CENT ADDITIONAL FARE.

Good only at and from transfer point indicated by star punched and on next car punched to destination, and in direction so indicated, and only if used by person receiving it from Conductor before expiration of time and on date punched.

From MAIN and PROSPECT STS. to Lower Main St. ★★

To Waverley ★★

To Roberts Crossing ★★

To Stone St. ★★

To Union Waltham Road (See-Atta Prospect St.) ★★

To Lower Main St. ★★

To Upper Main St. ★★

To Abundant ★★

To Waltham-Lex. Lower Line ★★

To Waltham-Waterloo Lower Line-Atta Bents ★★

To Robert St.-South ★★

To Waverley ★★

To Roberts Crossing ★★

To Newton and MAIN STS. ★★

To Lower Main St. ★★

To Crescent Park ★★

To Washington and THE STS. ★★

To Newton-Lower Park ★★

To Newton-Upper Park ★★

To Waltham-Waterloo Lower Line ★★

To Newton-Headman ★★

To Newton Centre ★★

To Washington St.-West ★★

To Adams & Washington STS. ★★

To Newton-Waterloo Lower Line ★★

To Washington St.-West ★★

Conductor No. 229 Transfer No.

DEC.	30	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
NOV.	15	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
OCT.	30																
SEPT.	15																
AUG.	31																
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JUNE																	
MAY																	
APR.																	
MAR.																	
FEB.																	
JAN.																	

Massachusetts Fare Increases—Transfer for Which 1 Cent is Charged

established. No one proposes to reduce the fares on any line earning 10 per cent. A second principle which the Railroad Commissioners should have in mind is the recognition of any advances in rates as temporary. While it may be necessary to permit the rural trolleys of the State to go on a 6-cent basis or its equivalent for a few years, this is an emergency measure, justified as bridging over a period while business is catching up with the trolley's overdevelopment.

The tendency in the early years of the trolley was to reduce average earnings by increasing the distances for

extremely optimistic and so ready to accede to public demands.

It is reasonable to expect the trolley companies to content themselves with an inadequate income in the anticipation of future returns. Franchises are revocable. The weight of a current deficit accumulates rapidly. Already one car line, that between Lexington and Woburn, has been discontinued to the great inconvenience of many working people who had built cottages along the route. It is obvious that no line will stop running cars so long as there are any net earnings. Several lines in the State, it is said, find it difficult to earn any excess over operating expenses, making it an open question whether it would be better to keep them open, especially as they

TO THE PATRONS OF THE LEXINGTON & BOSTON STREET RAILWAY COMPANY.

We publish below a statement showing the capital stock of the Lexington & Boston Street Railway Company, issued with the approval of the State Board of Railroad Commissioners, and paid for at par, as follows:

November 20th, 1899,	\$250,000.00
June 30th, 1900,	100,000.00
June 27th, 1901,	100,000.00
September 20th, 1901,	75,000.00
Total,	\$525,000.00

together with the net earnings applicable to dividends, and dividends paid, for each year since the organization of the road.

This statement is published in order that you may realize, as the officers of the Company do, that one of two things must be done: either have the Company go into the hands of a receiver, or change the unit of fare.

After giving the matter careful consideration, the Management have decided to change the unit of fare from five to six cents; said change to become operative February 1, 1908.

At the same time, i.e., February 1, 1908, the custom of issuing tickets enabling rightful holders of same to ride from town centre to town centre for five cents will be discontinued, and passengers will only be carried from any point in one town to any other point in the same town for one fare.

At the same time, i.e., February 1, 1908, after careful and serious consideration, it has been decided to resume operation of the so-called Woburn Branch of the same road on a six-cent basis within town limits similar to that being put into effect on the remainder of the road.

Transfers will be issued as at present, except that transfers will be given to all passengers paying their fare within the limits of the town to any other point in the same town; said transfers given to any other point in the same town regardless of whether passenger boards car within town limits or not.

LEXINGTON AND BOSTON STREET RAILWAY COMPANY. Year Ending September 30.

	On Capital Stock.	Net Divisible Income.	Dividends Paid.	Total Dividends.
1900	\$250,000.00	\$20,804.66*	1 per cent.	\$ 2,500.00
1901	250,000.00	10,000.00	" "	" "
1902	425,000.00	12,784.10	2 " "	12,000.00
1903	525,000.00	20,776.97	1 1/4 " "	15,062.50
1904	525,000.00	7,964.65	3 3/4 " "	19,687.50
1905	525,000.00	9,752.67	1 " "	5,250.00
1906	525,000.00	2,752.21	0 " "	" "
1907	525,000.00	3,871.11	0 " "	" "
		267.95	0 " "	" "

* Computed April 8, 1906. 1 Unit.

It is hoped by the Management that the necessity for this advance in fares will not be permanent. The Managers ask the hearty co-operation of the public in this change, necessitated by causes beyond their control.

Lexington & Boston Street Railway Company.

MATTHEW C. BRUSH, V. P. & G. M.

January 23, 1908.

To the Patrons of the Newton Street Railway Company and Newton & Boston Street Railway Company:

We are publishing statements showing the capital stock of the above companies, which was issued with the approval of the State Board of Railroad Commissioners, together with the operating expenses, net earnings, fixed charges, net divisible income, dividends paid, and other detailed information for each of the successive years from 1889 to 1907, of the Newton Street Railway Company, and from 1893 to 1907, of the Newton & Boston Street Railway Company, inclusive.

The statements are published in order that you may realize the real financial condition of the railway companies, which condition indicates the inevitable fact that some action must be taken to increase the net revenue of the companies.

The present condition is due primarily to the following facts:

1. The wages paid by the companies are very much in excess of those paid a few years ago.
 2. The cost of all material used in the construction and operation of a street railway has increased in a varying ratio from 20 to 100%.
 3. The distance which patrons can ride for one unit of fare has been steadily increasing by extensions of fare-limit points and added transfer facilities.
 4. The roadbed and equipment have been gradually and constantly wearing out, with the inevitable result of necessary replacement.
 5. Increased burdens have been placed upon street railway companies by municipalities at the times of added construction.
- You will note by the Newton Street Railway Company's statement that while the gross earnings have increased during the two years ending September 30, 1907, \$33,845,211, or 10.45%, the operating expenses have increased \$41,764,091, or 18.42%.
- You will note by the Newton & Boston Street Railway Company's statement that while the gross earnings have increased during the two years ending September 30, 1907, \$10,682,021, or 16.86%, the operating expenses have increased \$18,506,093, or 36.28%.
- The result of all of the above conditions makes it absolutely imperative that some legitimate means be taken to increase the net income.
- Although the wages paid by the above companies are very much higher than those paid a few years ago, the management, in considering the matter, decided not to reduce the wages of its employees, and thereby, possibly, render poorer service; believing that the public, as a whole, prefer good service at a reasonable rate, to poor service at a cheap rate. It has, therefore, been decided, after careful consideration, to change the unit of fare from five to six cents on all lines of the Newton & Boston Street Railway Company, and to change the unit of fare from five to six cents on the so-called Waverley line of the Newton Street Railway Company, operating between Roberts Crossing, Waltham, and Waverley, via South Street, Main Street, Linden Street and Waverley Oaks Road, said changes to become effective April 1, 1908.

It is also proposed to charge, when authority has been obtained, on all lines of the Newton Street Railway Company, six cents for each fare in connection with which a transfer is issued; and accordingly a petition is to be filed with the State Board of Railroad Commissioners for their approval of this action in so far as it affects the issue of free transfers.

The matter of raising the unit of fare on all the lines of the Newton Street Railway Company from five to six cents was given serious consideration, and the raising of the fare on the Waverley line and the anticipated change in the matter of transfers are being done with the hope that the result will be such as to not necessitate a general change in the unit of fare on all the lines of the company.

While it is hoped that the changes suggested above will bring satisfactory results, yet should they not, a general advance in the unit of fare on all the lines of the company may be necessary.

It is hoped that the officers of the street railway companies to market their securities in the recent past because of their very poor and unsatisfactory financial showing. The credit of the companies has been stretched to the limit, and their borrowing power is practically exhausted, and it is, therefore, no longer optional with the companies as to what action they must take.

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

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

NEWTON STREET RAILWAY COMPANY.
By M. C. BRUSH,
Vice-President and General Manager.
NEWTON & BOSTON STREET RAILWAY COMPANY.
By M. C. BRUSH,
Vice-President and General Manager.

Worcester, Mass., March 21, 1908.

IMPORTANT NOTICE

The following Fare Regulations will go into effect on the Lexington & Boston Street Railway Saturday, February 1, 1908

At a meeting of the Board of Directors of the Lexington & Boston Street Railway Company, called for that purpose, it was voted that on and after February 1, 1908, the fares of said railway will be as follows:

- Between any two points on the Main Line, Waltham Line or Woburn Line of this Company in 6 Cents
- The Town of Lexington or Arlington 6 Cents
- Between any two points on the Main Line or Concord Line of this Company in 6 Cents
- The Town of Bedford 6 Cents
- Between any two points on the Main Line of this Company in 6 Cents
- The Town of Billerica 6 Cents
- Between any two points in Concord on the Concord Division of this Company, 6 Cents
- Between any two points in Waltham on the Waltham Division of this Company, 6 Cents
- Between any two points in Woburn on the Woburn Division of this Company, 6 Cents

Transfer Points and Privileges

TO PASSENGERS PAYING FARE WITHIN THE TOWN OF LEXINGTON

Transfers will be given between the Main Line and the Waltham Line or Woburn Line, good for a continuous ride within the town of Lexington, if requested upon payment of fare.

TO PASSENGERS PAYING FARE WITHIN THE TOWN OF BEDFORD

Transfers will be given between the Main and Concord Divisions, good for a continuous ride within the town of Bedford, if requested upon payment of fare.

TO PASSENGERS PAYING FARE WITHIN THE CITY OF WALTHAM

Transfers will be given between the Waltham Division and the Newton Street Railway Company, good from the junction point on Main Street, for a continuous ride to any point in Waltham or to Waterloo Square, if requested upon payment of cash fare; transfers from the Newton Street Railway will be accepted at the junction point on Main Street, provided same were issued upon payment of cent fare.

TO PASSENGERS PAYING FARE WITHIN THE TOWN OF CONCORD

Transfers will be given to the cars of the Concord, Maynard & Hudson Street Railway Company, if requested upon payment of fare.

Transfers issued by the Concord, Maynard & Hudson Street Railway Company will be accepted from passengers boarding cars of this company at Concord Center, good for a continuous ride within the limits of the town of Concord, provided same were issued upon payment of cent fare.

SPECIAL REGULATIONS
Transfers will only be issued to passengers who ask for the same at the time of payment of fare.
Transfers will not be received unless properly punched as to date, time and route, and it is the duty of a passenger receiving a transfer to see that his transfer is punched as desired.
The above fare rates are subject to change without notice.
Signed,
Lexington & Boston St. Ry. Co.,
MATTHEW C. BRUSH, Gen'l Manager.

faced the months of supposedly heavy snows. This rate question is rendered peculiarly acute by the threatened business recession; the steam roads are meeting it by reducing the number of their trains. Those trolley lines which were doing badly when times were good find a problem now before them which is almost without precedent.

ENTITLED TO RELIEF

It is plain that the companies are entitled to some relief; it is not good policy for the State to starve them out or to discourage for too long a period new trolley investments. Let it see that the roads are managed efficiently and then, judging each case on its own merits, let those which are legitimately earning less than 4 per cent be permitted to make a temporary increase in their charges. This is the proper treatment of a public-service corporation and in line with the Massachusetts theory.

The operation of the Woburn branch, mentioned in the

On and after MARCH 1, 1908, the unit of fare on lines of the following companies will be SIX CENTS.

NATICK & COCHITUATE STREET RAILWAY
MIDDLESEX & BOSTON STREET RAILWAY
WESTBORO & HOPKINTON STREET RAILWAY.

On and after APRIL 1, 1908, the unit of fare on all lines of the Newton & Boston Street Railway Company will be SIX CENTS.

NEWTON & BOSTON STREET RAILWAY COMPANY.

On and after APRIL 1, 1908, the unit of fare on the Waverley and Roberts Crossing Line of the Newton Street Railway will be SIX CENTS.

NEWTON STREET RAILWAY COMPANY.

Massachusetts Fare Increases—Posters Placed in Cars

foregoing, was discontinued on Nov. 1, 1907, but service was resumed on this line on Feb. 1, 1908, with fares on the 6-cent basis.

The changes in fares have now been in effect long enough to justify discussion of the results which they have accomplished.

STATEMENT OF MATTHEW C. BRUSH

Matthew C. Brush, vice-president and general manager of the Newton properties, in discussing the financial and public policy aspects of the changes in fares, now that they have been in effect for some months, said that the results of the increases in the unit of fare would indicate that the move was unquestionably a wise one from every point of view; while no doubt some patronage was lost as a direct result of the increase in unit of fare, nevertheless the net result was improvement.

Mr. Brush cited as an instance the experience of one of the railways in the system. From Oct. 1, 1907, to Jan. 31, 1908, inclusive, representing the period of four months previous to the change in the unit of fare, there was a decrease in business, as compared with the corresponding period one year before, of 5.88 per cent in the number of passengers carried and of 4.05 per cent in gross passenger earnings. These declines were due, of course, to natural causes incident to the depression in business throughout the country. From Feb. 1 to Sept. 30, 1908, the eight months succeeding the change in unit of fare, the operation of the same property showed a decrease in the number of passengers carried, as compared with the corresponding period

of one year before, of 6.91 per cent, but an increase in passenger revenue for the same period of 8.94 per cent.

Some decrease in car-mileage has been justified by the reduction in passenger travel indicated by the foregoing figures.

Mr. Brush said that on other of the properties on which the unit of fare was advanced to 6 cents a decrease in the number of passengers carried was shown, but that each of the companies held its own in gross passenger receipts as compared with the corresponding period one year before, while the lines as a whole showed a gain. This, as Mr. Brush pointed out, occurred during a period when the large majority of other street railway properties showed marked decreases continuously.

ADVERSE EFFECTS

Discussing the adverse effects, Mr. Brush said there was no question that the increase in unit of fare or any material change in the fare situation which made the cost of riding larger had the immediate result of decreasing the number of passengers carried. This decrease, he said, was due partly to the loss of a certain amount of short-haul business and partly to an unjustified and unfortunate feeling of antagonism which the changes aroused in the minds of part of the public. Mr. Brush stated that this antagonism unquestionably, however, wore off gradually, until, as people became accustomed to the change, the feeling very largely passed away.

One feature of the situation which was emphasized by Mr. Brush as of the utmost importance is that the company increasing the unit of fare lays itself open to very strict scrutiny on the part of the public concerning the quality of its service.

"It is very essential," Mr. Brush said, "that the property which increases its charge for service shall exercise extreme and exceptional care to keep its service as nearly perfect as possible; many patrons do not object so seriously to paying an additional cent, but if they are obliged to pay it they certainly are justified in demanding first-class service in every respect."

OPERATING DIFFICULTIES TO OVERCOME

In discussing other aspects of the subject Mr. Brush said that the operating difficulties which had to be overcome in connection with the changes in fares were very slight and were surmounted easily.

A short while before the dates on which the increases were placed in effect Mr. Brush called meetings, which were attended by nearly all the trainmen in the employ of the various companies. At these meetings he pointed out the financial position of the roads and their necessity for some steps that would increase the net revenue. Mr. Brush showed the employees that as times had changed gross revenues had declined and the companies would have to obtain more revenue or, in lieu of that, reduce expenses. The only way in which expenses could be reduced was by reduction of wages or by decrease in the number of cars operated. The trainmen were shown that an opportunity was presented to them of assisting the company in establishing successfully a difficult but necessary change. As the men saw plainly that it was to their advantage to aid the company they supported the movement.

It had been anticipated that some difficulty would be experienced, in view of the fact that no 6-cent piece is coined, in getting the public as well as the conductors into the habit of making or giving the exact change without delay or friction. In order to prevent difficulty so far as possible, the companies issued tickets in strips of 10 for 60 cents.

Samples of these tickets are reproduced. These tickets were sold purely for the accommodation of travelers and conductors, as the rate was the same as the cash fare. While it was not known at the beginning whether the tickets would be adopted in sufficient amount to justify their continuance, Mr. Brush says it has been found that the number of ticket sales is from 15 per cent to 20 per cent larger than before the 6-cent unit was adopted. In addition to the strips of 10 tickets 50-ride books are issued, but also without discount. At each car house pennies in the aggregate amount of \$200 to \$250 were supplied, so that conductors could secure a number for change without difficulty.

(To be continued).

PRESIDENT GOODRICH'S ADDRESS

The address presented by President C. G. Goodrich at the meeting of the American Street & Interurban Railway Association Oct. 13 has been made public. It is given below:

To the American Street & Interurban Railway Association and Members of the Affiliated Associations:

The history of American street railways has been the same as that of American steam railways, one of constant change and development. Contrast the humble beginnings of our street railways with antiquated motive power, poor roadbed and track, crude equipment and cruder knowledge of what was required or the future might demand, with the magnificent systems of transportation to be found throughout the country to-day.

I think it is fair to say that the experience of any one of the street railway companies in the larger cities has been the experience of all. It can be briefly summed up as follows:

First.—The old horse car carrying from 16 to 20 passengers with one man serving in the dual capacity of driver and conductor, the passenger depositing his fare in a box provided for that purpose.

Second.—The discarding and consigning to the scrap pile of the original horse cars and light track and the substitution of larger and more modern cars and heavier track.

Third.—The discarding and consigning to the scrap pile of the entire horse railway system and the substitution of the underground cable railway system requiring power houses and new cars as well as the entire reconstruction of roadbed and track.

Fourth.—The discarding and consigning to the scrap pile of the entire underground cable railway system with all its expensive construction and appliances and the substitution of the originally invented system of street railways propelled by electric power.

Within a short time following these changes began the discarding of this original equipment of electric street railways, including power generating apparatus and machinery, track and cars, and the substitution continuously thereafter, from year to year, of the latest type of electric apparatus manufactured with high power and large capacity, heavier track and construction, as well as modern street cars. All of these changes were necessary to keep pace with the times and meet the increasing demands of both the traveling public and municipal authorities. And to-day we recognize that in the future, if we are to keep pace with the development of the industry and the territory served, the cost of maintenance and extensions, from year to year, will involve expenditures of revenues and capital considerably in excess of what we estimated only a few years ago would be necessary.

All of the enormous cost of building these separate and distinct systems of street railways complete and fully up to the then present stage of the industry only to realize almost immediately that each system was behind the times and must be thrown away, represents depreciation incident to the pioneering of a new business and of keeping abreast with the demands of travel. Who shall say that this depreciation, which is evidenced in the capital stock and bonds

of the street railway companies, represents no value and is therefore so-called "water" and not entitled to dividends from the earnings of the property at the present time? I thoroughly believe that this depreciation is one of the assets of any street railway company and should be capitalized and participate in dividends derived from the earnings of the property.

The street and interurban railway companies of America have financed themselves largely on assurances and claims of the manufacturers of street railway apparatus, both as to its cost of installation and its operating efficiency. All the companies have made the same mistakes and, to take advantage of the claims and guarantees of the manufacturers of electric railway apparatus and urged on by threatened competition and the demands of municipal authorities, have agreed to modifications and, in many cases, made concessions in their franchise rights from municipalities which are to-day the proximate cause of much of our inadequate service, public dissatisfaction and, in many cases, actual financial insolvency.

The manufacturers of electric railway equipment are not wholly to blame and should not be held responsible for all the errors they have led us into by their claims for their products, as they themselves have made honest mistakes, both in the design and manufacture of apparatus and in their guarantees as to its cost of installation, efficiency and durability. I think it is marvelous that the street railways have lived through this experience.

FARES

The Twin City lines now serve 53 sq. miles in the City of Minneapolis and 55 sq. miles in the City of St. Paul. Quite a large percentage of the passengers are carried at actual cost and some at a loss to our company. While at the present time we can possibly afford to carry the passengers as a whole, with the present area served, at a 5-cent fare, is it not a question of time, if the limits served should for any reason be extended, when we shall have to determine how far we can carry a passenger for a single 5-cent fare? Already in some of the large Eastern cities this question is beginning to receive most careful consideration.

In Massachusetts the Board of Railroad Commissioners, which has had control of street and interurban railways longer than any other similar commission in the Union since 1874, has, after long investigation and study of this problem in the densely populated district served by the Boston Suburban Electric Companies, sustained that company for one year's experiment in making an increase from 5 cents to 6 cents in the fares of the Newton system of street railways. If an increase of fares is justifiable in a densely populated district such as Boston and its suburbs, on account of the distance a passenger is carried, is not an increase of fares in sparsely settled districts with the same, or even a shorter haul, equally justifiable? I believe there are a number of cities to-day in which the street railway companies are carrying passengers at an actual loss on account of the extended area served. This subject is now a live one in New York, Philadelphia and Brooklyn, and I predict will become so in all large and growing cities in this country.

REGULATION

The question of State or municipal regulation is now confronting us. The former has been put into effect in some of the States, notably in Massachusetts, New York and Wisconsin.

Should street railway companies fear investigation by the State through commissions? I question whether there is not less to fear from fair, intelligent investigation by a State commission that could ascertain the full facts as to the cost and value of a property and its earning capacity on behalf of the public, than there is in withholding that information from the public.

By reason of a thorough, intelligent investigation and understanding of the full facts and employing proper methods of accounting under the direction of the State or Federal Government we can, I am sure, put our business on a sound and permanent financial basis and at the same time fairly convince the public that the profits from the operation of street railways are not, and never have been, as large as the public has been led to believe.

We are not to blame for the present situation of the false

education of the public in the past as to unreasonably large profits or net earnings from the street railway business. We could not help ourselves. Our accounting at the time was considered conservative, but our estimates have since proved inadequate in the light of sufficient years of actual experience. These sanguine estimates, however, proved to be the salvation of the business, as they afforded the encouragement which enabled us to keep pace with the phenomenally rapid development of the electric street railway business. These conditions included frequent and radical changes and improvements in motive power, track, rolling stock and other equipment used in electric street railways which could not be anticipated, the constant heavy investment required, disappointments due to failure to realize promised increased efficiency and economy of operation as well as the heavy demands made upon us by municipalities and the public. Fortunately the rapid increase in population and development of the cities served has tided us over while we were learning by experience how to keep our books in a manner required by the development of the business. The education and development in accounting has been as great as in any other department and could only be determined after experience. I believe we now know how to keep our books and accounts in accordance with good, sound business practice.

Only those who have been actively identified with the financial end of the street railway business for the past 25 years can have any idea of the great efforts and sacrifices which have been necessary to keep some of the very best propositions afloat. We have brought our properties to their high standard of to-day through years of struggling, fighting and working.

ASSOCIATION MATTERS

Relative to the American Street & Interurban Railway Association and its affiliated associations, I wish to say a few words. I do so with hesitation, but frankly and from the heart. What I have to say is not wholly my own idea, as the subject has been discussed at the meetings of the executive committee. Perhaps the idea may not win the endorsement of all of the member-companies of this association. However, it is what I think and believe to be for the highest good of all concerned.

I believe the American association should discontinue holding its annual convention simultaneously with those of its affiliated associations. The membership of the American association should consist only of the responsible officials of the member-companies; by this I mean president, vice-presidents, directors, general counsels or representative stockholders of member-companies.

The American association should hold one meeting or convention annually, say in the month of January, for the election of its officers, the organization of its executive committee, the discussion of subjects and the transaction of such business as might be brought before it, as well as to consider plans for and direct the work of the affiliated associations for the ensuing year.

The executive committee should consist of the president and the three vice-presidents of the American association, the president of the Accountants' Association, the president of the Engineering Association, the president of the Claim Agents' Association, and the president of the Transportation and Traffic Association, the same as at present.

Let the affiliated associations maintain their present organizations and hold their annual conventions. Let each affiliated association select for its secretary the secretary of the American association. The responsibility for directing the work of the affiliated associations should be placed in the hands of the executive committee of the American association.

It seems to me the greatest good could be accomplished if the affiliated associations should hold their annual conventions independently, each one at such time and place as will best suit the convenience of the majority of its member companies. Is it not wholly impractical and often hazardous to let the heads of all your departments be absent from their duties at the same time? Such conventions or meetings should be continued until the business before them is all done, no definite time being set for adjournment. Such conventions, being comparatively small, could well afford to meet in different parts of the country

each year without excessive expense to the delegates or the convention, with positively no disturbance or embarrassment to the member company in whose city the meeting was held. Personally, I believe the attendance and interest taken by delegates in the convention would be much greater, more actual work would be done, and more valuable results would be accomplished if the delegates' attention was not diverted by exhibits and entertainments. The proceedings at these meetings can be conducted along business lines, and the delegates appointed by the member companies to attend the meetings should be required to attend all sessions, and not have their attention diverted from the work in hand.

Is not this plan one promising more actual, effective results? Cannot the street railway business be better served with such a compact plan? Can we not all see the impossibility and impracticability of continuing the present organization of the association if we are to keep up with the times?

I have understood that the manufacturing companies have hesitated each year in agreeing to incur the necessary expense incident to the making of exhibits at conventions, and have often questioned their value and wisdom. These companies, I honestly believe, will firmly indorse the position of this association in discontinuing the exhibit feature. The world moves, and we must move with it. Exhibition and entertainment features at conventions have, in my opinion, seen their day, and should be relegated to history. If this plan is approved and put into effect, it will mean the disbanding of the Manufacturers' Association and the discontinuance of exhibitions at annual conventions. In this way the expense of the conventions of the affiliated associations will be greatly reduced. The money thus saved can be used by the secretary under the authority of the executive committee in extending the work already inaugurated of gathering and compiling valuable information for the use of all member companies.

If the plan which I have outlined in a general way meets with approval, the details can be worked out by such a committee as you may desire to have appointed for that purpose, and a perfected plan for a compact, harmonious and business organization can be put into effect without delay. Were we to consult the responsible men at the head of the various departments of our respective companies of which the affiliated associations are now composed, I am confident they would approve of the course I recommend.

I desire to call your attention briefly to the question of dues for membership in the American association for both active and associate members, and suggest that at this time it might be advisable to give this question careful consideration and appoint a committee, of which the secretary of the American association should be a member, to consider carefully the rates of membership dues and report at the next meeting of the American association.

The annual report of the secretary-treasurer will show in detail the work accomplished by your association during the past year, the number of active and associate members, and the financial statement at the close of the year. It is a record of a hard year's work, with valuable results accomplished, and I urge that every member of the association make a careful study of it.

I cannot close my remarks without taking this opportunity of most heartily commending the work done by our very efficient secretary, B. V. Swenson. His energy and untiring efforts in behalf of the association are an example which we might all follow with profit to the companies we represent.

A proposal has been introduced into the Peruvian House of Senators for the electrification of the Central Railway of Peru for the purpose of increasing the traffic capacity and facilitating the exportation of minerals. It is intended to utilize the existing stock by running electric and steam trains alternately.

The Cape Electric Railways have suffered considerable loss of business the past year, due in part to the financial depression, and also, it is claimed, to the competition of the Cape Government Railways.

NEW STANDARD CAR FOR THE METROPOLITAN STREET RAILWAY, NEW YORK

As announced in a previous issue of the *ELECTRIC RAILWAY JOURNAL*, the receivers of the Metropolitan Street Railway Company of New York City have placed orders with the J. G. Brill Company and the Jewett Car Company for 125 closed cars to be delivered in December. These cars are of a new type, which is the result of an investigation covering the past five months into all conditions of street railway service in this locality and into all standards of cars and equipment used by large systems of the country.

As is probably well known, the Metropolitan Street Railway Company has clung more closely since it commenced electric operation to certain types of cars than probably any other large company. These types, up to a year ago, were four in number, namely, single truck and maximum traction double truck, closed and open cars, all cars of each type being practically duplicates in every particular.

Last fall Oren Root, general manager, after a careful investigation into the operations of the pay-as-you-enter car, and in spite of misgivings as to its adaptability for

the best points of all American types. This investigation was made along three lines, as follows:

1. Data were obtained from 20 of the largest American street railway systems concerning present car standards.
2. Tests and records were made of all of the present Metropolitan Street Railway standard cars.
3. Practical tests were made of various operating devices on cars of the Metropolitan Street Railway by the mechanical and transportation departments.

A brief outline of the results obtained is as follows:

STANDARD TYPES OF AMERICAN CARS

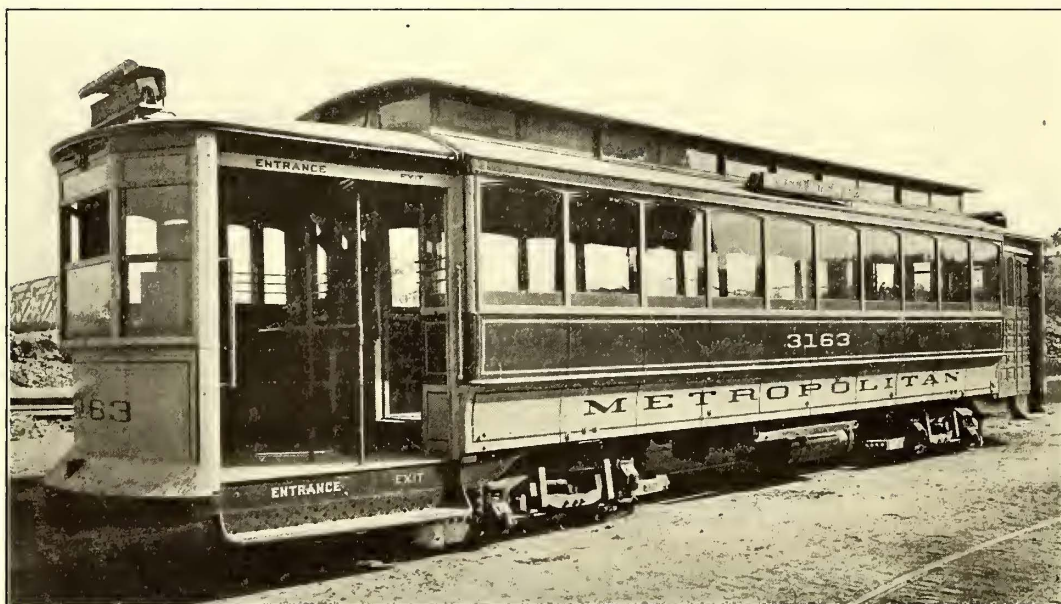
The present standard cars of the Metropolitan Street Railway as regards size, carrying capacity, weight and motive power are outlined in the table on page 1502.

The same information was obtained from all companies operating in cities of more than 250,000 inhabitants (exclusive of Cleveland).

From this it was found that the weight of empty cars per seat varies from 660 lb. in the Metropolitan single-truck car to 1397 lb. in the pay-as-you-enter cross-seat four-motor car. With the double-truck cars used

largely as standard throughout the country, this weight varies from 788 lb. in the Metropolitan maximum traction double-truck two-motor car to 1244 lb. in the heaviest double-truck standard four-motor car. The extra weight of the large platforms used in the pay-as-you-enter cars, and particularly the decrease of seating capacity with this type of car due to present arrangement of entrance and exit doors, is clearly reflected by the large weight of empty car per seat, which is

characteristic of this class of car. This is particularly noticeable with the Metropolitan pay-as-you-enter car, due to the fact that the seats are longitudinal, so that with the present standard pay-as-you-enter doors six seats are lost.



New Standard Closed Car of the Metropolitan Street Railway Company

metropolitan service, ordered 155 of these cars, which were placed on the Madison Avenue line. These met with instant success with the public, the car men and financially, so that Mr. Root's judgment was justified.

At the same time that the pay-as-you-enter cars were ordered last fall, 80 standard maximum traction double-truck closed cars were ordered, with more powerful motors than previously (two GE-210). While the pay-as-you-enter cars with four motor equipments have given satisfactory operating results, it was felt that the added weight of these cars in comparison with the lighter standard two-motor maximum traction equipments was expensive, particularly for maintenance and power. The company was therefore undecided as to the type upon which it should standardize. Accordingly, it was decided to have the matter given careful study, and Ford, Bacon & Davis were employed as consulting engineers to develop the facts upon which a standard car could be designed which might be a compromise between the desirable features of the pay-as-you-enter four-motor car and the standard double-truck two-motor car, and which would for New York City conditions embody

TESTS OF METROPOLITAN STANDARD CARS

Length of car stop.—A series of tests was made to determine the length of car stop of the five present standard Metropolitan cars (including pay-as-you-enter cars), to ascertain the comparative length of stop at point of busiest interchange and also at the heaviest loading terminal points, and the heaviest unloading terminal points on principal longitudinal and crosstown lines. For this purpose a record was obtained from 6 a. m. to 8 p. m. of the number of passengers on the cars at each stopping point, number of passengers leaving the car at each exit, and the number of passengers boarding the car at each entrance, together with the length of stop. These records were plotted as curves, and from them it was developed that for the average stop, the speed of loading and unloading for the double-truck standard car was slightly less than the pay-

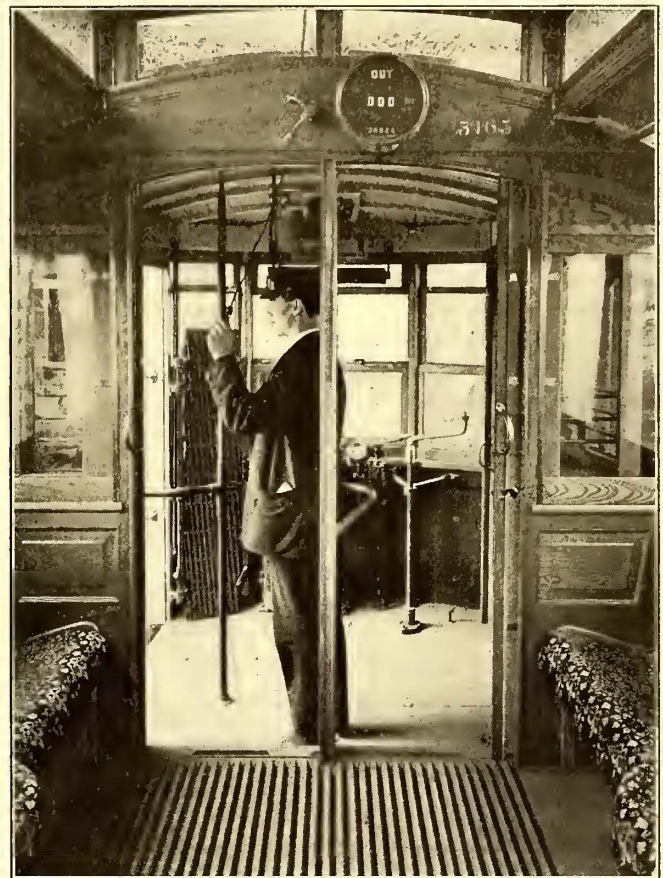
as-you-enter car, while for the double-truck open car the rate was almost double that of the closed cars.

Car acceleration.—A test was made of the acceleration and braking of each of the standard types of car empty, also with dead load equal to seated number of passengers. These tests were made on a special test track, with dry rail and with wet rail, it being especially desired to show the relative acceleration and braking of the pay-as-you-enter and double-truck closed cars, this being a trial of the comparative merits for acceleration of four-motor all-wheel traction and two-motor maximum traction equipments. From these tests it was determined that the acceleration of these cars was practically the same for dry rail, while for wet rail the maximum traction truck showed a considerably reduced acceleration. The influence which acceleration exercises on the schedule speed is, however, not as important as often considered. From a practical

each traffic subdivision. A record was also made of the number of passengers on the car at start and boarding and leaving car at each platform for each stop, from which the average load upon the car for each type was obtained. From the electrical records the relative current consumption in watt-hours per ton-mile for each trip was obtained. The test on each line and for each type of car covered the heavy part of the day, approximately 6 a. m. to 8 p. m., with an hour off in the middle of the day. As far as possible, the same motorman, conductor and observers were used for all tests, the car being one in regular service. Temperature readings were made at the end of each trial run. From these records it was found that the current consumption of the pay-as-you-enter four-motor car in watt-hours per ton-mile was about 10 per cent higher than the double-truck closed car. These figures, multiplied by the weight of each car with average load, give the equiva-



Metropolitan Standard Car—Front Platform, Showing Folding Seat for Passengers



Metropolitan Standard Car—Rear Platform, Showing Position of Conductor

standpoint the maximum traction truck car can operate on wet days the schedule required by the service.

Power consumption.—Tests were made of power consumption on the lines already mentioned, using the double-truck closed car as a standard and making comparison with the other four types of car on these lines. Each line was divided at important traffic points into sections about one mile in length, and a record of power consumption by integrating wattmeters was obtained at each traffic subdivision of the line and at terminals. Graphically recording wattmeters were used to check the integrating wattmeters, and graphically recording voltmeters were also used. For each single trip complete passenger and stop records were made, covering time of leaving and arrival at terminal, time of stopping and length of each stop; also time of arrival at

lent kilowatt-hours per car-mile of each car, which consequently was considerably less for the two-motor car.

PRACTICAL TESTS OF OPERATING DEVICES

Due to the large value of each additional seat in a street car during 18 hours out of the 20 of which it is in use as developed by this investigation, it was decided to make various tests on movable seats to be located at the corners inside of the present pay-as-you-enter car and also upon the front platform. The operating officials of the company developed from tests of a number of the different devices of this character the desirability of one folding seat inside the car and five folding seats on the front platform. Tests were also made upon a number of other operating devices used in connection with the pay-as-you-enter car and a

sample car was constructed to show the adaptability and cost of the present pay-as-you-enter platforms to the Metropolitan double-truck standard car. Finally, based on the development of the new type of car from the above considerations, a sample car was constructed embodying the principal points which it was desired to test. This car is No. 3163, which has been operating on the Madison Avenue line since July 18.

The novel features of this car, which have proved so satisfactory as to determine their use in the 125 cars just purchased, are outlined below in the description of the car which was finally bought. The sample car had a 28-ft. body, but this was lengthened in the car finally determined upon to 32 ft.

RESULTS OF EACH TYPE OF CAR

The determination of the standard car was between the following types:

1. Present double-truck closed car.

It was found, however, that the type of doors on the present pay-as-you-enter cars, due to the elimination of six seats, would have to be modified. Two modifications were considered, namely:

First, to remove the bulkhead doors entirely, leaving the platforms open to the body of the car and having sliding entrance and exit platform doors. This type of car might be designed along the lines of the Boston car, where the platform is of the same height as the car floor, where the use of two steps is necessary, or it may be designed similar to the cars which are being developed by the Philadelphia Rapid Transit Company, where drop platforms are used with a special device for closing the opening below the sliding platform doors.

Second, independently operated doors could be used in the center of the bulkhead. In other words, the usual style of double-center entrance doors could be used, each door operating independently, either with or without a stanchion

DIMENSIONS OF PRESENT STANDARD CARS

METROPOLITAN STREET RAILWAY COMPANY

A—Size:		Closed, Single Truck—Brill	Closed, Double Truck—Brill	Closed, P.A.Y.E.—Brill	Open, Single Truck, 10 Bench—Brill	Open, Double Truck, 12 Bench—Brill
1	Type of Car and Make.....	Closed, Single Truck—Brill	Closed, Double Truck—Brill	Closed, P.A.Y.E.—Brill	Open, Single Truck, 10 Bench—Brill	Open, Double Truck, 12 Bench—Brill
2	Length over Corner Posts.....	22' 0"	28' 0"	32' 0"	23' 4"	28' 0"
3	" " Bumpers.....	32' 3"	37' 2"	48' 0"	32' 3"	37' 9"
4	Width over all.....	7' 10"	7' 9"	8' 3 1/2"	{ 7' 11" over handles 8' 2 1/2" " steps	{ 8' 4" over handles 8' 5 1/2" " steps
5	Height (head of rail to top of roof).....	10' 8"	11' 1"	11' 5"	10' 11 1/2"	11' 1 1/2"
6	Length of Platform (inside).....	4' 2"	4' 0"	7' 6"	{ 3' 9" Body 3' 9" Platform	{ 3' 8 1/2" Body 3' 7 1/2" Platform
7	" " Step (size of opening).....	34 1/4"	34 1/2"	{ 60" Rear 27" Front	{ 3' 9" Body 3' 1" Platform	{ 2' 8 1/2" Body 2' 11 1/2" Platform
8	Width of Aisle:					
	A—Between Longitudinal Seats.....	42"	41"	47"	.....	.....
	B—" " Backs of Cross Seats.....	.....	.....	.....	.....	.....
9	Length of Cross Seats.....	.....	.....	.....	.....	.....
10	Center " ".....	.....	.....	.....	.....	.....
11	Kind of Brakes and Make.....	Hand	Hand	G. E. Air	Hand	Hand
B—Carrying Capacity:						
1	Longitudinal Seat Capacity.....	28	36	36	50	60
2	Cross Seat Capacity.....	..	..	..	50	60
3	Total Seated Capacity.....	28	36	36	50	60
C—Weight:						
1	Weight of Car Body.....	9,050 lbs.	13,480 lbs.	24,868 lbs.	9,810 lbs.	13,180 lbs.
2	" " Trucks.....	5,530 "	8,250 "	12,682 "	5,530 "	7,650 "
3	" " Electrical Equipment.....	3,914 "	6,650 "	10,320 " (Motors)	3,914 "	6,000 "
4	Total Weight of Car Equipped, empty.....	18,494 lbs.	28,380 lbs.	47,870 lbs.	19,254 lbs.	26,830 lbs.
D—Motive Power and Trucks:						
1	Make and Type of Motors.....	G.E.-1000	G.E.-210	G.E.-80	G.E.-1000	G.E.-57
2	No. of Motors per Car and H.P.....	2-34 H.P.	2-55 H.P.	4-40 H.P.	2-35 H.P.	2-50 H.P.
3	Total Motor Horse Power per Car.....	70 "	110 "	160 "	70 "	100 "
4	Make, Type and Wheel Base of Trucks.....	Brill—Single Truck	Brill No. 22—Max. Tract., 4' 0"	Brill 27-9-E. 1 4' 0"	Brill—Single Truck	Brill—Max. Tract.

Note.—Total weights from actual weighing of cars.

2. Present 32-ft. pay-as-you-enter four-motor car.

3. Proposed 32-ft. prepayment two-motor car.

The number of seats and weight of each of these three types of car is as follows:

	Seats, including platform seats.	Weight of car empty, tons.	Weight per seat, lb.
1.....	36	14.19	788
2.....	42	23.93	1,140
3.....	47	19.00	809

From above it will be seen that with the present pay-as-you-enter car it is possible to reduce the weight per seat by the addition of platform seats from 1330 lb. per seat to 1140 lb. per seat, and in the proposed new car this figure is still further reduced to about 800 lb. per seat.

From the above data the determination of the new standard was made. Eliminating unimportant details, the three principal points decided upon were as follows:

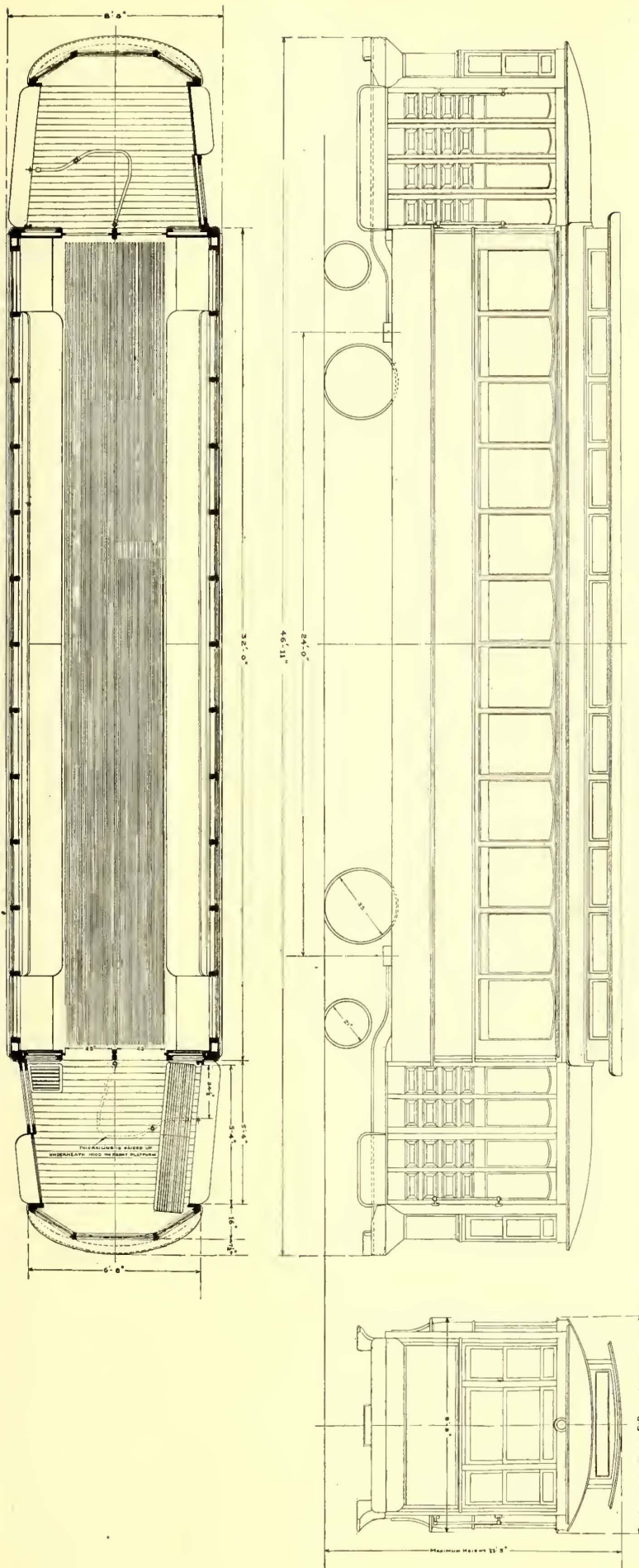
PLATFORMS

A careful consideration was given to the effect of the prepayment feature upon receipts, accidents and schedule, and the decision was in favor of the prepayment platforms.

between the doors. With a maximum allowable width over the corner posts of 8 ft. with this type of door it is necessary to have telescopic doors which fold into or roll past each other, similar to elevator doors.

The second type of car was decided upon by reason of its extreme simplicity and the fact that present standard car bodies could be developed more readily into this type of car. The sample car of this type, No. 3163 on the Madison Avenue line, has proved that cars with this type of door can be handled more readily than the present pay-as-you-enter type, are more convenient to the public and require less time for the stop at heavy interchanges. The elimination of the hinged door of the present pay-as-you-enter car is also considered an improvement, as is also the removal of the center section of the bulkhead, which in the present pay-as-you-enter car is an invitation for passengers to stand just inside the rear car door. The new design also permits the use of a wide entrance bulkhead door, which is a great advantage where the width of car over corner posts is limited to 8 ft. These rear-entrance and exit bulkhead doors can be left open except during extremely

Metropolitan Standard Car—Plan, Side and End Elevations



cold days in the winter, thus enabling the conductor to have better control over his car-load by enabling him to call streets, etc.

The net results of the prepayment platform upon receipts, accidents and schedule has been found to be favorable and is believed to counterbalance financially the extra cost and weight of this platform and type of car.

MOTOR EQUIPMENT: TWO MOTORS VS. FOUR MOTORS AND MAXIMUM TRACTION TRUCKS VS. STANDARD DOUBLE TRUCKS

After a thorough consideration of this subject, based upon data obtained as above, it was determined to use two-motor equipments with maximum traction trucks, this decision being based principally on the largely added cost of operation of the four-motor car, and also because of the following points: The height of step for the maximum traction truck is 15 in. as compared with 18 1/4 in. for the standard double truck. It was decided to reverse the usual position of the maximum traction trucks so that the driving wheels are toward the center of the car, thus obtaining additional distance between truck centers, which is equivalent to 10 in. less overhang of the car platforms on the shortest radius track curves, and which also permits the lightening of weight of the car trusses and sills. It is also possible for the underground conduit electric system used in New York City to support the underrunning plow between the axles of this truck instead of extending it on a cantilever support, as is the present practice. It is believed that this will decrease the amount of plow trouble.

From practical experience with the maximum traction truck in New York City, where grades are not severe, the company has found that the number of derailments and push-ups is no more serious than with the standard four-wheel double truck. The amount of slippage of wheels with the maximum traction truck during the above tests was accurately measured by recording the number of revolutions of a given circumference of wheel, both on wet and dry track, and it was found that even with wet rail the slippage was negligible. This entails a theoretically greater power consumption for the maximum traction truck car, but from tests to which previous reference has been made, it was found that the power consumption per ton-mile is not greatly different in the two types. From a practical standpoint it has been found that the maximum traction truck on wet days does not cause sufficient slippage to interfere with the operation of the company's regular schedules.

The type of maximum traction truck decided upon differs materially from that heretofore standard on this system. It is practically the same as the usual standard short wheelbase double truck, with the use of two small wheels and with kingpin and bolster

placed slightly off center toward the driving wheels, thus giving more traction on the driving wheels.

DESCRIPTION OF PROPOSED METROPOLITAN STANDARD CAR

The general arrangement and dimensions of the new type of car finally decided upon are shown in the accompanying plan and photographs. The general dimensions of the car are as follows:

1. Length of car over body corner posts, 32 ft.
2. Length of each platform, from the end of car body to the outside of dash, measured on the center line of car, 6 ft. 10 in.
3. Length of car over bumpers, 46 ft. 11 in.
4. Width of car at sills, including panels, 7 ft. 4 in.
5. Width of car over posts, 8 ft.
6. Width of car at widest part, 8 ft. 3 in.
7. Height from rail to top of roof not to exceed 11 ft. 5 in.

As will be noted, the principal change from the present type of pay-as-you-enter car is the arrangement of doors in the end bulkhead. The new car has the doors in the usual manner except that a stanchion is placed between the doors to separate the incoming from the outgoing passengers. This stanchion could probably be omitted, making the double doors meet at the center, although each door would have to operate independently. The clear opening of each of these doors is 23 in., and with a car of this width it is necessary to use a collapsible door, which in this case is of a telescopic design.

With a car of this width it is also necessary, in order to allow a line of entering passengers and a line of departing passengers to pass each other and at the same time not interfere with the knees of the passengers seated directly at the door, to have the end seats in the car slightly recessed. This means that the end seats must have straight backs and the end side windows be stationary and not dropped. Additional space is obtained by leaving out the paneling under the seats, as can be seen in the interior views of the car. This enables passengers to draw their feet under them and, in fact, to store bundles and satchels under the seat, besides somewhat lightening the car and enabling better access to the cables.

The folding seats on the front platform are plainly shown. The rail which on the rear platform separates the incoming from the outgoing passengers is made so as to slide upward on three iron pipe stanchions, so that on the front platform this rail is pushed up out of the way, as shown in the illustration. The side view of the car shows the reversal of position of the maximum traction trucks from that generally used, which reversed position permits the greater length of truck centers and less overhang.

The general design of the car otherwise is similar to the usual Metropolitan standard as to external appearance, interior finish of ash, etc. Some of the details of the car, however, have been changed, as follows:

Ventilator sashes are glazed with white wired glass.

Six illuminated Hunter signs are used, namely, one at each end of car in upper center vestibule sash, one at each end monitor sash and one at each side center monitor sash.

The car color will be the new standard green for both panels and letter board, striped with aluminum and with upper posts and roof of cream.

The Prussian Minister of Works, Herr Kabrierske, of Berlin, at the fifteenth conference of the Permanent International Tramways Union, held at Munich recently, stated that within 15 years in Prussia alone not less than 8000 km of light railways and 3000 km of tramways had been laid.

COST OF LIGHT AND HEAVY CARS IN RAILWAY OPERATION

L. H. Parker, of the Stone & Webster Engineering Corporation, submits some comparative figures in a recent issue of the *Public Service Journal* on the subject of semi-convertible cars vs. a mixed equipment for a city and suburban service. He bases his estimate for the semi-convertible equipment on a 52-seat car weighing 28 tons to 30 tons light and for the mixed equipment upon a 25-ft. box car for winter and a 10-bench to 12-bench open car for summer, each weighing from 12 tons to 13 tons light. The comparison follows:

		Investment	
Equipment consisting of 50 semi-convertible cars for all-year-round service. Each car seats 52 and can carry 100 with standing load.		Equipment consisting of 50 summer open cars (12 bench) and 72 25-ft. body closed cars seating 34 and carrying 70 passengers, including standing load.	
Power Sta. 2500 kw @ \$150.....	\$375,000	Power Sta. 2000 kw @ \$150.....	\$300,000
Car House 30,000 sq. ft. @ \$2.50.....	75,000	Car Houses , one 30,000 sq. ft. @ \$2.50..	75,000
Cars , fifty semi-convertible cars completely equipped with two 75-hp or four 40-hp motors, heaters, pneumatic door-opening device, air brakes, etc., @ \$8,000.....	400,000	One 25,000 sq. ft. @ \$1.50	37,500
		Cars , fifty 12-bench open cars, each equipped with two 30-hp motors @ \$2,500 ea.....	125,000
		Seventy-two 25-ft. body box cars, ea. equipped with two 30-hp motors @ \$3,500 ea.....	252,000
Total	\$850,000	Total	\$789,500
Yearly Cost of Power, Wages, Maintenance, Depreciation and Fixed Charges			
Power Cost 9,125,000 kwh at cars @ 1.5c. per kwh.....	\$136,875	Power Cost 4,790,625 kwh at cars @ 2c. per kwh.....	\$95,812
Maintenance of Cars and Elec. Equip. 1,825,000 car. mi. @ 1c.	18,250	Maintenance of Cars and Elec. Equip. 1,916,250 car mi. @ 1.15c.	28,743
Maintenance of Power Plant 2500 kw @ \$2.....	5,000	Maintenance of Power Plant 2000 kw @ \$2.....	4,000
Wages — Conductors and Motormen 1,825,000 car mi. @ 4½c.	82,155	Wages — Conductors and Motormen 1,916,250 car mi. @ 5c.	95,812
Depreciation , an average of 5% on all items of above investment	42,500	Depreciation , an average of 5% on all items of above investment	39,475
Fixed Charges 7% of investment.....	59,500	Fixed Charges 7% of investment	55,265
		Total	\$319,107
		Difference	25,173
Total	\$344,280	Total	\$344,280

In explanation of various features Mr. Parker stated that the mileage per car per day was taken as 100 and that the same schedule was assumed during 14 hours of the 18, with an increase of 44 per cent in mileage for four hours during six months only for the mixed equipment. The cost of power was placed higher for the mixed equipment because of the poorer power factor, for maintenance because of the lighter construction and for wages because of the larger extra list required by the mixed equipment. For the latter equipment both an operating and a storage car house were provided. Fixed charges are based on 5½ per cent for interest and 1½ per cent for taxes and insurance.

The Tramway Company of Constantinople will electrify its lines shortly, and has placed its contracts in France.

THE INSTALLATION AND PROTECTION OF TELEPHONES FOR ELECTRIC RAILWAY SERVICE

BY FRANK F. FOWLE

The use of the telephone for train dispatching and general communication on interurban electric roads is now almost universal. The practices which have grown up under such use are naturally varied according to local conditions and individual needs. The methods of communicating with train crews require the use either of portable or stationary types of telephone set, in conjunction with a transposed metallic circuit extending from the dispatcher's office or the private exchange switchboard to the end of each operating division. Portable sets are intended for transportation upon trains, connection with the line being secured by means of cut-in or so-called jack boxes. These boxes are installed periodically along the road at mile or half-mile intervals and at station stops, at sidings on single track and at junctions, and have permanent connection with the telephone circuit. The portable type of set is provided with a cord and a device for connecting with the stationary boxes. Sometimes the box is equipped with a plug, and the portable set with a jack concealed in a hollow handle which slips over the plug and is connected to the end of the cord. The more common arrangement is a jack in the stationary box and a plug connected to the cord of the portable set. No protective device is now commonly used in these boxes containing jacks or plugs.

Another method of securing connection with the line is by means of a so-called "fishpole," which is equipped with one and, sometimes, two contacts for engaging the line wires. This device is generally made in sections for convenient transportation, and equipped with metal joints and a considerable length of flexible conducting cord.

When portable telephone sets are not used, or if carried are employed only in emergencies, stationary sets are installed at all points at which trainmen will have daily or occasional need of communication with the dispatcher or the trainmaster. Such telephones are installed in a large variety of ways, sometimes protected, but often not; they are used occasionally in conjunction with semaphore train order signals which are under the direct control of the train dispatcher, for the purpose of stopping trains for orders. The telephone line itself is of well-known construction and needs no description; the important feature in regard to it is the choice of the material and the gage of wire, which together give the desired volume of transmission for the smallest annual cost, in interest, depreciation, maintenance and taxes.

PORTABLE VS. STATIONARY TELEPHONES

The question in any given instance of whether portable or stationary types of set should be adopted is affected by numerous considerations, among which the following are important:

1. Length of road.
2. Single or double track.
3. Frequency of schedule train service.
4. Frequency of irregular or extra train service.
5. Use of automatic or manual block signals.
6. Number of train registry offices and points at which train crews must report to the dispatcher.

These six elements are factors in determining the probable amount of use of the telephone for transmitting train orders and reports. On long roads with infrequent train service and few extra trains, it will usually be the case that the cost of telephone equipment will be a minimum if portable sets and jack boxes are adopted; the first cost

of a portable set is not materially different from the cost of a stationary set, usually a trifle less, and the cost of a jack box is only a fractional part of the cost of a set. A typical jack box installation is illustrated in Fig. 1. The chief advantage of portable sets for exclusive use is economy in first cost. The design of a compact, light portable set with a full complement of telephone equipment is a very difficult matter, and some compromise between weight or cumbersomeness and the amount of equipment is often necessary. Opinions differ, moreover, as to what constitutes the best compromise. Telephones for railway service are commonly subjected to rough handling, and are therefore more ruggedly built than the ordinary telephone; hence a substantial portable set with a full complement of equipment and batteries is very likely to be heavy and cumbersome. The battery cannot be done away with, because common-battery working on long open wire lines is

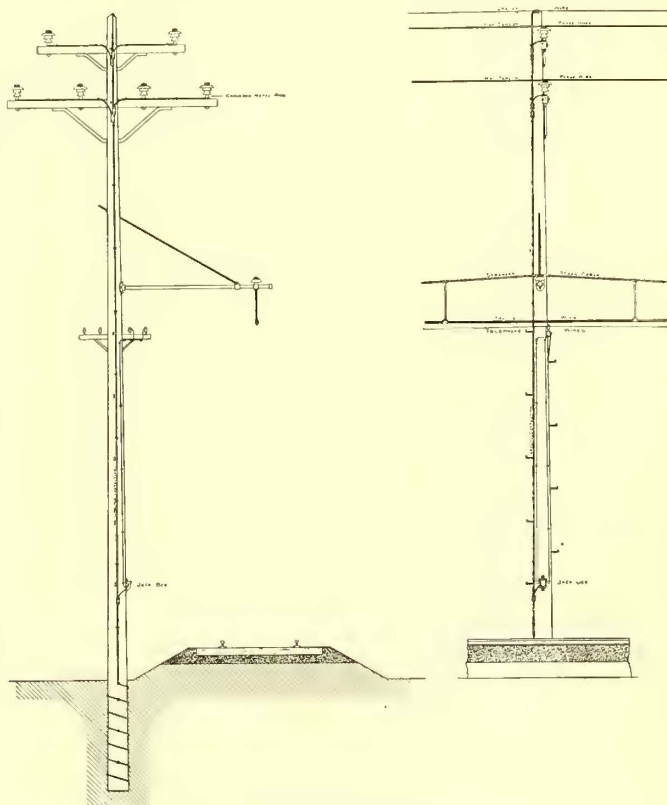


Fig. 1.—Jack Box Installed on Pole

impracticable. Portable sets are commonly carried in the motorman's vestibule or compartment. In case the poles along the road are located near enough to the tracks so that the motorman can plug into a jack box without leaving his car, the use of portable sets is much facilitated, and some of the objections to them disappear. In most cases, however, it is necessary for the crew to leave their train to plug into a jack box, and then there are the following objections to portable sets:

1. The set becomes a physical burden when used frequently.
2. No privacy is possible, and passengers may overhear orders and reports.
3. In stormy weather the crew is wholly exposed while using the telephone, and naturally will make a minimum use of it.
4. When a train has just arrived at a meeting or passing point in stormy weather, and the opposing or superior train is late, the crew may delay using the portable set in the hope that the other train will arrive in a few moments,

whereas they may be losing time in case the dispatcher has orders for them to proceed.

The following objections refer to portable sets in general:

5. If a portable set becomes deranged, no communication is possible until another train arrives.

6. In case of a train wreck, the portable set in the motorman's compartment is apt to be damaged at a time when its use is most necessary.

The last objection can be overcome to a degree by very substantial construction of the set (although this increases its weight), and by carrying it in some other part of the car. The use of a "fishpole" for making connection with the telephone circuit at any point along the road is most valuable in securing prompt relief in case of train accidents. No satisfactory device has appeared for making connections under all conditions with both wires of a metallic circuit by one pole; the use of two poles is now

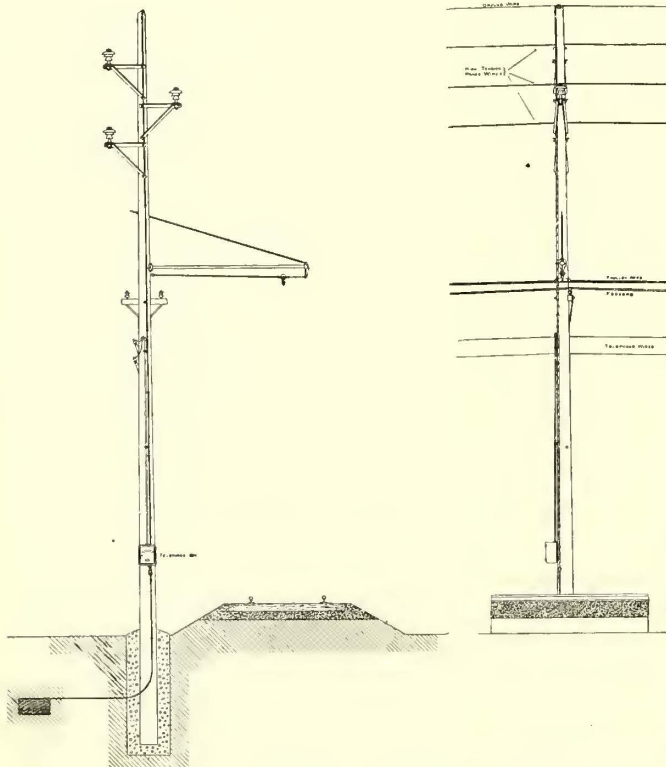


Fig. 2.—Stationary Telephone in Weatherproof Box on Pole

the most convenient plan. The fishpole method of connection is very satisfactory when used in the daylight by an employee who can distinguish with certainty between the telephone circuit, the feeders and the high-tension wires, which are frequently on the same poles. At night, however, there is great danger in case the telephone circuit is within a few feet of the feeders or the high-tension wires, and connection should not be attempted unless strong artificial light can be obtained.

The stationary type of set is commonly enclosed in a weatherproof iron case and locked. Such sets are often installed on a pole as shown in Fig. 2, but there are still the objections cited above in 2, 3 and 4, which must be overcome. This is done by installing the set in a booth or cabin, which serves to give the telephone set additional protection, to insure privacy and to protect the crew; order blanks may also thus be kept dry and a suitable place provided for filing copies of orders, later to be collected and examined by the superintendent. Fig. 3 shows such a cabin, arranged so that the door may be

locked with a switch lock, and equipped with electric lights operated by the trolley current. Stationary sets in frequent daily use are best installed as shown in Fig. 3, but for intermittent and irregular use, the expense of a cabin is not always justified, and the set may be installed on the pole, as shown in Fig. 2. One of the great advantages of stationary sets is their availability for use by section foremen, inspectors and linemen.

The most comprehensive telephone service can be obtained by the combined use of stationary and portable types of set; stationary sets installed in cabins should be used at points where the telephone is used daily with considerable frequency; iron box sets installed on the poles may be used at other places, if desired, where less use is made of the telephone. Every train may be equipped with a substantial portable set of very rugged design, carried in the emergency tool box, supplemented with a double fish pole outfit and a reel of flexible conducting cord; jack boxes may be installed along the road as frequently as desired. The portable set, under such circumstances, is intended only for emergency use, and therefore its bulkiness or weight is not especially disadvantageous; moreover, the set is then transported in a much safer place than the motorman's vestibule, and its readiness in emergencies is much more certain.

PROTECTION OF THE TELEPHONE LINE

The telephone line itself, while of simple standard construction, is located often within a few feet of the high-tension transmission and always within a few feet of the trolley wire, subject always to the danger of accidental physical contact with the trolley, the feeders or the high tension, caused by the breakage of any one of them, and further subject to inductive interferences, which are extreme on single-phase roads. The telephone line must operate under a group of conditions which are the most difficult encountered anywhere, so far as dangerous exposure and interference are concerned. The matter of protection to the equipment and to persons using it, both from lightning and from foreign currents of potential ranging anywhere between the trolley voltage and the high-tension voltage, requires ample consideration. The protective device which has become standard in telephone work consists essentially of three parts, as shown in Fig. 4. One of these is a circuit-opening device which is commonly a fuse; the second is an arrester or air-gap to ground which is adjusted to break down at approximately a known potential that is regarded as the safe maximum; the third is a heat coil or circuit-grounding device, which operates on currents that are so weak they will not blow a fuse, and are dangerous only when permitted to flow for considerable periods so that they overheat delicate apparatus. In theory, the action of the heat coils is to protect the apparatus against prolonged currents of just sufficient magnitude to overheat its windings, such currents being much below 1 amp and consequently below the range of fuse protection. The action of the arresters is to break down and provide a shunt circuit to ground for potentials exceeding a predetermined critical value that is regarded as the limit of safety. The fuses serve to open the line after the arresters break down, in case currents of a predetermined and dangerous magnitude flow in from the line to the arresters and thence to ground. Heat coils are not generally regarded as necessary for railway telephone sets; the common protection consists only of arresters and fuses.

The construction of the arrester is generally two carbon blocks separated by a thin sheet of mica having a small

hole so located as to form a gap between the carbon blocks, one of which is connected to line and one to ground; the thickness of the mica regulates the breakdown voltage. Discharges across the gap dislodge particles of carbon, which in time form a partial or a complete short-circuit between the blocks, and it therefore becomes necessary to clean the arrester at periodic intervals, dependent upon the season of the year and the period during which electrical storms occur. A vicious discharge across the gap usually leaves a partial or complete short-circuit behind it. The use of such arresters at isolated points along a telephone line has been found to cause much interruption to service, because of the time consumed in sending repairmen out to clear grounds in them. They further require considerable attention on periodic inspections and thus increase the maintenance costs. Metal blocks have been tried in place of the carbon and are superior, but no arrester is in general use for telephone protection which is self-restoring and requires no attention. A further difficulty arises from blowing of the fuses as a result of discharges through the arrester to ground, caused by lightning, when the gap is set for only a few hundred volts—300 to 400. Such discharges are transitory and the loss of the fuses is incidental rather than necessary, the result being an interruption to service when next the telephone is needed. If the gap is increased and the size of the fuses also increased until the lightning annoyance is obviated, the amount of protection will have been very much diminished.

GROUNDING TELEPHONE SETS

Stationary sets of the iron-box type are often constructed so that they are connected to line only when the door is open, and when the door is closed are wholly disconnected,

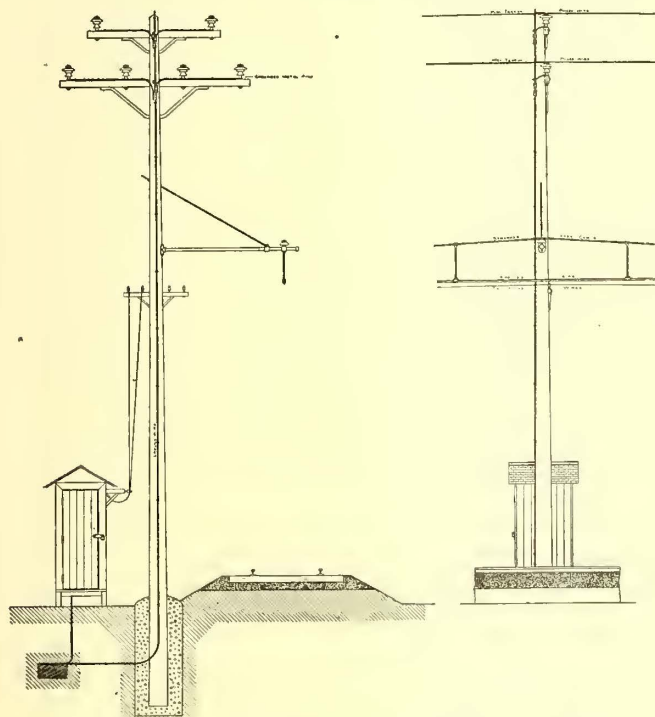


Fig. 3.—Installation of Stationary Telephone in Cabin

or only a bell is connected to line; in such cases the protector is usually connected to the telephone set, rather than the line, affording protection while the telephone is in use and disconnecting the arrester from the line at other times. The use of arresters is dependent upon obtaining good earth connections. When the poles are set in earth, a fairly good earth connection may be obtained by wrapping the ground wire about the butt of the pole, before setting;

a flat copper strip is the superior form of conductor to use, iron being of high apparent resistance and inductance to oscillations of the extremely high frequency which occur with lightning. When poles are set in concrete, the earth connection should be made at some point outside of the concrete. The resistance of any earth connection can be measured in a simple manner by driving down two temporary grounds, some distance apart, and measuring the three grounds in three pairs; if the measured resistances or impedances of the respective pairs are

$$Z_1 + Z_2 = A \tag{1}$$

$$Z_2 + Z_3 = B \tag{2}$$

$$Z_3 + Z_1 = C \tag{3}$$

the respective resistances, or impedances if a.c. current is used, will be

$$Z_1 = \frac{A - B - C}{2} \tag{4}$$

$$Z_2 = \frac{A + B - C}{2} \tag{5}$$

$$Z_3 = \frac{-A + B + C}{2} \tag{6}$$

The metal box or housing of stationary sets and jack boxes should be grounded in order to fully protect employees from accidental shocks, caused by crosses between

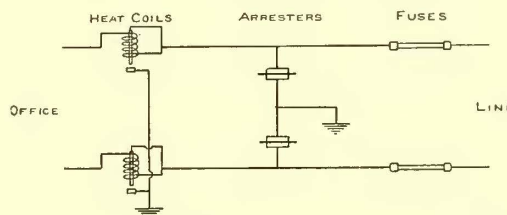


Fig. 4.—Protective Device for Telephone Circuits

the telephone line and the trolley feeders. The type of insulator commonly used upon the telephone line is incapable of withstanding potentials of any considerable magnitude and breaks down at a few thousand volts; owing to its small leakage surface it is not of high insulation resistance in wet weather, and will permit foreign currents of high potential to stray on to the telephone line, as well as allow telephonic currents to leak from wire to wire or from wire to ground. The breakdown of a high-tension insulator, caused in many instances by lightning or by mischievous persons with missiles or firearms, is likely to communicate a dangerous potential to the pole and therefrom to the telephone and signal circuits because of the small insulators used. The fall of potential from a high-tension phase-wire to earth is normally concentrated in the insulator and the potential gradient is very abrupt; when an insulator fails, the fall of potential is concentrated no longer in the insulator, but distributed over the cross-arm and pole, if the same are of wood, and that point of the pole at which the telephone line is supported may be elevated to a very considerable fraction of the full high-tension voltage. Dangerous potentials have been communicated to telephone wires upon the same line of wooden poles with the high-tension, at the time of insulator failures; this potential will be transmitted many miles, perhaps, in each direction from the failure, with great danger to employees who may be using the telephone.

The ideal protection is obtained from metal poles and cross-arms, a special earth connection being employed to insure always a very low resistance path to earth. High-tension insulator failures could not elevate the pole to a dangerous potential except in the inability of the earth

connection to transmit a large volume of current without appreciable potential drop, and this may be avoided by ample surface contact with the earth and high conductivity of the ground lead. In the case of wooden poles, a large degree of protection may be secured by the use of metal cross-arms, grounded as just described. This plan will maintain a zero potential gradient down the pole, in the event of a high-tension insulator failure. When wooden cross-arms are used, protection consists in grounding the metal pins, the ground conductor being carried along the top side of the cross-arm to the pole and thence downward. For full protection against lightning it is good practice to extend the ground lead to the extreme top of the pole, where it may be attached to the ground wire extending along the top of the transmission line, if one exists. One of the advantages of the safeguards last described lies in the protection given to wooden poles and cross-arms from

opening device and actuate it. This will leave the line open and prevent connection between it and the telephone, although such connection will not be interfered with, in case no dangerous potential is present on the line. Fig. 5 shows this protective system applied to a jack box and plug for use with portable sets. The jack box is designed so that the contact springs and fuses are disconnected from the line upon swinging the front cover outward and upward, and are then in a position for inspection or renewal of the fuses. Connection to line is made automatically upon closing the cover. The elongated plug-tip serves to short-circuit and ground the line-wires, when inserted in the jack. The ground wire is carried through the cord to the portable set so that the latter may be equipped with an arrester if desired, or with a repeating coil whose winding on the line side is grounded at its middle point, or with a bridged impedance grounded at its middle point.

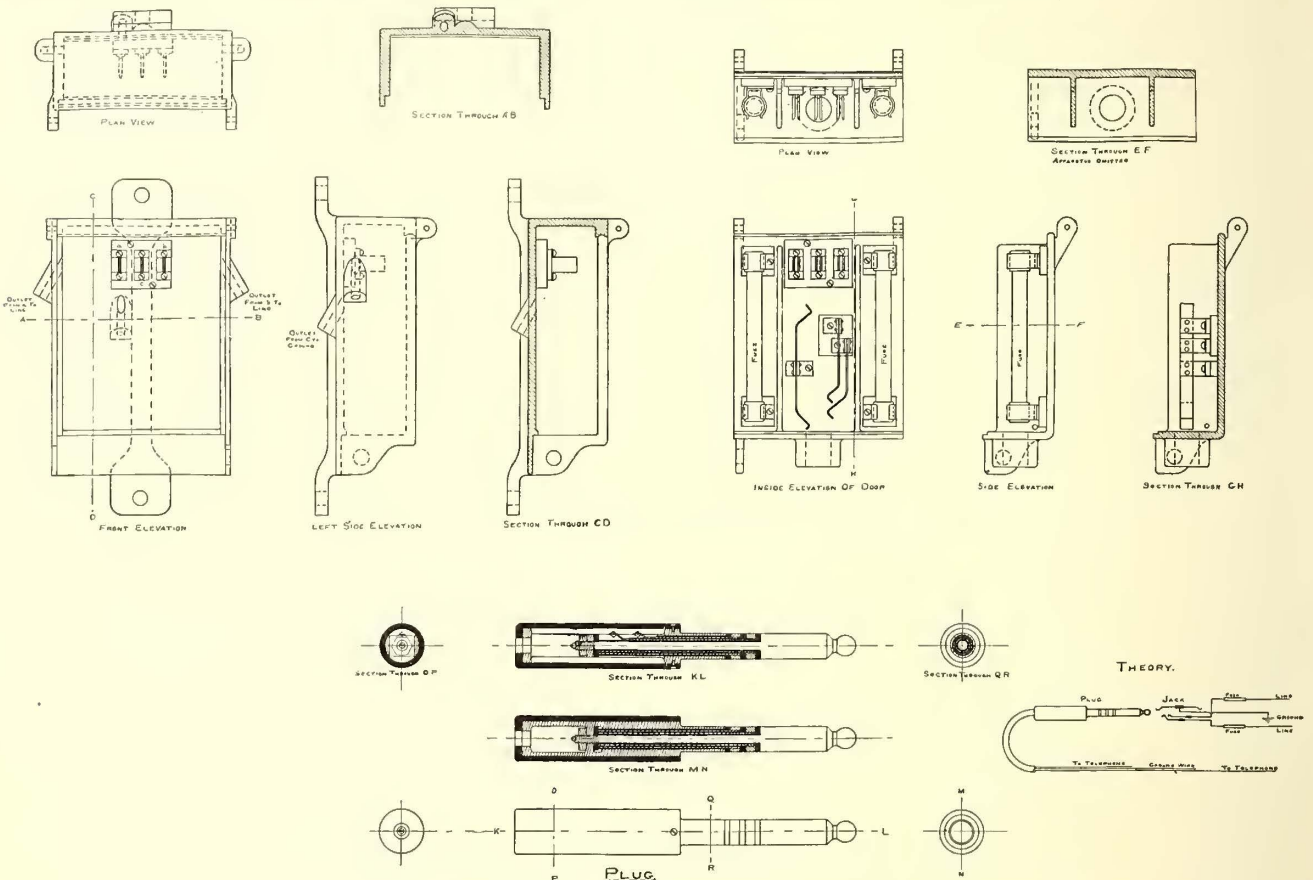


Fig. 5.—Application of Circuit Opening Device to Jack Box and Plug for Portable Telephone Sets

destruction by the arcs which ordinarily accompany failures of high-tension insulators and burn through the cross-arm or pole. Figs. 1 and 2 illustrate this method of protection.

CIRCUIT OPENING PROTECTIVE DEVICE

A new system of protection is the invention of the writer. When this device is applied to stationary sets or to portable sets with connection boxes, it is impossible to secure connection with the telephone line while it is elevated to a dangerous potential. The system consists of a circuit-opening device located between the line and the telephone or between the line and the connection box and a device for grounding each line-wire in the act of making connection, such grounding being accomplished before connection can be made and removed as the connection is completed. The telephone line is therefore short-circuited and grounded for a brief interval, during which the existence of any dangerous potential will cause currents to flow through the circuit-

Fig. 6 shows a reversal of the arrangement given in Fig. 5, the plug, instead of the jack, being made stationary in the connection box. The jack springs also are concealed in the hollow handle which forms a terminus for the cord of the portable set and slips over the plug in the connection box. The tip of the plug is grounded and the metal sleeve of the jack is elongated so as to short-circuit the plug rings that are connected to line, and also ground them, for a brief interval while the jack is being pushed into place on the plug. In order to insure good contact between the sleeve and the plug, small radial dowels of metal are let into a longitudinal slot in the sleeve, and by reason of spring pressure they make a rubbing contact with the plug. The fuses are accessible in the same manner as described for the jack box in Fig. 5. Fuses have not heretofore been employed in jack boxes as a means of protection, but the amount of protection which may now be secured by

such location of the fuses, in conjunction with the means described for briefly short-circuiting and grounding the line, is believed to warrant their use.

The application of this protective principle to a stationary set is shown in Fig. 7, which illustrates an iron box type of set. Two switches are provided and are actuated by plunger rods, the rods in turn being actuated by inner projections on the door of the box. When the door is closed, switches *A* and *B* are opened; as the door is opened, switch *B* is closed with the first movement of the door and the line wires are thereby short-circuited and grounded. As the door swings open, switch *A* is closed after the door has described a considerable angle, which requires a brief interval of time. During this interval the fuses will open the line in the event that a dangerous potential exists between the wires or between either or both wires and earth. Switch *A*, when it closes, disconnects the short-circuit and connects the line to the telephone. The telephone set itself may be equipped with an arrester as a protection to the apparatus and the person using it while the telephone is in use; the arrester will be disconnected from the line when the door is closed. Repeating coils or bridge impedances with their middle points grounded also give additional protection. A ground connection from the middle point of the winding of a repeating coil, on the line side, or from a bridged impedance, is not always feasible, owing to excessive noise thereby produced in the telephone receiver, which results from severe inductive interferences. In such cases an arrester with small gaps may be employed. A large degree of protection is secured by the use of a repeating coil, without a ground connection from the center of its line winding; such coils or transformers when used for protective purposes are wound with a one-to-one ratio and are specially insulated to withstand very large potential differences between primary and secondary for short periods. The principal difficulty lies in securing a coil of

The talking or transmission efficiency of any telephone circuit is divisible into two components, the efficiency of the telephone sets and the efficiency of the line circuit connecting them. To obtain satisfactory transmission for a minimum total investment, it is necessary to compare the investment in telephone sets with the investment in the

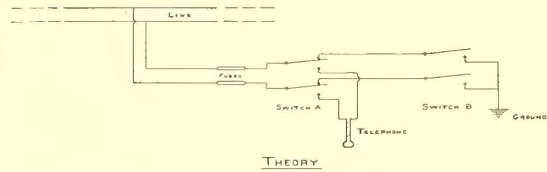
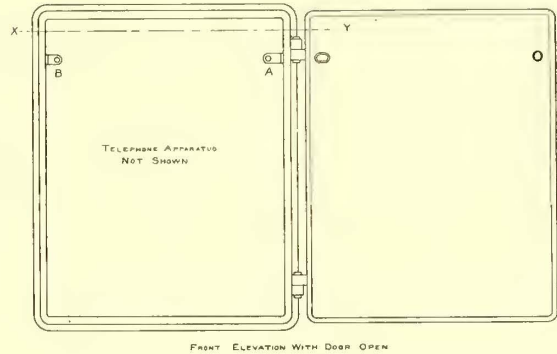
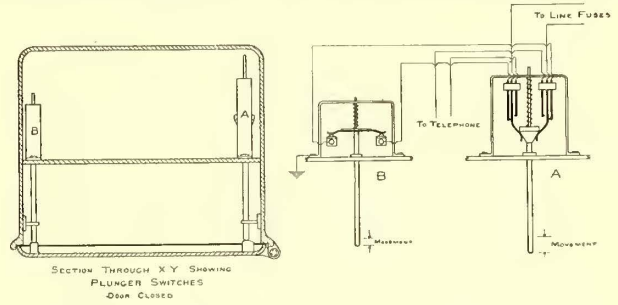


Fig. 7.—Application of Protective Device to Stationary Sets

line circuit, and make sure that an increase in efficiency and cost in one cannot be more than offset by a decrease in efficiency and saving in cost in the other. Nowhere is this principle in transmission of more importance, from the cost standpoint, than in the case of long private lines, such as those which form the subject in hand. For the purposes of discussion the following unit costs have been assumed, which are approximate, but in which variations of a few per cent will not offset the conclusions to be drawn.

Cost of stationary iron box telephones.....	\$25.00
Cost of portable telephones	20.00
Cost of connection boxes	2.50
Cost of bare hard-drawn copper wire, per lb.....	.15
Cost of iron wire, per lb.....	.035
Cost of stringing copper metallic circuit, pins, insulators, tie-wires, sleeves and labor, per mile.....	15.00
Cost of stringing iron metallic circuit, same, per mile.	13.00

As an illustration, take the case of 50 miles of No. 10 B. & S. gage copper wire, weighing 208 lb. per mile, and costing \$77.40 per mile, or a total of \$3,870. Assume 10 stationary sets, 10 portable sets and 90 connection boxes at a total cost of \$775, which includes an allowance of \$1 each or a total of \$100 for cost of installation. The total investment is \$4,645, of which 83 per cent is for lines and 17 per cent for equipment. The selection of equipment having transmitters of low power and the provision of insufficient transmitter battery would be of such effect on the transmission efficiency that in the estimate above, an additional investment of \$5 per telephone set for transmitters of the

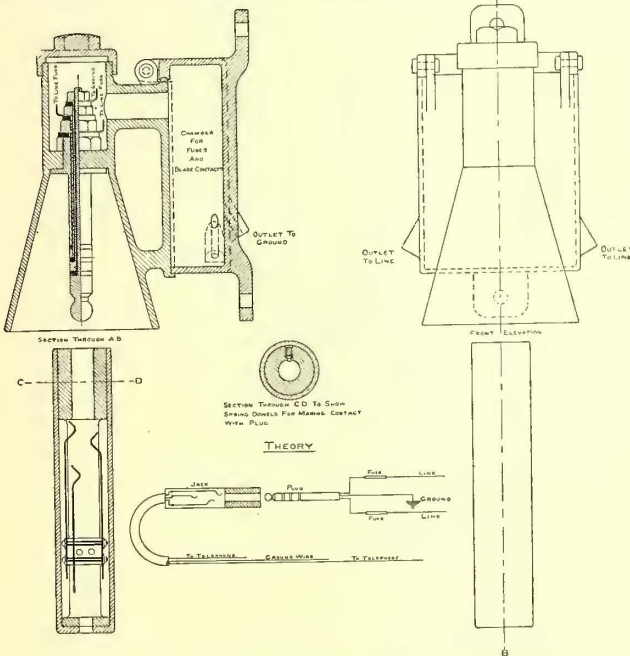


Fig. 6.—Plug Box and Jack for Portable Telephones

moderate size which possesses high efficiency, both in talking and in signaling. Talking currents are of variable and ever-changing frequencies, ranging from 100 to 2000 cycles per second, while the customary signaling or ringing frequency is about 17 cycles. Raising the signaling frequency is one of the means of reducing this difficulty.

highest attainable efficiency and batteries of the greatest power permissible without injuring the transmitters by overheating, would permit a reduction in the size of the line-wire. If such reduction amounted only to one gage number, the cost of 50 miles of No. 10 B. & S. gage copper circuit would be \$3,240 and the grand total cost of equipment \$875, or a total of \$4,115, which is a saving of \$530.

High efficiency in equipment is much cheaper to secure than high efficiency in the line circuit, and the principle becomes of increasing importance as longer lines are considered. When iron wire is employed the saving is not so great, but in the case cited above a reduction of the wire gage from No. 9 B. W. G. to No. 10 would have resulted in a net saving of \$92.50. The highest transmission efficiency for a given investment or the lowest investment for a given total efficiency will be arrived at by a careful study of all the local conditions in each case and a proper division of investment between equipment and lines.

COST PER MILE OF METALLIC CIRCUIT

No. 9 B. & S. copper.....	\$77.40
No. 10 B. & S. copper.....	64.80
No. 11 B. & S. copper.....	54.60
No. 12 B. & S. copper.....	46.50
No. 9 B. W. G. iron.....	34.35
No. 10 B. W. G. iron.....	30.50
No. 11 B. W. G. iron.....	27.00
No. 12 B. W. G. iron.....	24.55

Theoretically, the best division of investment between lines and equipment is secured when an increment of in-

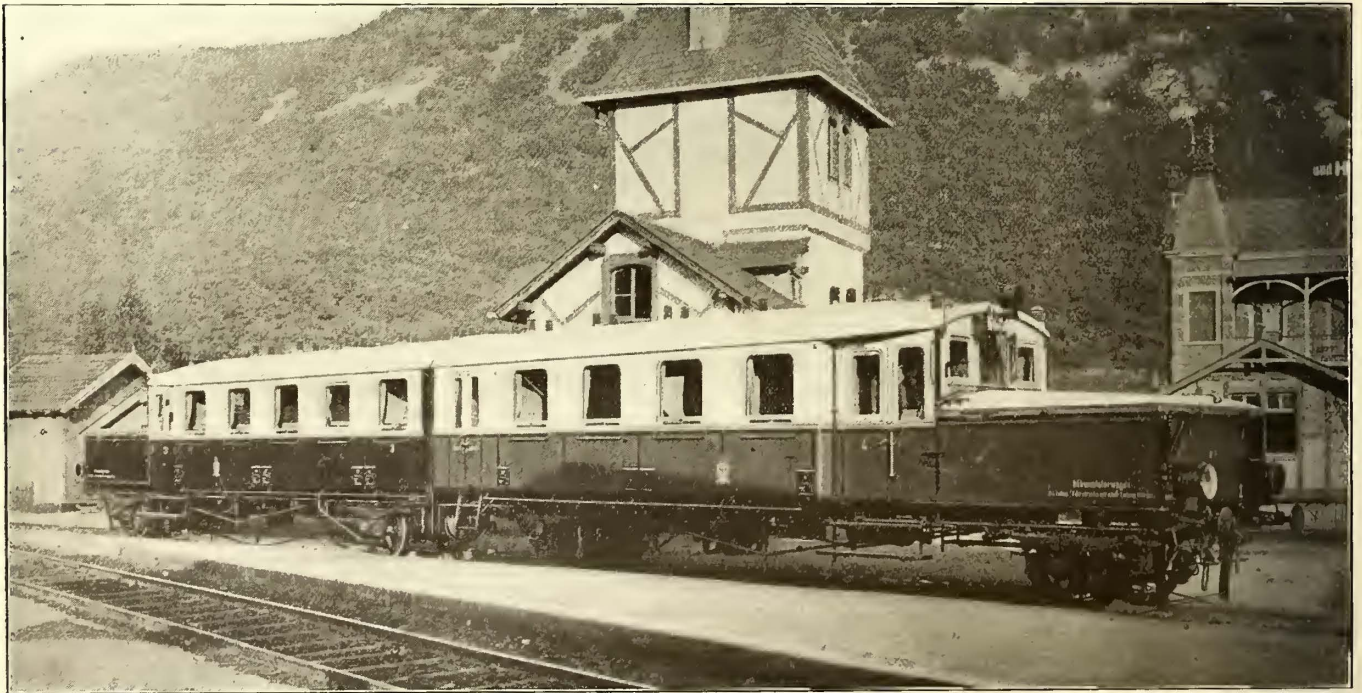
100 stationary sets, installed, would be \$2,600, which gives a large saving in favor of portable sets.

Contrast this with a road 20 miles in length, double track, maximum headway of 5 or 10 minutes and rolling stock of 50 motor cars. The cost of 50 portable sets and 20 connection boxes, installed, would be \$1,070, compared with \$520 for 20 stationary sets installed. For roads of a type lying between these extremes, the advantages of both types of set are obtainable at a reasonable cost, by locating stationary sets at the points of frequent use and equipping trains with portable sets for emergency use, in connection with jack boxes every few thousand feet.

ELECTRICAL EQUIPMENT OF ACCUMULATOR CARS FOR THE PRUSSIAN STATE RAILWAYS

Brief notes in regard to the trials with accumulator cars on the Prussian State Railways have been published in previous issues of this paper. The results of the experiments with these cars have proved so successful that the Government has recently added a number of novel double cars for use on branch lines and as supplementary service on the suburban sections of main lines. Views of one of these cars and its equipment, as supplied by the Felten & Guillaume-Lahmeyerwerke, Frankfort-on-Main, are presented herewith.

The controller is of the series-parallel type and is fitted with a "dead man's" handle to switch off the current auto-



Double Accumulator Motor Car Train in Use on the Prussian State Railways

crease in transmission efficiency is obtainable at equal cost, whether in improving the line or the equipment; in practice it works out that the best equipment is none too good.

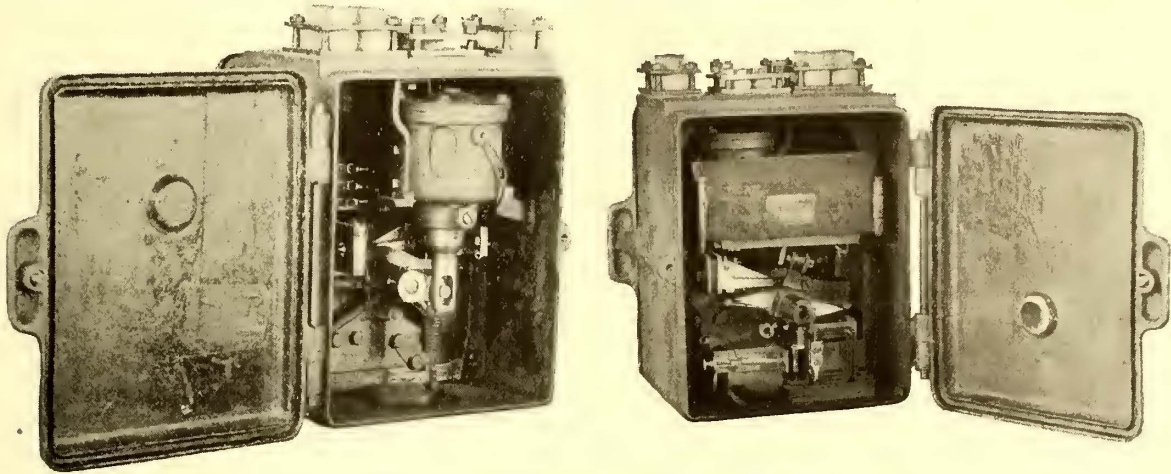
The choice between portable and stationary sets in any given case, from the standpoint of cost, may be of interest; two typical cases will be considered. Take a road 100 miles in length, with train service each way every other hour; assume that the rolling stock consists of 12 motor cars and 4 locomotives. The cost of 16 portable sets and 100 connection boxes would be \$570 plus an allowance of \$100 for installation, making a total of \$670. The cost of

matically and simultaneously apply the emergency brake in case the pressure on the handle is released. The controller is of the double-barrel type with an interlocking reversing switch. Views are also shown of the circuit breakers which are fitted with two windings, one of which closes the breaker when the controller handle is moved from the off position; the other, the overload coil, which opens the breaker at 750 amp. The motorman's compartment also contains a reversing switch so that either one or the other of the two batteries may be used.

The cars are equipped with automatic air brakes and

automatic air compressor and also with an electric short-circuiting brake. On a recent trial run between Mayence and Münster the car while operating at 23 m.p.h. was

32-cp, 75-volt Zircon lamps. They were built according to the design of Oberbaurat Wittfeld, of the Prussian State Railway Department.



Views of Circuit Breaker from Front and Rear

brought to a stop with the air brake in 600 ft. and with the air and electric brake in 300 ft.

The motors are of the interpole series type of 50 hp on a two-hour rating and of 85 hp on a one-hour rating. The batteries are carried in front of the motorman's cab and consist of 168 cells in two sections of 84 each. Their capacity is 368 amp-hours. A distance of 62 miles is run on one charge. The batteries were supplied by the Akkumulatoren-fabrik A. G., of Berlin. An ingenious construction of charge plug has been adopted. This plug is fitted with electromagnetic interlocking device which holds the connecting cable while the battery is being charged. The

The weight of a fully loaded train is about 62 tons and from actual tests carried out on the trial run it was found that the energy used at a speed of about 27 m.p.h. was only about 19 watt-hours per ton-mile.

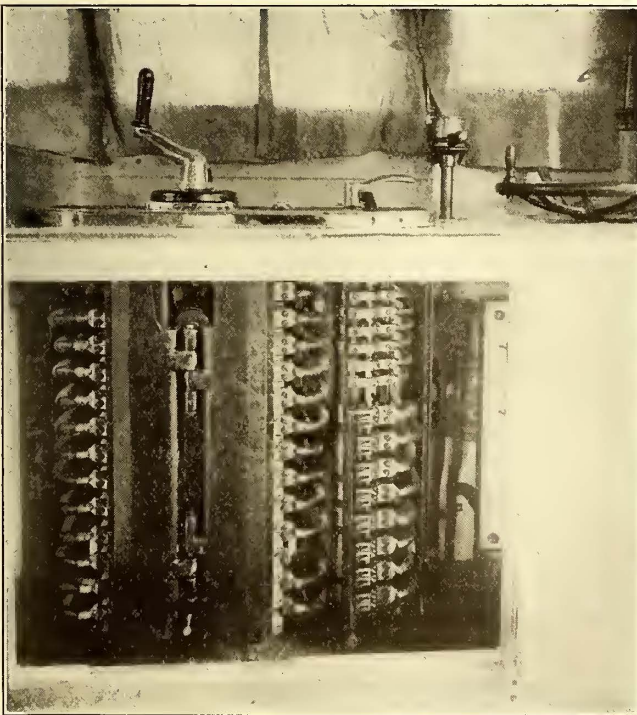
POSITION OF STATE COMMISSIONS REGARDING INTERSTATE ACCOUNTING SYSTEM

Replies from a number of State Railroad Commissions to inquiries by the *ELECTRIC RAILWAY JOURNAL* asking what action, if any, had been taken regarding the Interstate Commerce Commission classification of accounts for electric roads were published in last week's issue, page 1467. Additional replies have been received from three other commissions, as follows:

E. H. Walker, secretary, Railroad Commission of Nevada.—The Railroad Commission of Nevada has not taken any action regarding the classification of accounts for electric railways. Although this commission is given jurisdiction over electric railways of over 20 miles in length when they are not operated strictly within the limits of one municipality, there are no roads of this character in the State and therefore none coming within the jurisdiction of the railroad commission law.

George O. Goodall, secretary, Railroad Commission of Oregon.—We have made no announcement to electric railways in this State. The matter of the classification of accounts has been discussed with the auditors of the most important companies with a view to arriving at an understanding as to a future classification. One of these companies will follow the form prescribed by the Interstate Commerce Commission in making a report to us. The other, which is at present using the classification used by electric companies for a number of years, seems opposed to the adoption of a new classification along the line of the Interstate Commerce Commission's report. It is not probable that anything definite will be done by the commission in this regard for several months.

Jesse S. Jones, commissioner, Railroad Commission of Washington.—While no formal rules have been prescribed, we have furnished the interurban electric railway companies of this State with copies of the blank forms issued by the Interstate Commerce Commission and have called upon them to make a report in accordance with the information desired therein.



Controller with "Dead Man's" Handle, Used on Prussian Accumulator Car

cable can be withdrawn only when the charge current ceases to flow. The plug is also fitted with a covering which has to be removed while charging. If this covering inadvertently should be left off after the charging is completed the motors will not start. The cars are illuminated with

CLAIM DEPARTMENT RECORDS OF THE TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY

At one of the meetings of the 1908 convention of the American Street & Interurban Railway Claim Agents' Association, several members gave informal descriptions of the forms which they had found useful in recording accident data.

The record of any particular accident begins naturally with the reports from the trainmen, motorman and conductor, whose accounts must be made out on separate forms and individually signed. Form 1 shows the general character of information requested from the motorman and illustrates the division of the questions into groups covering the possible classes of accidents.

exactly alike, but the questions asked the conductor in the accident classification differ to the extent indicated in Form 2. The rule governing these reports is that each man must file his own story for every accident whether he saw the accident or not.

On receiving these reports from the trainmen, the claim agent sends to each witness a letter of the type shown in Form 3, enclosing therewith a two-sheet question blank. Following the scheme adopted for the conductor's and motorman's report, the witness receives one of the five inquiry blanks designed to include only the questions pertinent to the particular class of accident reported.

ACCIDENT REPORT.

File No.

INSTRUCTIONS TO MOTORMAN.

In case of any accident, however slight, in connection with or near your car, you will at once render necessary assistance, and obtain the names and residence in full of the persons injured and of all witnesses on or near your car.

Conductors must carry slips for witnesses to fill out. These original slips must be attached to the report. Conductor and motorman will each fill out a separate report of every accident.

Any failure to comply as fully as possible with these instructions will be a cause of discharge from the service of this company.

MOTORMAN'S REPORT OF ACCIDENT.

Car No. Train No. Division Date of accident the day of 19 Exact time of accident a. m. p. m. Car going from to Trip leaving at a. m. p. m. State exact place where accident occurred. Give street number nearest place of accident. City Name of injured Street Number Town or city State Age Male or female White or colored State extent of injury. What did injured person say? Was car stopped or in motion at time accident occurred? Was car on time? If at night, were all lights burning? Was your headlight burning? Was ambulance or other vehicle called? If so, from whom? Was a doctor called? If so, give name of doctor. Who called doctor? Who was left in charge of injured party? Where was injured party taken? Was any police or other law officer present? If so, give name, badge No. Was any postman present? If so, give name or badge No. Was any fireman or city or town employee present? If so, give names or badge Nos. Was any employee beside the car crew present? If so, give name or badge No. State fully in your own way just how the accident happened.

GIVE NAMES AND ADDRESSES OF WITNESSES.

Name. Residence. Business Address.

IF INJURED PERSON WAS BOARDING CAR, ANSWER THESE QUESTIONS.

Was the place of accident a regular stopping place? As you approached the place of accident did you see the injured person? Where was injured party when you first saw him? What was he doing when you first saw him? How far were you away when you first saw him? Was he standing at proper place before you got to him? Did he signal you to stop? Did you make a stop for injured party? Did you stop at the regular place? Did you get any signal from the conductor before you stopped? If so, what was it? Did you get any signal from the conductor after you stopped? If so, what was it? Did accident happen before your car came to a stop? Or was car standing still? Or did you start up just before accident? Or did you slow up and then increase your speed at the time of accident? Was there any jar, jerk or other unusual motion of your car at the time? Did you make one or two stops at the place of accident? If accident was not at a regular stopping place, how far was it from regular stopping place? Was it before you got to stopping place or after you had left it?

IF INJURED PERSON WAS ALIGHTING FROM CAR, ANSWER THESE QUESTIONS:

Did you have any signal to stop? If so, what kind of a signal? And where were you required by this signal to stop? Did you get any other signal? If so, what kind of a signal? And where was your car when you got it? And what was your car doing when you got it? Did accident happen before you got to the stopping place? If so, how far? What first called your attention to the accident? Was your car slowing or increasing its speed when accident happened? If your car stopped and you got a signal to start and did start and afterward got an emergency signal, how far had you moved from the stopping place when the emergency signal was sounded?

IF PERSON OR VEHICLE WAS STRUCK, ANSWER THE FOLLOWING QUESTIONS:

Was injured person on foot or in a vehicle? If in a vehicle, what kind? How many persons were in vehicle? Who was driving vehicle? Was accident at a street or highway crossing? If not, how far from nearest crossing? Which way was injured person going? From toward How fast was injured person moving? Was view of injured person obstructed so as to prevent seeing the car? If so, what was the obstruction? What effort did injured person make to see and avoid collision with the car? How far was your car away from place of collision when you saw injured person approaching the track? Had you given any warning of your approach before that? Did you give warning after you saw him approach track? How far was your car away when he first began to come upon the track? What efforts did you make to avoid the collision? What was his position when you began to try to avoid the collision? How far was your car away when you began to try to avoid the collision? If a vehicle, what part of it did car strike? Were any of the occupants thrown out? If so, how many? How fast was your car moving at moment of collision? How far did car run after collision? Did team run away after collision? What part of damage was caused by team running away? Was your car in perfect working condition? If not, in what respect was it out of order? Were your brakes, reverse and all stopping appliances in perfect working condition? If not, in what respect were they out of order? Were you on time? If late, how much? What was condition of track? Was there anything about the condition of the ground or elevation of the track that hindered or delayed the injured person in keeping out of the way of the car? If so, what was it? Did injured person try to hurry forward to get across? If so, did he begin when on the track or before he got to the track? Did injured person try to stop or back off the track? If so, how far was your car away when he made the attempt? Could you, after the injured person came into a position of peril, stop your car in time to avoid the collision?

IF ACCIDENT WAS A RUNAWAY (WITHOUT COMING IN CONTACT WITH CAR) ANSWER THESE QUESTIONS:

How far was your car from team when the team first began to show signs of fear? How fast were you running then? How far was your car from the team when the team first became unmanageable? How fast were you running then? Did you do anything in the way of sounding whistle or gong to cause or add to the fright of team? What did you do to avoid the accident? How far was your car away when you began to try to avoid accident? What did driver do to try to avoid accident? Was team meeting or going in same direction with the car? On which side of track was team? Where was driver as you approached? What was he doing as you approached? Were you running on center or on side of highway at point of accident? Was injured party driving team or merely riding in vehicle? How many persons were in vehicle? Was injured party thrown out of vehicle? If so, how far did team run before party was thrown out? Did vehicle strike any object to throw injured party out? If so, what was it? Did you stop your car? If not, why not? If you did stop, did you stop before reaching vehicle? How far before? Did you run by vehicle before stopping? How far? Did you stop before or after the team became unmanageable? Did you begin to stop before or after team became unmanageable?

IN CASE OF AN EJECTMENT, DISPUTE OR DISTURBANCE ON THE CAR, ANSWER THESE QUESTIONS:

What did you hear your conductor say to party causing the trouble? What did party causing trouble claim? What was done to stop trouble? Did you help? If party was ejected, was any more force used than was absolutely necessary? Were any blows struck? If so, who struck the first blow? What was the provocation given for striking the first blow? Extent of injury? Where did you leave party when trouble was all over?

IN CASE OF PROPERTY DAMAGES, ANSWER THESE QUESTIONS:

Kind of property damaged. Probable value before accident. Describe fully extent of damage. Did accident occur on a highway, or on a crossing or street, or was it on private right of way? Was there anyone in charge of the property just before the accident? If so, who was it? What did the person do to try to avoid the accident? What did you do to try to avoid the accident?

My conductor's name is His address is Signed: Town or city Motorman Town or City Address

FILE NO. day of 190.. day of 190..
TERRE HAUTE, INDIANAPOLIS AND EASTERN TRACTION COMPANY, INDIANAPOLIS, INDIANA.

Gentlemen: The undersigned was a witness to an accident at on the day of 190.., and can give the following account from personal observation: 1. Where were you when accident happened? 2. What claims did the party causing the trouble make as to his rights in the matter? 3. What claims did the conductor make with reference to the matter? 4. Which party seemed to be in the right? 5. What were your reasons for the above conclusion? 6. What was the conduct of the conductor? Did he use any improper language, and if so, what was it? 7. What was the conduct of the person causing the disturbance? Did he use any improper language, and if so, what was it? 8. What was the condition of the party causing the disturbance as to intoxication or appearance? 9. Was party ejected? If so, was any more force used than was absolutely necessary? Did anyone beside car employees help? If so, who was it? Name Address 10. Were any blows struck? If so, who struck the first blow? What was the immediate provocation for the first blow? 11. State fully in your own way how the trouble occurred and all that you saw and heard.

Form 6.—Claim Department Forms—Rose Blank, Covering Disputes and Accidents Resulting Therefrom

FILE NO. day of 190.. day of 190..
TERRE HAUTE, INDIANAPOLIS AND EASTERN TRACTION COMPANY, INDIANAPOLIS, INDIANA.

Gentlemen: The undersigned was a witness to an accident at on the day of 190.., and can give the following account from personal observation: 1. Where were you when accident happened? 2. Did the injured person step off the car and then fall, or fall off before alighting, or was the person in the act of alighting? (a) If by falling off the car, what caused the fall? (b) If by falling after leaving car, what caused the fall? (c) If by falling when in the act of alighting, what caused the fall? 3. Did the person get on the step before or after car stopped? 4. Was the car standing still when the person fell? (a) If so, was there anything about the condition of the car, step or handles that caused the fall? 5. Did the person injured alight from the car before it stopped? (a) If so, was the car slowing up to stop? 6. What care did person exercise in alighting as to holding on supports? 7. Were the injuries received by getting off the car while it was in motion? (a) If so, was the speed of the car fast enough to make it dangerous for the party to try to alight? (b) Was the car leaving or approaching the stopping place? (c) How far from the car was the nearest stopping place? (d) Was there any stopping or starting motion, or increase or decrease, or jerk that caused the fall? (e) If you say "yes," describe the motion to which you refer. 8. When the car did stop was it at the usual stopping place? 9. Did the car stop at or near that place more than this one time? 10. Was the only stop made by the car made after the person fell? 11. Was the injured person at fault for the accident? 12. Did the conductor warn the injured person before the accident? (a) If so, give his language. 13. Was either of the men in charge of the car at fault in any respect? (a) If you answer "yes" to question 13, state in what respect either of the men was to blame. 14. Was there anything about the condition of the alighting place that caused the person to fall? (a) If so, describe it fully. 15. Please describe in your own words all you saw and heard, giving the events in the order in which you saw them. 16. If injured person said anything as to how accident occurred at time of accident or immediately after, state as near exact words as possible.

Form 7.—Claim Department Forms—Light Yellow Blank, Covering Alighting Accidents

FILE NO. day of 190.. day of 190..
TERRE HAUTE, INDIANAPOLIS AND EASTERN TRACTION COMPANY, INDIANAPOLIS, INDIANA.

Gentlemen: The undersigned was a witness to an accident at on the day of 190.., and can give the following account from personal observation: 1. Where were you when accident happened? 2. Did the person injured try to board the car while it was in motion? 3. Was the car stopping or starting when the person tried to board it? 4. Was the car approaching or leaving a stopping place at the time? 5. How far was the car from a stopping place when accident happened? 6. How fast was the car going at the time? 7. Was there any jerk, increase of speed or other extraordinary movement of the car that had anything to do with the accident? (a) If you answer "yes" to question 7, describe what it was. 8. Was the car standing still when the person attempted to board it? (a) If you say "yes" to question 8, did the car remain standing still or did it move at the time the person fell? (b) Was there anything about the surface of the ground at that place that caused the fall? If so, what was it? 9. Was the person injured at fault for the accident? 10. Who, if anyone, beside the person injured was at fault? (a) Was there anything about the condition of the car or steps or handles that caused the fall? If so, what was it? 11. Was either of the car service men in any way at fault for the accident? (a) If you answer "yes" to question 11, state in what respect they were at fault. 12. Please describe fully in your own words all you saw and heard, giving the events in the order in which you saw them. 13. What was it that caused the person to fall? 14. What did the party injured say about the accident?

Form 8.—Claim Department Forms—Pink Blank, Covering Boarding Accidents

ACCIDENT REGISTER FILE NO.
Car No. Train No. Date 19... M.
Place
Name Age Occupation City State
R. F. O. No.
Kind of Accident Claim
Injured Passengers Employes Others
Killed Passengers Employes Others
Reported by Motorman Conductor Superintendent Foreman
Ina. Co. Report No. Date
Bl. R. R. Com. Report Preliminary Final
Remarks

Form 9.—Claim Department Forms—Accident Register Sheet

TERRE HAUTE, INDIANAPOLIS AND EASTERN TRACTION CO.

CALENDAR FOR THE MONTH OF 19

Table with columns: DIV, FILE NO, FILED, SETTLED, DECLINED, OUTLAWED, SUITS (FILED, SETTLED, DISMISSED), JUDGMENTS (FOR CO., FOR PLTF, REVERSED, COMP D, PAID). Includes a vertical label 'NORTHWESTERN' on the left side.

Form 10.—Claim Department Forms—Calendar of Cases Pending

IF PERSON INJURED WAS BOARDING CAR, ANSWER THESE QUESTIONS:
 Was car standing or in motion? Was car approaching or leaving stopping place? Was speed of car increasing or decreasing? Was there any jar, jerk or other extraordinary motion of the car that in any way caused the accident? How fast was car going when person took hold of it? How far from stopping place was car at time person took hold of it? Was any signal given? If so, by whom? What was the signal? Was any warning given the person? If so, by whom? What was the warning? When you first saw this person where was he? What signal, if any, was given by the injured party? Where did injured party come from just before accident? Walking or running?

IF PERSON INJURED WAS ALIGHTING FROM CAR, ANSWER THESE QUESTIONS:
 Was car standing or in motion? Was car approaching or leaving stopping place? Was speed of car increasing or decreasing? Was there any jar, jerk or other extraordinary motion of the car that in any way caused the accident? How fast was car going when person stepped off? How far from stopping place was the car? Did any defect in car, or step, or alighting place have anything to do with the accident? If so, what was it? Did the injured person signal you to stop? Had you given your motorman a signal to stop? Did you carry injured person by the stop? If so, how far? Did you warn injured person not to get off while car was in motion? Did you say or do anything to encourage this person to get off? Did you give a signal to go ahead just about the time of the accident? If so, was it given before the party fell? Or as the party fell? Or after the party fell? Was there anything about the surface of the ground at the place where injured person alighted that caused the fall? If so, describe what it was? Did any third person do anything to cause the party to fall? If so, who was it? Did any third person warn this person not to get off? If so, who was it? And what was said by him?

IF A PERSON OR VEHICLE WAS STRUCK, ANSWER THE FOLLOWING QUESTIONS:
 Which way did the person or vehicle come from just before the accident? If a person on foot, at what gait did this person approach the track? Was there any obstructions to the person's view? If so, what? How far away was the car when the person stepped on the track? What did the person do before entering the track to see whether a car was coming? If a vehicle, what kind of a vehicle? How many persons in the vehicle? Driver's name? Names of others in the vehicle? What part of the vehicle was struck? How fast was the car running when this party was going on the track? What warning did the motorman give? Where was the party when he gave this warning, on or approaching the track? If approaching, how far from track? What efforts did the person make to avoid the accident? How close was car when party began to try to avoid the accident? Where was party when he began?

IF A HORSE OR TEAM WAS SCARED BY YOUR CAR AND THE ACCIDENT WAS SO CAUSED, THEN ANSWER THESE QUESTIONS:
 Was the team going with the car or meeting it? How wide is the roadway there? How far was the car from the team when it first showed signs of fright? How far was the car from the team when it became unmanageable? What did the driver do to avoid the accident? Which way did the team run and what did it do?—Describe fully. Did the motorman begin to slow the car as soon as the team began to show fright? Was there any whistle or bell sounded or did any other thing occur to add to the fright of the team? If so, what was it? Did the car stop? If so, did it stop before or after passing the vehicle? And did it stop before or after team became unmanageable?

IF AN EJECTION, DISPUTE OR DISTURBANCE, ANSWER THESE QUESTIONS:
 What was the cause of ejection? What were the claims of the party ejected. State fully. What efforts did you make to avoid the trouble before ejecting the party? Were there any blows struck? If so, who struck the first blow? Did you use any more force than was absolutely necessary? If any one assisted you, give name. Where did you leave the party when the trouble was all over?

IN CASE OF PROPERTY DAMAGES, ANSWER THESE QUESTIONS:
 Kind of property damaged. Probable value before accident. Describe fully extent of damage. Did accident occur on a highway, or on a crossing or street, or was it on private right of way? Was there anyone in charge of the property just before the accident? If so, who was it? What did the person do to try to avoid the accident? What did you do to try to avoid the accident?
 My motorman's name is _____
 His address was _____
 Signed: _____ Town or city _____
 Conductor.
 Address _____ Town or city _____

Form 2.—Claim Department Forms—Conductor's Accident Report

OFFICE OF
 Terre Haute, Indianapolis and Eastern Traction Company
 INDIANAPOLIS, INDIANA.

Oct. 20/08

Mr. Walter Howard.
 New Castle Ind.

Dear Sir:

We learn that you witnessed an accident which happened at or near the west end of Main St. Greenfield Ind on the 18 day of Oct., 1908.

To enable us to have a complete account of the facts we respectfully ask that you state to us all that you saw and heard in your answers to the questions on the enclosed blank.

Enclosed find stamped envelope for reply and please permit us to thank you in advance for your kindness in the matter.

Yours truly,

William Tschew
 Claim agt.

Form 3.—Claim Department Forms—Letter to Witnesses

FILE NO.
 Sent _____ day of _____ 190..
 Returned _____ day of _____ 190..

TERRE HAUTE, INDIANAPOLIS AND EASTERN TRACTION COMPANY,
 INDIANAPOLIS, INDIANA.

Gentlemen:
 The undersigned was a witness to an accident at _____ on the _____ day of _____ 190.., and can give the following account from personal observation:
 1. Where were you when accident happened?
 2. How far away from the car was the horse or team when it first gave evidence of fear?
 3. When the horse or team first became unmanageable was the car past it, opposite it or approaching it?
 (a) If the car had not yet reached the horse when it first became unmanageable, how far was it from the horse at that time?
 4. When the horse showed signs of fright did the motorman begin promptly to stop his car?
 5. Did the motorman whistle or sound his going or do any other act to increase the fright of the horse or team?
 6. Was there any reckless or wanton conduct on the part of the motorman causing the accident?
 (a) If you say "yes," in what respect?
 7. Was the party injured at fault for the accident?
 (a) If you say "yes," in what respect?
 8. Give a detailed account of all that occurred, in the order in which it occurred, as you saw and heard it.
 9. If the injured party said anything about the accident, state as near as you can the language used.

(Common to all forms.)

GIVE NAMES AND ADDRESSES OF WITNESSES.

Name. Residence. Business Address.

The above facts are true as I know from personal observation.

Business address _____ Signature _____
 Town _____ Name of employer _____ Residence address _____
 State _____

Form 4.—Claim Department Forms—Yellow Blank, Covering Runaways

FILE NO.
 Sent _____ day of _____ 190..
 Returned _____ day of _____ 190..

TERRE HAUTE, INDIANAPOLIS AND EASTERN TRACTION COMPANY,
 INDIANAPOLIS, INDIANA.

Gentlemen:
 The undersigned was a witness to an accident at _____ on the _____ day of _____ 190.., and can give the following account from personal observation:
 1. Where were you when accident happened?
 2. How far was the person or vehicle from the track when your attention was first attracted?
 3. What caused your attention to be attracted to the person struck?
 4. Describe the movements of the person or vehicle from the time your attention was attracted until the accident.
 5. State speed at which person injured approached track.
 6. Was the gong or whistle sounded?
 (a) Was it sounded before the party entered the track?
 (b) Was it sounded after the party entered the track?
 7. How fast was the car going when the person or vehicle was about to enter the track?
 (a) Did the speed begin to slacken as soon as the injured party began to enter the track?
 (b) Did the speed continue to slacken until the accident?
 8. How far was the car away when the person or vehicle first entered upon the track?
 9. After the vehicle entered on the track did it stop and attempt to back off?
 10. If you answer "yes" to question 9, how far distant was the car when it was stopped?
 11. With what part of the vehicle did the car come in contact?
 12. Did the person struck take any precaution whatever to avoid the accident?
 13. If you answer "yes" to question 12, what did you see the person do?
 14. Was the person struck at fault for the accident?
 15. Did the motorman of the car do all he could to stop as soon as it became apparent that the person struck was about to enter the track?
 (a) Did he begin promptly to try to stop as soon as the danger became apparent?
 (b) Did he manifest any interest to run into or hurt the injured party?
 16. Was either one of the men in charge of the car to blame in any way for the accident?
 (a) If you answer "yes" to question 16, in what way were the men to blame?
 17. Was there anything to prevent the injured party from seeing the car?
 (a) If you answer "yes," what was it?
 18. Was there anything about the width or condition of the highway or the surface of the ground at that place that hindered the party in keeping out of the way of the car?
 (a) If so, what was it?
 19. Was the party injured interfered with in any way by any other person or vehicle or by any object or obstruction that had anything to do with getting out of the way of the car?
 (a) If so, please explain fully.
 20. Please describe in your own words all that you saw and heard, giving the events in the order in which you saw them.
 21. If anything was said by the person when struck, or immediately after having been struck, state exact words as nearly as possible.

Form 5.—Claim Department Forms—Green Blank, Covering Passenger or Vehicle Collision

TERRE HAUTE, INDIANAPOLIS AND EASTERN TRACTION CO
CLAIM DEPARTMENT

REPORT OF CLAIMS, SUITS, JUDGMENTS AND DISBURSEMENTS. MONTH OF *July* 190*8*

	CLAIMS											
	ON FILE BEGINNING OF MONTH		FILED DURING MONTH		SETTLED DURING MONTH		TRANSFERRED TO SUIT		OUT LINED		ON FILE CLOSE OF MONTH	
	NO.	AMOUNT	NO.	AMOUNT	NO.	AMOUNT	NO.	AMOUNT	NO.	AMOUNT	NO.	AMOUNT
TERRE HAUTE DIVISION												
NORTHWESTERN "												
EASTERN "												
MARTINSVILLE "												
BRAZIL "												
DANVILLE "												
TOTAL												

	SUITS													
	ON FILE BEGINNING OF MONTH		FILED DURING MONTH		COMPROMISED		PENDING FOR COURT		DISMISSED		JUDGMENTS RENDERED		ON FILE CLOSE OF MONTH	
	NO.	AMOUNT	NO.	AMOUNT	NO.	AMOUNT	NO.	AMOUNT	NO.	AMOUNT	NO.	AMOUNT	NO.	AMOUNT
TERRE HAUTE DIVISION														
NORTHWESTERN "														
EASTERN "														
MARTINSVILLE "														
BRAZIL "														
DANVILLE "														
TOTAL														

	JUDGMENTS											
	BY BEGINNING OF MONTH		HANDLED DURING MONTH		REVERSED		COMPROMISED		PAID		AT CLOSE OF MONTH	
	NO.	AMOUNT	NO.	AMOUNT	NO.	AMOUNT	NO.	AMOUNT	NO.	AMOUNT	NO.	AMOUNT
TERRE HAUTE DIVISION												
NORTHWESTERN "												
EASTERN "												
MARTINSVILLE "												
BRAZIL "												
DANVILLE "												
TOTAL												

	DISBURSEMENTS										
	CLAIMS SETTLED		SUITS COMPROMISED		JUDGMENTS PAID		LITIGATION*		MISCELLANEOUS		TOTAL
	NO.	AMOUNT	NO.	AMOUNT	NO.	AMOUNT	EXPENSE	RECEIVED			
TERRE HAUTE DIVISION											
NORTHWESTERN "											
EASTERN "											
MARTINSVILLE "											
BRAZIL "											
DANVILLE "											
TOTAL											

Form 11.—Claim Department Forms—Monthly Summary Sheet

TERRE HAUTE, INDIANAPOLIS AND EASTERN TRACTION CO
CLAIM DEPARTMENT
REPORT OF ACCIDENTS

MONTH OF *July, 1908* 7 MONTHS ENDING *July, 1908*

	MONTH OF							7 MONTHS ENDING						
	T H D	N W D	E D	M D	B D	Da D	Tot	T H D	N W D	E D	M D	B D	Da D	Tot
COLLISIONS														
Injured														
Passengers														
Employees														
Others														
Killed														
Passengers														
Employees														
Others														

	COMPARATIVE REPORT													
	MONTH OF							7 MONTHS ENDING						
	T H D	N W D	E D	M D	B D	Da D	Tot	T H D	N W D	E D	M D	B D	Da D	Tot
Damage Reserve														
Disbursements														
Surplus in Reserve														
Deficit in Reserve														
*Per Cent of Gross Earnings Received														
*Per Cent of Gross Earnings Expended														
Number of Passengers Carried														
Gross Receipts														
Number of Car Miles														
Number of Accidents Reported														
Number of Claims Made														
Number of Claims Disposed of														
Number Claims Pending Close of Month														
Amount Demanded on Pending Claims Close Month														
Number Suits Pending Close of Month														
Amount Suits Pending Close of Month														
Number Judgments Pending Close Month														
Amount Judgments Pending Close Month														

Forms 12 and 13.—Claim Department Forms—Cumulative Reports

of these blanks are differently tinted for convenience in filing.

The individual record of an accident is kept on a sheet of a loose-leaf register, as shown in Form 9. This form is a key to all the data relative to the case and gives a step-by-step history from the date of the accident to the final disposition of the claim or possible suit. Once the record is completed, it is taken out of the current file and permanently stored elsewhere.

Form 10 illustrates the calendar record for all cases coming up in a given month, classified as to separate claims, suits and judgments. The reproduction shows only that part of the form covering the Northwestern division, but the original also provides space for the Eastern, Martinsville, Brazil and Danville operating divisions.

Form 11 is the monthly totaled summary of claims, suits, judgments and disbursements on each of the six operating

divisions. This record is far more detailed than the calendar record, Form 10. The data under "Claims," for instance, covers the number of claims and total amount demanded as carried over from preceding months; the number and amount for the current month; the number of claims settled during the month with a statement of the aggregate amount demanded compared with the amount paid over; suits transferred; suits outlawed; and suits on file at the close of the month. The last three items also give the total demand figures, so that a continuous record is secured of the monetary difference between what the claimants want and what they get. The "Suits" and "Judgments" covering litigated cases are recorded in like detail, showing the amounts sued for and what suitors actually secured either through compromises or court verdicts. The section headed "Disbursements" includes all the expenses under the other heads plus the operating costs of the claim department.

Form 12 is a cumulative report for every class of accident to passengers, employees, trespassers, etc., arranged under the class of collisions, derailments, runaways, struck by car, alighting, boarding, ejections, miscellaneous and live stock and property damage. Every division has two columns for the same month of the current and past year respectively and likewise for all the preceding months of the year. Thus July, 1908, is compared with July, 1907, and the first seven months of 1908 with the same period of 1907.

To	of	Dr.
For injuries received on the line of said company:		
Date.	Nature of Injuries.	Amount Claimed.

It is the policy of this company to avoid needless controversy and unnecessary litigation, and in the event of an accident through the wrongful conduct of its agents or employees, without negligence or wrong on the part of the owner, it will make a reasonable settlement for said loss, provided the owner will fully and correctly communicate to it the facts. Hence, the claimant is requested, upon presenting a claim, to answer the following interrogatories:

All claims thus sent in will be promptly adjusted or declined.
Very respectfully,
Claim Agent.

Q. 1.
A.
Q. 11.
A.

Name

Form 14.—Claim Department Forms—Blank Sent to Claimants for Damages

Form 13 also is a cumulative report showing the comparative accident statistics and costs for different months and years in addition to stating the conditions of the damage reserve, percentages of gross earnings, reserved and expended, passengers carried, gross earnings and car miles operated. Other forms used are those relating to releases, accidents to employees, accidents not coming under the classifications mentioned and Form 14 shows the head of a blank sent to persons affected by an accident. As shown by the text, the inquiries are intended to sound the position of such persons before they present formal claims through lawyers. The part of the form not reproduced consists simply of lines ruled for questions and answers.

Taken altogether, the forms used by Mr. Tichenor constitute the basis for a record of claim work that is always up-to-date in every department and one which shows at a glance the statistical data of any of these departments contrasted with previous years.

An electric railway system using overhead trolley has recently been put in operation at Salonica, Turkey. Oil engines are employed in the power house as prime movers. The rolling stock, imported from the United States, consists of 25 cars, costing \$3,600 each, each car seating 36 passengers. Belgian capitalists are behind the enterprise.

BRAKE SHOE METHODS AND COSTS ON THE METROPOLITAN WEST SIDE ELEVATED RAILROAD, CHICAGO

An excellent example of the economy which can be effected by close attention to brake-shoe service is exhibited in the accompanying tables showing the results obtained by the Metropolitan West Side Elevated Railroad of Chicago. About 18 months ago the cost for brake shoes on this road was approximately 80 cents per 1000 car-miles, not including scrap value; and now, as the result of improvements in the brake rigging, whereby uniform wear is obtained, and as a result of systematically and closely inspecting the wear of brake shoes, the costs have been brought down month by month to an average of but little more than 40 cents per 1000 car-miles. Table II shows a cost slightly higher than this, but it should be noted that this table covers a period of 12 months, and during the last half of this period the cost was gradually being reduced to the present low figure of approximately 40 cents.

Table I below is a reproduction of one of the monthly reports on brake-shoe cost as submitted by the motive power and equipment department to the general manager.

TABLE I.—BRAKE SHOE REPORT FOR MONTH OF OCTOBER, 1908

	Motor.			Coach.	Total.
	Full flange.	Half flange.	Total motor.		
Number of shoes used	240	128	368	385	758
Cost	\$200.76	\$99.31	\$300.07	\$216.88	\$516.95
Car mileage	606,956.0			512,062.0	1,119,018.0

Average mileage per shoe, 11,889.
Cost of shoes per 1,000 car miles (not deducting scrap), \$0.462.
Net cost of shoes per 1,000 car miles (deducting scrap), \$0.385.

TABLE II.—BRAKE SHOE RECORD FOR YEAR ENDING NOV. 1, 1908

	Motor.	Coach.	Cost.
Number of shoes used	5,127	427	\$4,135.82
Average number of shoes used per motor	427	452	\$3,116.22
Average weight of new shoes, lb.	45.6	32	259.69
Average weight of scrap	20.9	8.5	
Average percentage of wear obtained	54 1/4	73 1/2	
Scrap value at \$12,875 per ton			\$295.35
Net cost			2,820.87
Total car miles	13,127,406		
Total coach and motor shoes used	10,545		
Total cost of shoes	\$7,252.04		
Total scrap value	\$985.06		
Net cost	\$6,266.98		
Average car miles per shoe	9,959		
Shoe cost per 1,000 car miles without deducting scrap value	\$0.5524		
Shoe cost per 1,000 car miles deducting scrap value	\$0.4774		
Average net cost per 1,000 ton miles (average 23 tons per car)	\$0.0207		
Average cost per 1,000 car miles	\$0.4774		
Average cost per 1,000 miles per shoe	0.0596		
Average cost per 1,000 ton miles	0.0207		
Average of wear	.64 per cent		

About six months ago the railroad company made a contract with the American Brake Shoe & Foundry Company for purchasing brake shoes on a mileage basis. The railway officials state that such a form of contract is a good one for both parties thereto, if there is confidence in the efficiency of the operating organization. Under such an arrangement it is, of course, necessary that the closest supervision be given to the character and the use of the brake shoes. The railway company should protect itself by taking precautionary measures to see that the shoes conform to the specifications included in the contract, and that the tire wear does not exceed the established standard for the road. These precautionary measures, as followed by the Metropolitan "L," are of particular interest, since they are an important factor in the success which this company has had in reducing its brake-shoe costs.

The shoes used are the American Brake Shoe & Foundry "U" type, with steel back for motor cars. These shoes have four specially formed lugs on the back so arranged that if a shoe breaks it will not fall to the track. The shoes used on the trail coaches are the standard steel back M.C.B. pattern of the same manufacturer. The shoes

for motor cars are either full flanged or half flanged, depending on which side of the motor they are put.* On account of the small clearance between the wheel and the gear case it is necessary to use the half-flange shoes on the wheel at the gear end of the axle. The motor cars empty have an average weight of 66,000 lb., and the trailer coaches empty an average weight of 35,000 lb.

The following tests are made to ascertain before using a shipment of new shoes whether or not they are liable to cut the tires: As a carload of new shoes is received eight sample shoes are taken out of that car to equip one motor or trail car. Before mounting these shoes all the tires on the car are carefully measured with a tire tape and the shoes are weighed. After about one week of regular service these sample shoes are again weighed, the tires are again measured and the mileage of the car is ascertained. The results of the two measurements show the rate of tire wear and this preliminary testing of samples from each carload of new shoes received is systematically carried out, so that before the shoes are put into stock the railroad company may know that the metal in the shipment is not so hard that it will cut the tires unduly. A number of new shoes also are broken, so that the character of the fracture may be observed.

In connection with this measuring of the tire and brake-shoe wear for test periods of one week on sample shoes from carload shipments as they are received, it might be said that the test would not be a fair one on account of the newness of the shoes. However, it is desired to have quick results, and as the same method is used for all preliminary tests, the results are comparable, even though the metal of the new shoes may give better wearing results when first applied than later, when the skin has worn off.

The brake shoes on all cars are inspected on a basis of 600 miles' service, and with the exception of a small number of trail cars all the equipment is taken into the shops when the inspection is made. At the end of each period the brakes are examined and adjusted. If any shoe is found that will not make another 600 miles, according to the established average wear, that shoe is replaced by a new one. The shoe that is taken off, if it is found to be overweight for scrap, is replaced in service on a lighter car.

If it is found that a shoe is wearing faster at the top than at the bottom, that shoe is reversed. In this connection the character of the wear has been greatly improved by placing a tie rod across from toggle bar to toggle bar. This rigid connection on motor trucks where there is no brake beam prevents the spreading of the brake levers and insures even wear on the shoes.

In gaging the efficiency of brake-shoe performance on the Metropolitan elevated it is necessary to take into consideration the service performed by the trains and the physical characteristics of the roadway. The following table gives the schedule speeds in miles per hour and the number of station stops per mile:

	Speed miles per hour, including stops.	Number of station stops per mile.
Northwest Division	17.18	2.22
Humboldt Division	15.60	2.62
Garfield Division	16.00	2.81
Douglas Division	15.50	3.06
Average	16.07	2.68

The above figures do not include the operation of the trains over the Union Elevated Loop in the business dis-

trict of Chicago. This loop is 2 miles long, and the stops are far more frequent than anywhere else on the system. In this run of 2 miles around the loop an average of 50 brake applications must be made; these applications, however, are not all station stops.

The foregoing information with regard to brake-shoe practice on the Metropolitan Elevated Railroad was supplied by B. I. Budd, general manager, and E. T. Munger, superintendent of motive power and equipment, under whose immediate supervision these excellent results have been obtained.

PRESS COMMENT ON THE CLEVELAND FAILURE

New York *Tribune*

The working out of the low-fare question will now be in the hands of neutral persons, who will have the backing of a court friendly to the idea; for Judge Tayler says: "A final adjustment, it is hoped, will result in such a public grant to the owners of the property as will return nothing more than a fair interest on actual investment, while the people will receive the best service at the lowest cost."* The receivers should have public support in their efforts, and if they are practical men the country in general, which has a real interest in this experiment of low fares, should be well pleased that it is to be tried at last under such favorable auspices.

Philadelphia *Saturday Evening Post*

In Cleveland the experiment of a 3-cent fare has been on trial for some months—not, however, under very favorable conditions. Much discontent has been expressed over the service given for that fare, and the recent referendum vote shows great dissatisfaction with that service. In Chicago a board of city engineers reports that of each nickel collected by the companies, 2.24 cents goes for wages and 1.26 cents for materials and taxes. The local transportation companies of New York, Chicago, Boston, Philadelphia and St. Louis, charging a 5-cent fare, carry over 2,500,000,000 passengers a year, or three times as many as all the steam railroads of the country carry. A cut of 1 cent in the fare means a reduction of 20 per cent. In some cities agitation for 3-cent fares is more or less popular, but it is a subject to be dealt with cautiously.

Omaha (Neb.) *Bee*

The incident simply serves to show the fallacy of trying to enforce a theoretical condition when business will not warrant it. Johnson's plan did not, perhaps, have a fair trial, but its failure demonstrates the difficulty in managing a complicated transportation problem by a popular vote.

Providence (R. I.) *Journal*

Free rides on the trolley cars in Cleveland, which Mayor Johnson once announced as the ultimate development of his policy of municipal ownership, are indefinitely postponed by the intervention of a receivership to save the roads, which have been trying to struggle along on a 3-cent basis. Taxpayers are inclined to be as close-fisted as stockholders, while the public is bound to protest against poor service even if the price is on a like scale of cheapness.

Youngstown (Ohio) *Telegram*

Tom Johnson has done many things for which he is to be commended and if he honestly tried to reduce the street-car fares of Cleveland he is entitled to praise, but his actions through this traction controversy have been so peculiar, so out of harmony with the public's welfare, that the action of the court is not at all surprising.

Buffalo *Express*

President du Pont asserts that the 3-cent fare was producing ample revenue for the purposes of the company and that the experiment would have been a success if it could have been continued a little longer. It must have grown somewhat unpopular, however, or the people would not have voted as they did on the franchise question.

Philadelphia *Ledger*

While two opposing views of Tom Johnson's picturesque activities always have been possible, from either view the conclusion is the same. Whether he mixed his railway business with political agitation with a view to financial advantage or from a benevolent desire to give the people

something for nothing, failure is equally the natural result. Call it calculated demagoguery or sincere idealism, neither affords a practical basis for success. It does not matter whether we regard Johnson as a demagogue or as an idealist or as a combination of both. Either is out of place in the complex and difficult business of a public service corporation of any kind, and the more completely they are both suppressed the better the public is likely to be served.

Syracuse (N. Y.) *Post*

This is the sad, dismal and comprehensive end of a halcyon and vociferous undertaking and a glowing and effulgent reputation. The proper attitude concerning it is that of silent gloom.

New Haven (Conn.) *Register*

The moral is a necessary one, for the experience of Cleveland was hardly needed to show how ready people in general are to accept the theory that corporations are necessarily robbers of the people. Let it be remembered that the conditions in Cleveland were especially favorable for the carrying out of Mr. Johnson's theories. He had the cream of the traction system of Cleveland. He had it at a time when it was in excellent condition, growing and paying well. And he had no small experience and ability as a manager of traction systems, having made his own money in that work. If under conditions such as these he failed, if his experiment but goes—as it surely does—to show that those who talk about excessive street railway profits fail to take into account unexpected expenses and constant risks and the permanent peril of setbacks of all sorts, surely there is no sense in assuming that, under present conditions, this thing can be done in the Johnson way anywhere.

New York *Sun*

Apparently the Mayor overlooked the fact that neither nominally low fares nor the pleasure of riding in municipal vehicles would compensate the patrons of the lines for poor service. That was what the Municipal company furnished, and that caused the defeat of the Mayor in the referendum at the polls this fall. The Cleveland experiment has been of peculiar interest because the conditions seemed ideal for its success. Mayor Johnson is an experienced street railway manager, the City Council was in sympathy with him and he had a valuable asset in the friendship of the public. If under these circumstances the trial of municipal operation fails, success can hardly be looked for in other towns, which have not practical railway men in the Mayor's chair to direct their excursions into the transportation business.

Cleveland (Ohio) *Plain Dealer*

During the progress of the hearing in federal court there was disclosed a deplorable state of affairs in the management of the Municipal. The use by Ben T. Cable of the "free stock exchange" for the unloading of his holdings was at least questionable. The connection of the Municipal with the Fare Box Company has been a disagreeable disclosure. While it does not indicate any necessarily improper transactions, the arrangement by which the Fare Box Company was practically financed by the Municipal, while possible profits might go into the pockets of individuals, was unbusiness-like, and not to the credit of the interested parties. A matter of very minor importance, but one which reflects distinct discredit upon Mayor Johnson, was the employment of his son to perform nominal services for the Fare Box Company at a salary far in excess of the value of the services rendered. Nepotism, which includes not so much favors to his son as to the little coterie of his official family, has been one of the unanswerable criticisms of the policy of the Mayor. Had Mr. Johnson been willing, upon assuming control of the Cleveland traction interests, to select his directors from the city at large, instead of from his tiny kitchen cabinet, it is more than likely that the franchise would have been upheld by the voters on Oct. 22. A receivership was not merely the best way out of the difficulty; it was the only possible way.

Cleveland (Ohio) *Leader*

With the sting of winter upon the city and the beginning of the bitter months at hand the vital need for immediate improvement of urban traction service becomes more apparent daily. It is fortunate for Cleveland that the traction receivership is in sane and steady hands. The men who, under the court, are responsible for the safety and the com-

fort of the great percentage of the public using the street railway lines will find a solution of the problem. All the town knows of the incompetency of the recent management. Crowded cars, careless and inexperienced operatives, incompetent sub-officials all have contributed to the evil conditions now existing. Accidents are occurring daily that may be avoided. Inconvenience and delay are suffered hourly that can be remedied. The dominant note of inefficiency in the traction organization can be tuned to a different key. And, which is the saving clause for Cleveland, will be.

Charlotte (N. C.) *Observer*

This comes of trying to furnish something for less than it costs.

Baltimore (Md.) *Star*

Johnson's failure goes to prove that capital in order to render an efficient public service must be permitted a reasonable remuneration, and that the most benevolent despotism at least in the management of city affairs and public utilities is at all times the source of disaster.

LOCATION OF OVERHEAD ELECTRIC CONDUCTORS *

A "third-rail," as laid down in the definition adopted by the association, is "an electrical conductor placed adjacent to and parallel with the track rail as a means for conducting electric current to the locomotive or cars." A conductor so placed is suitable only for an electric system employing a low potential current, say of 500 volts to 600 volts. Other electric systems are now in process of development using a higher potential current, in some cases up to many thousands of volts, and thus necessitating placing the conductors out of reach of the public or employees on the right of way.

As in the case of a third-rail, it is important to establish at the earliest practicable date standards for the position of such a conductor, to best fit the electrical requirements and the running conditions and limitations, and to facilitate interchange between various roads. Your committee has carefully considered the questions involved and can offer at this time a progress report only, for the reason that these newer systems are undergoing rapid evolution, and therefore limitations imposed at this time might injuriously affect the proper adaptation of the systems.

Generally speaking, the requirements are:

To establish an overhead conductor at sufficient height to safely clear a man standing on top of a box car under normal conditions and at the same time to introduce approach slopes in the overhead conductor so that its height can be reduced when passing under overhead bridges and maintain a minimum safe equipment clearance.

That the overhead conductor should be located in such a position relative to the running track that continuous contact with the conductor can be maintained by a sliding shoe on the car under all conditions of limitations between the maximum and minimum heights and through switches, turnouts, etc.

That the height so established shall allow a certain minimum clearance between the overhead conductor and overhead construction to provide for proper insulation, and, in the case of overhead bridges, to provide for the attachment of insulators between the overhead conductor and the bridge.

In order to meet all conditions, it appears to be desirable that the overhead conductor should be located over the center line of the track served, rather than at one side of same, although it has been suggested that to distribute wear on the sliding shoe, the conductor shall be at intervals dis-

*Report of the committee on standard location for third-rail working conductors of the American Railway Association presented at the Chicago meeting Nov. 18, 1908.

placed from the central position, producing a sinuous direction with a certain maximum displacement on either side of the central line.

It is necessary, furthermore, to establish certain standards in relation to the sliding shoe and its supporting mechanism, to establish the proper pressure to exert at the point of contact; the range of vertical motion to be allowed for, and the maximum length of the shoe transverse to the track; this latter to permit side clearance between the extreme positions of the shoe and signal blades and other overhead apparatus or structures.

In regard to the above requirements, as before stated, it seems inadvisable to fix at present definite limitations because of the incompleteness of our information and experience as to best running conditions, but the following figures are being used experimentally in the development of the overhead conductor system:

	500 to 2000 volts		2000 to 11,000 volts	
	Ft.	In.	Ft.	In.
Normal height of overhead conductor above top of rail.	22	.00	22	.00
Minimum height of overhead conductor above top of rail.	15	.01	16	.00
Minimum clearance between overhead conductor and overhead bridges	00	.04½	00	.10
Minimum clearance between overhead conductor and highest point of train equipment passing under same not less than.	00	.03	00	.12
Maximum length of contact shoe transverse to track.	5	.04	5	.04

Maximum rate of incline in overhead conductor approaching and leaving low points, 2 ft. in 100 ft.

Proper transition curves should be provided at all vertical intersections in the overhead conductor.

The figures given above do not include installations in submarine tunnels, where special insulation and construction will modify the minimum clearances as compared with normal indications.

It must be understood that the figures given are not in any way intended to be regarded as standards, even of a tentative nature. They are, as above noted, merely statements of practices now in vogue, and are given for the purpose of eliciting criticism and suggestions from among members interested.

The Frankfort (Germany) municipal tramway lines at the close of the fiscal year (1907) had a length of 38 miles and carried during that year 74,250,000 passengers. There are 612 cars for the passenger service and the total number of employees is 2124. On an average the electric cars run over 30,000 miles per day. During the great International Turner festival last July the number of miles run on some days exceeded 60,000. Though the fares are lower than in American cities (the ordinary fare is 10 pfennigs, not quite 2½ cents), yet the net profit derived from the service turned into the treasury was 1,315,000 marks (\$312,970). The profit realized during the year by the city from its electric lighting plant aggregated \$400,200. The stride tramway travel has taken in Frankfort in the last decade can be discerned when comparing the above statistics with those of 1897, when the city bought out the then existing horsecar lines which belonged to a Belgian joint stock company. Then the total length of line was 19¼ miles and the number of cars 197. It carried during that year 26,500,000 passengers and operated 3,375,000 car-miles.

OPENING OF THE WASHINGTON STREET TUNNEL IN BOSTON

The Washington Street tunnel in Boston was opened for traffic at 5:24 a. m., Monday, Nov. 30, by the Boston Elevated Railway Company. The final changes necessary to transfer the elevated trains from the Tremont Street subway to the new route were made on Sunday, and with the inauguration of the new service a regular schedule was maintained with excellent results. The new route is about 950 ft. shorter than the Tremont Street subway, and on account of the more favorable alignment and grade, the running time between Dudley Street and Sullivan Square has been shortened about 3 minutes. The present schedule time between these points, which are about 5 miles apart, by the new route is from 17 to 18 minutes. The service was begun with six-car trains run on 2-minute intervals, and 8 to 10 minute service being maintained from

BOSTON ELEVATED

TO OUR PATRONS:—

The use of the Washington Street tunnel will greatly augment the facilities for transportation and its kindred conveniences which our system already provides, but the removal of the elevated trains from the subway to this tunnel (required by law) will necessarily involve many changes, both with respect to the elevated trains themselves and to the routes of surface cars. These changes will be of great advantage to the majority of our patrons, but during the transition period there will be undoubtedly some annoying incidents. The officials of the company will do everything feasible to make things run smoothly, but the company asks the co-operation of its patrons, and a further share of that consideration with which they have favored the company in the past, and which the company has been glad to reciprocate. When the changes have been made, and both passengers and employees have become accustomed to them, facilities will be much superior to those now existing.

CHANGES

After the withdrawal of elevated trains from the subway, and during its alteration for the use of surface cars, which will take several days, it will be necessary to discontinue the service between Pleasant Street and Boylston Street. Surface cars will run on tracks hitherto used by elevated trains between Boylston Street and the North Station. Passengers wishing to go beyond the North Station should transfer at that point to elevated trains either for Charlestown or for Atlantic Avenue.

BOSTON ELEVATED RAILWAY CO.

Representative Advertisement

BOSTON ELEVATED

The
Washington Street Tunnel
is
Now Open
Boston Elevated Railway Co.

Representative Advertisement

the two terminals to each other via Atlantic Avenue. Service between the north and south railway terminals is maintained by shuttle trains. The tunnel running time from portal to portal is about 5½ minutes.

In its efforts to get the new tunnel into service with minimum embarrassment to the traveling public the Boston Elevated Railway Company has carried instructive advertisements in the daily press for the past week, explaining its intentions and the changes which the new system introduces. Three representative advertisements are reproduced herewith, the final one being merely an announcement of the beginning of service.

Contrary to the prevailing impression in certain quarters, the inauguration of tunnel service was a much simpler matter for the public to grasp than the original change of 1901, when the elevated trains were first run in Boston. The fundamental change is the transfer of trains to the tunnel. In place of these, surface cars are run through from the southerly portion of the Tremont Street subway to the North station on the northbound tracks

formerly used by surface cars before the elevated train service was commenced in the subway. In place of through elevated car service by the subway to Charlestown, the only change required is a transfer between the surface lines and the Washington Street tunnel elevated trains at the North station, and vice versa. The Charlestown through service is now conducted through the tunnel, and a similar arrangement applies to the service between the subway and Dudley Street. Within a few days through surface car service by the subway will be inaugurated between the North station and the Roxbury, Tremont Street,

be opened, and general directions. A large force of extra platform attendants was on hand to facilitate travel and answer inquiries.

EXPERIMENTAL CAR HEATING AND VENTILATING EQUIPMENT IN CHICAGO

The health department of the City of Chicago has been carrying on experimental work with a view to designing improved ventilation methods for street railway cars. Through the courtesy of the Chicago City Railway Company, Health Commissioner William A. Evans has had put at his disposal one of the new pay-as-you-enter type cars, and this car is now being used for the ventilation experiments. A very complete forced ventilation and heating system has been installed in this car, and it is said that by this means the car can be economically heated and thoroughly ventilated with all the windows, doors and deck sash closed.

The heating and ventilating equipment installed in this car comprises duplicate sets of electric heaters and suction and blower fans operated by electric motors. The hot air is distributed by means of ducts extending along the sides of the car. It should be clearly understood that there are duplicate sets of apparatus, so that in event of one becoming inoperative the car may still be heated.

The following is a brief description of the heating plant as installed for one side of the car: Two fans driven by a single motor and a box enclosing an electric heater are compactly installed under one end of the longitudinal seat at the end of the car. The horizontal dimensions of the seat box enclosing this ventilating equipment are 44 in. x 13 in. Within this enclosure is the 1/2-hp 500-volt motor. This motor has a long shaft carrying on one end the blades of a suction fan and on the other end the blades of the blower fan. These fans are enclosed in galvanized iron casings.

The suction fan serves to withdraw the foul air from the upper part of the car and discharge this air under the car floor. The intake for this fan is about 7 in. square, and is located directly under the deck rail at the end of the car. It is connected with the fan box by a wooden air duct fitted into the corner of the car and finished in the same color as the interior fittings of the car. In this way the appearance of the car interior is not disfigured. The exhaust is carried directly through the floor of the car and discharged in a horizontal direction.

The same motor that drives this suction fan for removing the foul air drives on the opposite end of its shaft a similar fan arranged to take air from outside of the car, force it through a set of heating coils and carry it through a distributing pipe under the car seats. Each of these fans is 7 in. in diameter and operates at 1800 r.p.m.

The fresh air intake is located close to the corner post of the car body and about 5 ft. above the platform level. It comprises a small malleable iron register protecting a brass screen 5 in. x 10 in. in size. The fresh air taken in through this screen is conducted down through the framing of the car and into the blower fan intake, from where it is forced through a box containing electric heating coils. These coils consume, as desired, 4, 7 and 11 amp of current, depending upon the temperature to which it is desired to heat the air. From the heating box, which, with the motor and the two fans, as earlier stated, are installed under one of the longitudinal seats at the ends of the car, the fresh heated air is distributed through a sheet-iron duct

BOSTON ELEVATED
It is the intention to
Open the Washington St. Tunnel
For public use on
Monday, Nov. 30th, 1908

ON SUNDAY, NOV. 29TH, THERE WILL BE NO TRAIN OR CAR SERVICE IN THE SUBWAY, EXCEPT THAT OF SURFACE CARS FROM BOYLSTON STREET (PUBLIC GARDEN) TO PARK STREET AND RETURN. CARS USUALLY ENTERING THE SUBWAY FROM THE NORTH WILL BE RUN TO SCOLLAY SQUARE ON THE SURFACE. ELEVATED TRAINS WILL BE RUN BETWEEN THE NORTH AND SOUTH STATIONS AND BETWEEN DUDLEY STREET AND SULLIVAN SQUARE VIA ATLANTIC AVENUE.

The service of surface cars in the SUBWAY will be restored between Boylston St. and the North Station on Monday, Nov. 30th, and between Pleasant St. and the North Station in a few days thereafter.

Boston Elevated Railway Co.

Representative Advertisement

Shawmut Avenue districts. At Park Street all cars from the Back Bay and western suburban points are being run as usual, entering and leaving the subway by the Boylston Street station and the Public Garden incline. In place of the trains which formerly ran between Park Street and the South station via Beach Street, the tunnel arrangements require bodily transfer to northbound cars at Park Street at the subway level, and thence a journey to the South station, via either Scollay Square, the East Boston tunnel and Atlantic Avenue, or via the North station, where transfer is given to the shuttle train service between the two railroad terminals.

The company has introduced a liberal transfer system between the cars running on the streets above the tunnel and the tunnel trains. In general, a passenger on a surface car may transfer to the tunnel without extra cost, provided he requests such transfer at the time of fare payment and on boarding the car between two contiguous

ORDER OF STATIONS.		
Sullivan Square Thompson Square City Square		
WASHINGTON STREET TUNNEL		ATLANTIC AVENUE
Southbound	Northbound	
Friend Milk Winter Boylston	North Station Union State Summer Essex Dover Street Northampton Street Dudley Street	Battery Street State Street Rowes Wharf South Station Beach Street

Diagrammatic Table Posted in Elevated Cars

tunnel stations. Similarly, transfers are given between tunnel trains and surface cars. The transfer arrangements are very elaborate and have been carefully worked out. To facilitate the service, the company has printed the names of all elevated train stations in cards framed in each end of each elevated car, the stations being arranged in their proper order, together with a map of the rapid transit system. Car dashers announced the opening of the tunnel, in addition to the press notices, and above the entrance of subway stations notices were posted a few days ago, stating the date upon which the tunnel was to

7 in. x 4 in. in dimensions and oval in section. This duct is securely fastened to the side of the car close to the floor and under the seats. It extends from one end of the car to the other, terminating under a longitudinal seat provided with a grating, so that the warm air may be discharged into the car body. Small screened openings are provided, one under each seat, and these openings are increased in size as the distance from the blower fan increases.

With this equipment the fresh screened air is heated to the desired temperature and distributed evenly throughout the body of the car. By means of the duplicate sets of heating and ventilating equipment fresh warm air is forced into the car under each seat, and the foul air is withdrawn from the roof of the car at an equal rate.

ALABAMA LIGHT & TRACTION ASSOCIATION

At a meeting of the representatives of the public service corporations of Alabama, held in Montgomery on Oct. 23, the subject of organizing an association to further the interests of the electric railway, electric light and gas companies of the State was discussed. Committees on by-laws and constitution, on nominations and on subjects were appointed, and a call was extended for another meeting of those interested in the movement, to be held in Mobile on Nov. 23 and 24. At the session at Mobile on the morning of Nov. 23 the constitution and by-laws as proposed by the committee on that subject were adopted for the Alabama Light & Traction Association, officers and an executive committee were elected, and the report of the committee on subjects was adopted. At the conclusion of the regular session on Nov. 23 those in attendance at the meeting visited the power house of the Mobile Light & Railroad Company. At the afternoon session J. B. McClary, general manager of the Sheffield Company, read a paper entitled "The Most Judicious and Effectual Way to Establish Just and Friendly Relations Between the People and the Public Service Corporations," and W. A. Heller, general manager of the Mobile Light & Railroad Company, read a paper entitled "Coal and Its Relation to the Boiler Plant," after which the power house of the Mobile Electric Company was inspected. In the evening a dinner was tendered to the delegates at the New Battle House by the Mobile Gas Company, Mobile Electric Company and the Mobile Light & Railroad Company.

At 9 a. m. on Nov. 24 the executive committee of the association met, and at 10 a. m. the regular meeting was convened and papers were read by R. M. Jennings, superintendent of the Mobile Electric Company, entitled "Minor Power House Economics," and by W. N. Harris, assistant superintendent of the Mobile Electric Company, entitled "Electric Meter Practice." The delegates were taken on a trolley ride through the city in the afternoon, during which they inspected the plant of the Mobile Gas Company.

The officers of the association are as follows:

President, A. H. Ford, president of the Birmingham Railway, Light & Power Company; vice-president, J. H. Wilson, president of the Mobile Light & Railroad Company; secretary-treasurer, Lloyd Lyon, secretary and auditor of the Mobile Light & Railroad Company; executive committee: the president, vice-president, and R. J. Chambers, president and general manager of the Montgomery Light & Water Power Company; J. B. McClary, general manager of the Sheffield Company; W. R. Hall, general manager of the North Alabama Traction Company, New

Decatur, Ala.; T. K. Jackson, president and general manager of the Mobile Electric Company; R. L. Rand, general manager of the Anniston Electric & Gas Company.

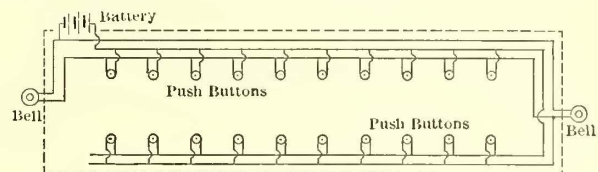
The committee on subjects is W. R. Hall, general manager of the North Alabama Traction Company; L. J. Davis, treasurer and manager of the Mobile Gas Company; A. R. Smith, secretary, treasurer and manager of the Demopolis Electric Light & Power Company. The question box is to be in charge of G. H. Schuler, president of Alabama City, Gadsden & Attalla Railway.

ONE YEAR'S GROWTH OF PAY-AS-YOU-ENTER PLAN

The large number of pay-as-you-enter cars already in service and the volume of attention which has been given them, makes it difficult to realize that their introduction in the United States dates back but one year, to Nov. 24, 1907, when the first car built under the licenses from the Pay-As-You-Enter Car Company was placed in operation in Chicago. The successful manner in which, in that city, the pay-as-you-enter cars met the claims for them of increased receipts due to the improved method of fare collection, elimination of platform accidents and faster operating schedules resulted in their rapid adoption in other cities. In an article published in the ELECTRIC RAILWAY JOURNAL of June 6, 1908, showing the rapid expansion of the pay-as-you-enter plan, it was stated that in addition to the original 300 cars in service on the Chicago City Railway, there were 100 cars under reconstruction in the company's shop for pay-as-you-enter service, 155 cars were in operation in New York City, 150 in Buffalo and 150 in Newark, N. J., 1000 additional pay-as-you-enter cars were on order or in prospect at that time, and most of them are now in service. Within the past six months the figures have been still further augmented, and the Pay-As-You-Enter Car Corporation reports that its records one year from the date pay-as-you-enter cars were first placed in operation in Chicago showed that 14 different cities will, within a very short time, have a total of 2500 cars built under license from the Pay-As-You-Enter Car Corporation, the new name of the Pay-As-You-Enter Car Company.

PUBLIC SERVICE RAILWAY INSTRUCTION PRINTS

An excellent feature of the shop practice of the Public Service Railway of New Jersey is the use of instruction blueprints, 6 in. x 3½ in. in size, which are distributed to the men to simplify their work. Most of these prints were reproduced in the STREET RAILWAY JOURNAL of Dec. 14, 1907, and showed the proper placing of brushes, connections for



NO. 13 ANNUNCIATOR WIRE USED
Wiring Diagram for Call Buttons

resistance, lighting and junction boxes, choke coils and arresters, motors, etc. The latest addition is the accompanying bell-wiring diagram prepared for the cars converted to the pay-as-you-enter type, as described in the ELECTRIC RAILWAY JOURNAL of Oct. 10, 1908. These prints are prepared under the direction of Charles Remelius, superintendent of rolling equipment.

COMMUNICATIONS

FREIGHT TRANSPORTATION IN SPRINGFIELD, MASS.

SPRINGFIELD STREET RAILWAY COMPANY
 SPRINGFIELD, MASS., Nov. 6, 1908.

To the Editors:

For the past three years this company has been developing a freight and express business and at the present time is carrying on such a business to practically all points on our system. Some of the points to which we run express cars are as follows:

	Distance from Springfield	
Springfield to Chicopee and Chicopee Falls.....	5	miles
Springfield to Westfield	10	"
Springfield to Russell	17.5	"
Springfield to Huntington	21	"
Springfield to Wilbraham	14	"
Springfield to Palmer	17.5	"
Springfield to Brimfield	28.5	"
Springfield to Agawam	7	"
Springfield to Suffield	12	"

The cars operated are large double-truck, closed cars with a carrying capacity of about 50,000 lb. We do business with the large wholesalers in meat, fruit, groceries, grain, etc., also with the retailers and individuals. Recently we have made a track connection with the Highland branch of the Springfield Breweries Company to handle their products direct.

There are several arguments in favor of extending these trolley connections with large business concerns. Products can be handled much more quickly and cheaper by means of the electric express cars. The system of transporting freight through the streets by means of teams is not only expensive to the shippers, but the cost of wear and tear on the streets and pavements is considerable on account of the heavy drays which are used for trucking purposes. This process also tends to a congestion of the main streets, especially during the busy portions of the day. By use of electric express cars greater quantities could be transported at one time and more expeditiously and the cost of maintenance of the streets would be greatly reduced. We believe the transportation of goods direct from the steam railroad tracks to the large houses to be practical and feasible, even the transporting of loaded freight cars over the trolley tracks, such movements being made during the night, when the streets are comparatively unoccupied.

H. C. PAGE,

Vice-President and General Manager.

EARNINGS POSSIBLE WITH P.A.Y.E. CARS

90 Wall Street, Nov. 23, 1908.

To the Editors:

To those who are responsible for the financial returns on investments in surface street railways there can hardly be a subject of greater interest than the results obtained in the practical operation of the pay-as-you-enter type of car. The ability to form a decided opinion on sound reasoning combined with the courage to act accordingly in matters outside the beaten track of experience is not given to all men. We cannot all be Napoleons and it is probably just as well for the stockholders in many cases that their managers are glad to "let the other fellow experiment" provided there is a quick appreciation when it is time to follow the trail.

In the case of the P.A.Y.E. car, the experimental

period should now be sufficiently advanced to show some practical results that can be expressed in financial terms. As this type of car is designed to increase net earnings by reducing existing losses in handling existing business, its success should be reflected in the operating percentage, in the receipts from steady traffic lines and, in this case, in the accident records. For various reasons results may not yet show up in the total operating percentages, but surely there must be significant, if not conclusive, results from practical operation on individual lines.

If a new era in surface street railway practice has commenced with the P.A.Y.E. car, and I think it has, the following questions are of immediate and immense interest:

(1). Is the general plan now in use so nearly right that only detail modifications need be contemplated, or is there yet some important change or addition needed to make the scheme fully operative?

(2). Do operating results with the new cars throw any light on the obtainable increase in earnings from the unknown but apparently large margin for gain consisting of fares earned, but not received?

To illustrate the precise meaning of question No. 1, I would say that the early electric motors would pull cars, but electric motors were far from "fully operative" until they had carbon brushes.

Concerning the margin of gain, the meat of the proposition, the Montreal Street Railway Company has quoted estimates ranging up to 18 per cent or more of gross passenger earnings and estimates of nearly 10 per cent have come out in important discussions. On the other hand, in your issue of Nov. 7 last, Mr. Root is quoted as stating that investigations on the Metropolitan system indicate an average loss in the past from fares missed "very evidently less than 3 per cent" and probably "very slightly, if any, in excess of 2 per cent." In other words, these figures represent to total possible saving of the P.A.Y.E. car. If correct they would sadly mar the attractiveness of the proposition.

Railway managers are sufficiently pestered for operating data to excuse them from volunteering additional information, particularly in the early stages of a new departure. If, however, the patentees and promoters of P.A.Y.E. equipment, on whom the burden should fall, will gather and present the required financial results, it will be a relief to the gentlemen on the fence.

F. V. HENSHAW.

[Very satisfactory returns are reported from P.A.Y.E. cars in operation, but unfortunately have not been available for publication. Undoubtedly the Pay-As-You-Enter Car Corporation could supply certain of these figures upon request.—Eds.]

MAINTAINING COLOR STANDARDS FOR PAINT

Electric railroad managers are well aware of the difficulty in maintaining a standard color for car bodies. The general practice is to obtain a paint of a satisfactory shade, and to require that all future shipments match this shade. Frequently the original sample is lost or used up, and even if carefully preserved the difficulty of determining slight changes in shade and the probable change due to fading results in a gradual change in the standard color. Where specifications are in use the trouble caused in this way is considerable, as differences of opinion are bound to arise. A very interesting instrument is in use at the Arthur D. Little Laboratory in Boston, for maintaining a desired shade of paint. This instrument, recently

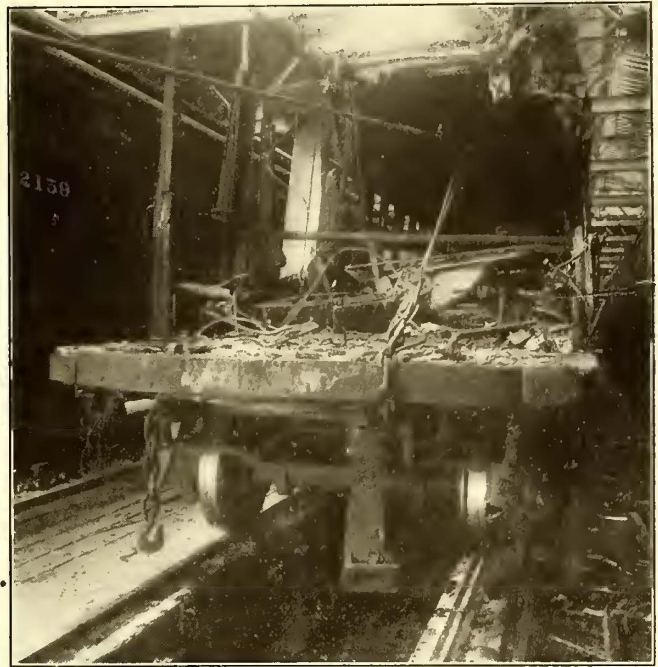
invented by Frederick E. Ives, is called a "colorimeter," and accurately measures the shades of any color. The method of procedure is as follows: The standard paint being determined, a board is carefully painted in the same manner as a car body and the color measured on the colorimeter. This instrument gives a certain scale reading, and by setting the instrument again at this same reading the original shade is at any time reproduced in the field of the instrument. On subsequent shipments a sample board is prepared in a similar manner and the exact shade measured on the instrument. This method does away with any need of preserving the original sample and eliminates any possibility of change from fading, as the standard is defined by certain scale readings on the instrument which give the exact color value of the different components which together make up the composite color under examination.

VALUE OF AN ANTI-CLIMBER BUMPER CASTING IN A NEW YORK SUBWAY TRAIN COLLISION

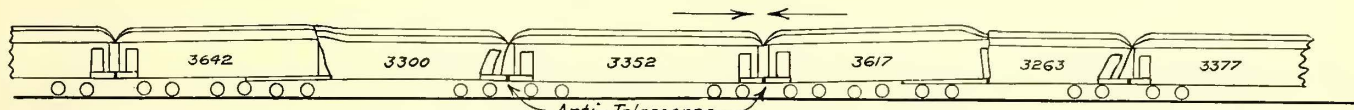
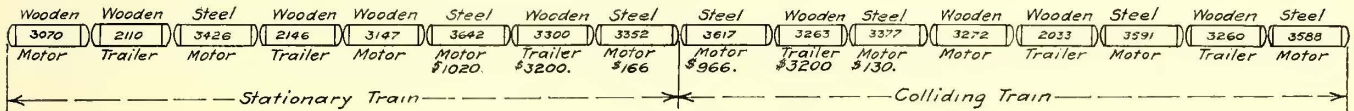
One of the important recommendations made by the standardization committee of the American Street & Interurban Railway Association was that where possible the face of the bumper on city cars be reinforced with a bumper casting which will engage the bumpers of interurban cars in such a way as to prevent climbing and telescoping. In the course of the active discussion of this recommendation J. S. Doyle, superintendent of car equipment, Interborough Rapid Transit Company, described the anti-climber bumper casting which his company had applied to some subway cars, and

said it had demonstrated its worth in a severe collision.

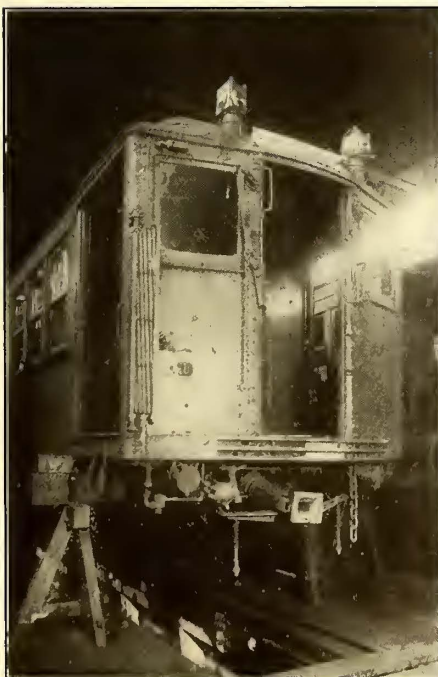
The device, which was invented by Frank Hedley, vice-president and general manager of the same company, was described and illustrated on page 425 of the STREET RAILWAY JOURNAL of March 14, 1908. It is made up of two



Wood Trailer Car, No. 3300



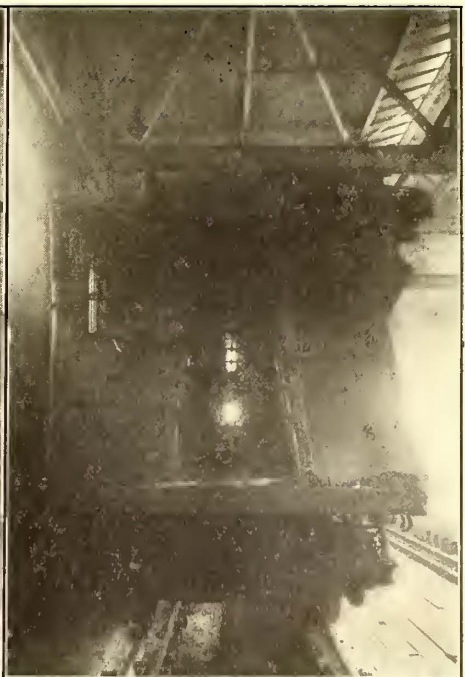
Order and Approximate Damage to Cars in Collision



Steel Motor Car, No. 3352



Wood Trailer Car, No. 3300



Steel Motor Car, No. 3642

3/4-in. steel plates laid flatwise and riveted to the top and bottom flanges of the floor framing with further provision made against climbing and telescoping by means of heavy steel castings with horizontal ribs, bolted to the face of each buffer timber and designed to interlock in collisions.



Wood Trailer Car, No. 3263

The Interborough Rapid Transit Company has now made available the following details of a collision in which this device was installed on one of the cars. The accident occurred at the Simpson Street station on the Westchester elevated extension on Dec. 4, 1907, when a train of eight

As the moving train weighed about 300 tons, its momentum at the speed mentioned was certainly enough to have caused heavy damage. As shown in the sketch, both trains consisted of wooden and steel cars, but the primary impact was between the last steel motor car, No. 3352, of the standing train and the first steel motor car, No. 3617, of the moving train. Car No. 3352 fortunately was equipped with an anti-telescoper at each end. As the cars immediately before and behind No. 3352 had no corresponding device, interlocking, of course, was impossible; yet the frictional effect of the projecting surface of the corrugated plate was great enough to prevent telescoping. This is well shown in the front-end view of the colliding train, illustrating the comparatively slight damage done to No. 3617. Even this partial use of the anti-climber saved the motorman's life, as will be seen by referring to the view of the rear end of this same car, which was totally destroyed, neither it nor the adjoining wooden car, No. 3263, being furnished with anti-climbers.

The two views of the non-protected wooden car, No. 3300, which was coupled to the protected motor car, No. 3352, show slight damage for the end adjoining car, No. 3352, and very serious damage at the opposite end, where it came into contact with the unprotected steel motor car, No. 3642, which was also badly broken up. The estimated damage loss of \$8,682 is made up of the following significant components:

No. 3352, steel motor car with anti-climber casting at each end.....	\$166
No. 3300, wooden car with frictional protection at one end from anti-climber on No. 3352.	3,200
No. 3617, steel motor car with partial protection like No. 3300	966
No. 3263, unprotected wooden car.....	3,200
No. 3377, unprotected steel motor car.....	130
No. 3462, unprotected steel car.....	1,020
	<hr/>
	\$8,682

This anti-climber and anti-telescoping casting has now



Wood Trailer Car, No. 3617



Steel Motor Car, No. 3617



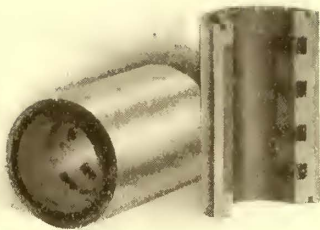
Steel Motor Car, No. 3352

empty cars struck a stationary empty train of the same length and caused a total property damage of about \$8,682. The collision happened at night and while the entering train was moving at a speed of from 30 m.p.h. to 40 m.p.h.

been placed on the market by Forsyth Brothers Company, of Chicago and New York. It can, of course, be adapted to a wide range of conditions on surface, elevated and subway service as well as for steam railroads.

GRAPHITE TROLLEY WHEEL BUSHING

The accompanying cut illustrates a form of special composition graphite trolley wheel bushing manufactured by the United Copper Foundry Company, Boston, Mass. The inside of the casting is grooved, and the graphite is forced into these grooves until it becomes a solid homogeneous mass. The bushings are then baked under moderate heat for at least ten days before they are finished for shipment. As an interesting illustration of how solidly the graphite is packed and baked into the bushing, some worn-out bushings made by this company were recently returned. In remelting these bushings the graphite inside was subjected to a temperature of 2000 deg. Fahr. After the metal had all melted away the graphite retained its shape and floated on top of the molten metal, from which it was skimmed off. On examination, these graphite fragments could be crumbled up, and they still retained the same soft, flaky, lubricating qualities as when first packed into the bushing.



Graphite Trolley Wheel Bushing

SUCTION CONVEYOR SYSTEM FOR HANDLING ASHES

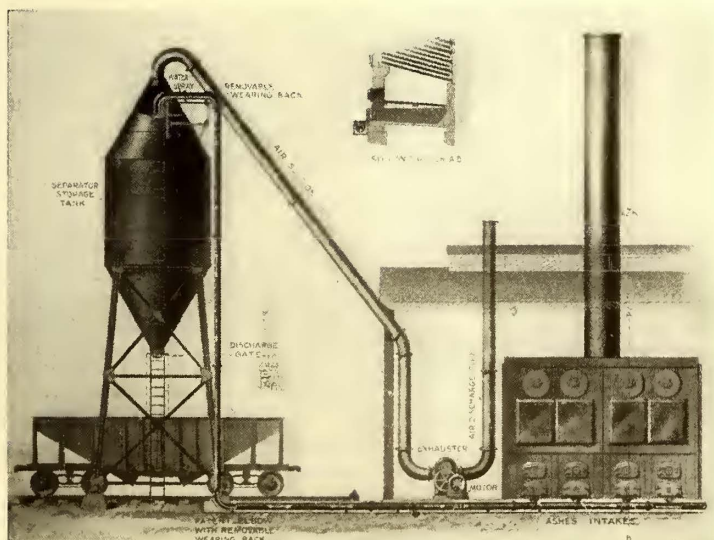
The disposal of ashes in a large steam generating plant oftentimes involves the installation of a conveyor system almost as elaborate as that required for handling the coal. The suction conveyor system of the Darley Engineering Company, New York, was designed especially for this service, and many advantages are claimed for it over mechanical conveyors of the ordinary type. With the exception of the exhauster, there are no moving parts whatever, the ashes being carried along by the rapidly moving column of air in the conveyor pipe. The apparatus con-

eter, and as far as possible is run in straight lines. Where bends are necessary a special elbow is furnished containing a removable wear plate. The separator is placed at the end of the conveyor run and can be made of any size or placed in any position to discharge its contents into a car, barge or storage bins. The conveyor pipe enters at the top, and is turned downward as shown in the engraving. Just before entering the separator the conveyed material passes through a water jet located in the conveyor pipe. The object of this jet is to take the heat out of the ashes and to eliminate the dust. From the top of the separator an exhaust pipe leads to the intake port of the exhauster. A positive cycloidal impeller blower is commonly used for large plants.

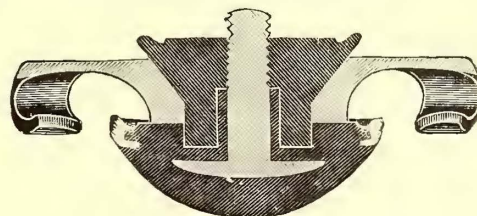
A low maintenance and operating cost is claimed for this system, as it is a peculiar fact that except at the elbows there is little wear on the conveyor pipe. Although only a few ounces of suction are used, the air in the conveyor pipe travels at a high velocity, but the velocity of the air column is less near the surface of the pipe than in the center, and the higher velocity in the center tends to lift the conveyed material away from the bottom and the sides of the pipe. A 6-in. conveyor pipe will handle 200 lb. of ashes per minute, while the 10-in. pipe will handle 500 lb. per minute. Plants have been installed in which ashes are carried 500 ft., and in one case a lift of 125 ft. has been used. Other points of advantage claimed are the small headroom required to install a conveyor of this type and the fact that while in use the dust and grit is sucked out of the boiler room by the action of the air in the conveyor pipe. The openings below the ash-pit doors are made slightly smaller than the diameter of the conveyor pipe, and any material which will pass the opening will be carried along in the pipe without clogging.

A NEW TROLLEY HANGER

The trouble arising from broken trolley hangers both in erection and in actual service has acted as an incentive to manufacturers of line material to place on the market a hanger which would combine both mechanical strength and durability with good insulating properties. With the ordinary hanger when the cap is screwed into place there is always danger of breaking the edges of the cap and thereby lessening the insulating properties. About 80 per cent of the breakages, however, result from the trolley slipping off of the wire, especially when a car is rounding curves. When the trolley wheel jumps the wire the pole will strike at least one hanger, which is often broken. As a result of a study of the conditions to be met, the Western Electric Company has recently placed on the market a new hanger which effectually prevents acci-



Suction Ash Conveyor



Reinforced Trolley Hanger

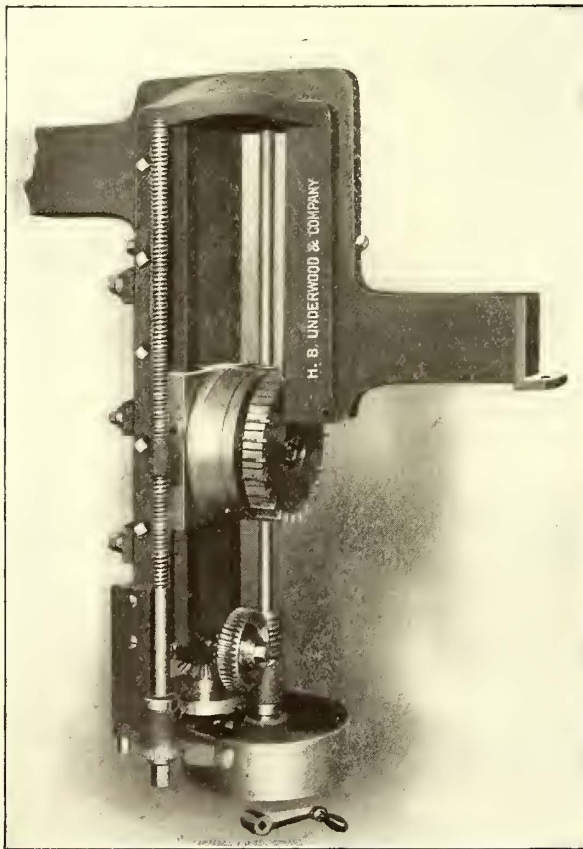
sists essentially of a conveyor pipe run under the floor of the boiler room and having openings under each ash-pit door, a separator or receiving bin, an exhauster and a water jet. The conveyor pipe is of steel, 6 in., 8 in., or 10 in. in diam-

dental breakages, as well as greatly facilitating the work of erecting the hangers. The cap and cone of this hanger are made of the well-known insulating material, Electrose, and the other parts are of metal. The feature of this de-

vice, however, is a metallic ring imbedded in the cap. Since this cap must necessarily be of an insulating material and is, therefore, liable to break under the strains coming on it, a metal reinforcement was necessary, and this metal ring, it is claimed, has successfully solved the problem. When the hanger is brought into place the strain in applying the wrench comes on this metal ring, instead of the edge of the cap. When a trolley pole strikes this hanger the metal ring sufficiently strengthens the hanger to prevent breakage.

TRUCK SIDE-FRAME FACING MACHINE

The portable machine shown in the accompanying half-tone illustration was designed for truing up the pedestal bearings on car-truck frames after they have become worn out of true. It is a strong, powerful tool, using an inserted blade milling cutter of large or small diameter, and made of high-speed steel. The cutter has an adjustment of $1\frac{1}{2}$ in. in and out to accommodate different widths



Portable Truck Side Frame Facing Machine

of jaws, and also an adjustment for the depth of the cut. The driving is done by a worm and worm wheel, geared 42 to 1, giving great power and smoothness. The feed is so arranged that a number of different feeds can be used from very fine to very coarse, to suit the conditions.

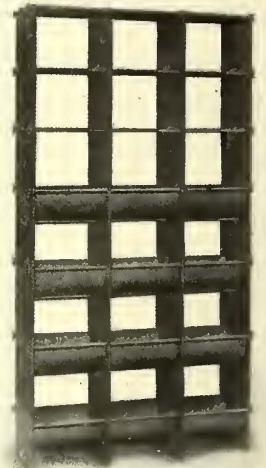
The bed of the machine, carrying the sliding head and milling cutter, is made in the form of a chuck with T-slots on both the top and bottom edges on the back, in which fit the projections of the clamps that hold the tool rigidly to the pedestal. In the center of these clamps are fitted adjusting screws that go through and clamp the whole device to the back of the leg without springing the bed or the jaws to be milled. At the top and bottom edges are shown six set screws for holding the machine edge-ways, and these, in conjunction with the clamps, hold the

machine firmly to the work. By placing wedge-shaped pieces in the chuck the machine will mill taper jaws as well as parallel jaws. In very wide jaws a parallel piece can be used in the same manner, giving the tool a wide range of work.

The regular cutter is $8\frac{3}{4}$ in. in diameter, and is capable of taking a deep cut. By reason of its large diameter only a small circular corner of about $\frac{1}{4}$ in. is left on the cut. It is adjusted by a socket wrench, which fits into and operates a cross-feed screw in the center of the cutter, moving it in or out and still retaining a long bearing for the shaft and driving device. The head has a 20-in. travel. The machine is belt driven ordinarily, but the drive-shaft end can be fitted to use an air drill or any portable power. Various sizes are built to meet requirements, and the machine can be made useful in other work besides that of milling the jaws of car-truck pedestals, for which it was originally designed. It is made by H. B. Underwood & Company, Philadelphia, Pa.

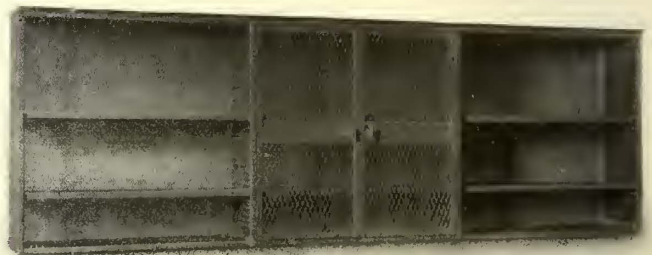
STEEL MATERIAL LOCKERS AND SHELVING FOR SHOPS

The value of metal lockers as clothes receptacles in shops and factories is generally recognized on account of their sanitary and fireproof qualities. There are many other uses for metal lockers in shops, especially in the tool and stock rooms. Edward Darby & Sons Company (Inc.), Philadelphia, makers of the well-known "Pen-Dar" metal clothes lockers, is also building a complete line of steel material lockers and shelving, two designs of which are shown in the accompanying engravings. The material locker shown is constructed entirely of sheet steel and expanded metal. The expanded metal used in its construction is made by a new process from a sheet of planished steel plate, cut, expanded and then rolled in such a manner



Metal Shelving

that it presents a smooth, even surface, entirely free from rough edges or corners. These lockers are fireproof, easily cleaned, and can be made to fit in any desired space.



Expanded Metal Material Locker and Shelving

The steel shelving shown is designed for storing tools, light material and small parts, such as nails, screws, nuts, etc. The shelves are made either flat or in the shape of shallow bins. They are held in the uprights by steel rods, and are shipped either set up complete or knocked down. Any mechanic can take down or erect the shelving, which is practically indestructible and can be moved to any place,

GRAPHIC RECORDERS FOR A. C. AND D. C. CIRCUITS

Curve drawing instruments to indicate load conditions are a necessary addition to the modern switchboard. The General Electric Company has in commercial use for this service a complete line of voltmeters, ammeters, wattmeters and power factor indicators for a.c. circuits, and ammeters, voltmeters and wattmeters for d.c. circuits. The d.c. voltmeters and wattmeters resemble the a.c. instruments, except that they are calibrated on direct current. D.c. wattmeters can be furnished in capacities up to and including 200 amp. The d.c. ammeter is like the corresponding a.c. instrument mechanically. Its electrical construction is described later. The a.c. voltmeters, ammeters and wattmeters are constructed on the direct reading dynamometer principle, while the ammeters are constructed on the magnetic vane principle.

The only friction in these meters is that of the recording pen on the paper. The moving element is suspended by a steel piano wire, and the lower end is centered by a small hardened steel pivot passing through a sapphire. A device is also provided to hold the moving element and pen arm in place during shipment.

The pen depends for its action upon the principle of capillary attraction. It has an iridium point sealed into a very small glass tube, which in turn is placed inside of a larger tube, the latter terminating in a bulb which holds sufficient ink to operate the pen seven days without re-filling. The record is made on a band of paper 60 ft. long. On this paper lines are ruled corresponding to the time and to the instrument calibration; the lines ruled across the paper representing time and those ruled lengthwise represent volts, amperes, watts, or power factor, depending upon the instrument. This form of chart has the advantage of permitting the use of time divisions of equal length throughout the entire range of the recording pen. The latter is so attached to the moving element that its motion is transmitted in a straight line parallel to the time divisions on the chart, and the record, or diagram, thus produced is believed to be much easier of interpolation than that produced by instruments with lines which are curved or of unequal length.

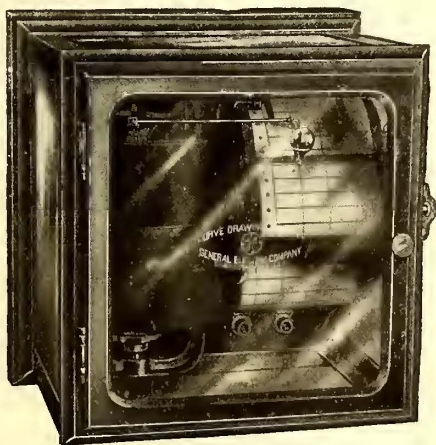


Fig. 1.—Direct-Current Recording Ammeter

As the paper is unwound and passed under the recording pen, it is paid into a space at the bottom of the instrument case. The instrument is provided with a paper cutter. When a roll is exhausted the empty wooden holder can be easily removed by withdrawing it from the spring supporting trunnions. A new roll can then be placed in position on the supporting trunnions and the end of the

paper carried over the idler roll at the back of the case. The pen arm can be moved back from the paper simply by lifting it. This locks the pen into position, where it remains until loosened.

The standard rate of chart feed is 3 in. per hour, although a feed of 1 in. or 6 in. per hour can be furnished if desired. In the latter case a slot is made in the bottom of the cover, through which the record may pass, and thus prevent too great an accumulation inside the instrument case. The rapid feeding of recording instrument charts is of great importance, as it insures a clearer and more accurate record than can be obtained with slow moving

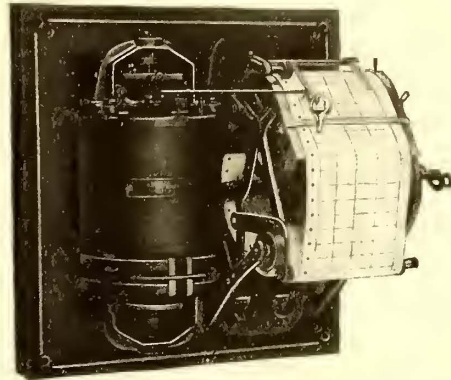


Fig. 2.—Alternating-Current Recording Wattmeter, With Cover Removed

charts. An eight-day clock is used to drive the chart. Through suitable gearing, the clock drives a drum having peg teeth, which engage the holes located near the edge of the chart. These teeth not only feed the paper under the recording pen, but also give it a definite and accurate position along the axis of the drum.

The feeding drum is driven by a friction clutch operated either forward or backward. This enables the paper to be accurately located in regard to the time graduations without difficulty or without strain to the driving gears and clock. If desired, a re-roll attachment can be furnished by which the chart is re-wound as it passes from the drum after the record has been made.

The torque of these instruments is high, to insure long life with continued accuracy. The pen arm fluctuations are magnetically damped by an aluminum disk passing between the poles of permanent magnets. This method of damping is very effective, introduces no friction, and is free from the objectionable features common to air or liquid damping systems. The instruments are thoroughly shielded from the influence of external magnetic fields by the use of a laminated soft iron shell which completely surrounds the measuring coils. These instruments are stated to be free from heating errors, and may be used on circuits of any wave form or power factor.

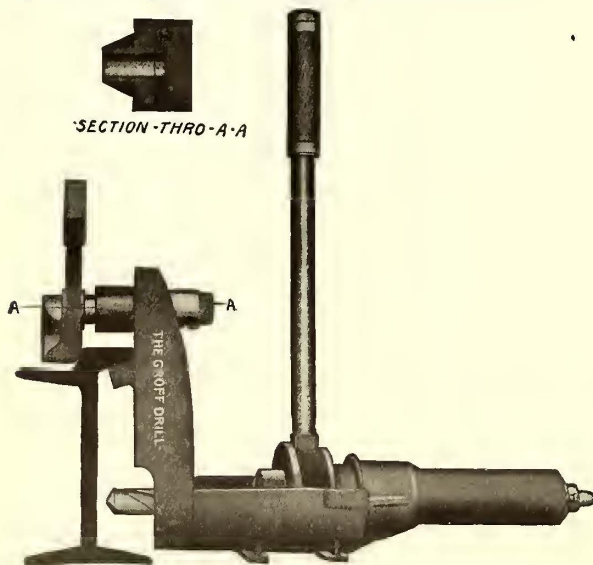
Ammeters, power factor indicators and single-phase wattmeters are made in capacities up to and including 200 amp and 650 volts, for use without current or potential transformers. For circuits in excess of the foregoing, current and potential transformers must be used. Voltmeters are made up to and including 750 volts without potential transformers, these being required, however, above this limit. Polyphase wattmeters with current capacities up to and including 60 amp, and with potential capacities up to and including 650 volts are made for use without current and potential transformers. On circuits where the voltage and current exceed the above limits, current and potential transformers must be employed.

D.c. curve drawing ammeters are constructed according to the astatic principle, and are of the electromagnet type. The moving element consists of two rectangular shaped coils connected together with two soft sheet steel astatic control pieces fastened between them. The current to be measured, or a shunted portion of it, is passed through the coils which are free to move in the field set up by two astatically arranged electromagnets. These magnets are wound standard for 125-250 volts and 550 volts, and the instruments are so designed that a 25 per cent variation above or below normal will cause no appreciable error in the instrument indications. The movement of the coils is opposed by the counter-torque of the astatic control pieces, and also by the control springs.

D.c. ammeters are made self-contained in capacities up to and including 60 amp. Instruments with capacities from 80 to 3000 amp, inclusive, being provided with external shunts. Instruments of higher capacities will be furnished if desired. All of the shunts used with these instruments have a uniform drop of 60 millivolts, and capacities in excess of 800 amp are provided with a special thermo-electric attachment to eliminate absolutely errors due to thermo-electric currents. Both the a.c. and d.c. instruments are finished in dull black, and are enclosed in glass cases and fitted with felt guards or cushions to make them dust-proof.

AN IMPROVED TRACK DRILL

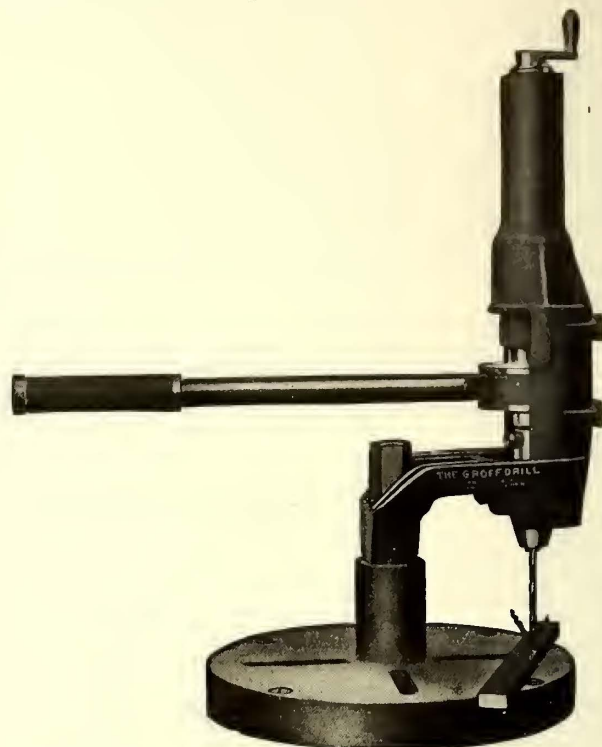
The Groff drill shown in the accompanying illustrations embodies a number of new features. It is intended either for track drilling or for any other class of work in restricted positions where rapidity and ease of application and removal are essential. The distinguishing points in this drill are its double action, friction feed and the cam lock for attaching it to the rail. It is made in two sizes for drilling holes up to $1\frac{1}{2}$ in. in diameter. The smaller size weighs 15 lb., while the larger size weighs only $18\frac{1}{2}$ lb. or with the special clamp for use on high girder rail 20 lb.



Drill Attached to High Girder Rail

The drill revolves in one direction with a movement of the handle in either direction by means of an ingenious triple pinion drive which reduces friction. The normal pressure required to move the handle of the large size drill is 5 lb. in one direction and only $2\frac{1}{2}$ lb. in the other direction, thus providing relief for the operator. The friction feed, however, may be adjusted to give any pull desired,

the rate of advance being correspondingly varied. The feed is always acting whenever the handle is moved in either direction, but it cannot jam or crowd the drill and it is automatically reduced if the point of the drill encounters a hard spot. The bonding drill, for example, will drill through the web of a 100-lb. rail of normal hardness in 20 seconds, but if a hard spot is encountered the feed is re-



Drill Adapted to be Used as a Drill Press

duced and it will require from 30 seconds to 40 seconds.

The barrel of the machine containing the ratchet and feed screw is filled with grease that will not melt below 400 deg. Fahr. and the moving parts will run a year without further lubrication. The working parts being thoroughly lubricated and perfectly enclosed in the barrel of the drill, the machine may be exposed to all kinds of weather and used in sandy localities without damage. Vanadium steel is used for all working parts subject to shock and the barrel is made of crucible cast steel.

The machine may be attached to a rail in a few seconds and removed from the rail in one second, no matter whether the drill sticks fast in the hole or not. The machine is locked to the rail with a cam, which, by a blow of a hammer, falls to a horizontal position and permits the machine to be withdrawn from the rail in a plane substantially parallel to the drill itself. No set screws are used to hold the drill in the drill socket, so that the machine can be removed instantly from the drill.

The advancing of the drill to and withdrawing from the work is accomplished by rotating the small crank on the outer end of the barrel. This movement is entirely independent of the friction feed. As soon as the crank is held stationary by the pin, as shown in the cut, the automatic friction feed is ready for work at once. This permits the friction feed to remain set at the correct point indefinitely and in practice no change in adjustment is required for months at a time.

These drills are made by the Groff Drill & Machine Tool Company, Camden, N. J., and are sold through the Standard Supply & Equipment Company, Philadelphia, distributing agents.

LONDON LETTER

(From Our Regular Correspondent)

The Congress of the International Electro-Technical Commission has finished its labors. Delegates were present from Canada, Denmark, England, France, Germany, Hungary, Japan, etc. The United States were not officially represented, owing to some local misunderstanding, but unofficially Mr. C. O. Mailloux, a visitor, was a most efficient substitute, and his knowledge of languages stood the Congress in good stead. The permanent bureau of the organization is in London with Mr. Le Maistre as permanent and Colonel Crompton as honorary secretary. Professor Elihu Thomson was unanimously elected president, as successor to Lord Kelvin and M. Mascart. In his absence Sir John Gavey, of the General Post Office, occupied the chair, and the delegates were welcomed by Mr. A. J. Balfour, the leader of the opposition in the House of Commons. The rules to govern the Congress were unanimously adopted, as also was the general scope of a proposed glossary of terms to be universally employed, which will be compiled by collaboration between the local committees. The adoption of any photometric units was voted premature and postponed, and various points for future decision were referred to the same local committees. The German delegates invited the Commission to meet in Berlin in 1910.

A Royal Commission on London Traffic, after many months' work and after examining a cloud of witnesses, issued a monumental report in 1905, making various recommendations, which until August in this year had been practically ignored, as no action whatever was taken on it so far as the public knew. In August a special London Traffic Branch of the already over-burdened Board of Trade was constituted under Sir Herbert Jekyll, a Royal Engineer officer. This branch has for its main object the consideration of new schemes of locomotion seeking statutory authority, and will no doubt issue all necessary rules and regulations to govern them, without, it is hoped, hampering their usefulness and development. Further information to supplement the enormous and, we fear, undigested mass accumulated by the Royal Commission will be collected and embodied in future blue books for the information and edification of Parliament. The first of these has just been issued under date of Sept. 4, and indicates the changes that have taken place since 1905, with such additional information as has since become available. Editorial comment on this report appears elsewhere in this issue, but some other facts contained in its pages will be mentioned.

The report points out that although many very important street improvements have been carried out, they have had little relation to each other or to the general requirements of London as a whole. As to the number of street vehicles there has been little change, but their character differs enormously. The gondola of London, the hansom cab, is fast disappearing at the rate of 500 a year. Of four-wheeled vehicles, other than omnibuses, those driven by mechanical power rose from 1 in 1905 to 723 in 1907. Omnibuses increased in number by 126, but the number of motor buses rose from 13 to 1305, with enormously increased seating capacity. The number of trams has risen by 453, those drawn by horses declined from 1143 to 404, and the mechanically propelled cars rose from 576 to 1768, also with greatly increased accommodation. After alluding to the influence and the controlling power secured by the Underground Electric Railway Company over the tubes and other lines, including the London United Tramways, Sir Herbert says it can hardly be doubted that an extension of the principle of amalgamation to the whole of the electric railways and tramways of London would be attended with still greater benefit. He suggests that it might, perhaps, eventually be carried a step further, so as to include the metropolitan omnibus services, and thus bring all the public means of locomotion in London, with the exception of the trunk railways, into one comprehensive system under a single management. This is a big order, but there is no doubt that the present unremunerative competition will have to be tackled somehow. The County Council Tramways are the great offenders in this respect, and it would seem only fair that the undertakings, with which they compete on very unequal terms, should be shown some consideration in the matter of that local taxation which enables competing lines to be constructed.

The report declares that central lamp posts and standards reduce the capacity of the road by 25 per cent, but the turning of important thoroughfares into places for installing cab ranks, for loading and unloading goods at all times of the day, and not at all in the night, the crawling cabs and costermongers' barrows and other obstructive vehicles, are much more serious and constitute universal restrictions to

the free use of thoroughfares as such. Within the last three years 26½ miles of tube railways have been opened. Electricity has supplanted steam on 68 miles of railway; 28½ miles of horse tramways have been converted to electricity and 80 miles of new electric tramways have been laid down in outer London. Tramways have crossed the river at Westminster and Vauxhall bridges, but stop at Victoria for the present. Blackfriars Bridge will soon be ready for the tramrails, and these are being brought down to Liverpool Street from the north and east, so that the sanctity of the City of London is being increasingly desecrated by tramways. Highbury is directly connected by tram with the whole of South London, and Rotherhithe Tunnel is an additional link for other traffic between the two banks of the river. The report indorses the recommendation of the Royal Commission that a permanent traffic board be appointed, and in one of the appendixes there is a memorandum on the Government Extension at Washington.

The muddle over the G. B. surface contact system on the 3 miles in the Mile-End Road has not yet been cleared up. The company, whose system has been working most satisfactorily in Lincoln for some years, affirmed that there was no reason why it should not be equally satisfactory in London. It offered to put the system right at its own expense and to maintain it for 12 months, provided the London County Council (which had laid the lines down) would equip the cars in accordance with the company's designs, as the unsatisfactory results were attributed to a disregard of the company's advice. Mr. W. M. Mordey, president of the Institution of Electrical Engineers, was consulted by the Council, and although his report has not been published it is stated that, in his opinion, all the defects at present existing can be remedied, and that the working can be made safe and efficient without any material alteration and at a comparatively small cost. Mr. Mordey suggests that the studs on half a mile of line be modified, and that arrangements be made to compare different methods in respect to details. The G. B. Company, in a letter to Mr. Mordey, urges, inter alia, that the car equipments, for which it disclaims responsibility, were so defective that it was impossible to expect satisfactory working, and the company recommends that, in any further experiments, these car equipments should be scrapped and entirely new ones fitted.

In his presidential address at the Institution of Electrical Engineers, Mr. Mordey stood up for the old country, and wound up by saying that there was nothing in its electrical work to justify in any way the charges that had been so freely made against this country. There was one thing he ought to say, namely, that these depressing charges had not originated abroad; they were entirely of home production. The backwardness referred to did not exist; we were ahead and well ahead.

The London and District electricity supply bill has been thrown out by the select committee to which it had been referred, thereby sharing the fate of its two predecessors. On the other hand, the "linking-up" bill has had its preamble passed, and a clause has been inserted making the London County Council the purchasing authority.

The Tramways & Light Railways Association has at last issued its "brakes" report, on which the Council has been working for many months, and it forms a continuation of Mr. A. L. C. Fell's report on the same subject read some three years ago before the same association. Mr. Fell was the chairman of the brakes committee, and, being chief officer of the London County Council Tramways, was enabled to give every facility for the prolonged investigations, which have resulted in a classical work of great value and importance.

The electrobuses in London appear to have a distinctly good time in view as the following table shows:

	Year ended July 15, 1908.	Three months ended Oct. 15, 1908.
Average daily mileage of buses.....	.....	67.2
Number of passengers.....	1,596,831	925,959
Total receipts.....	£8,728	£5,006
Average receipts per bus mile.....	13.8d.	14.38d.
Total operating expenses.....	£7,985	£3,480
Average operating cost per bus mile.....	.....	9.99d.
Profit on operating.....	£743	£1,526

The operating expenses do not include any provision for establishment, supervision or head office charges, nor repairs to buildings, but the total of these, excluding depreciation for the three months above mentioned, was under £1,517 and amounts to about £6,000 a year, which amount would not be materially increased if the company's buses were doubled in number. All the battery maintenance has been done under contract at 2d. per mile, and the company has offers to maintain over 100 electrobuses at the same rate for three years.

A. C. S.

News of Electric Railways

Cleveland Traction Situation

Receivers Warren Bicknell and F. A. Scott spent the last week in arranging schedules for the Cleveland street railway system. On all lines that have been taken up so far the receivers seem to have fixed upon a service that is satisfactory, as they have received many complimentary letters on the manner in which they are handling the affairs of the operating department. So far, they have not taken the rate of fare into consideration in arranging schedules, but it is said that the business is increasing. Whether this is due to increased business activity generally, or the fact that people are riding more on account of better accommodations, cannot be told now. The approach of the holiday season may have something to do with the matter.

As an example of the change in service, it may be stated that the schedule on Euclid Avenue from the business section to Fairmount provides for cars every 3 minutes during the day, 1½ minutes in the morning and 1 minute in the evening, instead of 5 minutes during the day, 2½ minutes in the morning and 1 minute in the evening, as given by the former management. The receivers recognize the necessity of a better all-day service, although it has been found that the evening service cannot be increased materially at this time. The service from Fairmount to the end of the Euclid line has been improved in about the same proportion, and East Cleveland is getting a much better service than it had at any time during the period of control by the Municipal company. This is due to some extent to the fact that all cars sent to the Windermere car house are marked "Windermere" and carry passengers. In the past these cars have run wild, and all cars that could be handled at Lake View were turned there. Now the Windermere car house is being used more and this, of course, gives a portion of East Cleveland frequent cars. Notwithstanding this fact, many of the cars are crowded during the evening rush hours. The St. Clair Avenue service has been increased from 6 to 5 minutes during the day, with 3-minute trailer cars morning and evening during the rush hours. The East Fifty-fifth Street crosstown line has been given a 5-minute instead of a 6-minute service, with cars every minute and a half in the morning and every minute in the evening; 4-minute instead of 5-minute service has been established on Superior Avenue, with 1½ instead of 2½-minute cars in the morning and 1 instead of 2 minutes in the evening. As these cars operate to Lakewood on the west side, the people of a portion of that suburb are greatly relieved. The service through the village will also be improved. At present cars are run every 8 minutes through to the west end of the line. Wade Park Avenue service has also been increased, especially at the noon hour, when many people go home to lunch. Cars on the 105th Street line will be run through to the end, and Euclid Beach traffic will be handled on other lines during the winter.

After this work is completed attention will probably be given to the rate of fare that will be necessary to furnish the service decided upon. Nothing has been done in that direction yet. It is said that the cost of hauling passengers under certain conditions may be figured out, no matter what fare is charged at this time. Into this computation all expenses of maintenance and a reserve for injuries and damages would enter.

Under a decision of the receivers, motormen, conductors and inspectors began on Thanksgiving morning to ride free of charge to and from their work. The receivers said they believed that it was unreasonable to charge employees for riding. At the same time they yielded to the wishes of the men in the matter of purchasing their own uniforms. Hereafter the men will purchase and own their own uniforms, and they will be allowed to select blue or gray, whichever suits their tastes. The Municipal Traction Company furnished the men one suit a year, but required them to pay fare when they rode on the cars.

A large number of the old Cleveland Electric Railway platform men have been given places within the last week. The receivers ordered that the age, weight and height limits on conductors and motormen should be lifted in the case of old employees who apply for positions. Some complaint was made that division superintendents were discriminating against the old employees and many of the latter went to the general office, where their cases were taken up by the receivers.

Ernst & Ernst, accountants, are engaged in opening a new set of books for the receivers. They will date from the time the properties were turned over by the court and will probably embody some changes in the manner of

classifying certain charges. J. B. Tanner, auditor of the Municipal Traction Company, may remain with the receivers for the present and will be in charge of the books of that company up to the time the receivers began their work.

Within a short time the receivers will file their first report with the United States Circuit Court. It will show the financial condition of the Municipal company at the time they took charge of the business. An application was filed with the court on Nov. 28 asking for instructions regarding the payment of claims against the Cleveland Railway Company from the fund of \$293,050 which was turned over to the Municipal company. The receivers stated that there is \$266,440 to the credit of the Municipal in the various banks, but that they are unable to say how much of it belongs to this deposit. Attached to the application was a request from the Cleveland Railway that \$4,500 personal injury claims be paid from the fund, which was thought to amount to about \$150,000.

A meeting of the board of directors of the Cleveland Railway Company was held on Nov. 27. The Guardian Savings & Trust Company was appointed registrar of the stock, instead of the Depositors' Savings & Trust Company, the business of which was acquired recently by two other banks.

The only changes made in the operating department so far have been the dismissal of two division superintendents who were succeeded by former employees of the Cleveland Railway. A number of minor changes about the office indicate that the receivers are practising economy. F. C. Alber, assistant to President Du Pont, has resigned.

On Thanksgiving Day the system handled 6000 people who attended the Case-Reserve football game. Mr. Bicknell kept in touch with the timekeeper on the ground and asked to be notified 10 minutes before the game closed. When the crowd left, it was found that 50 cars had been drawn up in front of the University buildings and within 10 minutes all the cars had moved away. The cars were routed over various lines to avoid interference with regular traffic.

New York, New Haven & Hartford Railroad to Electrify New York Suburban Lines

Application has been made by the New York, New Haven & Hartford Railroad and the Harlem River & Port Chester Railroad to the Public Service Commission of the Second District of New York for permission to change the motive power of the Harlem River & Port Chester from steam to electricity between New York and New Rochelle and to extend the line to Stamford, Conn. The petition states that the New York, New Haven & Hartford Railroad is the lessee of the Harlem River & Port Chester, and that as it is operating its main line by the alternating-current system, it desires to extend the same system to the operation of the leased lines which do a strictly local and suburban business. The company intends to finance the change in motive power from the proceeds of an issue of \$15,000,000 of bonds, known as the New York, New Haven & Hartford-Harlem River & Port Chester first mortgage 4 per cent 50-year gold bonds. This issue was secured by a first mortgage dated May 16, 1904, made to the United States Trust Company as trustee.

Unofficially the plan of the company is said to contemplate a separate terminal in New York for the suburban lines of the company and to provide a connection in upper New York with the proposed Lexington Avenue subway. This would permit the company to interchange passengers with the subway and might possibly result in an arrangement with the city to operate trains in the subway. Pending a decision by the Public Service Commission, the company deems it inadvisable to make any statement for publication regarding its plans.

Westinghouse Electric & Manufacturing Company Accepts Reorganization Plan and Approves Directorate

The stockholders of the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., at a meeting in that city on Nov. 24, voted to increase the authorized capital of the company \$10,000,000, and also adopted the substitute or modified plan for the readjustment of the debt of the company, which is based on the plan of the merchandise creditors. Regarding the meeting, the following official statement was issued by the company:

"At the meeting held on Nov. 24, the stockholders in-

creased the authorized capital stock of the company by \$10,000,000, all assenting stock, and also adopted the substitute or modified plan for the readjustment of the debt of the company which is based upon the merchandise creditors' plan. Of the \$10,000,000 additional stock only between \$2,000,000 and \$3,000,000 is needed under the readjustment plan. The balance will be subject to issue by authority of the board of directors. The meetings have been adjourned until Nov. 30, when it is expected that the new board of directors and the proxy committee will be elected."

At the meeting of the company on Nov. 30, resolutions were passed amending the by-laws of the company so as to allow the election of 16 directors and to provide for the election of a proxy committee. The following directors, approved by the readjustment committee, the merchandise creditors' committee and the stockholders' committee, were elected:

For the class whose term expires in July, 1909—Richard Delafield, E. C. Converse, Anthony N. Brady and J. D. Callery. Terms expiring July, 1910—A. G. Becker, George M. Verity, William McConway and Charles A. Moore. Terms expiring July, 1911—Charles F. Brooker, James S. Kuhn, Edward F. Atkins and E. M. Herr. Terms expiring July, 1912—George Westinghouse, Neal Rantoul, Joseph W. Marsh and Albert H. Wiggin.

The following proxy committee, approved by the readjustment committee, the merchandise creditors' committee and the stockholders' committee, was also elected: James N. Jarvie, Jacob H. Schiff, Charles Francis Adams, Robert S. Smith and F. W. Roebing.

Subway Progress in New York

H. B. Seaman, chief engineer of the Public Service Commission of the First District of New York, has made the following reports on the portions of the subway and the Brooklyn loop lines now in process of construction:

"Contract plans for the Fourth Avenue subway, Brooklyn, were completed to Forty-third Street, and the contracts were awarded by your commission on May 22, 1908. The contracts provide for the completion of the work in 24 months, or by May 22, 1910. It may be noted that this is only five months after the date of completion of the loop lines in Manhattan, and of the proposed opening of the Manhattan Bridge. Had the work been commenced when the contracts were awarded, it would now be nearly one-fourth done.

"The construction of additional tracks north of Ninety-sixth Street, New York, was commenced on Oct. 1, 1908. The main work of construction will commence about Jan. 1, 1909, and will require about two years to complete.

"The Van Cortlandt Park extension will probably be finished before Jan. 1, 1909.

"Work on the Brooklyn loop lines in Manhattan should be completed by January, 1910.

"At Chambers Street station the work was stopped in accordance with the letter of May 12 from Mayor McClellan, requesting that this commission 'direct the contractors to suspend work in connection with the subway station.' The six months which have elapsed since that date have been taken up in the preparation of plans by the Department of Bridges for the foundation of the municipal office building, which plans, I understand, are now completed and the contract about to be let. I am advised that it will take about one year to build these foundations, and probably several months more to bring the work up to the point at which it was stopped six months ago.

"It will not be practical to operate the loop lines until the Chambers Street station is completed."

New Street Railway System Opened in Argenta, Ark.—The Argenta Street Railway was recently opened for traffic. The system is 7 miles in length.

Annual Meeting of the Pennsylvania Street Railway Association.—The annual meeting of the Pennsylvania Street Railway Association will be held at the office of the Central Pennsylvania Traction Company, Harrisburg, Pa., on Dec. 11, at 12 m. General business will be transacted.

New York Central Exonerated for Accident.—The indictment for manslaughter in the second degree filed against the New York Central & Hudson River Railroad on March 27, 1907, following the wrecking of the Brewster express, drawn by an electric locomotive, in which 24 persons were killed on Feb. 16, has been dismissed by Justice Davis in the criminal branch of the Supreme Court upon motion of District Attorney Jerome.

Fire in Los Angeles.—The Los Angeles-Pacific Company suffered a severe loss through the destruction of its depot on Fourth Street, between Broadway and Hill Street, Los Angeles, by fire on Nov. 16. The ground floor of the build-

ing was used by the company as an office for the purchasing agent and the engineering department, and contained the ticket office of the company. The general offices of the company were on the third floor. The other floors were all leased. The building was valued at \$150,000. Temporary offices have been established by the company at its Hill Street depot.

Chester Strike Declared Off.—The strike of the employees of the Chester (Pa.) Traction Company, which began on April 13 last, was declared off officially by the local union at Chester, and the Amalgamated Association of Street & Electric Railway Employees of America, on Nov. 23. Recently 13 members of the local union, who were former employees of the company, were arrested on the charge of dynamiting cars of the company. They were indicted by the Grand Jury, but at their trial the jury disagreed and the men were held in bail for trial at another place. This latter trial has not yet commenced.

Supreme Court Refuses to Enjoin New York City from Paying Expenses of Public Service Commission.—Justice Gerard, of the Supreme Court, has denied the application of Adolph C. Gubner, a taxpayer of New York, for a temporary injunction restraining the city of New York from defraying the expenses of the Public Service Commission in the First District of New York. The court refused, however, to pass on the question as to whether the act creating the commission is unconstitutional. On this point Justice Gerard said: "I shall deny the motion for a temporary injunction, which would practically end the function of the commission, and leave the question of the constitutionality of the act to be finally determined by the higher courts."

Official Inspection of New Boston Tunnel.—The Washington Street tunnel, Boston, which was the subject of a descriptive article in the *ELECTRIC RAILWAY JOURNAL* of Nov. 28, was inspected officially on Nov. 23 by a number of State, municipal and railroad officials as guests of the Boston Transit Commission and the Boston Elevated Railway. The start was made from the Union-Friend station at 2 p. m. and about 900 persons were carried through the tunnel on two trains. Messrs. Allen, Crocker, Carson and Swain represented the Boston Transit Commission, and Gen. Wm. A. Bancroft, C. S. Sergeant and several heads of departments the Boston Elevated Railway. The train stopped at every station to permit the passengers to inspect the details. Each guest was presented with a folder descriptive of the tunnel.

Worcester Motorman Rewarded for Bravery.—In recognition of his heroism and devotion to duty, the Worcester (Mass.) Consolidated Street Railway, through its vice-president, L. S. Storrs, recently presented Ralph A. Cook, a motorman in the employ of the company, with a check for \$100, and the Massachusetts Humane Society presented Mr. Cook with a medal for bravery. On May 26, 1908, at 5 o'clock p. m., as car 16 on the Worcester & Blackstone Valley Street Railway, operated by Mr. Cook as motorman, was going north near Saundersville, a child about four years old ran upon the track in front of the car. The mother observed the danger of the child and made a desperate attempt to extricate it from its dangerous position. Mr. Cook sounded the alarm, but seeing that he could not possibly stop the car in time to avoid running over both the mother and child, reached over the front end of the car, and as it approached the mother threw her and the child from the track with his hand. In doing so, however, Mr. Cook fell from the car and was almost run over. By his act he saved the mother and child from being killed.

Dispute Over the Municipal Railway at Port Arthur.—An injunction has been secured in behalf of the citizens of Port Arthur, Ontario, Can., to restrain the Ontario Railway & Municipal Board from carrying into effect its order that the local commission at Port Arthur, which has control of the Port Arthur Electric Street Railway, surrender its powers to a new joint commission, of which two members were appointed by Port Arthur and two by Fort William and the fifth by the Ontario Railway & Municipal Board. The street railway at Port Arthur was built by the city in 1893 and extended to Fort William, but continued to be operated by the Port Arthur Railway Commission. Aldermen from both cities met recently in Toronto and arranged for the sale to Fort William of that portion of the system running in Fort William. No vote of the residents had been taken, however, and when the time came for transferring a portion of the line to Fort William the Port Arthur Railway Commission refused to relinquish the management of the property to the joint commission which had been appointed to operate the system. The Ontario Railway & Municipal Board was appealed to and instructions were issued by that body to the Sheriff to turn the property over to the joint commission. This action was prevented by an injunction secured by the local commission of Port Arthur.

Financial and Corporate

New York Stock and Money Markets

DECEMBER 1, 1908.

After a week of considerable irregularity and rather light trading, the stock market seems to have settled down to strength and gradual advances. One of the striking features of the situation is the fact that trading has very considerably decreased from the volume that was in evidence immediately after election. This seems to be due to the fact that outsiders, who are not regular dealers in the market, have either become satisfied with the purchases they have made or have concluded to stay out. Prices, however, remain strong and there is apparently no organized movement to put them down. This is largely because the market continues to be in the hands of those strong interests which began the advance movement six or eight months ago. As long as this clique retains its extensive holdings, it will be dangerous for any bears to attempt raids, and there is little likelihood of any natural depression. The most active stocks on the list are the Harrimans and Steel common. The latter seems to be particularly the favorite with the smaller dealers. Tremendous blocks of it are dealt in every day, and it is generally believed that a large portion of this buying is of a more permanent character than simple speculation. The number of odd lot sales that are recorded among the smaller houses indicates that inconspicuous investors are also taking a hand in the buying.

The bond market remains strong and every good security is snapped up as soon as offered. In spite of the many large issues which have been absorbed within the last few weeks, there seems to be no limit to the demand.

The money market is stiffer and rates for call money advanced to-day to 2½ per cent, although the majority of the loans were made at a lower figure. This is due to the fact that the demand is better for commercial purposes and that the conditions are such that gold exports are imminent. In fact, it is announced that \$5,000,000 for this purpose have been reserved to-day. Money rates are quoted at 1½ to 2½ for call and 2¾ to 3 for 90 days.

Other Markets

Transactions were quiet on the Boston stock market, although there continues to be some trading in Boston Elevated at 129 to 130. Massachusetts Electric, common, has been selling at 12¾ and the preferred about 60. Several blocks of Seattle Electric 5s have been sold at 104.

Chicago Railways certificates are the only active feature in the Chicago stock market. The Series 1 have been selling at 117 and the Series 2 at 44½. Other traction issues are stagnant.

In the Philadelphia market, Philadelphia Electric has been the most active issue among the tractions. Considerable blocks of this stock have been sold at 11½ to 11¾. Rapid Transit is less active than formerly and is selling around 22. There has been some trading in Union Traction at 49 to 50.

In Baltimore, bonds continue to be of interest. All of the United Railway issues are in the market at prices practically unchanged. The funding 5s are particularly in demand and are selling at 79 to 80. Prices on the other issues are practically unchanged.

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

	Nov. 23.	Dec. 1.
American Railways Company, Philadelphia.....	46	46½
Boston Elevated Railways.....	129½	129
Brooklyn Rapid Transit Company.....	53¾	56
Chicago City Railway.....	185	185
Cleveland Railway.....	—	—
Consolidated Traction Company of New Jersey.....	a73	a76
Consolidated Traction Company of New Jersey, 5 per cent bonds.....	a104	a104½
Detroit United Railway.....	53¾	55
Interborough-Metropolitan Company.....	13½	14¾
Interborough-Metropolitan Company (preferred).....	34¾	35½
Manhattan Railway.....	142	147
Massachusetts Electric Companies (common).....	11¾	12¾
Massachusetts Electric Companies (preferred).....	58	60
Metropolitan West Side Elevated Railway, Chicago (common).....	a17	a15
Metropolitan West Side Elevated Railway, Chicago (preferred).....	a44	a44
Metropolitan Street Railway.....	*30¾	31
North American Company.....	72¾	76½
Philadelphia Company, Pittsburg (common).....	41½	43¾
Philadelphia Company, Pittsburg (preferred).....	42	43¾
Philadelphia Rapid Transit Company.....	22¾	22¾
Philadelphia Traction Company.....	89	90
Public Service Corporation, 5 per cent collateral notes.....	a97½	a98
Public Service Corporation certificates.....	a74	a75
Union City Rapid Transit Company, Minneapolis (common).....	94½	94¾
Union Traction Company, Philadelphia.....	49¾	49¾

* Asked.
* Last sale.

Consolidation of Suburban Lines Approved in Massachusetts

The Massachusetts Railroad Commission has approved the consolidation of the Middlesex & Boston Street Railway, the Westboro & Hopkinton Street Railway, and the Natick & Cochituate Street Railway, and has authorized the Middlesex & Boston Street Railway to issue new stock requisite for the proposed exchange of shares. These companies are all controlled by the Boston Suburban Electric Companies.

By the terms of the contract all the property and obligations of the Westboro & Hopkinton Street Railway and the Natick & Cochituate Street Railway are to be transferred to the Middlesex & Boston Street Railway, which is to assume all outstanding indebtedness and obligations. To enable the stock to be exchanged share for share, the Railroad Commissioner has approved the issue by the Middlesex & Boston Street Railway of not more than 1400 shares, amounting at par value to \$140,000. The Middlesex & Boston Street Railway operates in Natick, Sherborn, Framingham, Ashland and Hopkinton; the Westboro & Hopkinton Street Railway in Westboro and Hopkinton, and the Natick & Cochituate Street Railway in Framington, Natick, Needham, Wayland and Wellesley.

Chicago (Ill.) Railways.—As a result of conferences held recently in Chicago, the following committee has been appointed to consider the organization of a company to control the Chicago City Railway, Chicago Railways, Commonwealth Edison Company, Northwestern Elevated Railroad, Chicago & Oak Park Elevated Railroad, Metropolitan West Side Elevated Railway, South Side Elevated Railroad, all of Chicago: J. J. Mitchell, Chauncey Keep, J. A. Spoor, Henry A. Blair, W. N. Eisendrath, Wallace Heckman and Samuel Insull. To correct any erroneous impression that might result from the publication of rumors, J. A. Spoor and Henry A. Blair have issued a statement over their signatures to the effect that "no plan has been formulated, and it is as yet wholly uncertain whether one can be formulated which will be satisfactory."

Chicago & Milwaukee Electric Railroad, Chicago, Ill.—Suit in foreclosure has been brought by Jacob Newman, of Chicago, for the Investment Registry, Ltd., London, Eng., representing more than \$1,000,000 of the bonds of the company. Following the filing of the papers, Mr. Newman said: "A bondholders' agreement was entered into in October looking toward reorganization. Under its terms, there have been deposited for reorganization purposes \$6,102,000 of the \$10,000,000 issue of bonds. One million three hundred thousand dollars of the bonds are held in London and their owners are acting with the bondholders' committee. Another \$1,250,000 of the bonds will be deposited between now and Dec. 15, subject to the same agreement. This will give us a total of \$8,652,000 out of \$10,000,000 to be used in the reorganization. The plan which is being put through is the only one which will put the company on its feet, in my opinion."

Pittsburg & Westmoreland Railway, Pittsburg, Pa.—Common Pleas Court No. 1, at Pittsburg on Nov. 16, in an equity suit brought by Charles P. Goehring and W. H. Goehring, creditors to the extent of \$690, appointed Manning Stires, Westmoreland, and Thomas M. Evans, McKeesport, Pa., receivers of the property on the ground of insolvency. Besides the bonded debt of \$350,000, there is said to be a floating debt of \$90,000, while \$30,000 is needed to complete the line, which is in operation between Irwin and McKeesport.

West End Street Railway, Boston, Mass.—The annual meeting of the stockholders of the West End Street Railway was held on Nov. 24. The condensed balance sheet as of Sept. 30 last shows a surplus of \$1,586,990, an increase of \$436,897. President Russell reports to the stockholders that the accounts received from the Boston Elevated Railway relating to additions and improvements made to the property during the 18 months ended Sept. 30, 1907, have been audited and approved, and under them a net sum found due to the Boston Elevated Railway of \$2,135,750. To liquidate this amount the company has increased its bonded debt during the year to the extent of \$700,000 by the issue of 4½ per cent 15-year bonds, due Jan. 1, 1923, and by the issue of 20,218 shares of the common stock of the company, 18,709 of which were taken by the stockholders and 1,509 sold at auction. The premium above par received from the sale of this stock was \$120,393. The proceeds of the sale, amounting to \$1,431,293, together with the \$700,000—the par value of the bonds above mentioned—were paid to the Boston Elevated Railway to cover the accounts as above stated.

Traffic and Transportation

Hearing by Massachusetts Railroad Commission on the Haverhill Fare Case

A hearing was given by the Massachusetts Railroad Commission on Nov. 25 upon the petition of R. L. Wood, Mayor of Haverhill, Mass., relative to increase of fares on the Haverhill & Southern New Hampshire Street Railway between Haverhill proper and Ayers Village. The petitioner argued that a 6-cent fare between these places is discriminatory and urged that as Ayers Village lies within the city limits of Haverhill the fare be reduced to 5 cents.

David A. Belden, president of the New Hampshire Electric Railways, a voluntary association operating the Southern New Hampshire Street Railway, the Lawrence & Methuen Street Railway and several other electric railways in Haverhill and vicinity argued the case for the company. Mr. Belden stated that the Haverhill & Southern New Hampshire Street Railway competes with the Boston & Northern Street Railway between Haverhill and Lawrence over a route a mile longer than that of the Boston & Northern Street Railway. The fare on each line is 10 cents. The Haverhill & Southern New Hampshire Street Railway, however, furnishes a terminal in Haverhill for a group of lines, and is part of an interurban system which does practically no urban business. In operating this group of lines they are treated as a single corporation. Through cars are run between Haverhill and Lawrence, Lowell and Nashua, and each company is credited with its proper portion of the earnings. In the case of the company in question the fare points are at its terminals.

The operating expenses are divided on a car-mileage basis, except that each company is charged with the cost of maintaining its own track and line. The rolling stock and equipment of the Haverhill & Southern New Hampshire Street Railway are of the same type, age and character as that of the companies with which it connects, so it is fair to proportion the maintenance of equipment and similar expenses on a car-mile basis. This basis is also used for proportioning the general expenses of the companies.

The basis of the power charge from the Rockingham County Light & Power Company, a subsidiary of the general organization, is to tax the railway companies owning substations at the rate of 1.75 cents per kw-hour for direct current measured at the substation panels, and 2 cents per kw-hour to the companies owning no substation or converting apparatus. The difference between these charges was accounted for by the explanation that it represented the allowance for the investment and depreciation incident to the operation of these substations by the railway companies themselves. These rates are the same as the charges made by the Rockingham County Light & Power Company for power for commercial purposes when sold under contract. The Haverhill & Southern New Hampshire Street Railway owns no power equipment, and is therefore charged 2 cents per kw-hour.

The total operating charges per car mile for the Haverhill & Southern New Hampshire Street Railway by years for the past four years ending Sept. 30 have been as follows:

1905	1906	1907	1908
\$.156	\$.156	\$.168	\$.196

The average operating expenses of all the electric railways in Massachusetts, omitting the Boston Elevated Railway, the Boston & Worcester Street Railway, the Worcester Consolidated Street Railway, the Springfield Street Railway, the Springfield & Eastern Street Railway and West End Street Railway, were:

1905	1906	1907
\$.159	\$.167	\$.167

The increase of 2.78 cents per car mile on the Haverhill & Southern New Hampshire Street Railway in 1908 over the preceding year was due to increased expenditures for track and line maintenance, and to an advance in the power charge from the rate of 1.25 cents per kw-hour previous to Oct. 1, 1907, a charge without profit to the Rockingham County Light & Power Company and lower than any rate obtainable by a railway not affiliated with a power company. Mr. Belden stated that at least \$10,000 ought to be spent in renewing ties and on the track alone within the next two years.

The gross earnings of the Haverhill & Southern New Hampshire Street Railway for the year ended Sept. 30, 1908, were \$49,817. Of this the Ayers Village line earned \$24,007 and the Lawrence line \$25,719. The Ayers Village line did a larger proportion of the summer business from June to September, inclusive, amounting to \$12,860 against \$10,931 on the Lawrence branch, all passenger fare earnings. In the other eight months of the year the Ayers

Village line earned \$11,237 and the Lawrence line \$14,788, the larger portion being from the latter section of the system. During eight months of the year the Lawrence line operated 74,935 car miles at an average income of 19.83 cents per car mile. The Ayers Village line earned only 14.63 cents per car mile in the eight months on 78,665 car miles. No road in Massachusetts can be operated for 14 cents per car mile, according to the respondents. Taking out the fixed charges, the Ayers Village line in the four summer months of the heaviest traffic had a deficit of \$359, and for the other eight months a deficit of \$4,680, making a total deficit for the Ayers Village line of \$5,039 for the year. The four months' record showed a profit of \$2,044 for the Lawrence line and the other eight months a deficit of \$2,150, making a deficit for the year of \$107. The Haverhill & Southern New Hampshire Street Railway in its entirety showed a deficit for the year of \$5,145, due to the Ayers Village line.

Mr. Belden pointed out that the distance from Haverhill to Ayers Village is 5.15 miles, but as the State line and the consequent western terminus of the road is only 0.7 mile beyond, it became the logical fare point. The residents of Ayers Village have been paying fare at the rate of less than 1 cent per mile, before the change of Nov. 1, and since then at the rate of 1.16 cents per mile, while the next limit on the connecting line yields 1.58 cents per mile, and with the exception of the direct line between Haverhill and Lawrence, the average of the fare limits on the system of connecting roads in the western and eastern divisions of the New Hampshire Electric Railways is 1.45 cents per passenger mile. Mr. Belden said that "roads of this character operating through sparsely settled districts with practically no local or short haul business cannot expect to survive on a rate of 1 cent per passenger mile, and their future must be to some extent precarious, with fares 50 to 100 per cent higher."

Of the road's gross earnings, 48 per cent are obtained in the summer months, largely from pleasure travel in connection with Canobie Lake Park. The gross earnings of the company have increased 20 per cent in the three years ending Sept. 30, 1908 (\$8,624), the operating expenses and taxes have increased 37 per cent (\$13,233), and will continue to increase for the next two or three years on account of the expense necessary to the proper maintenance of roadbed. The gross income applicable to taxes, interest on bonds and floating debts and dividends decreased from \$7,544 in 1905 to \$2,819 in 1908, and the deficit after paying interest and taxes has increased from \$1,113 in 1905 to \$5,146 in 1908, the total accrued deficit in 1908 being \$3,663, without reserve for depreciation, deferred maintenance or dividends.

The board implied in its finding of Feb. 26, 1906, that if the condition of the road did not improve after operation "a while longer" under the 5-cent fare, it would be proper to revive the matter of an increased rate. The company feels that it has in good faith tried the experiment of continuing the 5-cent fare without success, and that it should not be required to continue a fare out of proportion to the service rendered, and asked the commission not to require it to conform to a condition which the Supreme Court has held to be irregular and without force or effect, and which deprives the company of its just and proper income. The board took the matter under advisement.

Increasing Traffic and Efficiency

The following general order was recently issued by H. G. Hetzler, president, and posted for the observance of all employees of the Metropolitan West Side Elevated Railway Company of Chicago. There are so many good suggestions in this bulletin that it is reprinted here in full:

"To assist the company which employs you, and enable it to successfully continue its business, your co-operation is solicited, so far as is consistent, in increasing passenger travel and the efficiency of the service. Criticisms and suggestions are invited from employees, irrespective of the position they may occupy, upon any subject which they think will result in the betterment of the service, equipment, methods or system of operation; and the same will be carefully considered on their merits. Employees should bear in mind that in making these criticisms and suggestions they will be giving evidence of their interest in their work, and, in general, proving their worth and loyalty to the company.

"Trainmen should appreciate the responsibility of their position, as the safety of their fellow employees and the public who patronize the road depends upon the manner in which their work is performed. A trainman should never become excited, but should always be calm, courteous and obliging, using deliberate judgment at all times. Nothing

should be allowed to distract his attention from the responsibilities attending his duties. This is particularly true of a motorman, and he is urged to realize his responsibility for the protection of human life under his charge and keep a close observance of the track and everything pertaining to the safety of the train he is operating. A moment of inattention on his part might result in an accident to be forever regretted.

"The management considers that its agents, trainmen and other representatives possess the ability of exercising good judgment in the performance of their duties and the faculty of being courteous and obliging in their dealings with the public. To those who cultivate and exercise these gifts, the management extends its congratulations and its thanks. To those who may not have fully appreciated the importance of courteously meeting the public, thoughtful consideration of the following, which in substance is a copy of a circular recently issued by a Western railroad, is suggested:

"The principle that underlies courteous treatment of others is simply that of doing unto others as you would they should do unto you.

"In a highly complex and technical business, such as that of the railroad, there are many things that you with your training and daily experience understand with perfect familiarity, but which the public do not understand; therefore, do not assume that the public should comprehend them without asking questions, but when they make inquiry of you, give them the courtesy of a reply, just as full and clear as you can make it, and without any suggestion of superiority born of a greater knowledge.

"Words are only one means of expression, and manner is quite as important; therefore, remember that a kindly and gracious manner is not only the sign and mark of a self-respecting man, but is to your words what oil is to machinery, in making them move effectively to their purpose.

"True courtesy is no respecter of persons. It remembers that "a man's a man for a' that," and gives the civil word and the helping hand quite as readily to the ill-clad stranger as to an official of the company.

"Courtesy is not only something the public has a right to expect of you, but it pays.

"It pays in the friends it makes you personally and as a representative of the company.

"It pays in minimizing the friction of your life, as well as that between the company and its patrons.

"It pays in raising your standing with the company.

"It pays in the personal satisfaction resulting from having done the right and kindly thing by "your neighbor."

"It is the wish of the management of this company that all its representatives whose work brings them into contact with the public should appreciate and fully measure up to their duties and privileges.

"In writing this letter it is my hope that it will prove not only beneficial to our company, but to all of us."

Decision Favorable to Western Massachusetts Street Railway in Fare Case

The Massachusetts Railroad Commission has decided in favor of the Western Massachusetts Street Railway, Westfield, Mass., in the petition of the selectmen of Westfield asking for a reduction from 10 cents to 5 cents in the fare from Park Square to points on the Holyoke lines beyond St. Mary's Cemetery. A hearing was held by the commission on Sept. 30, and the arguments were summarized in the *ELECTRIC RAILWAY JOURNAL* of Oct. 10, page 938. The board says:

"The question presented for determination is whether the existing rate of fare between the square in Westfield and the boundary line of Holyoke, established at 10 cents by the Western Massachusetts Street Railway, is unreasonable and excessive.

"The subject of fares in Westfield was brought to the attention of the commission in 1907. After a hearing it was determined that certain fares were excessive, and upon the recommendation of the commission they were reduced. This year the company petitioned for approval by the commission of the withdrawal of free transfers in the town, and recited its purpose, if the petition was granted, to install round-trip tickets at 10 cents each during the summer season for a ride from Westfield Square to the boundary line between Westfield and Holyoke and return, thus decreasing the fare for a through ride to Holyoke and for a ride to Hampton Park, so-called.

"At the hearing opposition was made to the proposed withdrawal of free transfers by citizens of Russell, Huntington and Montgomery. The commission decided that the withdrawal of said transfers was not in the interest of the

whole public, and further said: 'If there is merit in the statement made at the hearing that the company's fares in Westfield ought to be readjusted, we will, upon petition involving the whole subject, take appropriate action.' The petition was therefore dismissed without prejudice.

"No application was made to the commission for a readjustment of fares in Westfield, but we are now asked to recommend to the company a reduction of its rate of fare upon one portion of its lines within that township upon the ground that the fare now charged is unreasonable and excessive. We have, therefore, made an investigation of the single question raised by the petition, and have obtained a comparative statement of returns showing earnings for 1907 and 1908 on the Huntington, Holyoke and Tatum lines. This statement covers July, August, September and October, showing the summer and fall patronage.

"A careful examination of these returns, studied in connection with the fares and free transfers as now established, convinces us that we ought not, in view of the income of the company, to recommend a reduction of the existing rate of fare as petitioned for. It is, therefore, ordered that the petition be dismissed."

Subsequent to the hearing, the Western Massachusetts Street Railway filed with the Railroad Commission a statement of comparative earnings and traffic on the Westfield-Huntington line, the Westfield-Holyoke line and the Park Square-Tatum line for July, August, September and October, 1907 and 1908. These figures showed a general falling off of car receipts on the Huntington and Tatum lines, with a fair retention of earnings on the Holyoke line. The non-revenue traffic increased about 700 per cent on the Huntington line, held about constant on the Holyoke route and increased between 25 to 30 per cent on the Tatum line. The car-mile receipts were with the revenue and non-revenue passengers:

	Revenue Passengers		Non-Revenue Passengers		Receipts per Car Mile	
	1908	1907	1908	1907	1908 cts.	1907 cts.
Westfield-Huntington Line:						
July.....	68,969	80,524	6,566	876	26.45	30.59
August.....	66,374	83,924	6,175	803	26.15	32.36
September.....	56,340	59,502	4,957	549	22.74	24.08
October 1-15.....	22,522	26,082	1,846	228	18.57	21.37
October 16-31.....	23,021	23,263	1,740	430	17.49	18.09
Westfield-Holyoke Line:						
July.....	105,412	101,509	14,246	14,255	37.24	33.70
August.....	81,219	103,858	12,515	15,219	33.01	33.47
September.....	51,814	49,798	7,765	6,486	22.40	21.04
October 1-15.....	16,579	18,503	1,842	1,970	15.95	17.38
October 16-31.....	16,435	15,646	1,881	1,876	14.45	13.96
Westfield-Tatum Line:						
July.....	77,278	87,077	18,372	14,788	26.76	30.34
August.....	76,251	81,871	18,704	15,135	26.42	28.47
September.....	70,730	79,919	15,239	11,198	24.85	25.74
October 1-15.....	32,505	34,330	6,042	4,930	22.65	24.59
October 16-31.....	34,939	34,306	6,433	4,780	22.71	30.16

Side Doors for New York Subway Cars

The New York Public Service Commission, First District, has extended until Jan. 15, 1909, the time in which the Interborough Rapid Transit Company is to equip two trains of eight cars each with side doors, in accordance with the order of the commission based upon the report of Bion J. Arnold. This is the second extension which has been granted the company, and the delay is explained by the fact that the problem of providing pneumatic operation for the side doors has demanded unusual study.

Mr. Arnold recommended that four additional doors be added to each subway car, two on each side of the car and each of these at opposite ends close to the present doors. The commission, after a series of hearings, issued an order last summer directing the company to equip 16 cars with such side doors by Oct. 16. This time was extended later to Nov. 30 and the final extension is to Jan. 15.

At present, one guard manipulates two doors, one in each car, but with two doors added, it will be impossible for one man to operate manually four separate doors. It is, therefore, necessary to have some kind of pneumatic attachment which will enable the guard to close all four doors by one operation. The engineers of the company have been studying this problem and have just succeeded in perfecting a workable plan.

The commission has inspected two of the cars already equipped with side doors, but without pneumatic attachment; and so far as the improvement goes, announces that it is acceptable.

Railroad Accidents on Electric Railways of Indiana for Quarter

The Railroad Commission of Indiana has made public the following summary of accidents on the interurban electric:

railways in the State for the three months ended September, 1908:

Where:	
On passenger trains.....	51
On station grounds.....	5
Causes:	
Collisions.....	12
Derailments.....	0
Getting on and off moving trains.....	27
Getting on and off trains after stops are made.....	1
Miscellaneous.....	16
Results:	
Deaths.....	0
Fractures or dislocations.....	4
Sprains.....	12
Cuts and bruises.....	35
Miscellaneous.....	5
Where:	
Travelers on highways in vehicles.....	12
On foot.....	2
Causes:	
Struck on crossings.....	10
Teams frightened.....	3
Miscellaneous.....	1
Results:	
Deaths.....	5
Sprains.....	1
Cuts and bruises.....	8
Miscellaneous.....	0
EMPLOYEES.	
Employment:	
Conductors.....	3
Motormen.....	5
Laborers.....	6
Causes:	
Collisions.....	5
Miscellaneous.....	9
Results:	
Deaths.....	1
Fractures or dislocations.....	1
Sprains.....	1
Cuts and bruises.....	10
Miscellaneous.....	1
Where:	
Trespassers on tracks.....	4
Miscellaneous.....	0
Results:	
Deaths.....	2
Fractures or dislocations.....	2
Collisions, 5; damage, \$1,746.	
Total casualties on the interurban roads:	
Deaths.....	8
Injured.....	80
Total casualties on all the railroads:	
DEATHS.	
Steam railroads.....	103
Electric railroads.....	8
Total deaths.....	111
INJURED.	
Steam railroads.....	502
Electric railroads.....	80
Total injured.....	582

Improved Terminal Facilities in Columbus.—The Ohio Electric Railway is said to have plans in view for the improvement of the passenger and freight station on West Gay Street, Columbus.

Hearing on Trailers in Washington, D. C.—The District Electric Railway Commission is soon to set a date for a hearing on the question whether it is advantageous for street railway companies operating entirely within the city limits to run trail cars.

Seats for Motormen of Connecticut Valley Street Railway.—The Connecticut Valley Street Railway, Greenfield, Mass., is equipping its cars with stools for the motormen, to be used on the Northampton-Greenfield line and on other routes through the county where there are long stretches with few stops.

Increase in Fare of Letter Carriers in Salt Lake City.—The special fare of three cents made by the Utah Light & Railway Company, Salt Lake City, Utah, to letter carriers will be discontinued on Jan. 1, 1909, and the letter carriers will thereafter be considered by the company as ordinary passengers without special privilege.

More Pay-As-You-Enter Cars in New Jersey.—The Public Service Railway, Newark, N. J., recently placed 24 pay-as-you-enter cars in service on the belt line in Jersey City. This is the third line in Jersey City to be equipped with pay-as-you-enter cars operated under lease from the Pay-As-You-Enter Car Company.

Committee of Canadian Street Railway Association to Report on Transfers.—A special committee has been appointed by the Canadian Street Railway Association to consider the question of transfers in the Dominion and report to the association. The names of the members of the committee have not been made public.

Settling Passenger Tax in St. Louis.—It is said that the amount to be paid to the city of St. Louis by the United Railways, in accordance with the decision of the United States Supreme Court upholding the tax of 1 mill per cash passenger, will be adjusted by the city presenting a bill for the amount which it considers due subject to correction.

Petition Filed in Boston for Half Fares for Pupils.—The Selectmen of Whitman, Mass., have filed a petition with the Massachusetts Railroad Commission requesting that half fares be granted to pupils attending the State Normal School at Bridgewater and the Brockton Business School, which are reached by the lines of the Old Colony Street Railway, Boston.

Committee Appointed to Report on Transit Facilities in Washington.—The Interstate Commerce Commission has designated Commissioners Lane and Clark a committee to receive, consider and submit to the commission, with such comment and recommendation as they deem best, suggestions hereafter made to the commission for the betterment of the street railway service by the district commission.

New York Women Express Opinions on Subway Traffic.—A committee from the New York City Federation of Women's Clubs called on Chairman Willcox, of the Public Service Commission of the First District of New York, recently, and offered a list of suggestions relating principally to the subway, in which they referred to station and train signals and the limiting of danger to passengers at stations on curves.

Chicago & Oak Park Elevated Railroad to Establish Express Service.—It is reported in Chicago that Clarence A. Knight, president, has promised that express service will be established between Chicago and the western terminus at River Forest. The company has no storage yards for its cars at the western terminus, but negotiations are under way for property that may be used as a storage and switching yard. The express service will be made possible by the installation of multiple-unit equipment. It is stated that the improvements will increase the capacity of the railroad 10 per cent.

Hearing on Fare Between New York and Yonkers.—There was a joint hearing on Nov. 27 by the Public Service Commission of the First District of New York and the Public Service Commission of the Second District of New York on the joint rate between New York and Yonkers over the Union Railway, New York, and the Yonkers Railway. Leslie Sutherland, receiver of the Yonkers Railway, increased the fare between New York and Yonkers from 8 cents to 15 cents on Oct. 17. Counsel for Mr. Sutherland said that the conditions under which the company operates are very severe, and that to continue the 8-cent fare would jeopardize the property. The hearing was adjourned to a later date.

Increase in Wages in Middletown, N. Y.—William Vanamee, receiver for the Walkill Transit Company, Middletown, N. Y., issued the following order to the employees of the company on Nov. 23 notifying them of an increase in wages to date from Thanksgiving: "Beginning Thanksgiving Day, Nov. 26, 1908, the pay of motormen and conductors will be advanced as follows: From 17 cents an hour to 22 cents; from 16 cents an hour to 20 cents; from 15 cents an hour to 18 cents. Beginning Dec. 1, 1908, all new men taken on will be put upon the following scale: First six months, 18 cents an hour; second six months, 19 cents an hour; third six months, 20 cents an hour; fourth six months, 21 cents an hour; after two years, 22 cents an hour. On and after Jan. 1, 1909, the pay of those now employed will be adjusted to the foregoing scale. That is, those who at and after that date shall have been in the service of the company more than six months will be paid as follows: Six months' men, 19 cents an hour; 12 months' men, 20 cents an hour; 18 months' men, 21 cents an hour; two years' men, 22 cents an hour."

Indiana Roads Must Exchange Carload Freight with Interurban Roads.—In the case of the Winona Interurban Railway, Winona Lake, Ind., against the Wabash Railroad, a decision was rendered by the Indiana Railroad Commission on Nov. 28, to the effect that a steam railroad must interchange carload freight with an interurban electric railway. The evidence before the commission showed that the Big Four Railroad entered into an agreement with the Pittsburg, Fort Wayne & Chicago Railroad not to deliver any cars to the Winona Interurban Railway. The officials of the Wabash Railroad contended that the interchange of traffic in carload lots would bring their equipment under the control of the interurban railways and result in the use of their rolling stock by the interurban railways. The commission holds that the interchange of traffic in carload lots increases the opportunities of shippers, and is designed to bring steam and interurban railroads into competition; that it is inadmissible for a railway to contend that it cannot be required to deliver cars to a connecting carrier unless such connecting carrier is able to give car for car, and that the Legislature conferred upon it the power to determine in each case whether or not traffic should be interchanged.

Personal Mention

Mr. Theodore G. Seixas, who, in July, 1908, was appointed acting general manager of the Pacific Traction Company, Tacoma, Wash., has been elected vice-president and general manager of the company.

Mr. C. I. Richmond, who was recently appointed general manager of the Berkshire Street Railway, Pittsfield, Mass., has been elected a director and vice-president of the company.

Mr. Charles A. Flaherty, general manager of the Egerton Tramway Company, Stellarton, Nova Scotia, has been elected president of the company to succeed Mr. R. T. McIlreith, and Mr. Raymond Apollonio has been elected secretary and treasurer of the company to succeed Mr. Gardner Perry.

Mr. P. Ney Wilson, formerly roadmaster of the Rochester (N. Y.) Railway, has accepted the position of roadmaster of the New Haven Division of the Connecticut Company, with headquarters in New Haven. Mr. Wilson has recently been connected with the Mack Paving & Construction Company, Philadelphia, and for nine years served in the maintenance of way department of the Southern Division of the Public Service Corporation of New Jersey.

Mr. James F. Hamilton, who has been connected with the Schenectady (N. Y.) Railway since May, 1902, as assistant superintendent, has been appointed superintendent of transportation of the company to succeed Mr. E. J. Ryon, resigned. Mr. Hamilton was connected with the operating department of the International Traction Company, Buffalo, for six years before entering the employ of the Schenectady Railway.

Mr. J. R. Kreider has resigned as superintendent of the Lancaster & York Furnace Street Railway, Lancaster, Pa., to become superintendent of the Hummelstown & Campbellstown Street Railway, Hershey, Pa. Mr. Kreider was superintendent of the Lancaster & York Furnace Street Railway four years and previous to that was for 13 years in the employ of the Edison Electric Illuminating Company, Lancaster, Pa., and the Lancaster County Railway & Light Company, Lancaster.

Mr. Edward Hardin, superintendent and purchasing agent of the Hot Springs (Ark.) Street Railway, was the subject of a biographical sketch in a recent issue of the *Arkansas Thomas Cat*. Mr. Hardin has been a resident of Hot Springs about 18 years, during 13 of which he was superintendent of construction of the Hot Springs Reservation. He is the inventor of an automatic fender and an automatic switch lock. At the recent meeting of the Arkansas Association of Public Utility Operators he read a paper on roadbed construction and paving.

Mr. Joseph T. Britton, Van Wert, Ohio, who was recently appointed secretary of the Central Electric Traffic Association, with headquarters with Mr. A. L. Neereamer, chairman of the association, in the Traction Terminal Building, Indianapolis, Ind., entered railroad work in the yard department of the Pennsylvania Railroad at Fort Wayne, Ind., in 1902, and assisted in tracing cars and in making up trains. Subsequently he was transferred to the office of the freight agent in Fort Wayne as stenographer. In January, 1905, he entered the services of the Fort Wayne, Van Wert & Lima Traction Company, Lima, Ohio, now a part of the Ohio Electric Railway, under Mr. H. F. Dicke, superintendent, and assisted in opening that line between Lima and Van Wert and in completing the line from Van Wert into Fort Wayne. The office force of this company being very small at first, Mr. Britton performed many duties and became familiar with all phases of interurban railroad work. In June, 1907, he resigned to accept a position as storekeeper and chief clerk to the master mechanic of the Cleveland, Southwestern & Columbus Railway Company, Elyria, Ohio, where he remained until March, 1908. Since then he has been connected with the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., as assistant claim agent.

Mr. George L. Wells has resigned as chief engineer and superintendent of construction of the Youngstown & Ohio River Railroad, Youngstown, Ohio, to take active charge of the engineering work on 120 miles of single-phase electric railroad for the Kansas City, Olathe, Ottawa & Iola Railway, Olathe, Kan., as vice-president of the Standard Engineering Company, Cleveland, Ohio, which has a contract for the civil, mechanical and electrical engineering of the road. Mr. Wells began his railway engineering with the Lake Shore & Michigan Southern Railroad, at Cleveland, in 1882. Subsequently he became connected with the New York, Pennsylvania & Ohio Railroad. In September, 1883, Mr. Wells went to St. Louis, Mich., and surveyed for the

Toledo, Ann Arbor & Northern Michigan Railway and the Lansing, Alma & Mt. Pleasant Railroad, and in November, 1885, was appointed chief engineer of the Lansing, Alma & Mt. Pleasant Railroad. Shortly thereafter he became principal assistant engineer of the Toledo, Saginaw & Muskegon Railroad, and when the Toledo, Saginaw & Muskegon Railroad was taken over by the Ann Arbor Railroad the following summer, he was appointed principal assistant engineer of that road. This work was completed in January, 1890, and Mr. Wells became principal assistant engineer of the Iron Range & Huron Bay Railroad. In March, 1892, he was appointed engineer and contracting agent of the 11 water works companies owned and controlled by the Michigan Pipe Company, Bay City, Mich. Mr. Wells resigned from the Michigan Pipe Company in July, 1900, to form a partnership with Mr. Edward J. Hingston, Buffalo, as Hingston & Wells, general contractors. Subsequently he became chief engineer of the Springfield & Xenia Traction Company and later division engineer for the Miami & Erie Transportation Company. He then did some special work in installing machinery for the Lake Shore Electric Railway, Cleveland, and as engineer and superintendent of construction for the Cleveland Construction Company supervised the construction of the Kokomo, Marion & Western Traction Company's line. He became chief engineer and superintendent of construction of the Youngstown & Ohio River Railroad in October, 1905, and in this capacity built a new line from Washingtonville, Ohio, to East Liverpool, Ohio, and electrified the company's line between Salem, Ohio, and Washingtonville, Ohio, which had previously been operated as a steam railroad by the Wabash Railroad. In 1890, 1891 and 1893, Mr. Wells was vice-president of the Michigan Engineering Society, and was president of the society in 1906 and 1907. He is succeeded as chief engineer of the Youngstown & Ohio River Railroad by Mr. Hugh Cook, who is also connected with the Standard Engineering Company.

OBITUARY

Rudolph Taylor McCabe, formerly president of the Steinway Electric Railway, Long Island City, N. Y., is dead.

James E. Murdock, head of the Murdock Syndicate, which owns and controls one of the largest systems of interurban railways in Indiana, died very suddenly of heart failure at his home in Lafayette, Ind., on Nov. 27, aged 71 years. Mr. Murdock was born in Ireland in 1837 and went to Indiana when a mere lad. His executive ability was demonstrated while in the contracting business, building roads, bridges and public buildings. Mr. Murdock was the head of the Indiana and Ohio syndicate which controlled many natural gas plants, and when natural gas failed was quick to see the necessity of installing gas plants to utilize the pipe lines in the distribution of artificial gas. In early days, Mr. Murdock owned a number of street railways in Indiana, which he converted to electricity as soon as its value as motive power had been established. He and his sons next made investments in interurban railway property, and the Murdock estate is probably the largest owner of street and interurban railways in Indiana. In addition, Mr. Murdock owned and operated several electric light plants in Indiana and Ohio.

NEW PUBLICATIONS

Electric Motors. By Norman G. Meade. New York: McGraw Publishing Company; 155 pages (4½ in. x 7¼ in.); cloth; illustrated. Price, \$1.00 net.

In so small a work on so large a subject, one cannot look for comprehensive treatment, but Mr. Meade's experience as a contributor to electrical journals and his practical knowledge have helped him to make an attractive and helpful resumé of the essential features of the principal motors used for industrial purposes. As the best of motors get into trouble occasionally, readers will find the section on repairs particularly useful, because it gives information not easily available. It is to be hoped, however, that this branch of the subject will receive more extended treatment in a future edition.

Design of Highway Bridges. By Milo S. Ketchum. New York: The Engineering News Publishing Company; 531 pages (5¾ in. x 8¾ in.), with inserts and index; cloth. Price, \$4.00 net.

This work on highway bridge design and the calculation of stresses in bridge trusses is conspicuous for the author's clear treatment of both the algebraic and graphic methods. The author has not given any special treatment to the problem of electric railway bridges, presenting mainly extracts from C. C. Schneider's specifications on that class of bridge design. Mr. Schneider's specifications will be found in great detail in a two-part article published by him under the title of "Bridges for Electric Railways" in the *ELECTRIC RAILWAY JOURNAL* of Sept. 15 and 22, 1906.

Construction News

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

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

FRANCHISES

Berkeley, Cal.—The Board of Trustees has granted the San Francisco, Oakland & San Jose Consolidated Railway a 48-year franchise for a number of new extensions on certain streets of Berkeley.

Ocean Park, Cal.—The Los Angeles-Pacific Company has been granted a 40-year franchise by the Board of Trustees for a line running from the main line on Trolleyway along Lorelei Avenue to the sea.

Pomona, Cal.—The Pacific Electric Company has applied for a franchise to build a line around the east side of Ganessa Park, connecting Huntington Boulevard, which runs through the park to Holt Avenue, with the right of way north of the park.

Sioux City, Ia.—The City Councils of Spirit Lake, Hartley, Primghar, Paullina and LeMars along the route of the proposed Sioux City & Spirit Lake Interurban Electric Railway have voted to grant franchises permitting the company to use streets and alleys for its railway line and electric light and power systems. The line will be 110 miles in length. Westinghouse, Church, Kerr & Company, New York, contractors; Fred Davis, secretary. [E. R. J., Oct. 10, '08.]

Rosedale, Kan.—The Kansas City & Olathe Electric Railway has applied to the Council for a 20-year franchise to operate its line from the present terminals to the western limits of the city, a distance of nearly a mile.

Topeka, Kan.—The City Council has amended the old franchise of the Topeka-Southwestern Railway so as to require the company to bear all the expense of altering the grades of streets crossed by the railway for a distance of 300 ft. on either side of the right of way through the city.

Youngstown, Ohio.—The Lake Erie & Youngstown Railroad has submitted an ordinance to the City Council granting the company a 20-year franchise for entering the city with its proposed electric railway from Conneaut, Ohio, to Youngstown. John H. Ruhlman is reported to be interested in the road. [S. R. J., Sept. 7, '07.]

***Pennsburg, Pa.**—J. L. Bowles, New York, has made application to the Borough Council for a franchise for an electric railway. Similar applications have been made to the various town councils in the Perkiomen Valley through which the road will pass.

Seattle, Wash.—The Seattle, Renton & Southern Railway has applied to the City Council for a franchise for its lines from the intersection of Fourteenth Avenue South and Jackson Street, with connections to the company's present tracks on Fourteenth Avenue South, thence west on Jackson Street to Occidental Avenue; thence north on Occidental Avenue to Washington Street, with connections to the company's lines on Washington Street.

Spokane, Wash.—The City Council has granted the Spokane Traction Company two franchises for a number of extensions to its present lines in Spokane.

RECENT INCORPORATIONS

Grand Junction Electric Railway, Colorado Springs, Col.—This company has been incorporated in Colorado to build a standard-gage electric railway, from Grand Junction to Palisade, Col., a distance of 17 miles. Headquarters, Colorado Springs. Capital stock, \$100,000. Incorporators: Horace K. Devereaux, Eugene A. Sunderline, Thomas A. Curtis, Henry C. Hall and Frank McMahon. [E. R. J., Sept. 19, '08.]

Columbia Power, Light & Railways Company, Wilmington, Del.—Chartered in Delaware to act as a holding company for the Columbia & Montour Electric Railway, Danville & Bloomsburg Street Railway, United Gas & Electric Company, Irondale Electric Light Company, Standard Electric Light Company, Standard Gas Company and Berwick Electric Light Company. These companies all operate in Columbia and Montour counties. Capital stock, \$1,200,000. Incorporators: W. H. Sponsler, New Bloomfield, Pa.; M. P. Reed, Philadelphia, Pa., and C. L. Ward, Wilmington, Del.

***Valdosta, Moultrie & Western Railroad, Valdosta, Ga.**—Application has been made by this company for a charter to build a line from Valdosta to Moultrie. Capital stock, \$100,000. Incorporators: Frank Roberts, W. B. Conoley, John T. Roberts, W. L. Roberts, A. L. Davis, W. E. Davis, A. F. Langford, D. Ingram and J. L. Giddens, Valdosta, and W. P. Roberts, Jacksonville, Fla. The new road will

be about 40 miles long and will run through the counties of Lowndes, Brooks and Colquitt.

***Peoria & Galesburg Railway, Peoria, Ill.**—This company has been incorporated in Illinois to construct a line from Peoria, through Peoria to Galesburg, and from Peoria to Canton. Capital stock, \$100,000. Incorporators and first board of directors: D. M. Mayer, Peoria; Arthur C. Black, Peoria; S. F. Atwood, Peoria; William K. Boone, Lima, Ohio, and Homer T. Dick, Chicago, Ill.

***Port Jervis & Delaware Valley Railroad, Port Jervis, N. Y.**—This company has been incorporated in Pennsylvania to build and operate a road from Port Jervis to Milford, a distance of 7 miles. Capital stock, \$200,000. Incorporators: Francis O. Sawyer, Canton, president; C. F. Wright, Susquehanna; Isaac N. Beardslee, Edward P. Emerson, James S. Helden, Port Jervis; Alfred Marvin and Thomas F. Dcgraw, Matamoras.

***Scott Township Street Railway, Pittsburg, Pa.**—Application has been made at Harrisburg by W. E. Kusen, A. J. Schmidt, C. August Stuetz, W. P. Heckman and J. D. C. Miller, Pittsburg, for a charter for this company, which proposes to build a street railway from Scott Township, Allegheny County, Pa., to a point on the Castle Shannon road.

***Brattleboro & Vernon Railroad, Brattleboro, Vt.**—This company has been incorporated in Vermont to construct an electric railway from Brattleboro through Vernon to the Massachusetts line. Capital stock, \$10,000. Incorporators: Charles R. Crosby, George L. Dunham, H. L. Emerson, J. H. Estey, Olin L. French, Lyman E. Holden, M. J. Moran, George W. Pierce, Howard C. Rice, L. D. Taylor, William H. Vinton, Henry P. Wellman, all of Brattleboro, Vt., and A. A. Dunklee, J. C. Allen, E. H. Akley, A. G. Barnes, John Wright, T. E. Stockwell, all of Vernon, Vt.

TRACK AND ROADWAY

Norwich, Colchester & Hartford Traction Company, Norwich, Conn.—The stockholders of this company, which proposes to build an electric railway between Norwich and Hartford, at a meeting last week, decided that the route for the line should be surveyed at once. The following directors were elected: Costello Lippitt, Lucius Brown, Henry W. Tibbits, John N. Backus of Colchester, Dr. C. E. Stark and Albert L. Potter. These in turn elected as officers: Costello Lippitt, president; Lucius Brown, secretary, and Henry W. Tibbits, treasurer. Capital stock, \$100,000. [S. R. J., Sept. 21, '07.]

Fairburn & Atlanta Railway & Electric Company, Fairburn, Ga.—Frank Lederle, 509 Candler Building, Atlanta, Ga., engineer in charge of survey, writes that men are now running the preliminary surveys, but the company is not yet ready to award any contracts. The road will be a standard-gage one, connecting Fairburn, Union City, Stone-wall, Red Oak, College Park and Atlanta, and will be approximately 12 miles long. It has been decided to adopt the overhead trolley system. Capital stock, \$100,000. Officers: W. T. Roberts, Fairburn, president; W. A. McCurry, Fairburn, vice-president; J. H. Harris, Union City, Ga., secretary; J. H. Langino, Fairburn, treasurer. [E. R. J., Nov. 21, '08.]

Boise & Interurban Railroad, Boise, Idaho.—It is stated that this company plans to extend its city line to reach Twelfth and Front Streets by building a spur $1\frac{3}{4}$ miles in length, from Twenty-eighth Street up Fairview Avenue to Front Street, and on Front to the site for the new freight house which is to be erected at this point. It is also said that the company expects to make a number of improvements at Pierce Park, and in addition will double-track its line to the park, probably next summer. W. E. Pierce, president.

Southern Traction Company of Illinois, East St. Louis, Ill.—This company has filed a first mortgage for \$1,500,000 in favor of the Union Trust & Savings Bank, East St. Louis, Ill. Henry D. Mephram, Jr., promoter of this road, states that the company has obtained its private right of way for the entire distance and that building operations have begun, five blocks of track having been laid at the Belleville end. The termini of the road will be Broadway and Fourth Street in East St. Louis and Main and Spring Streets in Belleville. Mr. Mephram says it is the intention of the company to extend the line southward as far as Cairo, Ill. [E. R. J., July 18, '08.]

Sioux City & Spirit Lake Railway, Hartley, Ia.—L. A. Wakefield, chief engineer of this road, and a party of surveyors, accompanied by J. D. Browning, general manager of the company, have begun making the final surveys for railroad crossings along the line of the proposed interurban electric road between Sioux City and Spirit Lake. Crossings with steam roads will be made as follows: With the

Great Northern Railway at a point 2½ miles southwest of LeMars; with the Chicago, St. Paul, Minneapolis & Omaha Railway at LeMars; with the Chicago & Northwestern Railway at Paullina; with the Illinois Central at Primghar; with the Chicago, Milwaukee & St. Paul and the Chicago, Rock Island & Pacific at Hartley; with the Chicago, Rock Island & Pacific at Spirit Lake. [E. R. J., Oct. 10, '08.]

***Salisbury, Md.**—It is reported that the project to construct an electric railway from Salisbury, Md., to Bivalve, Md., has been revived by Mark Cooper and W. B. Miller, Salisbury, Md.

Boston, Mass.—The Massachusetts Railroad Commission has dismissed without prejudice the petition of the Boston, Waltham & Western Electric Railroad for a certificate of exigency. This action has been taken upon motion of the directors, a new petition covering the same ground having been presented by the Boston & Western Electric Railroad.

Calumet & Lac la Belle Traction & Power Company, Calumet, Mich.—J. Bruce Paton, Laurium, Mich., has been appointed receiver for this company by Judge Streeter. The company was formed for the purpose of building an electric railway from Calumet to Lac la Belle. [E. R. J., July 18, '08.]

Michigan United Railways, Lansing, Mich.—The new extension of this road between Lansing and Mason, which is to be continued to Jackson next year, was opened for service last week, a delegation of Lansing citizens, including members of the Common Council, making a trip to Mason in the first car.

Nebraska Traction & Power Company, Omaha, Neb.—This company, which proposes to build an electric railway from Omaha to Papillion, including the town of Ralston, has filed with the Midland Guarantee & Trust Company as trustee of the bondholders, a blanket mortgage for \$1,330,000 to cover a proposed bond issue. [E. R. J., Oct. 24, '08.]

Rochester & Manitou Beach Railroad, Rochester, N. Y.—This company is reported to be surveying a route for an extension of its line from Manitou Beach to Hitton. Surveys have also been made to the lighthouse at Devil's Point, and it is stated that the company may also build an extension to that point.

Rochester & Honeoye Valley Railway, Rochester, N. Y.—It is stated that within a short time active work will be begun on this new road. Plans have been drawn up and a survey made of the proposed route of the new electric railway. The proposed new line will run from East Rush, where it will tap the new Rochester, Corning & Elmira Electric Railway, when completed, to Atlanta, through Honeoye Falls, Lima, Honeoye, and stopping at Atlanta. The trustees and promoters of the new road are John S. Rockwell, Edward P. Lupfer and Harrison H. Reed, Honeoye.

Charlotte, N. C.—The Carolina Valley Railroad, projected from Thomasville to Denton, a distance of 30 miles, and only partially completed, was sold at auction at High Point on Nov. 30 to B. L. Jones and W. T. Van Brunt, New York. The North Carolina Electric Company's charter and rights of way between High Point and Thomasville were sold to E. D. Steele and W. T. Van Brunt, New York. The latter project has advanced to the extent of grading and 1 mile of track has been laid. The purchase includes over 100 tons of steel rails. The purchasers announce that both projects will be completed.

Dayton (Ohio) Street Railway.—This company is said to be considering a change in its proposed route through the central portion of the city. The plan now is to come down Burns Avenue to Warren Street and to take Warren Street as far as Main, then going north on Main. The original plan was to come down Morton Avenue to Brown, then north on Brown to Fifth, west on Fifth to St. Clair Street and then north on St. Clair. C. H. Bosler, Dayton, general manager. [E. R. J., June 13, '08.]

Pittsburg & East Liverpool Electric Railway, East Liverpool, Ohio.—A meeting of the promoters of this proposed electric railway system, from Pittsburg to East Liverpool, a large portion of which system will pass through the south side of Beaver County, was held at East Liverpool last week. The company, it is said, has about \$2,500 subscribed of the \$4,000 necessary for the completion of a survey and obtaining a report on the project. Practically the entire route of the company lies along private rights of way, and with few exceptions has been donated to the company by citizens interested in the completion of the road. J. M. Reed, Dravosburg, president. [E. R. J., Oct. 10, '08.]

Beaver Falls & New Castle Street Railway, Beaver Falls, Pa.—In order to hold the charter granted to T. P. Simpson for an electric railway, to be built from New Castle to

Beaver Falls, about 60 ft. of track were laid last week on the right of way at Morado on the line surveyed between the two cities. It is said that the company intends to resume construction of the line next spring.

Johnstown & Gallitzin Street Railway, Johnstown, Pa.—This company is reported to have awarded to Pierce & Barnes, 7 Water Street, Boston, Mass., the contract for making the surveys and preparing the plans and specifications for the proposed new electric line that will be built between Johnstown and Gallitzin, a distance of about 25 miles. [E. R. J., Nov. 28, '08.]

Monongahela & Carroll Street Railway, Monongahela, Pa.—The contract for the construction of this projected electric railway has been awarded to Pihl & Miller, Wabash Building, Pittsburg, Pa. The contract covers 14 miles of line, from Monongahela to Ellsworth, Pa., and will pass through Monongahela, Hazel Kirk, Braznell, Bentleyville and Ellsworth. Later the contracts for the remainder of the line, which will extend through to Washington, Pa., a like distance, will be awarded. Work is to be started at once and continue throughout the winter. George M. Hosack, Pittsburg, Pa., president. [S. R. J., Oct. 26, '07.]

Mount Pleasant, Tex.—M. C. Wolfe, manager of the Red Mineral Springs Development Company, of Mount Pleasant, is reported as saying that preparations are being made to build an electric interurban railroad between Red Springs, Mount Pleasant and Pittsburg, Tex., 12 miles. H. W. Peterman has a franchise to build between Mount Pleasant and Red Springs, and it is contemplated to extend this plan. [E. R. J., Aug. 8, '08.]

Otter Creek Electric Railway, Wallingford, Vt.—H. B. Barden, Wallingford, writes that this company proposes to build an electric railway system, about 50 miles in length, connecting Rutland, Clarendon, Wallingford, Danby, Dorset, Manchester, Sunderland, Arlington and Shaftsbury. Mr. Barden states that up to the present time the organization of the company has not been fully completed. Capital stock will be \$50,000. [E. R. J., Nov. 21, '08.]

***Everett & Cherry Valley Traction Company, Everett, Wash.**—This company, of which J. T. McChesney is president, is reported to have resumed work on the survey for an electric railway from Snohomish to Fall City, in Cherry Valley. It is the intention of the company to build a line to tap the agricultural and timber region tributary to Cherry Valley and connect with the Stone-Webster system at Snohomish for Everett.

Pacific Traction Company, Tacoma, Wash.—It is announced that this company has prepared plans, specifications and engineering data for the construction of several new lines in Tacoma, for which franchises were granted by the City Council some time ago. The lines contemplated at present are as follows: One out South Fifteenth Street, from Court A to connect with the present American Lake line at Sprague Street; one on Eighth Street, from Sprague to Proctor, then out Proctor to Sixth Avenue and out Sixth Avenue to the city limits; one to Point Defiance and another to South Tacoma. The company has already received estimates of cost for three different systems of motive power for the Fifteenth Street and other steep hill lines, viz.: The counterweight system, cable and electric systems. It has not yet been decided which system will be used. T. G. Seixas, Tacoma, vice-president and general manager.

Walla Walla, Wash.—A meeting of delegates from Dayton, Waitsburg, Prescott, Touchet, Wallula and Walla Walla was held at Walla Walla recently to formulate plans for the construction of a railroad from Dayton to the Columbia River. Dr. N. G. Blalock, Walla Walla, was chosen chairman, and C. H. O'Neil, Prescott, secretary. Plans were adopted to take over the old company organized two years ago, known as the Walla Walla-Columbia Traction Company, with rights of way, franchises and other assets, and immediately begin work of grading the line, using the farmers' teams and right of way donated by the farmers. Dr. N. G. Blalock was chosen general manager of the company. The proposed line will begin at Dayton, pass through Huntsville, Waitsburg, Prescott, Walla Walla, Touchet and Wallula, connecting there with boats on the Columbia River. [S. R. J., April 11, '08.]

Western Transportation Company, Portage, Wis.—Asa B. Karns informs the ELECTRIC RAILWAY JOURNAL that this company is building a standard gage road from Portage to Briggsville, Oxford, Big Springs, Friendship and Grand Rapids, Wis. The length of the system will be about 75 miles. Mr. Karns states that it is the intention of the company to install gasoline motor cars for passenger service and steam for hauling freight. The repair shops will be located at Briggsville, Wis. It is also proposed to establish an amusement park at Briggsville, on Mason Lake. Capital

stock, \$50,000, to be increased to \$500,000. Headquarters, 401-403 American National Bank Building, St. Paul, Minn. Officers: J. N. Braun, president and general manager; P. A. Lyngstad, vice-president; Asa B. Karns, secretary; E. A. Schwedler, treasurer, all of St. Paul. Albert Cummings, Briggsville, superintendent; Clayton Oehler, superintendent. [E. R. J., Nov. 14, '08.]

Madison, Wis.—H. H. Zigler, president of the Cincinnati Construction Company, which proposes to construct an electric railway from Madison to Janesville, is reported to have announced that the road will be in operation by next fall. The company has secured practically all of the necessary franchises and six different routes have been surveyed. It is intended to bring the line in on the west side of the city, touching on the west shores of Lakes Kegonsa, Waubesa and Monona. Joseph Ellis, chief engineer. [E. R. J., Sept. 5, '08.]

SHOPS AND BUILDINGS

Boise & Interurban Railroad, Boise, Idaho.—It is announced that this company will build a large freight house at Twelfth and Front Streets. A substantial foundation for the building will be constructed to permit of enlarging the structure later. Tracks will be built into the building, permitting of loading and unloading under cover. Plans are also being prepared for the company's passenger depot and office buildings at Seventh and Bannock Streets. It is expected that work on this building will be begun next summer. This building ultimately will cost at least \$50,000.

Boston & Northern Street Railway, Boston, Mass.—This company has recently completed a car house at Marblehead on the line between Marblehead and Salem, replacing the horse-car house which was destroyed by fire some time ago. The building is 160 ft. x 46 ft., has 4 tracks lighted by 12 light circuits and a storage capacity of 20 40-ft. cars. The men's lobby is 24 ft. x 15 ft., and has steel lockers and all modern equipment. The foreman's office, also located in the building, is 15 ft. x 12 ft., and is heated by a No. 218 Trojan heater.

Washington Water Power Company, Spokane, Wash.—It is reported that this company plans to erect a warehouse and combination passenger depot for the interurban lines at Lincoln and Bridge Streets.

POWER HOUSES AND SUBSTATIONS

Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind.—This company is said to have received plans for the remodeling of its power station in Lafayette. When completed the equipment will be removed from the old station at Huntington, which was closed after the power plant was completed in Fort Wayne. At present, the Lafayette plant is used to supply current only in Lafayette and for the Battle Ground branch line.

Rochester Railway & Light Company, Rochester, N. Y.—This company has decided to equip the Commercial Street power plant, known as Station No. 1, with oil-burning apparatus. This plant, after being equipped with the new apparatus, will be used only in case of emergency. It is expected that the new 750,000-gal. oil tank, which the company is building below Platt Street, will be completed within the next two weeks, and the supply of oil to be used at No. 1 station will be drawn from it.

AMUSEMENT PARKS

Kankakee (Ill.) Electric Railway.—The ELECTRIC RAILWAY JOURNAL is officially advised that this company expects to contract for a roller coaster, and for other amusement devices which will meet local requirements.

Indiana Union Traction Company, Anderson, Ind.—This company expects to build a new park during the next six months, and is therefore open to propositions from park builders, concessionaires, etc.

Chambersburg, Greencastle & Waynesboro Electric Railway, Chambersburg, Pa.—This company is reported to have bought the 136-acre Chambers farm two miles north of Chambersburg, along the Conococheague River, where a park will be established.

Hummelstown & Campbellstown Street Railway, Hershey, Pa.—It is stated that this company is enlarging Hershey Park at Hershey to the extent of 7 acres. This new addition will be converted into a zoological garden. The company also expects to erect a large open-air amphitheater with a larger and more commodious stage than the one in the present theater. There will also be a large restaurant erected in the park in the near future.

Newell (W. Va.) Street Railway.—F. B. Lawrence writes that this company expects to purchase a number of polar bears, kangaroos and water fowl for the zoo at Lake Newell Park. The company also expects to contract for iron work for a bear cage.

Manufactures & Supplies

ROLLING STOCK

Clinton Street Railway, Clinton, Ia., is asking for prices on 15 new cars.

Detroit United Railway, Detroit, Mich., is in the market for 25 new cars.

Milwaukee Northern Railway, Cedarsburg, Wis., is asking prices on interurban trucks.

Rochester & Manitou Railroad, Rochester, N. Y., is in the market for five new interurban summer cars.

Kankakee Electric Railway, Kankakee, Ill., has sent out specifications asking for bids on four motor cars.

Rock Island Southern Railroad, Monmouth, Ill., is preparing specifications for 12 motor cars and 10 trailers.

Montreal Street Railway, Montreal, Que., has placed an order for two snow sweepers with the McGuire-Cummings Manufacturing Company, Chicago, Ill.

Indianapolis, Columbus & Southern Traction Company, Columbus, Ind., has recently rebuilt three of its interurban cars. The cars will soon be put in operation.

Joliet & Southern Traction, Joliet, Ill., will soon purchase five interurban cars. The Fisher Construction Company, Joliet, Ill., will direct the purchase of these equipments.

Bakersfield & Ventura Railroad, Oxnard, Cal., is in the market for one gasoline car for its interurban traffic. This road is under construction, but expects to be in running order in the spring.

Sheffield Car Company, Three Rivers, Mich., has placed an order with the Taylor Electric Truck Company, Troy, N. Y., for trucks to be used on the gasoline cars built at its Three Rivers' plant.

Chicago Railways Company, Chicago, Ill., will receive in January the first car of the order for 50 all-steel closed motor cars, placed some time ago with the Pressed Steel Car Company, Pittsburg, Pa.

Southern Railway & Light Company, Natchez, Miss., is having two new cars built by the St. Louis Car Company, which will be delivered before the end of the year. They are adaptable to both winter and summer use.

Western New York Construction Company, Buffalo, N. Y., has ordered eight cars from the Cincinnati Car Company. These cars will be fitted with four-motor GE-204 car equipments and with Sprague-GE-type "M" control.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia., has just received three single truck cars from the McGuire-Cummings Manufacturing Company, Chicago. The cars have each an overall length of 28 ft. 11 in. and have a seating capacity of 24. The total weight of the car is 10,370 lb. The cars are equipped with McGuire-Cummings hand-ratchet brakes.

Southern Pacific Railroad, which as was stated in the ELECTRIC RAILWAY JOURNAL of Nov. 28, is making up specifications for electric cars, will ask for bids within 30 days. While the original order will be for 80 or 85 cars, it is anticipated the company will order nearly twice that number during the year 1909. These cars will be used on all the urban and suburban electrified lines of the Southern Pacific leading from the Oakland (Cal.) and Alameda moles.

Iowa & Omaha Short Line Railway, Walnut, Ia., which is building a steam railway in Iowa, expects to install a semi-interurban service on its lines as soon as they are completed. The company announces that it will probably buy for this service either gasoline-electric or storage battery electric cars. These cars will be in addition to 12 standard locomotives, 3 switch engines, 25 coaches and a complete freight equipment which George W. Adams, president of the company, will purchase.

Portland (Ore.) Railway, Light & Power Company has ordered 20 double-truck motor cars from the American Car Company, to be built under license from the Pay-As-You-Enter Car Company. The new cars are to be 45 ft. long and 8 ft. 3 in. wide over all and will have a seating capacity of 34. The length of the body over the vestibule will be 43 ft. 8 in. and the height inside 8 ft. 6 in. The bodies will be built of wood with steel sills, underframes of wood and steel, bolsters steel, interior finish cherry with

car trimmings brass. The cars will have folding steps and longitudinal seats. The principal specifications follow:

Air brakes	National Hand brakes	Brill
Center bearings	Brill	Headlights,
Control system,	U. S. H. L. Co., 10 in.	
G. E. Co., K-28-F	Journal boxes	Brill
Couplers. Van Dorn No. 11½	Motors, type and number,	
Curtain fixtures	Acme	Two G. E. 58
Curtain material ..	Pantasote	Side bearings
Destination signs,	Hunter, illuminated	Trolley poles and attach-
Fenders	Hunter	ments ....G. E. Co. No. 6
Gears and pinions,	Brill 27 G. E. 1.	
Gongs	G. E. 15-69	Varnish
	Dianda	Vestibule ..Pay-as-you-enter

TRADE NOTES

Lima Brake Shoe Company, Lima, Ohio, has increased its capital stock from \$10,000 to \$25,000.

G. W. Hoffman, Indianapolis, Ind., is sending out to the trade a neatly packed sample of his United States metal polish. The sample is put up in a tiny aluminum box.

H. R. Swartley, who has been New York manager of the Electric Service Supplies Company, has gone with the Pay-Within Car Company, Philadelphia.

Benson E. Brown has resigned as vice-president and manager of sales of the J. B. Sipe Company, Pittsburg, and has been elected president of the Regal Paint & Oil Company, Detroit, Mich.

Sanitary Rag Company, Kalamazoo, Mich., is now putting up its sanitary wipers packed in bales of 150 lb. This is being done in order to meet the demand from the trade for smaller packages than 500-lb. bales.

Expanded Metal & Corrugated Bar Company, St. Louis, Mo., on Dec. 1 changed its name to the Corrugated Bar Company. On the same date the offices of the company were moved to the National Bank of Commerce Building.

Association of Manufacturers of Chilled Car Wheels has been incorporated in Illinois by E. F. Carry, W. G. Pearce and C. F. Kopf. This is a general association of manufacturers of car wheels and its objects are the advancement of the industry.

Hauk Manufacturing Company, Brooklyn, N. Y., is now putting on the market two styles of portable oil burners designed for heating metals in manufacturing industries. These burners are said to be especially useful in railway shops for repair work.

G. S. Leavenworth, for the past five years chief engineer of the Powers & Mansfield Company, Troy, N. Y., has removed to Burlington, Vt., where he will take an active interest in the Vermont Construction Company, in which he is a director. He will be consulting engineer for the company.

Edward Elden, formerly master mechanic of the New York Central and Lake Shore railroads, with headquarters at Buffalo, has become associated with the Dodge Manufacturing Company, Mishawaka, Ind., in the capacity of agent of sales of the railroad department.

A. Cook, who has been manager of the supply department of the St. Louis Car Company in St. Louis for many years, has been transferred to New York, where he will have charge temporarily of the Eastern office at 1706 Broadway, succeeding Mr. A. H. Sisson, who resigned some time ago.

Grant W. Spear, who for many years has been vice-president of the Dearborn Drug & Chemical Works at Chicago, took charge Nov. 1 of the general Eastern offices of the company, 299 Broadway, New York City, as vice-president and Eastern manager, Mr. McVicker being no longer connected with the Dearborn Company.

E. A. Bunker, New York City, has been made sole agent in the United States and Canada for the Wilford waterproof cloth used by railways for car roof covering, curtains, etc. This cloth is made of a twisted flax thread, is strong, light and durable and will not crack. It is said to be impenetrable by either salt or fresh water.

Wagner Electric Manufacturing Company announces the appointment of John Mustard as assistant manager of sales for the East, including Pittsburg and territory east thereof, with headquarters in Philadelphia. Mr. Mustard has been with the Wagner Electric Manufacturing Company as district manager at Philadelphia for the past 15 years.

P. W. Hood, formerly of the firm of Tweedy, Hood & Finley, Chicago, has resigned his position, and is now associated with the American Distributing Company, Cleveland, Ohio. The latter company has recently opened an office in the Old Colony Building, Chicago, where it will conduct a railway sales department. Mr. Hood will devote his entire time to this field.

Westinghouse Electric & Manufacturing Company, Pittsburg, Pa., has been awarded a contract by the Southern Power Company, Charlotte, N. C., for the installation of transformers aggregating 93,000 kw. This is one of the largest transformer orders ever placed. They are to be used on the transmission lines between Charlotte, Greensboro and Greenville.

Russell Car & Snow Plow Company, Ridgway, Pa., has recently shipped a size 6 pedestal electric snow plow to the Bangor Railway & Electric Company, Bangor, Maine; a size 2 double-track snow plow to the Buffalo, Rochester & Pittsburg, Rochester, N. Y.; a size 6 pedestal electric snow plow to the Lewiston, Augusta & Waterville Street Railway, Augusta, Maine; a size 6 combination car and snow plow with double-track steel noses to the Ottawa (Que.) Electric Company.

Carbolineum Wood Preserving Company, 345 West Broadway, New York, announces the following changes in the locations of its representatives: Fred C. Bartels, transferred from St. Louis to New York office; Robt. L. Felser, Pennsylvania representative, present headquarters in New York; Julius Perlowitz, New England representative, headquarters in New York; Louis Edward Rusch, New York City representative; Edwin Scheftels, transferred to Milwaukee office.

Union Switch & Signal Company, Swissvale, Pa., has received the contract for the interlocking signal and switching devices to be used in the Hudson & Manhattan Railroad's Cortlandt Street tunnel. It is expected that this tunnel will be completed next spring and trains will be running before summer. The Union Switch & Signal Company will install at the Cortlandt Street station four electro-pneumatic interlocking machines and also the intermediate block signals and train stops. The signals will be electrically operated.

J. R. Gordon has been appointed manager of power apparatus sales for the Western Electric Company for its southern territory, with headquarters in Atlanta. He resigned a month ago from his position of manager in the Southern States for the Westinghouse Electric & Manufacturing Company. Mr. Gordon is known throughout the country as a pioneer in the electrical field, having been associated with those who organized and operated the first of the Edison plants. For many years he has been a member of the American Institute of Electrical Engineers and the American Society of Mechanical Engineers.

W. B. McVicker has resigned as vice-president and Eastern manager of the Dearborn Drug & Chemical Works, Chicago, Ill. Mr. McVicker was connected with the company for many years, having opened and developed all of the territory east of Chicago, including Cuba. He has incorporated the W. B. McVicker Company, with offices at 115 Broadway, New York. A new and complete laboratory and factory are in course of construction and will be completed this month. They will have complete facilities for general analytical work and the manufacture of high-class products. The personnel of the new company includes Charles M. Eddy, Albert E. Carpenter, Joseph F. Hammill, William J. Schatz, G. Frank Duemler and Frank J. Zink, men who have long been associated with Mr. McVicker.

The J. G. Brill Company, Philadelphia, Pa., says that the fire on Nov. 29, which destroyed part of the lumber department of the company, although it entails a considerable loss on account of the value of the lumber consumed, will not interfere with the carrying forward of business, as a large stock of all grades of lumber was uninjured and is amply adequate for the requirements of the company for some time to come. Investigation has not determined the origin of the fire, which started in a lumber shed and spread with great rapidity to adjoining sheds and lumber piles. By the excellent work of the Brill fire department and the city fire department, the fire was confined to one section of the lumber department. Temporary sheds were immediately erected to accommodate lumber arriving at the plant, and the work of reconstructing the sheds on the burned area was commenced as soon as the debris was removed. Adjacent buildings were uninjured, and as no machinery was damaged very little inconvenience was experienced and work was commenced in the various shops without interruption on Nov. 30.

Simmen Automatic Railway Signal Company, Los Angeles, Cal., announces in a circular that it has been given permission by the Atchison, Topeka & Santa Fé Railway to use 18 miles of track in Southern California for the purpose of experimenting with the Simmen signal system. The purposes of the system are outlined in the circular. The Simmen system is now installed on this experimental track to the extent of making an automatic record of train movements in the dispatcher's office, signaling between the dispatcher

and the engineer by means of a cab signal, and establishing telephone communications between the dispatcher and the engineer. Tests are being made of this apparatus with the purpose of establishing its efficiency, and the Simmen company hopes to be able to announce in the course of a few months definite information as to the results of these tests. A second installation is now being made on the Toronto & York Radial Railway, at Toronto, Can., which will be ready for inspection by Jan. 1, 1909. P. J. Simmen, president of the Simmen company, is at present located at the branch office of the company in the Continental Life Building, Toronto.

ADVERTISING LITERATURE

Arthur S. Partridge, 421 Olive Street, St. Louis, Mo., has recently issued schedule No. 25, giving prices on second-hand steam and electric machinery. Almost anything that is wanted, from an electric locomotive to small motors, can be found in the list.

Sterling-Meaker Company, Newark, N. J.—This company is sending out an instructive illustrated leaflet descriptive of the virtues of its fare registers. It claims that the use of these registers is an absolute guarantee that the railroad company will receive all the fares that are paid to the conductor.

Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y.—This company is sending out some new literature showing the value of its intercommunicating telephones for hotels, offices, residences, etc. The little booklets are very attractively illustrated and the good points of these telephones are fully described.

Western Electric Company, Chicago, Ill.—Booklet No. 1150 of this company has for its subject lead-covered telephone cable. It covers the telephone field comprehensively, taking up the subject of dry-core cable, insulation resistance, electrostatic capacity, lead sheath, aerial and underground cable, submarine cable, interior cable, etc.

Bird-Archer Company, New York, N. Y.—A little booklet recently issued by this company explains the value of the Bird-Archer boiler compounds, which have been on the market for the past 10 years. It sets forth the economy in the use of these materials and contains much valuable information as to the care and handling of boilers.

Railroad Supply Company, Chicago, Ill.—This company has issued a vest pocket catalog for the use of trackmen, which contains illustrations and descriptions of various kinds of tie plates and their application, track tools, nut locks, track bolts, switch stands, etc. A number of pages are devoted to tables for use in track laying and maintenance.

C. W. Hunt Company, West New Brighton, N. Y.—A little booklet describing the manufacture of superior manila rope is being distributed by this company. With profuse illustrations, the process of manufacturing the company's brand, "Sfevedere," is described. It is claimed that this make of rope is superior for transmission and for hoisting purposes.

Thew Automatic Shovel Company, Lorain, Ohio.—Circular No. 13 of this company is devoted to a description of its electrically operated shovels and their advantages in construction work. The special equipment that is described is in use on the Brantford & Hamilton Electric Railway, Hamilton, Canada. The capacity of this apparatus, its economy and adaptability to railway work, are especially set forth.

American Battery Company, Chicago, Ill.—This company is sending out a booklet which contains 16 pages of matter devoted to the design, application and maintenance of its American electrolytic rectifiers. Special attention is called to the fact that the American rectifiers are made in a number of sizes and styles designed to meet the demand for a low-priced device for making use of alternating current for the charging of storage batteries of from 1 to 50 cells of any capacity up to 300 amp-hours.

ELECTRIC RAILWAY PATENTS

UNITED STATES PATENTS ISSUED NOV. 24, 1908.

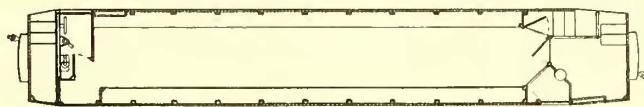
[This department is conducted by Rosenbaum & Stockbridge, patent attorneys, 41 Park Row, New York.]

Overhead Electric Railway, 904,525; Francis M. Frederick, St. Louis, Mo. App. filed Nov. 4, 1907. The cars are suspended from a single overhead rail provided on one side with rack teeth. A truck arranged for operation on the rail has gear wheels engaging the rack on the rail and motors arranged for operation in the truck and arranged to drive the wheels thereof.

Overhead Electric Railway, 904,526; Francis M. Frederick, St. Louis, Mo. App. filed Nov. 4, 1907. Relates to construction set forth in the foregoing patent and has special reference to means for raising and lowering the cars.

Device for Preventing Trolley-Wheels from Jumping, 904,541; William O. Lane, Cleveland, Ohio. App. filed March 12, 1908. Has a bracket near the upper end of the trolley pole, carrying arms extending in advance of the pole and a roller in the arms.

Passenger Car, 904,576; William S. Twining, Philadelphia, Pa. App. filed May 25, 1908. A "pay-as-you-enter" car provided with a rear platform divided into an entranceway to the car in front of an elevated conductor's cab and an



Passenger Car—Patent No. 904,576

exitway from the car located at a lower plane by the provision of a stairway leading from the interior of the car.

Manufacture of Rail-Bonds, 904,663; Walter Howard Williams, Mansfield, Ohio. App. filed Nov. 14, 1906. A process of making rail-bonds consisting in forming a stranded terminal member with the strands separated to form an aperture. Then inserting one end of a body portion into the aperture and compressing the joint.

Suspension for Railway and Tramway Vehicle Trucks, 904,720; Edgar Peckham, London, Eng. App. filed May 22, 1906. A spring suspension for vehicle trucks, consisting of a supporting spring placed under the axle journal box and resting and held on an adjustable plate carried at the forked ends of a supporting link depending from the top of the journal boxes.

Electrically-Operated Semaphore Mechanism, 904,741; Jean F. Webb, Jr., Denver, Col. App. filed May 12, 1908. An electric motor turns the semaphore shaft, and means are provided for disconnecting the motor from the shaft and for holding it in its signaling position.

Electric Railway Signaling System, 904,834; Yorke Burgess, Washington, D. C. App. filed Dec. 7, 1907. Details in a system of signaling with a number of signals on each train operated separately by different strengths of electric current.

Emergency Brake, 904,844; Fred B. Corey, Schenectady, N. Y. App. filed July 16, 1903. An emergency valve for use in connection with an "automatic" air-brake system, and a pressure-retaining valve adapted to prevent the reduction of the train-pipe pressure below a predetermined amount after the emergency valve has been operated.

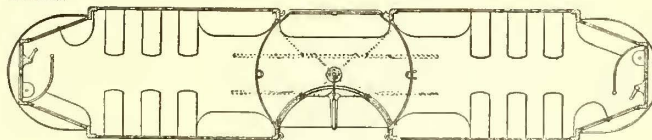
Trolley for Cars, 904,877; John Kaufman, Hazleton, Pa. App. filed June 5, 1908. The trolley remains in contact with the wire. The head is of two parts hinged together on a vertical access with a contact wheel in each part. Oil is fed to the journals of the wheels.

Line-Interrupter for Electric Railways, 904,902; Albert Thode, Hamburg, Germany. App. filed July 8, 1908. A trolley insulator provided with shoes to raise a trolley wheel or harp as it passes under the insulator.

Railway Cross-Tie, 904,944; Frank N. Drane and Hugh A. Drane, Corsicana, Tex. App. filed March 10, 1908.

Combination Trolley and Telegraph Pole, 904,952; James Hackett, Bellaire, Ohio. App. filed Aug. 14, 1908. The trolley pole is enameled and made of stepped sections, which narrow toward the top of the pole.

Automatic Railway-Alarm, 904,971; Niels Lang, Vancouver, British Columbia. App. filed April 21, 1908. Rings an alarm in the engine cab and gives a visual indication by particular construction of track circuits and engine equipment.



Passenger Car—Patent No. 905,100

Truck for Replacing Derailed Street Cars, 905,050; Elmer E. Birch, East Liverpool, Ohio. App. filed Feb. 11, 1908. The truck comprises a triangular body portion having grooves formed therein, wheels connected to the truck, a guide wheel connected thereto, a notched wheel connected to the guide wheel, and means engaging the notched wheel for regulating the direction of movement of the guide wheel.

Passenger Car, 905,100; Louis T. Pyott, Philadelphia, Pa. App. filed Aug. 19, 1908. A "pay-as-you-enter" car, having an entrance and exit turret that can be turned so as to shift the entrance and exit from one side of the car to the other.

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.

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., Oct. '08	157,532	90,258	67,274	43,779	23,496	LExINGTON, KY. Lexington & Inter-urban Rys. Co.	1m., Sept. '08	64,049	36,670	27,378		
	1 " " '07	155,291	92,701	62,590	43,369	19,221		1 " " '07	59,195	31,120	28,076		
	10 " " '08	1,378,685	912,299	665,385	435,785	230,000		9 " " '08	466,589	297,264	169,325		
	10 " " '07	1,615,075	925,289	689,787	426,529	263,258		9 " " '07	420,783	266,307	154,476		
BELLINGHAM, WASH., Whatcom Co. Ry. & Lt. Co.	1m., Sept. '08	29,381	17,363	11,018	8,945	2,072	LITTLE ROCK, ARK. Little Rock Ry. & Elec. Co.	1m., Oct. '08	55,286	*28,043	27,244	10,271	16,972
	1 " " '07	29,033	17,049	11,984	7,529	4,455		1 " " '07	56,988	*27,625	29,363	8,586	20,777
	12 " " '08	359,087	205,581	153,506	95,293	58,213		10 " " '08	551,104	*282,952	268,152	101,667	167,085
	12 " " '07	338,191	192,014	146,178	82,965	63,213		10 " " '07	523,789	*270,935	252,854	84,324	168,530
BIRMINGHAM, ALA. Birmingham Ry., Lt. & Power Co.	1m., Oct. '08	194,069	*132,739	61,331	43,669	17,661	MEMPHIS, TENN. Memphis St. Ry. Co.	1m., Oct. '08	148,146	*91,310	56,836	35,353	21,483
	1 " " '07	213,595	*142,125	71,470	41,976	29,494		1 " " '07	146,418	*92,458	53,960	34,447	19,513
	10 " " '08	1,780,096	*1,170,663	609,433	438,441	179,992		10 " " '08	1,347,911	*851,629	496,282	350,322	145,960
	10 " " '07	1,817,890	*1,204,536	613,355	393,847	219,507		10 " " '07	1,345,092	*831,101	513,991	335,941	178,050
CHAMPAIGN, ILL. Illinois Tr. Co.	1m., Oct. '08	379,222	202,062	176,560			MILWAUKEE, WIS. Milwaukee Elec. Ry. & Lt. Co.	1m., Oct. '08	338,442	165,955	172,487	100,560	71,928
	1 " " '07	368,838	198,852	169,986				1 " " '07	338,049	179,643	158,404	101,063	57,340
	10 " " '08	3,352,273	1,924,114	1,428,159				10 " " '08	3,248,392	1,652,370	1,595,822	994,230	601,592
	10 " " '07	3,091,321	1,732,926	1,358,395				10 " " '07	3,228,886	1,628,980	1,599,907	982,010	617,897
CHARLESTON, S. C. Charleston Con. Ry. Gas & Elec. Co.	1m., Oct. '08	60,655	41,693	18,961	15,074	3,887	Milwaukee Lt., Ht. & Tr. Co.	1m., Oct. '08	112,675	30,560	82,115	58,858	23,258
	1 " " '07	58,551	39,872	18,679	14,942	3,738		1 " " '07	112,499	31,910	80,589	56,967	23,623
	8 " " '08	505,751	327,664	178,087	119,364	58,723		10 " " '08	1,180,739	311,018	869,721	597,154	272,568
	8 " " '07	482,661	304,455	178,206	118,715	59,491		10 " " '07	928,259	299,357	628,902	447,088	181,815
CHICAGO, ILL. Aurora, Elgin & Chicago Ry. Co.	1m., Oct. '08	121,525	67,041	54,484	27,731	26,752	MINNEAPOLIS, MINN. Twin City R. T. Co.	1m., Oct. '08	554,166	265,893	288,273	138,667	149,607
	1 " " '07	122,930	67,554	55,376	27,840	27,536		1 " " '07	515,178	255,587	259,590	132,642	126,949
	4 " " '08	561,555	281,229	280,326	110,758	169,568		10 " " '08	5,319,968	2,637,918	2,682,050	1,283,789	1,398,261
	4 " " '07	504,973	288,261	276,713	110,174	166,538		10 " " '07	5,055,451	2,436,024	2,619,427	1,169,383	1,450,043
DALLAS, TEX. Dallas Electric Corporation.	1m., Sept. '08	95,842	63,080	32,762	27,956	4,806	MONTREAL, CAN. Montreal St. Ry.	1m., Oct. '08	328,608	168,124	160,484	27,480	133,004
	1 " " '07	95,632	63,669	31,963	28,390	3,573		1 " " '07	311,898	164,575	147,323	27,868	119,455
	12 " " '08	1,148,061	772,430	375,631	353,411	22,220							
	12 " " '07	1,091,259	759,838	331,421	305,825	25,596							
DETROIT, MICH. Detroit United Ry. Co.	1m., Oct. '08	619,490	*412,650	206,840	133,379	73,461	NASHVILLE, TENN. Nashville Ry. & Lt. Co.	1m., Oct. '08	141,815	*82,888	58,927	32,829	26,098
	1 " " '07	613,249	*413,695	199,554	133,432	66,122		1 " " '07	144,650	*85,484	59,166	30,495	28,671
	10 " " '08	5,989,402	*3,807,903	2,181,499	1,352,239	829,259		10 " " '08	1,309,348	*786,280	523,069	319,620	203,449
	10 " " '07	6,037,649	*3,782,677	2,254,972	1,300,608	954,363		10 " " '07	1,297,600	*772,019	525,581	294,077	231,504
DULUTH, MINN. Duluth St. Ry. Co.	1m., Oct. '08	78,730	45,927	32,803	18,917	13,887	NORFOLK, VA. Norfolk & Portsmouth Tr. Co.	1m., Sept. '08	162,938	94,834	68,104		
	1 " " '07	74,508	41,461	33,047	17,919	15,128		1 " " '07	295,611	161,921	133,690		
	10 " " '08	731,992	444,502	287,490	185,667	101,823		9 " " '08	1,395,234	835,271	559,963		
	10 " " '07	700,180	351,084	349,095	177,727	171,369		9 " " '07	1,977,297	1,200,668	776,629		
E. ST. LOUIS, ILL. East St. Louis & Suburban Co.	1m., Oct. '08	178,644	90,804	87,841			OAKLAND, CAL. Oakland Trac. Co.	1m., Sept. '08	235,023	107,904	127,119	45,943	81,176
	1 " " '07	206,014	97,085	108,929				1 " " '07	247,939	119,881	128,058	46,758	81,301
	10 " " '08	1,666,500	872,042	794,457				8 " " '08	2,082,487	988,668	1,093,819	413,147	680,672
	10 " " '07	1,788,913	933,730	855,183				8 " " '07	2,058,540	1,043,265	1,015,275	393,734	621,540
EL PASO, TEX. El Paso Cos.	1m., Sept. '08	43,828	33,338	10,490	7,133	3,357	San Francisco, Oakland & Oake Cons.	1m., Sept. '08	74,763	37,381	37,383	22,727	14,656
	1 " " '07	45,556	31,172	14,384	5,956	8,428		1 " " '07	72,927	36,076	36,851	20,390	16,461
	12 " " '08	530,215	375,030	155,185	82,817	72,368		8 " " '08	673,384	336,560	336,824	191,417	145,407
	12 " " '07	474,875	356,335	118,540	64,629	53,911		8 " " '07	595,040	313,917	281,123	183,508	97,615
FAIRMONT, W. VA. Fairmont & Clarksburg Tr. Co.	1m., Sept. '08	41,934	12,470	29,464	1,927	27,537	PHILADELPHIA, PA. American Rys. Co.	1m., Oct. '08	230,984				
	1 " " '07	37,328	14,316	23,012	947	22,065		1 " " '07	242,300				
	9 " " '08	309,142	107,963	201,179	10,512	190,667		10 " " '08	1,016,028				
	9 " " '07	287,648	113,615	174,033	8,058	165,975		10 " " '07	1,108,543				
FT. WAYNE, IND. Ft. Wayne & Wabash Valley Tr. Co.	1m., Sept. '08	122,443	60,973	61,469			PLYMOUTH, MASS. Brockton & Plymouth St. Ry. Co.	1m., Sept. '08	12,603	6,678	5,925	1,833	4,092
	1 " " '07	125,732	69,984	55,748				1 " " '07	11,620	8,450	3,170	2,222	948
	9 " " '08	978,700	553,469	425,231				12 " " '08	120,716	90,003	30,713	27,101	3,612
	9 " " '07	937,622	557,012	380,610				12 " " '07	117,721	77,051	40,671	26,935	13,735
FORT WORTH, TEX. Northern Texas Elec. Co.	1m., Sept. '08	88,190	49,316	38,874	15,216	23,658	ST. LOUIS, MO. United Railways Co. of St. Louis.	1m., Oct. '08	949,914	*572,325	377,589	233,846	143,743
	1 " " '07	93,468	50,153	43,315	13,776	29,539		1 " " '07	971,322	*607,450	363,872	231,483	132,389
	12 " " '08	1,052,922	616,171	436,750	184,562	252,189		10 " " '08	8,810,539	*5,645,394	3,165,145	2,331,178	833,967
	12 " " '07	1,018,274	590,595	427,679	153,268	274,411		10 " " '07	9,087,659	*5,906,466	3,181,193	2,315,214	865,979
GALVESTON, TEX. Galveston-Houston Elec. Co.	1m., Sept. '08	91,790	46,620	45,170	20,121	25,049	SAVANNAH, GA. Savannah Electric Co.	1m., Sept. '08	48,404	27,662	20,742	15,887	4,855
	1 " " '07	97,651	52,942	44,709	19,495	25,214		1 " " '07	52,894	32,000	20,894	15,261	5,633
	12 " " '08	1,060,003	620,378	439,624	241,240	198,385		9 " " '08	435,797	299,236	136,561	132,419	4,142
	12 " " '07	1,023,838	600,452	423,385	218,608	204,777		9 " " '07	446,400	283,115	163,285	123,761	39,524
HOUGHTON, MICH. Houghton County St. Ry. Co.	1m., Sept. '08	23,934	11,801	12,133	4,963	7,170	SEATTLE, WASH. Seattle Elec. Co.	1m., Sept. '08	385,946	209,952	175,994	93,345	82,649
	1 " " '07	23,878	12,023	11,856	4,798	7,057		1 " " '07	359,423	209,729	149,694	82,884	60,810
	12 " " '08	257,707	148,422	109,284	57,042	52,243		12 " " '08	4,425,521	2,607,185	1,818,335	1,054,098	764,237
	12 " " '07	247,581	144,411	103,171	56,202	46,969		12 " " '07	3,918,097	2,280,227	1,637,870	852,992	784,878
JACKSONVILLE, FLA. Jacksonville Elec. Co.	1m., Sept. '08	34,017	18,372	15,645	8,053	7,592	TACOMA, WASH. Puget Sound Elec. Ry. Co.	1m., Sept. '08	148,861	95,983	52,878	43,372	9,506
	1 " " '07	32,651	19,621	13,030	7,060	5,970		1 " " '07	147,150	92,403	54,747	40,163	14,583
	12 " " '08	414,592	249,893	164,699	96,888	67,811		12 " " '08	1,678,073	1,073,876	604,197	510,955	93,242
	12 " " '07	386,478	223,136	163,342	68,825	94,518		12 " " '07	1,592,415	988,810	603,604	426,556	177,248
KANSAS CITY, MO. Kansas City Ry. & Lt. Co.	1m., Sept. '08	537,301	289,330	247,971	155,181	92,790	TAMPA, FLA. Tampa Elec. Co.	1m., Sept. '08	43,356	26,705	16,652	4,538	12,114
	1 " " '07	534,923	262,980	271,943	156,157	115,786		1 " " '07	43,079	32,153	10,925	638	