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The Pennsylvania Contract

The long awaited contract of the Pennsylvania Railroad for the electrical equipment of its tunnel and approaches from Newark, N. J., to Jamaica, L. I., was finally approved by the board of directors of the Pennsylvania Railroad, Nov. 2. The decision to construct a tunnel meant necessarily the selection of electricity as motive power, so that the adoption of a system was the only question at issue. As will be seen from the account published elsewhere in this issue, a definite selection between alternating current and direct current has not yet been made, or, at least, announced, but the character of locomotive adopted and other conditions surrounding the contract indicate a choice in favor of the single-phase system. Coming so soon after the decision of the Illinois Central to equip its terminal in Chicago electrically, the announcement has a most important bearing on the future of electrical development in this country.

The Election

The election is over and business conditions should now return to a normal basis. The selection of Mr. Taft as successor to Mr. Roosevelt will, we believe, meet with general satisfaction on the part of the railway companies, which cannot but benefit by the gradual improvement of business conditions that is now anticipated. The industrial stagnation, however, has not been the only cause for the present adverse status of electric railway enterprises and for the disinclination of capitalists to engage in new undertakings. In many States the public utilities have had to bear the harmful effects of the agitation which has been rife against corporations in general, and are as much in need of relief from this burden as from the existing business conditions. The restoration of industrial activity will probably restore gross earnings rapidly to at least the point at which they stood before the business depression began to be general, but if public service corporations are to be encouraged to make the improvements and extensions which the return to business prosperity will require, the hostility against them must be abandoned. The victory of Governor Hughes indicates that in New York State, at least, public service commissions have come to stay, although it is too early to say whether the laws from which they derive their authority will be amended soon. We believe the companies of New York State will accept this situation; in fact, many of them have already recognized that the commissions should be—and undoubtedly will be—of great assistance in protecting their property rights against demagogic and irresponsible legislative interference.

Continuing the Benefits of the Convention

An excellent plan for increasing the benefit which a company secures from the attendance of its men at a street railway convention has been put in force by at least one road. This company sent to Atlantic City this year about 10 men, who necessarily came into contact with different people, discussed different topics at the convention, considered matters from different standpoints, and, altogether, obtained nearly 10 times the range of ideas and

thoughts that would have been derived from the meeting by one delegate. In the natural course of events, these men would apply the lessons so acquired to their own work, with the addition of such points as they might receive from the others to whom in return they would impart any useful suggestions they had obtained at the convention. Such a plan, however, does not fully realize all of the benefits which can be derived from a trip of this kind. Instead, each delegate to the convention has been asked to prepare a statement of the most helpful information which he received while at Atlantic City, and each in turn will present these experiences at a series of meetings to be held in the early future. These meetings will be attended not only by those who were present at the convention, but by all of the responsible officers of the company. The plan is an excellent one. The fact that a person has to put in concrete form his ideas on any topic assists in their logical consideration. When to this is added the obligation of each to submit his conclusions to the criticism of the others on the staff, a maximum of value is obtained. In a sense, the plan is the equivalent of the attendance at the convention of each officer of the company in a decuple capacity, for it would be impossible for any two of the 10 attendants to derive just the same ideas or see only the same things during a busy week, such as that of Oct. 11 at Atlantic City.

New Cars in Chicago

It is seldom that an order for as many as 650 cars is placed at one time in the electric railway field, but conditions of service as well as the franchise agreements in Chicago require this number of cars for immediate use on the North and West Side lines of the Chicago Railways Company. The first of the new cars, which are described elsewhere in this issue, were placed in service on Nov. 1. Their details of design and the requirements of manufacture have been approved by the Board of Supervising Engineers of Chicago Traction, which includes the chief engineers of the Chicago Railways Company, the Chicago City Railways and the Calumet & South Chicago Railway, as well as the two consulting engineers representing the City of Chicago. It would hardly be possible to find another body of men so well acquainted with the needs of Chicago traction service and the best methods by which these needs may be met. The lines of the Chicago Railways Company radiate from the loop district of Chicago to the west, northwest and north sides of the city, and the cars on these lines must be designed, not only to operate satisfactorily on the long runs of the outlying districts, but also must include features of design which will assure the rapid handling of congested traffic in the crowded business district of the city. The latter requirement, it is expected, will be fulfilled by the use of the pay-as-you-enter method of fare collection and by the use of especially long platforms. This additional length is principally in the entrance space, which is thought to be wide enough for two intending passengers to step onto the platform at one time. The long overhang, more than 14 ft., might be criticised in this car. On some cars that have been built for pay-as-you-enter service it has been found that the long platforms have required attention to keep them from sagging unduly. In the Chicago cars, however, the use of 18-in. side sills of steel plate, to which the platform knees are securely braced through the medium of castings connecting with the end sills, should make it possible to assure a minimum deflection with the maximum load.

Other interesting features of these 600 new cars are the use of cast-steel body bolsters; the substitution of buzzers on the conductor's circuits instead of bells; the wiring of the main trolley circuit on the roof of the car in metal conduit, and the use of metal sash throughout the body and deck of the car. Before beginning the construction of these 600 cars two sample cars were built. These sample cars were subjected to careful inspection. The value of having all of the equipments conform to the standards of the sample cars and the benefits derived by having available actual cars for inspection and revision of details by the various engineers interested justified the withholding of the construction of the main portion of the order until all details of the sample equipments could be made complete and satisfactory to the representatives of the railway company and the city.

Publicity Regarding Maintenance

The Kansas City Railway & Light Company is to be commended for its courage in publishing in an annual report to its stockholders a statement from chartered accountants that, in their opinion, the allowance from income for accruing renewals and depreciation is not adequate for the maintenance of the property over a series of years. It appears that the company set aside $829,814 during the five years ended May 31, 1908, toward charges of the nature stated, "but after allowing for the fact that during a great part of this period the property has been in process of reconstruction" this amount was not, the accountants thought, adequate. The report of the accountants to the directors, published in last week's issue of the Electric Railway Journal, page 1301, states that they were satisfied that the charges to property accounts for the entire period represented "either expenditures for new properties, extensions and additions to existing systems, or outlays for the electrification and reconstruction of cable lines and other properties" as contemplated under a plan and agreement dated May 9, 1903.

When the accountants made the foregoing statements the directors had before them two courses, either (1) to withhold the information from the shareholders to whom it rightfully belonged, or (2) to publish it and let the consequences, if any, which arose be dealt with afterward. They chose, with some courage, to state the facts.

Too little regarding the accounts and earnings of electric railways has been made public in the past. It is partly because of ignorance concerning the true cost of service, and partly because of a failure by those who knew the facts to make them public that some companies are burdened now with franchise contracts from which they can never make a profit. Accounts that are made public should come as near the truth as it is possible for them to be made. If companies declare dividends without a sfatement that the provisions for renewals are not adequate, if such is the fact, the public assumes, with justification but without knowledge, that the profits divided were earned. If divi-

dends are declared and a statement is made that they were not earned if account is taken of the accruing need of provision for maintenance, the public and shareholders are in possession of the facts.

Publicity respecting existing and probable requirements for maintenance places a company in a light before municipal and State regulating bodies which it can secure in no other way. Public authorities will reach the point eventually where they will recognize the right of utility corporations to a return on the investment reasonably made in the property. If they do not recognize that right of their own volition, the courts, in the end, will force them to do so as a matter of justice to the security-holders whose funds have been invested in the enterprise. If the existing rates of fare and transfer arrangements will not permit such return, the fare and transfer systems will have to be amended; units of fares will have to be raised; transfers will have to be curtailed, or a change that will effect results of equal importance will have to be worked out.

Lightning Arresters

Papers on lightning arresters have been presented at two recent conventions of street railway associations, a fact which is indicative of the interest felt in the subject. Lightning on a distribution system is a vague term loosely employed to cover every sort of abnormal voltage from a simple surge up to the real thing. The very various experiences with the same type of arrester, and the varying success of many different types, depend on the real nature of what one is pleased to call lightning. In railway systems the conditions vary enormously, hence also the results. In addition, many railways have to take care of both a 600-volt d.c. system and a high voltage three-phase system. These not only are differently exposed to lightning, but require radically different treatment. One the d.c. side it is practicable to use large choke coils in combination with any well designed and durable arrester with pretty good results. Several choke coils in series with intermediate arresters are likely to be effective in protecting station apparatus from everything but severe direct strokes, and sometimes even from these. Unfortunately, lightning varies in its equivalent frequency to an enormous extent. Most of the casual disturbances on lines are of pretty high frequency, and choke coils are correspondingly effective. Direct strokes, however, are certainly not always of high frequency, and may even be practically non-oscillatory, yet the wave front is commonly steep enough to make choke coils still important as measures of protection. Luckily, direct strokes are rare, most lightning being merely induced discharges following real lightning near the line. These induced discharges are oscillatory, less from the excitation than from the oscillation impressed by the line itself.

A single tremendous cloud discharge may be, and probably is, practically non-oscillatory owing to the nature of its discharge circuit. An induced potential wave on the line runs along it both ways from the center of disturbance, and, taking the period of the line, sets up a real oscillatory disturbance. The period of this is unlikely to be the natural period of the line, but that of segments of the line of somewhat indeterminate character, uniting to produce oscillations of extreme complexity, all fairly rapid and some very rapid but of small amplitude. The frequency ascribed to lightning in most of the earlier writings was generally merely the frequency of the observation circuit as a whole or in segments. Consider what really happens when a lightning flash induces a powerful wave on a long line having its initial crest at a point near the center of disturbance. The wave spreads both ways along the line with transmitter and reflected components at every point where the electrodynamic constants of the system vary at every branch and piece of apparatus, even at every insulator. Each component sets up its own proper oscillation rate, and the inevitable result is not a single wave system, but a series of superimposed systems of frightful complication. The office of the lightning arrester, so-called, is to keep the components of large amplitude out of the apparatus. To do this requires an arrester set to act on an excess of potential considerably below the factor of safety of the insulation. From this point of view one can readily understand the comparative ease of protecting very high voltage systems. If a line and its transformers have, say, 100,000 volts excess insulation to go and come upon, it is obvious that only induced disturbances of pretty large amplitude can produce serious results, while a lower voltage system with the same factor of safety may have absolutely only, say, 25,000 volts excess to save it, and will be correspondingly difficult to protect.

The electrolytic arrester described in the paper by Mr. Creighton is a most ingenious safety device acting as a very high resistance up to a certain potential and as a low resistance beyond it, constituting a real electrodynamic safety valve. It does, however, require some care to keep the electrolytic films in proper condition, and as Mr. Creighton intimates, even such apparatus is of uncertain value in case of a direct stroke. Such a catastrophe, however, very commonly puts the line out of business by breaking down its insulation at the point struck. We note that Mr. Creighton says nothing about protection by a grounded wire strung along the line, a device about which there are very varying opinions. It is probably owing to the very uncertain nature of lightning that experiences with the grounded wire have been so various. It is hard to see how it can have much palliative effect on induced discharges unless it is of very low resistance and extraordinarily well grounded. As to direct strokes, there is a chance of deflection to earth, although the wire is usually too near the lines to make it of much avail, and there is some likelihood of a breakdown between line and guard wire quite as disastrous as between line and actual earth. There is some evidence that the guard wire has been of use in particular plants, but the facts thus far accumulated do not show the real nature of the protection. Fortunately, much of the overhead system of the ordinary electric railway is in situations little exposed to direct strokes and is fairly easy to protect, especially since the advent of modern insulation in the generators. Some of the early machines were frightfully sensitive and would break down at the first symptom of lightning. Another favoring factor is the moderate voltage and pretty good insulation of the trolley system, so that there may be considerable fireworks without actually putting the line out of business. As to station apparatus and cars, one needs to be careful, and the hints given by Mr. Creighton

should be of much service in planning an effective system. For the rest, it is a good maxim to trust in Providence and keep your arresters in order.

The Law of Negligence in Bridge Disasters

Of the ramifications of the negligence law there is no end. All views of the subject are based, however, upon the principle of common law, that if the defendant has exercised ordinary care and foresight, he is not responsible for the damage resulting from any accident. Many definitions of actionable negligence have been prepared. One legal encylcopedia says it "is the inadvertent failure of a legally responsible person to use ordinary care under the circumstances in observing or performing a non-contractural duty, implied by law, which failure is the proximate cause of the injury to a person to whom the duty is due." Another treatise says no exact definition can be formulated, because negligence is always a question of fact, and every case depends necessarily upon its own particular circumstances.

The general question came up in an interesting form last month before the Supreme Court of Appeals of Virginia in the case of the Roanoke Railway & Electric Company *vs.* Sterrett. Here an action was brought by a passenger to recover damages for injuries alleged to have been sustained by her, in consequence of the negligent failure of the defendant company to maintain one of its street railway bridges in a safe condition. The trial in the lower court resulted in a verdict and judgment in favor of the plaintiff, the propriety of which was questioned by the company, so the case was brought before the Court of Appeals.

The record showed that the bridge had been constructed by a thoroughly reliable builder and that shortly prior to the accident had been entirely overhauled. Its capacity was supposed to be much greater than any use to which it was being put, yet on the day of the accident it suddenly broke down, a car was precipitated into the river underneath, and the passenger who brought the action was injured. Various theories were advanced to account for the collapse of the bridge. One, that of the plaintiff, was that some of the stringers had slipped from their supports, and that the company should have been aware of the precarious condition of these timbers. Another, which was advanced by the company, was that there was a hidden defect in one of the chords of the bridge. This caused the chord to part and the entire truss to go down without warning. The evidence, in the opinion of the Court of Appeals, was decidedly in favor of the latter theory, and that the casualty, in the language of the court, "was one of those inevitable and unavoidable accidents which human care and foresight could not have provided against."

The chief points of legal interest in the case do not hinge upon the relative weights of the testimony relating to the cause of the disaster, but to the treatment given by the court to the question of the burden of proof, and also to the definition of the reasonable care which a person must exercise to exculpate him from the legal consequences of an accident for which he would otherwise be liable. On the latter point the lower court had given the following instruction to the jury:

> The slightest neglect against which human prudence and foresight might have guarded, and by reason of which the injury may have been occasioned, rendered the Roanoke Railway Company liable in damages for such injury.

Objection was made to this instruction by the company on the ground that it gave the jury too exalted an idea of the degree of care which the company should have exercised. It will be admitted that this statement at first sight does seem to be contrary to the principles of responsible negligence outlined in the opening paragraph of this discussion. Actually there is strict accordance. The trend of practice of the courts of most States is opposed to the old plan of dividing degrees of negligence into different classes, such as slight, ordinary and gross. If a man or a company exercises the care to be expected from an ordinarily prudent person, he is not negligent. Viewed in this light the instruction is an adequate statement of the law because it calls only for the care legally to be expected. In fact, the Court of Appeals cited other instructions in cases of like nature which had been held to be proper and saw no reason why such a statement was not in harmony with a decision that there was no negligence in this particular case.

The other instruction of the lower court, which was also upheld, related to whether the defendant or the plaintiff should bear the burden of proof of negligence in an action of this kind. The defendant company asked the lower court to instruct the jury that the plaintiff, in order to recover, must establish the negligence of the defendant by evidence sufficient to satisfy reasonable and well-balanced minds, and that if it was just as probable that the accident had resulted from one of two causes, for one of which the defendant was not responsible, the company could not be held for damages. This the trial judge declined to do. Instead he said:

> The jury are instructed that the plaintiff, in order to recover in this case, must establish the negligence of the defendant by evidence sufficient to satisfy reasonable and well-balanced minds, and the evidence must show more than a probability of a negligent act; but when the plaintiff has shown that she was injured by the breaking down of the bridge and overturning the car, then this is sufficient proof of negligence on the part of the defendant company to meet the requirements above stated; and then the burden of proof is on the company to establish, by a preponderance of evidence, that it has been guilty of no negligence whatsoever which caused the accident and the damage has been occasioned by inevitable casualty or by some cause which human care and foresight could not prevent.

The Court of Appeals in this instance again upheld the action of the lower court. It explained that in the case under consideration it was the duty of the defendant to establish by preponderance of evidence that the accident could not have been avoided by human care and foresight, but this duty, as already explained, it seemed to have performed, in the opinion of the court.

The Electrical Equipment of the Illinois Central

The electrical equipment of the Chicago terminals of the Illinois Central, which has been definitely authorized by the stockholders and directors of that company, compares in magnitude with any of the terminal electrifications in and around New York. It will probably not involve the enormous contributory expenses for terminal changes and new construction outside of the congested terminals which have

been incurred by the New York Central, the Pennsylvania and the Long Island Railroads. nevertheless it will include equipping for electric operation of approximately 325 miles of single track in the main line and yards, extending for a distance of 25 miles. A 3-mile section of the main line is an eight-track road and the greater part of the main line is six-track. The situation in Chicago is also complicated by the fact that the entire system of freight terminal tracks of the Illinois Central is to be equipped electrically, as well as the through and suburban main lines and terminal tracks. With the exception of the tunnels of the Baltimore & Ohio in Baltimore, all of the electrified terminals in the East have been designed exclusively for handling passenger trains, the freight terminals being entirely separate and the service still operated with steam locomotives.

The reasons underlying the decision of the company to electrify may be divided into two classes: the demands of the public and the needs of the service. Agitation against the smoke nuisance has reached an acute stage in Chicago, and justly or unjustly, the railroads entering the heart of the business district have been charged with being the chief offenders. The Illinois Central in particular has been attacked on this ground by reason of its location on the lake front, adjoining Michigan Boulevard and Grant Park, which extends out into the lake on reclaimed land and can only be reached by bridges over the sunken right-of-way of the railroad. Farther south the Illinois Central runs through the best residential district of the South Side, with its eight-track main line, over which 400 regular trains pass daily. Its city freight terminal is also on the lake front, where all of the smoke from switch engines drifts over the retail shopping district. The efforts of the city officials to regulate the smoke nuisance from locomotives have proved of little avail, and the public clamor for the entire elimination of the smoke on the lake front by electrification probably had no small effect on the decision just reached. The report of the municipal commission appointed by Mayor Busse, of which a summary was given last week, lays great stress on the reduction of the smoke nuisance from the public and civic standpoint. In the matter of eliminating the smoke nuisance, the situation in Chicago bears some resemblance to the situation of the Park Avenue tunnel of the New York Central previous to electrification. There is this important difference, however, that in New York the elimination of smoke in the tunnel was considered from the standpoint of safety to the traveling public, which supported the railroad by its patronage, while in Chicago the elimination of smoke is demanded on the ground that it will increase the comfort and aesthetic enjoyment of the great mass of people who do not use the railroads.

Aside from the smoke nuisance, and possibly also the noise nuisance, the people of Chicago have little cause of complaint against the service now given by steam-drawn suburban trains. The suburban service of the Illinois Central has been developed to the maximum degree of efficiency possible with steam locomotives, and it is exceptionally well patronized. To the residents of a large part of the already thickly populated district on the South Side bordering on Lake Michigan, the suburban trains of this road offer the only means of rapid transit. The recent rehabilitation of the surface electric lines, however, will undoubtedly affect the present steam traffic and some corresponding improvement would have been necessary in any event to hold the patronage now enjoyed. Farther out, the purely suburban territory south of Burnside and Pullman is beginning to build up rapidly, and better and quicker transportation service made possible by electrification cannot fail to advance a growth already well started.

The local suburban service north of Woodlawn closely approximates that of the elevated roads, during the rush hours at least. The stations are less than one-half mile apart and trains run on 5 and 10 minute headway. The possible increase in average speed in this service, due to rapid acceleration of electric motor cars in multiple-unit trains, is perhaps the strongest inducement to secure more traffic than is now enjoyed. It will be difficult, even with electric trains, to improve greatly the urban express service running time between Woodlawn and Randolph Street, which is now maintained at close to 28 m.p.h., including five stops in 9 miles. Obviously the expense of the electrification of this portion of the terminal district which contributes the largest share of the existing traffic must be justified largely by possible future economy in operation rather than an immediate increase in traffic. This possible economy of operation will have an important bearing on the final selection of the system of electrification to be employed.

The terminals of the Illinois Central are not yet seriously congested, but, unlike most of the other railroads in Chicago, they are absolutely confined by municipally owned park property on both sides and can never be materially enlarged except by lengthening out along the right of way or by double-decking. Either of these methods would be awkward with steam locomotives in use, but with electric traction a large increase in track capacity will be made possible at once without any material changes in the track layout or buildings. If at some future time the traffic increases to such an extent that loop terminals or even connections to a subway system extending under the business district seem advisable, they can be built without affecting the operation of the trains either during construction or later when they are put in use.

No plans have been announced for beginning the electrification project, and it is not known whether the whole work of selection of a system and its installation will be left to an advisory board or commission, as was done by the New York Central, or whether this important task will be delegated to the company's own engineers. The problem of electrifying the extensive freight yards and terminals, as well as the passenger terminals and the eight-track main line section, involves some features which will make the selection of the distributing system to be employed as between an overhead structure or third-rail, particularly difficult. The widely varying character of the motive power necessary for high-speed passenger and heavy freight service also complicates the situation. On some points the experience so far gained in the heavy electrifications in the East and abroad will be of great assistance, but a large amount of pioneer work remains to be done. Whatever decision is reached will not only be of great importance in the general field of electrification, but also because of its close relation to the possible future electrification of the other five passenger terminals in Chicago.

FIRE EXTINGUISHER INSTALLATION IN THE MILTON CAR HOUSE OF THE BOSTON ELEVATED RAILWAY COMPANY

During the past few months the Boston Elevated Railway Company has been completing the installation of fire extinguisher equipments in several of its car houses. A representative case from the standpoint of protection is afforded by the car house at the Milton end of the system, located in Dorchester, near the boundary between the town of Milton and the city of Boston. Like many of the Boston car houses, the Milton station illustrates a gradual development in capacity and arrangement as the surface system has expanded, and for this reason the problem of fire protection was somewhat more complex than ordinarily obtains in the designs of such a system for a new house. The Milton house is a wooden frame structure, extending over a considerable area on an irregular lot. The piping runs, therefore, had to be worked out with special care to provide an installation of operating flexibility.

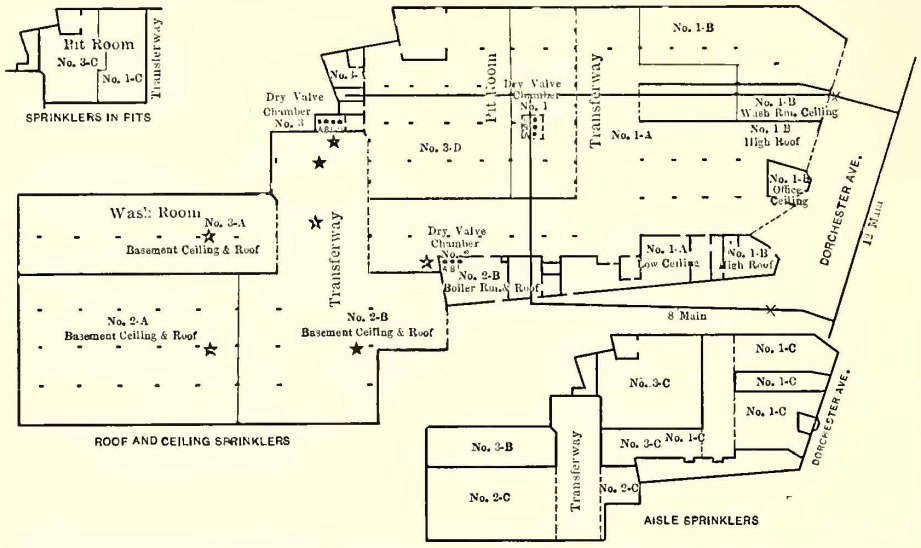


Fig. 1.—Fire Protection of Milton Car House—Location and Lettering of Dry Valves, with Section Operated by Each. The Stars Show Location of Sprinklers, Drip Pipes and Drip Valves in Basement.

The system is supplied with water by two mains leading from the 12-in. city main in Dorchester Avenue. One main, an 8-in. line, enters the house on the north side, while the other enters nearer the south end of the house. To insure against having the entire supply of water cut off, a 12-in. valve is placed in the city main between the two branches, the street main being supplied from both directions.

Both supply mains are connected so as to insure a continuity of service to all dry valve chambers, in case it becomes necessary to shut off either supply from the street. Valves are also inserted so that any one of the three dry valve chambers can be cut off from the branch supply without interfering with the supply to the others.

Three dry valve chambers are installed on the property, one being located beneath the pit room, a second near the car house boiler room, and the third just outside the east transferway. A general plan of the car house, showing the areas protected by the dry valve chambers and their connecting pipe lines, is given in Fig. 1. The sizes of sprinkler pipes and branches are in general those recommended by the insurance regulations, depending upon the number of heads installed on different runs. Pits, storage tracks, aisles, roofs, and all auxiliary rooms in the house are provided with sprinklers. Lignum vitæ insulating joints are installed on each division of the sprinkler system above the dry valves and in each independent pipe from the air supply to the sections of heads. These insulation joints, together with the care taken with the hanging of all pipes, completely insulate the entire system from all possible chance of grounding, should there be any electrical contact with the piping. To guard against the breaking down of the insulation through the leaning of any metal against the piping or from moisture or other causes, there is a ground detector system installed, which is tested daily, and shows to the foreman the existence of any ground and the section where it occurs. Nothing smaller than 1¼-in. pipe is used in the aisle lines. Fig. 2 illustrates a typical distri-

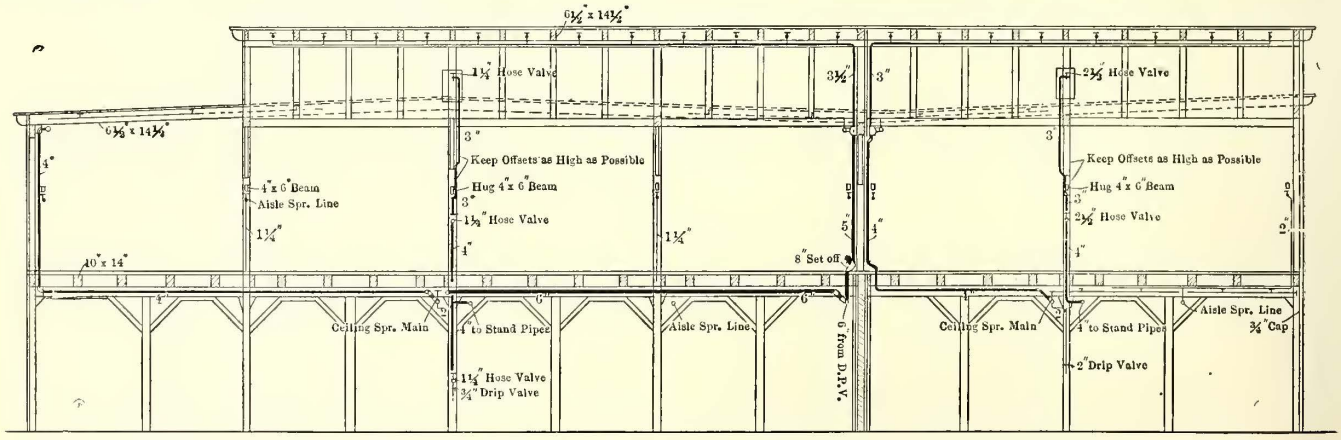


Fig. 3.—Fire Protection of Milton Car House—Cross-Section, Showing Location of Sprinklers, Valves, Etc.

The Milton installation contains about 2400 sprinkler heads. The system was furnished by the General Fire Extinguisher Company of Providence, R. I., the standard Grinnell dry pipe valves and fittings being used. There are eight 6-in., one 5-in., and one 4-in. dry valves in the installation, all being electrically connected with an annunciator in the office of the station master in charge of the house. The dry valves are all located in fireproof chambers, and

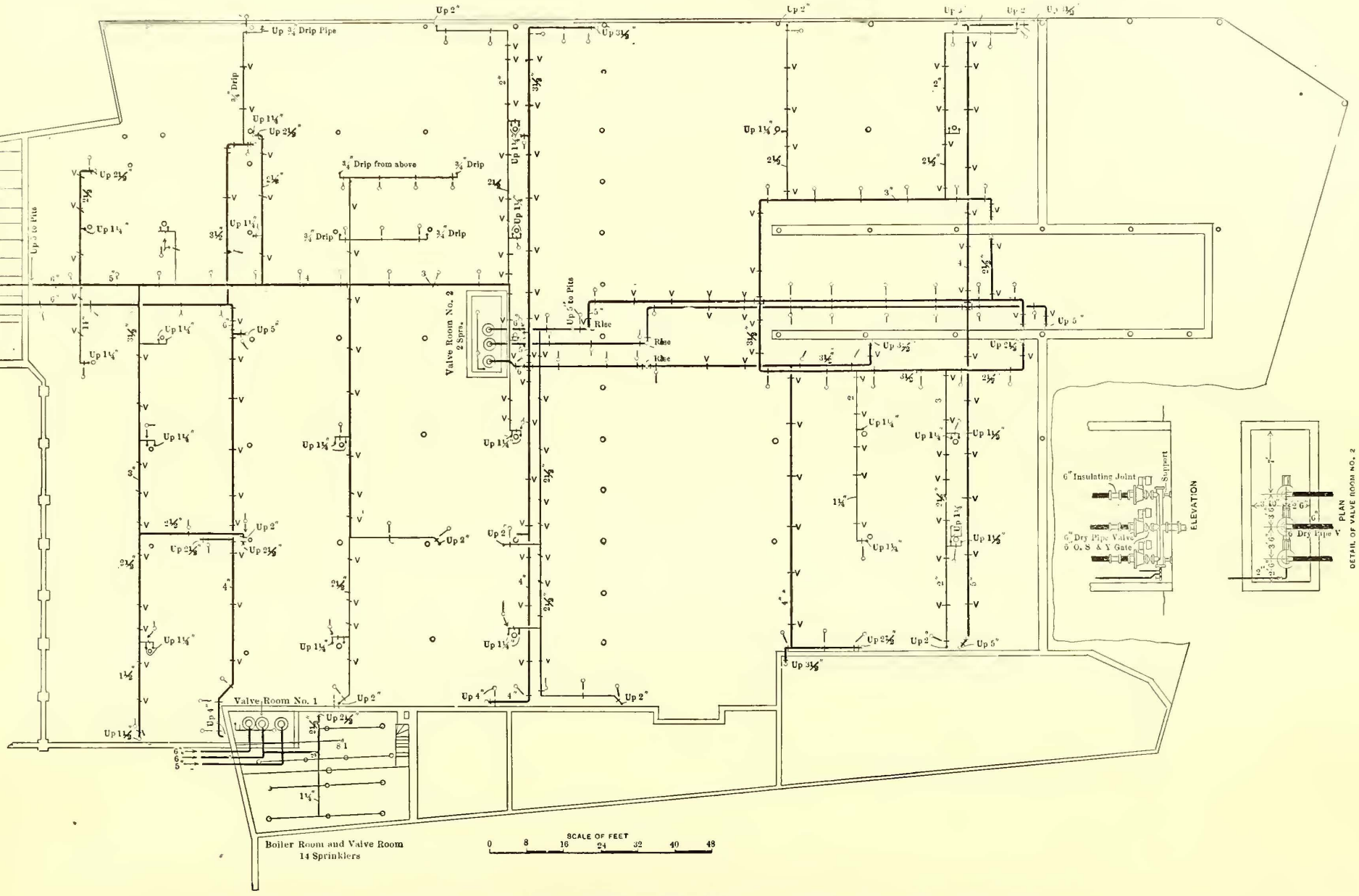


Fig. 2.—Fire Protection of Milton Car House—General Plan, Showing Piping Layout and Valve Locations

bution of pipe runs from a dry valve chamber, together with the detailed protection installed in the boiler room, and the details of valve room No. 2. The sprinkler mains start from the valve chamber in the 5-in. or 6-in. size of pipe and gradually diminish in diameter as the various branches and risers are taken off. Fig. 3 shows a typical cross-section of the house, which illustrates the care taken to keep the risers clear from the cars. In some cases

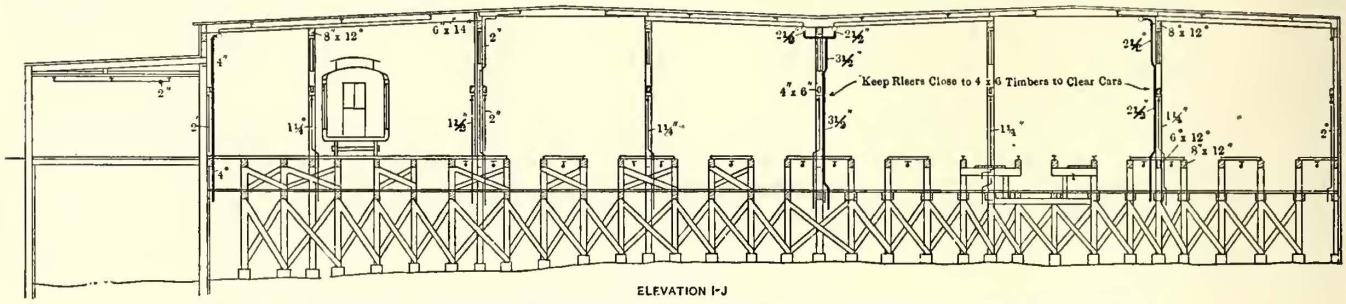


Fig. 4.—Fire Protection of Milton Car House.—Elevation, Showing Aisle Sprinklers

risers are carried to the roof level, where they connect with hose valves. Pit sprinkler arrangements are illustrated in Fig. 4, elevation I-J. The leads serving the sprinkler heads gradually diminish to a minimum diameter of ¾-in. at the last head in each row of sprinklers.

Fig. 5 illustrates the method of supporting the sprinkler pipes above the floor, designed by F. F. Low, architect of the Boston Elevated Railway Company. The sprinkler line in these cases is carried by an adjustable clip secured to a 4-in. x 6-in. wooden beam fastened to the regular 10-in. x 10-in. posts of the house, the bottom of the beam being carried at a height of 8 ft. 8 in. above the tracks.

To facilitate the operation of the valves in the car house, each valve is provided with a blue print, as shown in Fig. 6. Each valve is lettered as shown, but the particular area of the house which is cut in or out by the opening or closure of the valve to which the print is attached is blocked out in white (indicated by double lines on the cut), so that the action of closing any valve can at once be determined. Thus, in Fig. 6, valve D controls the roof line serving the area shown, and in any emergency there is no danger of operating the wrong valve with such a print attached to each gate.

In addition to the sprinkler system the company has in force stringent regulations in regard to the prevention and control of fires in all car houses. All employees are required to know the location of the nearest fire alarm box, and to keep the water supply and hose ready for immediate use in case of trouble. In case of fire all transferway doors, pit doors and other doors are required to be immediately closed to prevent drafts, and thus check the fire from spreading. All doors hung on inclined tracks so as to be self-closing are required to be regularly inspected to see that they are in operative condition, and the instructions are to keep such doors closed as much of the time as possible, holding them open when necessary by a fusible link at least 5 ft. above the floor on the front edge of the door. Employees are not allowed to hold doors open in any way that would keep them from closing automatically in case of fire. When double doors are used for oil rooms the inner door when in constant use is preferably kept open by a fusible link, the plan being to keep the outer door constantly closed, except when it is necessary to get out stock. Heavy transferway doors are held open by substantial chains with hooks at the door fronts that can be handled easily by one man.

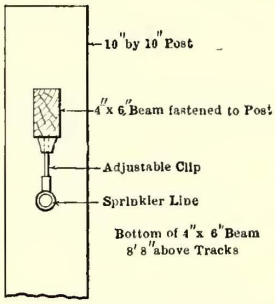


Fig. 5.—Method of Supporting Sprinkler Pipes

Special attention is called by the company to the importance of cutting current off cars when they are not in use, and to the closing of windows and doors in lofts and storage places when no one is present. It is felt that the danger from fire from spontaneous combustion, or from spreading flames in adjoining structures is greatly increased with open windows and doors. It is forbidden to leave gasoline torches burning when the men eat their lunch in a dis-

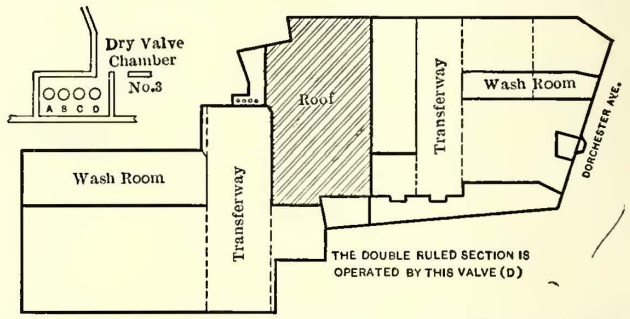


Fig. 6.—Fire Protection of Milton Car House.—Valve Operating Chart

tant part of the building. Keeping the car houses clean and free from combustible matter is emphasized by the company's instructions, and waste is required to be kept in approved fireproof oil cans or boxes, with self-closing covers. These cans are confined to places where the fire risk is lowest. Only small quantities of inflammable materials are allowed out of the store rooms at any one time and place.

REHABILITATION IN CHICAGO

Ida M. Tarbell has contributed to the *American Magazine* for November the first of two articles on the civic regeneration of Chicago. After telling what has been done in Chicago in the last decade toward supplying sufficient and efficient schools for the children of the city and carrying out important city improvements, Miss Tarbell reviews the facts which have led to the present arrangement between the street railway companies and the city. Credit is given to T. E. Mitten, president of the Chicago City Railway, for his management of that property, and Bion J. Arnold, chairman of the board of supervising engineers, is praised for the exhaustive reports made by him, which were used as a basis for the settlement. The article is illustrated with the portraits of many of the men connected with the movement looking toward the rehabilitation of the properties, and with pictures of cars in service, showing the excellent results that followed the introduction last November of the pay-as-you-enter cars on the South Side.

MUNICH CONVENTION OF THE INTERNATIONAL STREET & INTERURBAN RAILWAY ASSOCIATION

The Internation Street & Interurban Railway Association is an organization composed of most of the larger street railway companies on the continent of Europe and a few British companies and holds meetings every two years in different cities in Europe. In 1902, the association met in London; in 1904, it held its annual convention in Vienna, and in 1906, the meeting was held in Milan. This year the association held its convention at Munich, Sept. 7-10. Abstracts of a number of papers presented at the Munich meeting have been printed in recent issues of this paper.

At the Munich convention, which was the fifteenth in its history, the association was the recipient of many courtesies from the Bavarian government and the municipality of Munich. His excellency, Mr. von Frauendorfer, Minister of Transportation of Bavaria, and Mr. von Brunner, Mayor of Munich, took an active part in the preliminary arrangements for the meeting, as well as in the entertainments, which compared very favorably both in dignity and importance with those at any previous meeting of the association. There were in attendance at the association 404 delegates and about 120 ladies.

FIRST SESSION

The meeting on Sept. 7 was opened by an address from Mr. Janssen, general manager of the Brussels Tramways Company, and president of the association. In this speech Mr. Janssen referred to the important results accomplished during recent years by the association and to the consideration which it enjoyed among the different European governments. He said it now comprised more than 640 members, whose companies represent investments of more than 4,000,000,000 francs ($800,000,000), and afford a livelihood to more than 1,500,000 men. After discussing further the work of the association, and after having thanked the different governments of Europe which had sent representatives to the congress, the president declared the meeting open and requested Mr. Grassmann, counsellor to the Minister of Transportation of Bavaria, to preside at the first meeting of the association.

Mr. Grassmann, after stating that the Minister of Transportation expected to be present at the first meeting of the association, but found he was unable to do so, welcomed the delegates in the name of the Bavarian government. He remarked that Bavaria was greatly in sympathy with the work of the association for, for many years, the minister of transportation had been conducting special studies upon the subject of the electrical equipment of all of the Bavarian railways, in connection with the utilization of the hydraulic power in Bavaria.

Mr. von Brunner then welcomed the association in behalf of the city of Munich and made an eloquent speech in which he referred to the close relation between the development of a city and its tramways system and the importance of the latter in ameliorating the social and economic condition of the population. Mr. Kabierske, counsellor of the Minister of Public Works, of Berlin, then, in the name of the chief European governments represented at the congress, expressed cordial sympathy with all of the work of the association.

THE ECONOMIC IMPORTANCE OF LARGE POWER STATIONS

The first report as scheduled on the program was then presented. It was prepared by Mr. Petri, general manager of the Schuckert Company and of the Continental Company of Electrical Enterprises, at Nuremberg, in regard to "The Economic Importance of Large Power Stations on the Development of Interurban Railways." Mr. Petri considered first the great development which has taken place, especially during the last 20 years, in city and interurban railways. He remarked that in Germany, for instance, there were only four cities of over 35,000 inhabitants which did not possess electric tramway systems. He then showed by means of special figures for 1906 from Germany, Belgium and France, the development which was taking place in suburban and interurban railways. In this group, there are at present in Germany 8232 km (5104 miles of track), in Belgium 2930.9 km (1817 miles of track), and in France 6114 km (3791 miles of track). This corresponds to lengths of track per 1000 hectares to 1.52 km (0.24 miles of track per square mile) for Germany; 9.95 km (1.6 miles of track per square mile) for Belgium, and 1.14 km (0.18 miles of track per square mile) for France. Per 10,000 inhabitants the figures would be 1.36 km (0.84 miles of track) for Germany, 4.10 km (2.54 miles of track) for Belgium, and 1.56 km (0.97 miles of track) for France.

He mentioned in passing that the tremendous development of suburban and agricultural lines in Belgium had resulted in that country in the enactment of the laws designed especially to encourage that type of road. Thus, in 1906 in Belgium the dividends available for distribution from these suburban lines averaged 3.16 per cent, while in France they had averaged only 1.5 and in Germany 2.48 per cent. Based on the financial results of 88 tramways and suburban railways, Mr. Petri gave some figures on the average ratios between the expenses for power and the total operating expenses and return on the investment. He showed (1) that with companies generating their own power, the expenses for power* represented a maximum of 31.8 per cent, a minimum of 11.9 per cent and an average of 19.6 per cent of the total expenses of operation; (2) that the expense of power per car kilometer was a maximum of 7.6 pf. (3.2 cents per car mile), a minimum of 2.1 pf. (0.8 cent per car mile), and an average of 4.2 pf. (1.75 cents per car mile); (3) that the cost of power per kw-hour was a maximum of 12.0 pf. (3 cents), a minimum of 4.0 pf. (1 cent), and an average of 6.8 pf. (1.7 cents).

For the companies which purchased their power the following figures were obtained: (1) The cost of power in percentage of the total expenses of operation was a maximum of 40.8 per cent, a minimum of 19.1 per cent, and an average of 27.5 per cent. (2) The cost of power per car kilometer was a maximum of 18.8 pf. (7.8 cents per car-mile), a minimum of 4.2 pf. (1.75 cents per car-mile), and an average of 7.2 pf. (3 cents per car-mile). (3) The cost of power per kw-hour was a maximum of 17.0 pf. (4.25 cents), a minimum of 6.4 pf. (1.6 cents), and an average of 11.7 pf. (2.92 cents). These latter figures naturally include return on the capital invested and allow for sinking fund and general expenses. These three latter charges might be considered as amounting to 2 pf. per kw-hour, which would naturally reduce the difference between the price of production given in the two tables. It can then be said that for the companies generating their own power the average cost per kw-hour is 8.8 pf. (2.2 cents) and for companies purchasing power the average is 11.7 pf. (2.92 cents), the general average being 10.2 pf. (2.55 cents) per kw-hour.

In discussing the total expenses of power in relation to the capital invested, based on the data from the 88 roads

*In the classification of accounts of the International Association the account for power corresponds to that of Operation of Power Plant in the American classification.

selected, the relation was found to vary between 8.4 per cent and 0.6 per cent, the average being 3.34 per cent; that is, the cost of power is a very important factor in profitable operation and even a small reduction in this item would be of great economic value.

Mr. Petri then showed the very satisfactory results which have been obtained by the construction of large power stations. He mentioned the notable example of the Rheinische Westfalische Elektricititäts Werke, Essen, which was established in 1898, with a capital of 2,500,000 marks ($625,000), and is capitalized to-day at 60,000,000 marks ($15,000,000). Each of the two power stations of this company has an annual output of 50,000,000 to 100,000,000 kw-hours. The cost of installation of these power stations has been less than 300 marks ($75) per kilowatt installed. In 1906, the cost of operation per effective kw-hour was 4.58 pf. (1.145 cents). The speaker also referred to another central station in the industrial district of Upper Silesia, which supplies energy at a uniform rate of 2.73 pf. (0.6825 cents) per kw-hour. If the electric railway companies could secure power for 6 pf. (1.5 cents) per kw-hour, the relation between the cost of power and the original investment would be very much better. Thus among the 88 companies selected the establishment of a rate of 6 pf. (1.5 cents) per kw-hour would increase the return from the investment in the most favorable case 4 per cent, in the least favorable case, 0.2 per cent, and on an average road 1.37 per cent.

Mr. Petri then passed to large hydraulic power stations and mentioned that the recent important studies made by Prof. Intze in regard to the construction of impounding dams are certain to have a great influence on the future of hydro-electric development. Thus the dam of the Urft River, in the Eifel district, permits to-day a supply of electric energy at between 3.7 and 4.1 pf. (0.925 and 1.025 cents) per kw-hour. He also referred to the large hydraulic power station at Kykkelsrud, in Norway, which has a capacity of 56,000 hp, and one at Molinar, in Spain, which has a capacity of 30,000 hp. An elaborate report of Mr. Kohn shows that the hydraulic power utilized in Switzerland in 1905 aggregated 380,000 hp; in Italy, 464,000 hp; in France, 660,000 hp, and in Germany, 295,000 hp. According to the speaker, the available water powers on the earth which can be commercially utilized have an aggregate power capacity of 5,000,000,000 hp, that is to say, five times the amount required at present by humanity.

Mr. Petri recalled the fact that the Bavarian government had commenced a study of the utilization of the waste water powers in Bavaria. These powers, whose title is reserved to the government, have an energy of more than 300,000,000 hp available throughout the year. The installation of impounding dams permits a regulation of the discharge of these rivers and the presence of reservoirs permits the utilization of an intermittent flow which will often double and even treble the energy available.

Among the Bavarian State railways, on which electrical equipment will be especially advantageous, Mr. Petri mentioned the line between Salzburg and Bertesgaden, which will call for a consumption of 1,700,000 kw-hours, while the station will be able to furnish 12,000,000 kw-hours. The cost of energy at this power station will be 1.45 pf. (0.38 cents), although a charge of 4.9 pf. (1.25 cents) per kw-hour would make electric traction more economical than steam. Results equally favorable would be obtained by the electrification of the line between Munich and Partenkirchen and that between Munich and Rosenheim. Electrical energy in the first case could be produced for 2.6 pf. and in the second case for 2.38 pf. per kw-hour. At the Alz power station, the expense of operation would be only 0.41 pf., and calculations for the proposed Valkenzee station indicate that energy can be generated there for between 0.5 pf. and 1.0 pf. per kw-hour. If it was possible to secure instead a uniform price of 6 pf. per kw-hour for power, even a figure of 3 pf., the increased return on the invested capital in tramway undertakings would be 2.34 per cent. Mr. Petri concluded with expressing his regret that in view of the importance of cheap power to all industries certain of the German States had expressed an intention of placing an internal revenue tax on the production of electric power.

At the close of Mr. Petri's address, Mr. de Merozyng, the delegate from the Russian government, remarked that that country was also engaged in the study of the same question.

The president thanked Mr. Petri for his interesting discussion, and stated that the members of the congress had a special interest in the development of hydraulic power on account of its use in electric railway service.

INDEPENDENT MOTOR CARS, GASOLINE, STEAM, ELECTRIC

The second question in the day was in regard to motor cars for trunk line and suburban line service. The paper on this subject was very voluminous and interesting and was by E. A. Ziffer, president of the Bukowina Railway, of Vienna. In the first chapter he considered the employment of steam motor cars, gasoline motor cars and accumulator motor cars on European lines, and he referred especially to the interesting experiments which are being conducted by the government of Hungary. In the second chapter he gave the results which are being obtained in the United States with the employment of combination electric and gasoline motor cars. He then stated that in Germany, especially, the employment of accumulator motor cars is being considered again with favor and a number are in use, but that steam motor cars are still most generally employed. He also referred to the use of motor cars with superheated steam. He terminated by presenting a note from Mr. Heude, chief engineer of bridges and highways, French government, in which the latter referred to some tests which his department had been making on the use of motor cars in France.

There was no discussion of the report.

At the close of the first meeting, the delegates participated in a lunch, which was greatly enjoyed. They then visited the Munich exposition. In the evening they met at the old Hotel de Ville for a reception, which was followed by a banquet offered by the Municipality of Munich.

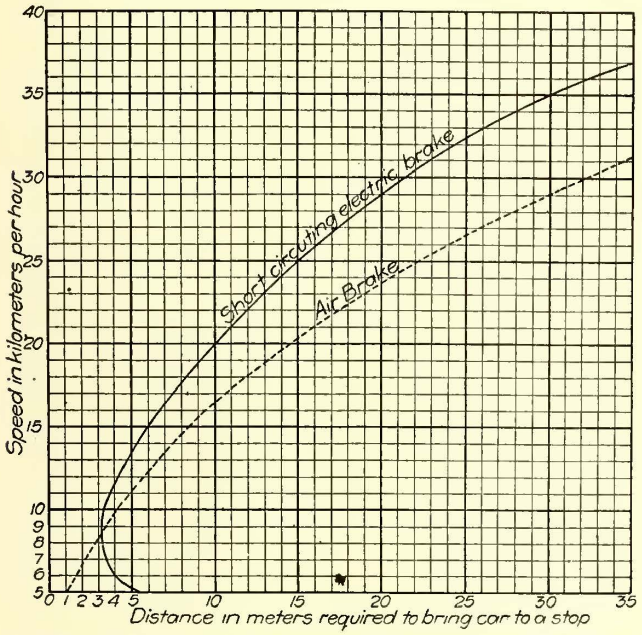
SECOND SESSION

The chairman of the session on Sept. 8 was Rechtsrath Kühles, one of the aldermen of the city of Munich and chairman of the municipal railway service in that city.

BRAKES

The first subject considered was that on brakes for electric railways. Three reports were presented on this subject, by Mr. Scholtes, general manager of the Municipal Tramways of Nuremberg; Mr. Petit, chief engineer of the Société Nationale des Chemins de fer Vicinaux of Belgium, and Mr. Schorling, chief engineer of the tramways of Hanover. A brief summary of the statistics in these reports was published on page 931 of the Electric Railway Journal for Oct. 10. Mr. Scholtes, after presenting his report, stated that the data sheet sent out by the committee indicated that most of the companies used hand brakes for regular service and that during the last few years

the hand brake had been improved so that it no longer involves the same muscular fatigue on the part of the motorman. Most of the companies also have an electric brake for emergencies, but the exclusive use of the electric brake seems to be very rare. A minority only of the companies are obliged by law or local conditions to use power brakes as service brakes. Mr. Scholtes then discussed the tests on braking which had been conducted by a large number of the companies. If those obtained by the electric brake and the air brake are compared, and if the results thus obtained are plotted, a curve will be obtained which shows the superiority of the electric brake over the air brake. For low speeds only the air brake gives better results than the electric. This is because the motors require some time before their fields are excited. The data sheet sent out by the association to the members of the association included a



Averages of Tests of Braking Obtained by Different Railways

list of questions bearing upon the general subject of car service. These were introduced with the object of learning if braking by air or electricity occasioned any inconvenience or disadvantages from the viewpoint of wear and maintenance of the various parts of the cars. On this point there is apparently little or no difference. As regards maintenance, Mr. Scholtes was of the opinion that in general the hand brake is the most expensive, the air brake comes next and the electric brake is the cheapest.

Mr. Scholtes then passed to a criticism of the reports presented by Messrs. Petit and Schorling. The former had said that the electric brake and the air brake were equivalent from the standpoint of the effect produced. This is true for low speeds, but does not hold for high speeds. If, in certain cases, a longer braking distance had been required for stopping with the electric brake, it was due simply to the bad construction of the motors or to their delay in excitation. Mr. Scholtes also disagreed with Mr. Petit's conclusion that electric braking dangerously overloaded the motor. Mr. Schorling in his report estimated that where electric brakes were used the capacity of the motors should be increased 48 per cent. Mr. Scholtes admitted that the capacity of the motors should be larger than if electric brakes were not used, but thought that the increase should be much less than that quoted. If Mr. Schorling's claim that the electric brake would cost 1,100 marks ($275) per car was true, it would not have been adopted so generally as at present. Mr. Scholtes also thought that the cost of maintenance of the electric brake was not more than one-fifth of the figure quoted by Mr. Schorling. At the termination of his report, he suggested the following resolutions be adopted:

1. That in selecting a car brake all of the conditions of operation should be taken into consideration and the application of any one of the systems—hand, electric or air—may be justified. A car should be braked steadily, not intermittently. The equipment of the car should include two complete systems independent of each other. The service brake should not require excessive muscular energy from the motorman.

2. When, on account of the weight of the cars, the grades or the number of trail cars used, the hand brake is not reasonably adequate as a service brake, a mechanical brake should be used, preferably an electric brake.

3. Where an electric brake cannot be employed because the capacity of the motors is too small or for some other reasons the air brake is admissible.

4. Air brakes are indispensable when cars are especially heavy, when they run at high speed or when trains are run consisting of more than two trail cars.

Mr. Schorling then presented his report on the same subject. He remarked that more than 500 tests had been made to determine the best system of braking. These tests had been conducted with single motor cars and with trains of one, two or three trail cars. Great care had been taken to determine the consumption of energy with different types of air brakes. The results were as follows:

(1) On city lines, the consumption of energy for eccentric compressors was 41.5 watt-hours per car kilometer (66.4 watt-hours per car mile); with geared compressors, 31.2 watt-hours per car kilometer (49.9 watt-hours per car mile), and with motor compressors, 16.16 watt-hours per car kilometer (25.86 watt-hours per car mile).

(2) On suburban lines, the consumption for eccentric compressors was 22.8 watt-hours per car kilometer (36.5 watt-hours per car mile); with geared compressors, 14.6 watt-hours per car kilometer (23.4 watt-hours per car mile) and with motor compressors, 6.32 watt-hours per car kilometer (10.11 watt-hours per car mile).

In conclusion he claimed that air brakes are preferable to electric brakes and to any other system of braking. The great advantages of air brakes are they are more reliable, they are ready at any moment, they can be gradually applied, they do not tire the motorman, they are completely independent of the rest of the equipment, and they permit the addition of any number of trail cars. A train can be braked just as rapidly whether it consists of one or more cars. He then moved that the association adopt the conclusions given at the end of his report, which endorsed the air brake.

A third report on braking was presented by Mr. Petit, chief engineer of the Société Nationale de Chemins de fer Vicinaux, of Belgium. Mr. Petit, having been prevented from attending the session, his conclusions were read by Mr. t'Serstevens, secretary of the association. They were, briefly, that the car should be equipped with a service brake and an emergency brake, that the proper service brake for a car was the hand brake, unless the cars were especially heavy or operated on high speeds, and that then either an air brake or an electric brake could be used.

At the conclusion of these three reports the subject was open for discussion by the convention. Mr. Stahl, manager of the Dusseldorf tramways, criticized certain points of the report of Mr. Schorling. Mr. Schorling had claimed that the large currents required with the electric brake caused

trouble with the contact fingers in the controllers. Mr. Stahl believed that this trouble was not common. He could not, also, agree with the statement that electric brakes flattened more wheels than air brakes and considered the consumption of power a serious drawback to the air brakes.

Mr. Köhler, of Berlin, said that the subject of brakes had been discussed at every meeting of the association since 1898 and that each time very elaborate reports had been presented on the subject. He did not believe that it would be advisable to continue the subject on the program of the next meeting because each system had its advocates, none of whom seemed able to win over the others to their opinions. He proposed that the association should approve the first clause of the conclusions proposed by Mr. Scholtes, but should amend the second clause by substituting for the words "a mechanical brake should be used, preferably an electric brake," the words "a mechanical brake should be employed, either an electric brake or an air brake, according to the local conditions as, in general, both the braking systems give good results which can be considered equivalent." These resolutions could be modified at a subsequent convention if further experience should indicate a decided advantage in favor of any system.

Mr. Janssen, of Brussels, agreed with Mr. Köhler that the topic need not be taken up at the next meeting. He thought, however, that it would be best not to adopt any of the conclusions, each company being free to follow the advice given in any one of the reports.

Mr. Köhler urged the adoption of his amendment. Mr. Nolden, of the Wiesbaden Tramways, and Mr. Stahl, of the Dusseldorf Tramways Company, approved Mr. Köhler's amendment.

Mr. Kuntze, of the Geneva tramways, thought that in the conclusions proposed by the members of the committee, as in those proposed by Mr. Köhler, too little importance was attached to the hand brake. He stated that his system contained many steep grades, some of which are as high as 8 per cent with curves of 12 m (39 ft.) radius, and some of the cars were very heavy, yet up to the present time the hand brake had been sufficient. In his opinion, the proper maintenance of the brake was more necessary than the adoption of any particular type. He demanded that no conclusions should be adopted.

Mr. Pattai, of Vienna, thought it equally inadvisable to adopt any of the conclusions, because he feared that any such positive action might prevent the development or improvement of other systems of braking. Among others who took part in the discussion were Messrs. Mariage, of Paris; Sobersky, of Nuremberg; Spängler, of Vienna, and Micke, of Berlin.

The chairman finally put the question to vote, and the resolutions of Mr. Köhler were adopted, as follows:

1. In selecting a car brake, all the conditions of operation should be taken into consideration and the application of any one of the systems—hand, electric or air brakes—may be justified.

2. A car should be braked steadily, not intermittently. The equipment of the car should include two complete systems, independent of each other. The service brake should not require excessive muscular energy on the part of the motorman.

3. When, on account of the weight of the cars, the grades, or the use of a number of trail cars, the hand brake is not reasonably adequate as a service brake, it is proper, according to the conditions, to use either an electric brake or an air brake, either of which can be considered as efficient and equivalent to the other.

RADIAL TRUCK CARS

The president then asked Mr. Spängler, of Vienna, to present his report on the advantages and disadvantages of radial truck cars.

Mr. Spängler stated that he had considered the subject only from the standpoint of operation and not from the standpoint of car design. The question of the reciprocal effects between rail and wheel in tangents and in curves possessed great theoretical interest, although but little attention had been given to it. The author had recently been authorized by the Vienna government to conduct experiments on a trial line, to determine the relative advantages of the various types of cars in general use. These experiments are now in progress. The proper field of each type of car is determined by the traffic. For example, long four-motor cars should be employed where the traffic is great and where there is a uniform fare, so that the conductor can collect the fares easily. Double truck cars with two motors and cars on maximum traction trucks are not suitable for lines with steep grades or where trail cars are used. Double truck cars are more expensive to maintain than single truck cars. Their motors are less accessible and the weight of the car per passenger and the cost is greater. Moreover, the energy consumption is greater in proportion to the carrying capacity. Single truck cars usually have a wheel base of 1.70 m to 1.80 m (5 ft. 6 in. to 5 ft. 10 in.). This is the maximum wheel base which can be used on curves of radius of 15 m to 18 m (50 ft. to 60 ft.). The capacity of these cars is usually 24 passengers, although occasionally 36 passengers can be carried with long platforms. Long platforms, however, are not advisable, as they give the car a tendency to gallop at high speed. For smaller systems, as well as for those where various rates of fare are employed, such cars can be cared for more easily by one conductor than the longer cars, and they are well suited for trailer service.

There is a decided tendency at present in Europe toward the use of radial axle cars. For example, the systems at both Budapest and Vienna have put in use more than 1000 cars of this type. The radial principle has also been used in a large number of trail cars, for which it seems to be particularly adapted. Cars with radial running gear, that is, those in which the boxes are mounted on leaf springs attached to side sills, have been built in lengths of 10 m (33 ft.) and with a capacity of from 40 to 50 persons. The weight, including that of the electrical equipment, varies between 9.5 and 11.6 metric tons. The wheel base is generally 3.6 m (11 ft. 10 in.). With standard gage track, these cars pass easily through the curves of 18 m (60 ft.) radius, although the speaker remarked the axles do not always take a perfectly radial position. This, however, is rarely necessary for even a slight departure from a parallel position makes the passage of the car through the curves very much more easy than if the car had a rigid wheel base. Within recent years railway companies have been using for the outside rails on curves a shallow groove so that the outside wheels travel on their flanges. This plan has been followed in Vienna for all curves with a radius of less than 30 m. (100 ft. radius) and has greatly reduced the power required by the cars, even with cars having a rigid wheel base. Mr. Spängler said that in Vienna there are more than 100 cars with wheel bases of 3.6 m which traverse easily curves 18 m radius. It was sufficient, he said, to allow the axles a certain vertical play and to employ rails with a sufficiently wide groove. The normal width of the groove in Vienna is 35 mm (1⅜ in.), and the play between the flange and the rail is 16 to 18 mm (0.65 to 0.7 in.).

Mr. Spängler then discussed the various types of radial trucks now in use compared with the cars with radial axles in which the axles are spring supported on the car body without a truck frame. According to his opinion, the truck construction is very complicated when the radial principle is used, compared with those having a rigid wheel base; they are heavier and have a higher initial and maintenance cost. The increase in weight of the most simple truck of this type is about 10 per cent. Mr. Spängler concluded by remarking that it is possible to operate around curves cars whose wheel bases are not greater than one-fifth that of the curve radius, and that it is very desirable to use for the outside rail a groove which is shallow and wide.

There was no discussion of the report.

REPORT ON THE MAINTENANCE OF ELECTRICAL EQUIPMENT

The president then called for the report of the committee on the Maintenance of Equipment, of which Mr. Stahl was the chairman. This report was published in abstract on page 710 of the ELECTRIC RAILWAY JOURNAL for Sept. 26.

In his oral discussion of the report, the speaker pointed out that his figures indicated for the first time the relation between the cost of maintenance and the gage. The former increases rapidly with a reduction in gage. In his opinion, one of the most important things to which attention should be given is the reduction in power required in car operation. The results from ball bearings and roller bearings, especially the former, have been far from satisfactory. Further tests with roller bearings are desirable. Mr. Stahl also believed important economies were possible if the gears were made larger, so as to reduce the specific pressure and wear. The noise from the gears also varies inversely with the diameter and number of teeth. He considered it unfortunate that it has been impossible to secure some kind of elastic gearing. He also said that axles in service seem to undergo a molecular change, which makes them brittle. Hence it is necessary to make the axles larger than the size which theory, based simply to the strength of the new material, would dictate.

There was no discussion.

LUBRICATION

The president then called upon Mr. Julius, of Haarlem, for the report of the Committee on Lubrication. This report was published on page 676 of the ELECTRIC RAILWAY JOURNAL for Sept. 19. Mr. Julius, in presenting the report, pointed out that while with all journals the tendency was to use oil instead of grease, there was no settled practice in regard to gear lubrication. Grease seems to be more efficacious than oil in reducing the noise of the gearing, but not the wear. He closed his remarks by saying that the addition of a small amount of sawdust or graphite and the use of "Ironsides" had been recommended by a number of companies.

Mr. Sobersky, of Nuremberg, said he had heard a great deal about the latter material and had tried it. The results were not very satisfactory, but perhaps the material had been used improperly. If the oil from the motors got into the gearcase it formed a sort of soapy mixture with the patented lubricant. If it was possible to make the gearcase absolutely oil tight, "Ironsides" could be recommended.

Mr. Poetz, of Hamburg, said that his company had employed the material for many years, and had obtained very satisfactory results. The wear of the gears had been reduced in an extraordinary way. In fact, during the preceding fiscal year they had not had to replace a single gear or pinion. It was true that its use required a certain amount of experience, but after that had been acquired the results were excellent.

Mr. Haehner, of Strassburg, said he had also used the material. During the first months the results had been good so far as the wear on the pinions was concerned. But after the first six months the grease became packed between the teeth. A disagreeable noise resulted, and it was very difficult to get the material off, because it was packed down so hard. He suggested that the lubricant could be improved by its dilution with a certain amount of ordinary grease.

Mr. Julius, of Haarlem, had tried the material, and said that it had lengthened the life of the gears on his road four years.

Mr. Sobersky, of Nuremberg, said that he had recently tried a new kind of grease called "Keysson-Henke." This mixture occupied a position midway between ordinary grease and oil, and gave all the advantages of "Ironsides," and also those which were possessed by grease and oil.

Mr. Spängler, of Vienna, said that he had also tried "Ironsides," but with unsatisfactory results. He believed lubrication by oil was more desirable and took less power. "Ironsides" had the appearance of a very solid material, almost like gutta percha, and it was natural to expect that more power would be required when it was used, for the teeth would have to clean themselves.

Mr. Poetz, of Hamburg, replied that on his system there had been no increase in the current consumption on account of the use of "Ironsides," and that his experience was entirely opposed to that quoted by Mr. Spängler.

The president of the association thanked the various members for their reports, and suggested that it would be well to appoint a committee for the ensuing year to take up the question of the maintenance of car equipment.

In the afternoon of the same day the delegates visited several manufacturing establishments in Munich, as well as a number of car houses and power stations of the municipal tramways. In the evening they attended the Art Theater at the exposition, and witnessed a very interesting presentation of Shakespeare's "As You Like It."

THIRD SESSION

The chairman of the third session was the Counsellor of the city of Munich, Mr. Stiesdorfer.

The first question of the day was that of steam locomotives for suburban railways. There were two reports on this subject—one by Mr. Heimpel, chief engineer of the Bavarian local railway system, and the other by Mr. von Littrow, chief engineer of the Austrian railway system.

Mr. Heimpel said that the development of electric traction during the last 10 years had greatly stimulated the manufacturers of steam locomotives to make improvements. These had consisted especially of the reinforcement of the locomotive frame, the redesign of the boilers to secure a more economical use of fuel, changes in method of drive to obtain suppleness on curves, compounding and superheating.

Mr. von Littrow also referred to the extent to which the development of electric traction had modified the steam operation. He called special attention to the possibilities of small, light locomotives which could be operated by one man. He said that several locomotives of this type were on exhibition at the exposition. There was no discussion.

TRACK CONSTRUCTION

The president then called for the report of Mr. C. de Burlet, general manager of the Société Nationale des Che-

mins de fer Vicinaux, of Belgium, on Track Construction for Interurban Lines.

Mr. de Burlet said that pine and oak ties still continue to be most generally used. Wood preservation is generally employed. It increases the life of the oak ties 50 per cent and that of the pine ties 100 per cent. Mineral oil or chloride of zinc is the usual preservative. Metal ties cost more than wood, and their life has not yet been determined. They are not to be recommended except under special conditions. Mr. de Burlet's discussion of concrete ties was published on page 700 of the Electric Railway Journal for Sept. 26.

INTERURBAN RAILWAY PRACTICE

It was expected that Mr. Reichel, professor of electrical engineering at the Berlin Polytechnic Institute, would address the association on the advantages of electric traction for interurban lines. He was not able to be present, and a communication on that subject was read by Mr. Eichel, formerly of the General Electric Company, and now consulting engineer in Berlin.

Mr. Eichel's paper described several American installations, and was accompanied by many photographs of typical roads. Mr. Eichel concluded by expressing the hope that his paper would stimulate the interest of European managers in the experiments which are being made by their colleagues across the water.

This communication from Mr. Eichel was vigorously applauded by all the members of the association, and in view of the great value to European roads of the information contained, the executive committee decided to have the paper printed promptly and distributed among the members.

MOTOR BUSES

The last subject of the day was the question of auto or motor buses, on which two reports were presented, one by Mr. Mauclère, chief engineer of the General Omnibus Company, of Paris, the other by Mr. Otto, chief engineer of the Berlin Tramways. A brief abstract of the first report was published on page 694 of the Electric Railway Journal for Sept. 26. Mr. Otto, of Berlin, discussed the experience in Berlin. According to him the operating expenses were as follows:

	Pf. per car-km	Cents per car-mile
General expenses	3	1.2
Car labor	11	4.4
Administration	1	0.4
Fuel (benzol) (0.4 kg at 20 pf. per kg)	8	3.2
Lubrication and lighting	3	1.2
Tires	10	4.0
Maintenance and supplies	13	5.2
Insurance	2	0.8
Total	51	20.4

This is the minimum cost if the cars are inspected regularly and carefully. If benzine is employed in place of benzol, or if the price of rubber for tires should increase, the expenses of operation would immediately rise to from 60 to 65 pf. per car-km (24 to 26 cents per car-mile). German tramway statistics showed that the operating expenses of tramway companies in different cities vary between 24 and 40 pf. per car-km (9.6 cents to 16 cents per car-mile), including interest on the investment and amortisation. The introduction of motor-bus lines need not be entirely dependent upon the financial results because they will often be subsidized by real estate owners. Mr. Otto then presented a typical operating report of a motor-bus line, operating a regular service of 45 buses. This would require a total of 60 buses. The initial investment for such an enterprise would be as follows:

60 cars at 19,000 marks (without tires)	Mk. 1,140,000	or $285,000
Rubber tires and renewal fund	120,000	or 30,000
Car house and shops (6,000 marks per car)	360,000	or 90,000
	Mk. 1,620,000	or $405,000

So long as the maintenance is kept up, the life of the motor-bus should be about 300,000 km (185,000 miles). Since each car would cost Mk. 19,000 ($4,750) and its value when worn out is about Mk. 1,000 ($250), the depreciation is about 6 pf. per car-km (2.5 cents per car-mile). In regular service a motor-bus will run about 45,000 km during 300 days. The total annual performance of the system of 45 cars is then about 45 × 45,000 km, or about 2,000,000 car-km (1,240,000 car-miles) per year. The charges, in addition to the operating expenses, are about as follows:

	Pf. per car-km.	Cents per mile
Interest on investment at 4 per cent	3.24	1.296
Depreciation on cars	6.	2.400
Depreciation and maintenance of buildings (2 per cent on 200,000 marks or $50,000)	0.20	0.080
Depreciation on tanks and repair shop (12 per cent on 80,000 marks or $20,000)	0.48	0.192
Total	9.92	3.968
Operating expenses	51	20.4
General expenses	10	4.
	61	24.4

These figures represent the minimum for the system taken as an example. They can be obtained only if advantage is taken of all possible advantages. Mr. Otto concluded by saying that motor-buses cannot be operated profitably except in special cases where there is no competition and where a high fare is charged.

Mr. Mariage, of Paris, said that in his city the total expenses of operation, including interest on the capital invested, amounted on the electric tramways to 2 centimes per seat-kilometer (0.64 cents per seat-mile), and on the motor-buses to exactly twice that amount. It followed that the fare on the motor-bus should be double that on the electric tramways. Mr. Mariage was of the opinion that the motor-bus was commercially profitable only under the following conditions: (1) To conduct light traffic between two points at least 10 km (6.2 miles) apart, not yet connected by any other means of transport, such as an excursion service to the environs of the large cities and to picturesque points; and (2) as a means of judging the possible traffic on certain routes before making the investment necessary to construct a tramway.

Mr. Kühles, chairman of the Munich tramway committee, said that that city had been compelled by circumstances to install a motor-bus service on certain streets in Munich and had purchased three motor-buses. The streets in question were paved with asphalt. The price of the operation per car-kilometer, however, had been considerably higher than that of 65 pf., quoted by Mr. Otto. In fact, they were 75 pf. (30 cents per car-mile), while the cost of the operation of tramways was only 27 pf. (10.8 cents per car-mile). He said that the experiment in Munich had proved disastrous and the motor-bus service would have to be abandoned.

The delegates then adjourned to an elaborate lunch which was tendered by the Bavarian Suburban Railway Company, after which the party took a special train to Starn-

berg where the delegates enjoyed a trip by steamer over the beautiful lake of that name. The weather was very propitious and the visitors greatly enjoyed the sight of the picturesque scenes of the villas, as well as the view of the Bavarian Alps, which were silhouetted on the horizon. In the evening, the delegates returned to the Salle des Fêtes of the exposition, where a reception offered by the local committee closed the events of the day.

FOURTH SESSION

The chairman of the fourth session was Mr. Janssen, general manager of the Brussels Tramways and president of the association. The first question was that of the production of electrical energy in power stations. The report on this subject was presented by Mr. Rizzo, chief engineer of the Société Generale de Chemins de fer Economiques of Brussels. As he was unable to be present at the meeting, Mr. t'Serstevens, secretary of the association, gave a résumé of this report. On motion of Mr. Thonet, of Liége, the subject was laid over until the following convention with the suggestion that the committee take up the question of the production of power with Diesel engines. Mr. Thonet stated that several tramways, whose affairs he directed in Russia, had obtained some very interesting results with this type of engine.

RAIL CORRUGATION

The president then called for the report of the committee on rail corrugation, which was presented by Mr. Busse, of Berlin. Mr. Busse, after having treated briefly the historical aspect of this question, stated that the subject had attracted a great deal of attention from the engineering profession since 1878, and referred to the tests conducted by Dr. Dudley in America and also the studies on the subject made by Messrs. Fell, of London, Péroud, of Paris, Carus-Wilson, of London, and Sibert, of Nuremberg. He added that the information obtained in reply to the data sheet (of which an abstract was published in the ELECTRIC RAILWAY JOURNAL of Oct. 31), was most voluminous, but the experience given was extremely varied. Sometimes corrugation was reported to have appeared on one rail and sometimes on two; sometimes on straight track and sometimes on curves; on down grades and on up grades; on lines of light traffic and on lines of heavy traffic; on lines with rigid substructure and on track laid with an elastic substructure. The conclusions reached by the committee after carefully considering the reports received upon this subject were as follows:

Certain conditions of construction or the method of operating the cars produce corrugation, providing they are coincident with other conditions of the rails, or of the tires, or of the track foundation. Corrugation is effected principally by:

(1) The quality of the rail.
(2) The use of hard tires.
(3) Too rapid braking at high speeds.
(4) Too rapid acceleration.
(5) Too high speeds.
(6) Nosing or side oscillation of the car, which can be produced by: (a) rigid construction of the two wheels of the same pair of axles; (b) unequal diameters of the two wheels on the same axle; (c) difference in elevation of the two rails; (d) unequal division of the weight; (e) variations in elasticity of the different springs of the same car; (f) play in the journal boxes; (g) irregularity in the gage of the wheels; (h) irregularities in the surfacing of the track; (i) effect of torsion due to the method of motor support; (j) axles out of square; (k) bad construction of the car; (l) lack of uniformity in the loads on the cars.
(7) Large radius curves.
(8) Character of track substructure.

On this latter point, Mr. Busse said that a rigid substructure has a tendency to produce corrugation as the rail cannot bend, consequently elastic foundation is desirable. Mr. Busse concluded his report by mentioning the conclusions which had been adopted by the various associations on this subject.

Mr. t'Serstevens then read a note in which Mr. Culin, of Hamburg, stated that the experience of the past year had confirmed him in the opinions expressed by him in the report presented at the Mannheim convention of the German Association on rail corrugation.

Mr. Zuelmann, counsel to the Minister of the Bavarian State Railways, said that that government had made a study of this question. He believed it was because of a lack of uniformity in the metal to the rail. He added that for some time special effort had been made to secure a rail for electric railway track in which the metal should be very uniform, and he believed this would overcome the trouble.

Mr. Petarson, of Dortmund, thought that the trouble was due to the method of manufacture.

Mr. Gérard, secretary-general to the Belgian Minister of Railways, also believed it due to the method of manufacture. Mr. Stahl, of Dusseldorf, expressed the same opinion.

Mr. Kuntze, of Geneva, said that he had never had trouble of the kind, and believed it due to the fact that his track was laid with an elastic foundation. He had noticed corresponding corrugation in the trolley wire at points where it was held rigidly.

Mr. Busse said that corrugation had occurred on track with flexible foundation. If the trouble had not been noticed at Geneva, it is probably because the streets being narrow and hilly, the cars ran at only moderate speed.

Mr. Paulus, of Nuremberg, said that on the suspended railway at Elberfield, where the rails were held in a very elastic manner, there was no corrugation, except on a short section where the rails were held rigidly.

Mr. Gerding, of Hanover, said that he had both rigid and elastic track, and that corrugation had occurred on both sections.

Upon vote, the subject was continued until the following convention.

WATTMETERS ON CARS

The third and last question was on the subject of wattmeters and other current recorders on cars. There were two reports on this subject, one by Mr. Otto, of the Berlin Tramways, the other by Mr. Battes, of the Frankfort Tramways.

Mr. Otto said that he was originally a partisan of the use of wattmeters, but now thought the current-time recorders, described on page 435 of the STREET RAILWAY JOURNAL for Sept. 22, 1906, were much more cheap and simple and were equally as accurate. All of the cars on the Berlin Tramways Company were equipped with this device. Its operation can be easily understood by the men, whereas it is difficult to read a wattmeter.

Mr. Battes, of Frankfort, said that great progress had been made in the current-time recorders since 1906, and that by their use 17 per cent had been saved in the energy consumption on his line. He recommended that all companies should adopt them.

Mr. Bouton, of Paris, agreed in general with the opinions of Mr. Otto and Mr. Battes, but believed both devices could be improved.

Mr. Haehner, of Strassburg, said that the use of the current-time recorder had resulted in a saving of 8 per cent over the old method. There are, however, disadvantages

because the motormen in attempting to reduce the time in which the current was being taken from the trolley wire would open their controllers wide and then coast as much as possible. Consequently the repair charges on motors had increased.

Mr. Schörling, of Hanover, was using the time-recorders and had offered prizes to the motorman who obtained the best results.

The subject was assigned for the next convention.

The business meeting of the association then followed. Mr. Broca, manager of the Tramway Company of Paris and of the Department of the Seine, whose term of office had expired, declined a renomination, and Mr. Pavie, general manager of the Compagnie Générale Française de Tramways, was elected a member of the executive committee. In addition, Mr. Bertini, general manager of the Edison Company, at Milan, and Mr. Neiszen, manager of the Municipal Tramways, of Amsterdam, were elected members of the executive committee. The association also elected Mr. Géron vice-president.

The association selected Brussels as the meeting place in 1910, partly because there is to be an international exposition in that city during that year, partly because the association was founded in Brussels in 1885. It will thus be able to celebrate its twenty-fifth anniversary in the place of its birth.

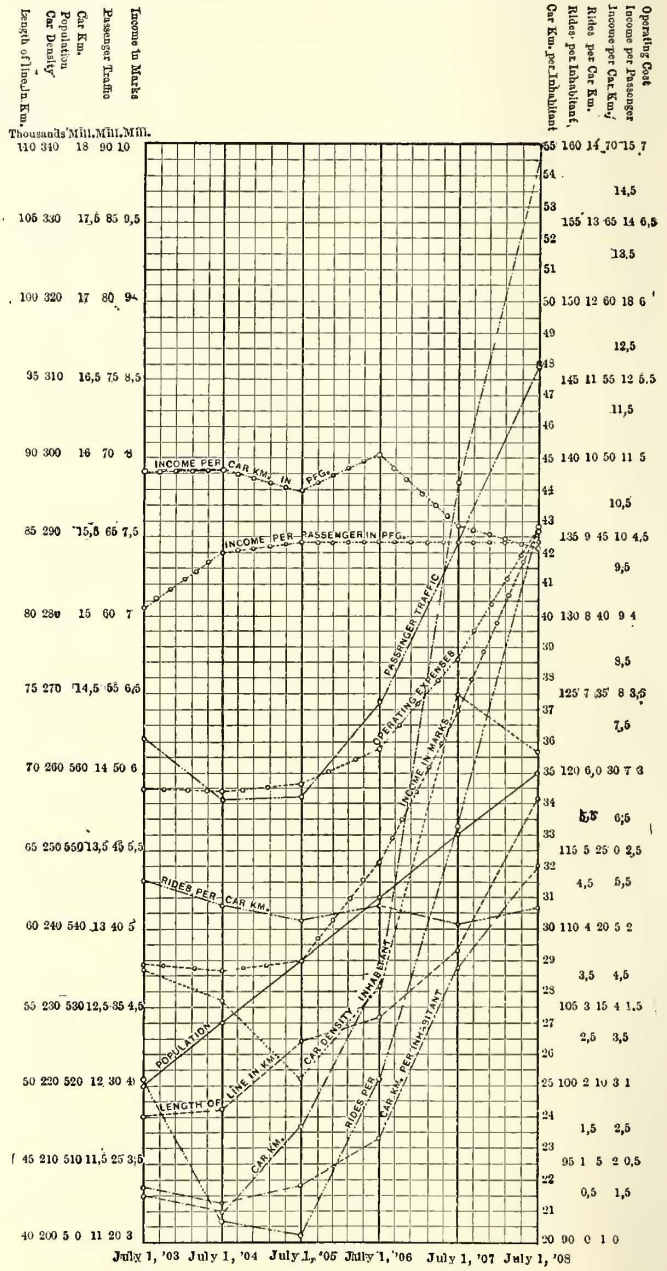
After adjournment, the members took a special train to Pullach, one of the most attractive of the many beautiful suburbs of Munich, where lunch was served. They then visited the hydro-electric power station of Isar and returned to Munich in the afternoon to a special banquet which was extended to the association by the municipality of Munich.

GROWTH OF THE MUNICH STREET RAILWAY SYSTEM BETWEEN JULY, 1903, AND JULY, 1908

J. Schmidt Eckert, engineer of traffic, Munich Municipal Railways, has published an interesting account of the traffic conditions in Munich from 1903 to 1908. When Wilhelm Mattersdorf wrote his monograph on "Influences Determining Street Railway Traffic in German Cities" (abstracted in the Street Railway Journal of June 2, 1906), he showed that Munich's density of traffic for the year 1902-1903 was so much less than that of other cities that it might be considered abnormal and therefore not subject to the general formulas derived by him. In the year 1906-1907 this unsatisfactory condition had been eliminated to such an extent that instead of having only 48,000,000 rides for a population of 500,000, as in 1903, there were 64,000,000 rides for a population which had increased only to 550,000. As the traffic density is still rising, it is believed that Munich will soon surpass the figure of 67,000,000 rides calculated by Mr. Mattersdorf for cities of 500,000 people.

It would require too much space to explain in detail what has been done to secure so favorable an increase in the density of traffic. There was no extraordinary increase in population nor any appreciable betterment of industrial conditions, but there were several other reasons. The first was the thorough rerouting of lines to create as many through routes as practicable and reduce the nuisance of transfer points to a minimum. When this work was accomplished measures were taken to increase the schedule speeds and concentrate the traffic by cutting down layovers at terminals and creating regular and emergency stopping points. Another important change was the substitution of trailers by motor cars in the ratio of one motor car for two all-day trailers, thereby securing a notable improvement in headway during the hours of light traffic. By rewinding all armatures, the maximum speed of the motor equipments was raised from 20 km (12.4 miles) an hour to 25 km (15.5 miles) an hour.

The principal changes during the five years, from July 1, 1903, to July 1, 1908, may be summarized as follows: Increase in trackage, from 48.1 km (30 miles) to 68.2 km (42.3 miles); car density, from 235 to 263 per 1000 car-km (625 miles) with a maximum of 270 in July, 1907; population, 1½ per cent annually; car-km increased from 11,300,000 to 17,900,000 because of schedule improvements and



Munich Street Railway Statistics

extensions; passenger traffic increased from 52,200,000 to 76,000,000, although a business depression in 1904-1905 caused a drop to 48,200,000; the income from passenger traffic naturally tended to increase in the same ratio as the number of riders, but there was a slight reduction in 1903-1904 because the unit fare for Sundays and holidays was increased to 3 cents, yet the passenger income rose from 4,750,000 marks ($1,187,500) to 7,550,000 marks ($1,887,500); car-km per inhabitant increased from 21.75 to 32; rides per inhabitant increased from 100.5 to 135; seat-use

per car-km decreased from 4.9 to 4.45, which is explained by the greater amount of mileage operated; income per passenger increased from 9.1 pf. to 9.9 pf. per km (3.67 cents to 4 cents per car-mile). The operating expenses increased from 2,900,000 marks ($725,000) to 4,500,000 marks ($1,125,000). This was not due entirely to the adoption of faster schedule, but also to higher labor and material costs, the greater number of extra men kept by the railway since municipal ownership and the practice of charging as operating expenses certain rolling stock replacement items usually considered as renewals.

TRANSFERS ABROAD

The discussion of the use of transfers in this country and the proposal to abolish them in many instances make the situation in regard to the extent to which transfers are given abroad of interest.

Very few transfers are issued by the street railways of Great Britain except by the payment of additional fare. Thus the committee of the National Civic Federation in 1907 states that of the eight street railway systems examined by it:

No transfers were given by any undertaking, except at Norwich, where a sort of zone system was in force. If one has to change cars to complete his journey, a transfer may be had upon application when the fare is paid, provided, of course, the required fare for the full distance is paid when the transfer is asked for.

Transfers have been used to a greater extent on the Continent of Europe, where the question of their issue has been thoroughly discussed by the International Street & Interurban Railway Association, especially at its 1902 and 1904 meetings. At the 1902 meeting the subject was brought before the association through a paper presented by E. Lavalard, manager, General Omnibus Company, of Paris. The discussion showed that a large proportion of the transfers issued by these European roads were charged for by payment of additional fare. In some cases these roads allow the first transfer free, but make a charge for any further transfers after the first. As practically all of these Continental roads use the zone system with identification checks or tickets, these tickets are used in making the transfer when within the same zone, consequently avoiding some of the possibilities of transfer abuse and extra cost of printing. One of the conclusions was that "transfers should only be allowed onto a line not parallel with the original line. The issue of transfers for several changes is productive of fraud."

At the 1904 meeting there was a report which canvassed the replies of 44 of the member companies giving transfers. The conclusions included the following:

The opinion of all the railways operating under similar conditions is practically unanimous on the following dicta:

The adoption of transfers has fulfilled expectations when the fare can be regulated in accordance to the value of additional service rendered; (a) when the additional cost does not exceed the gain in income, and (b) when transfer system can be regulated in accordance with the local conditions.

A. Railways issuing tickets as fare receipts for all trips have found the introduction of transfers advantageous when fares could be regulated in harmony with the service rendered. Railways in this class have incurred no appreciable additional expense on account of transfers. The application of this experience to the different groups of railways gives the following facts:

1. Railways using the zone rate system charge according to the service rendered, and are therefore not obliged to charge anything additional.

2. Large systems which now have long through routes and the uniform-fare system have had unfavorable results until they made an additional charge for transfers.

3. On extensive systems having numerous through lines and low uniform fares the earnings have decreased, even when an additional fare is charged. On such lines the necessity of transfer passengers paying additional fare, even though the total ride is short, is the only offset the railway can obtain for long through trips, etc.

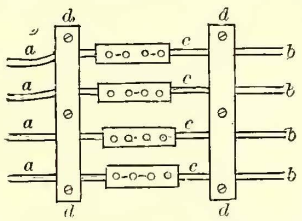
It would seem that Classes 2 and 3 of these conclusions apply to most American city systems.

In the discussion of this subject which ensued at the meeting, Mr. Koehler, general manager of the Berlin system, described his experience in America inspecting the systems of New York, St. Louis, Chicago, Boston, and other large centers. He expressed great astonishment upon finding that transfers were issued free upon the payment of a 5-cent fare, although it was explained to him that this had been forced upon the companies by the governmental authorities. He stated that it was curious to see how the conductors forced transfers upon the passengers even when they did not desire them, and in conclusion he said that in his opinion the free transfer system, certainly on large tramways, constitutes a direct loss which is not made up by the increase in traffic secured. None of the members of this association dissented from the conclusions expressed.

MOTOR LEAD CONNECTIONS

All electric railways have trouble with loose or grounded motor leads followed by fire. The following simple precautions will help to avoid such trouble: On double-truck cars bring the cable taps opposite the motor area subjected to the least sweep on curves and bring the motor terminals out through this area even if it is necessary to redrill the motor shell. Use only the best flexible wire in the leads. See that the motor lead wire fits the motor lead bushing and that the bushing fits the hole in the shell. As grease rots the bushing do not use it as a lubricant in pulling the lead through the bushing, but employ soapstone or clay.

Where special terminals are used, both the cable taps and motor leads must be sweated into them and the job tested by a strong pull. If ordinary sleeve connectors are used, they are sweated to the cable taps and the carefully prepared ends of the motor leads brought into the other ends of the connectors. To prepare the ends skin off ½ in. more insulation than is apparently necessary, so that there will be some wire to cut off, and leave the remainder full size clear to the end. Maintain the original "lay" of the wires, dip in hot solder, cool and trim with a file, then cut off to the proper length to insure that both connector screws shall have full bearing on the wire. In connecting, screw home the inner screw first and be sure that the inner screw alone can hold the wire against a strong pull; then tighten the outer connecting screw. To get rid absolutely of all working pull between the sleeve connector and any of the conductors engaging it, it has been found good practice to put a four-hole wooden cleat on both sides of the connector, as in the figure where *a, a, a, a* are the cable taps; *b, b, b, b,* the motor leads; *c, c, c, c,* the connectors, and *d-d, d-d,* the wooden spreaders or cleats. The connectors can be accessibly protected by short sleeves of flexiduct or garden hose which can be pushed aside when it may be necessary to get at the screws for disconnecting.

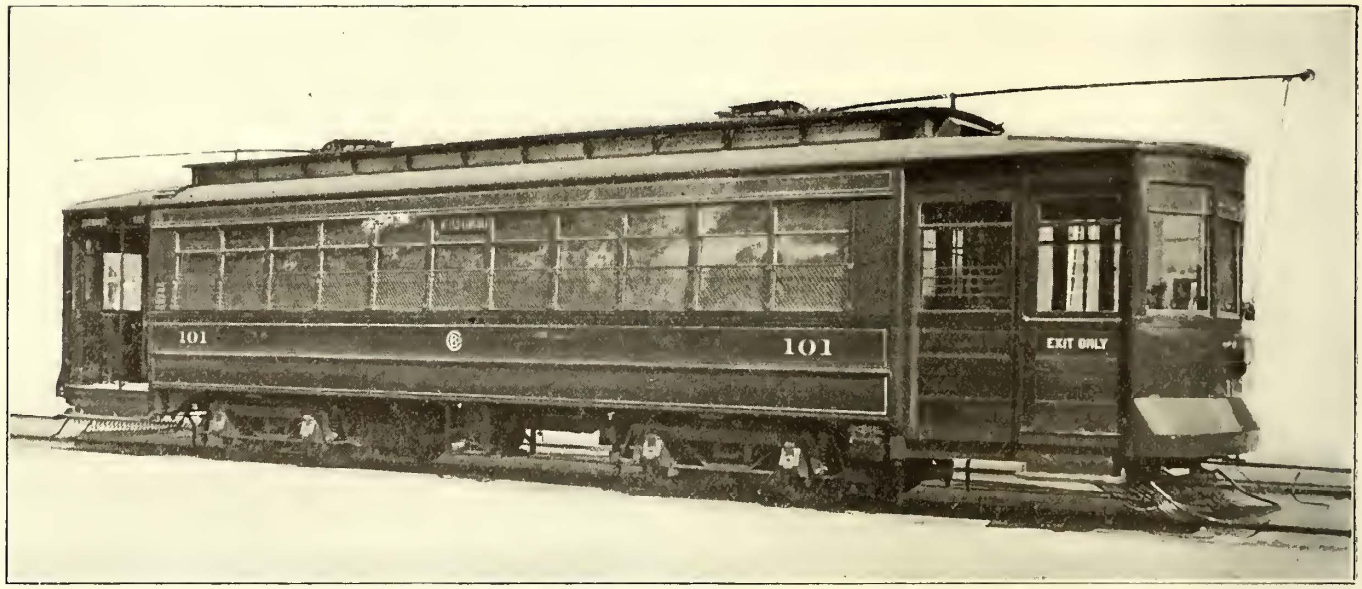


NEW CARS OF THE CHICAGO RAILWAYS COMPANY

The Chicago Railways Company will soon put into service the first of an order of 600 pay-as-you-enter type cars, which the manufacturing department of the Pullman Company is building. All of these cars will follow the general design illustrated by the accompanying engravings. An additional order of 50 cars of similar dimensions is being executed by the Pressed Steel Car Company. These 50 cars will be made of steel throughout, but are not yet ready for delivery. The entire number of cars now on order for the Chicago Railways Company will be built with long platforms, so that the pay-as-you-enter method of fare collection may be used.

Accompanying halftone engravings show the interior and exterior appearance of the composite cars now being delivered by the Pullman Company. The general dimensions of these cars follow:

Length of car over end panels	32 ft. 5	in.
Length of car over crown pieces	48 ft. 2	in.



Chicago Railways Company Car—Exterior View

Length of car over bumpers	49 ft. 2	in.
Width of car over drip rails	8 ft. 7	in.
Width of car over posts at belt rail	8 ft. 7½	in.
Width of car over guard rails	8 ft. 9	in.
Car to be drawn in at drip rails on each side	1	in.
Height, top of rail to top of trolley boards	11 ft. 8	in.
Center of posts	2 ft. 8	in.
Truck centers	20 ft. 1	in.
Diameter of wheels (cast iron)	33	in.
Diameter of wheels (steel)	34	in.
Seating capacity (persons)	40	
Weight of electrical equipment	13,800	lb.
Weight of trucks	15,200	lb.
Weight of body, with accessories	24,000	lb.
Total weight	53,000	lb.

FRAMING

It will be noted from the line engravings that the overhang from truck center to face of bumper is 14 ft. 6½ in. This overhang is the same on both ends of the cars, and required special care in the design of the framing so that there might be no sagging of the long platforms required for pay-as-you-enter service. The most interesting feature in the design of the framing of these cars is the use of deep steel girder side-plates as the main members of the bottom framing. Each of these steel side sills is 18 in. deep by ⅜ in. thick, reinforced at the top by a special angle iron 1⅜ in. x 4 in. x 7/16 in. in size, riveted to the top of the plate on the inside, and a ⅜-in. angle iron riveted to the bottom on the outside of the plate. When assembled with these angles the deep steel side sill has the form of a Z section extending the full length of the car body.

Inside of the steel plates and below the floor there is a 1½-in. x 5⅞-in. wooden sub-side sill which carries the floor boards and into which the cross-bearers are mortised. On the outside of the steel side sill supported on the lower angle are wooden side sills, into which the posts are mortised. The end sills are 10-in., 20-lb steel channels faced with yellow pine, into which facing the end posts are framed. The sides of the car at the end sills are tied together with ¾-in. iron rods extending through from plate to plate. The cross-bearers are of yellow pine, 3½ in. x 5⅞ in., supported by truss rods. Between the four cross-bearers are yellow pine floor joists, which provide support for the seat pedestals and for the attachment of the equipment under the car body.

The body framing, a cross section of which is presented, is of the concave and convex type. The outer side panels are of ½-in. stuff covered with No. 14 patent leveled and resquared mild sheet steel, held in place by countersunk oval-headed screws, passing through a steel overlapping molding. The steel panels above and below the guard rail are of the same width. All the side posts are securely bolted to the 18-in. side-sill plate.

The flooring comprises two layers, each 1 3/16 in. thick, the top layer being of hard maple with hollow back and the bottom layer of yellow pine. A filler of building felt is interposed between the layers.

The platform is supported by two main platform knees of 3-in. x 8-in. x 3-in. x ½-in Z section, reinforced at the end sills with angles riveted to the top and bottom. There are three center platform knees of pine. To test the strength of the platform supports, 46 men were crowded on to one platform and led to jump rhythmically. This severe load was held safely, with no undue straining or breakage of the platform connections.

The angle-iron bumper of ½-in. plate is formed with a radius of approximately 5 ft. 7 in. at the center and a radius of approximately 15 in. at the ends. The body bolsters are of cast steel, with the ends gibbed under the side

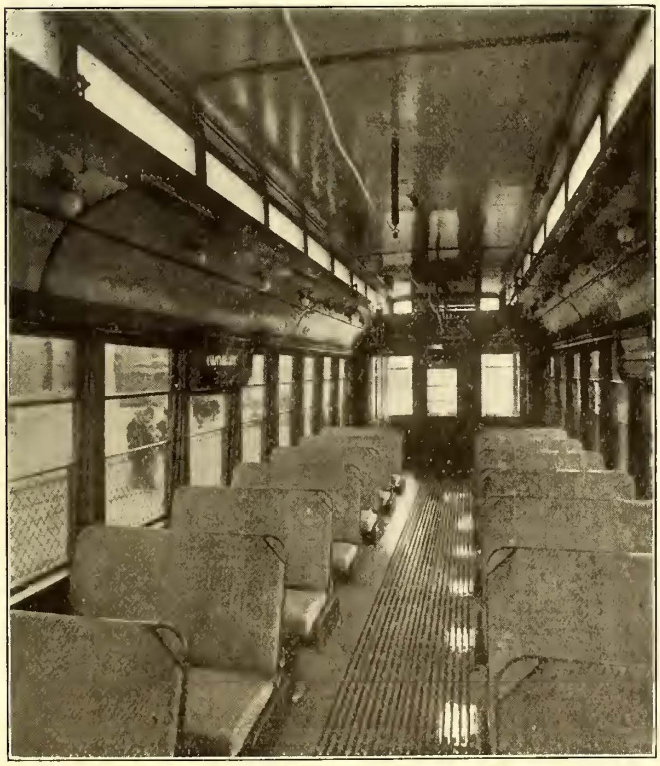
sills. The depth of the bolsters at the center, as shown in the illustration, is 10 in., and the side bearings are 4 ft. 8 in. between centers.

The framing for the monitor deck roof, which extends the length of the car body, is supported by continuous iron carlines, one at each pair of posts, except those next to the corner posts. Each carline is forged to the shape of the roof and has a foot turned up on each end, which is secured to the side plate and the side frame rods. These carlines are 1½ in. x 7/16 in. in section, and are bolted to the wooden carlines, which are spaced 11 in. center to center. The upper deck is covered with poplar boards ⅜ in. thick and the lower deck with three-ply ⅛-in. veneer. The roof is covered with National prepared roofing canvas.

As the cars are designed for double-end service, the vestibules and platforms are similar. Each end of the car has a clam-shell type vestibule of heavy construction. Each vestibule above the belt rail comprises three sash, single in two parts. The upper sash is stationary and the lower sash is arranged to drop to the level of the belt rail. The inside of the dash below the window rail is paneled with No. 14 steel in three sections, and the outside is paneled with No. 10 B. & S. gage sheet steel.

BODY ARRANGEMENT

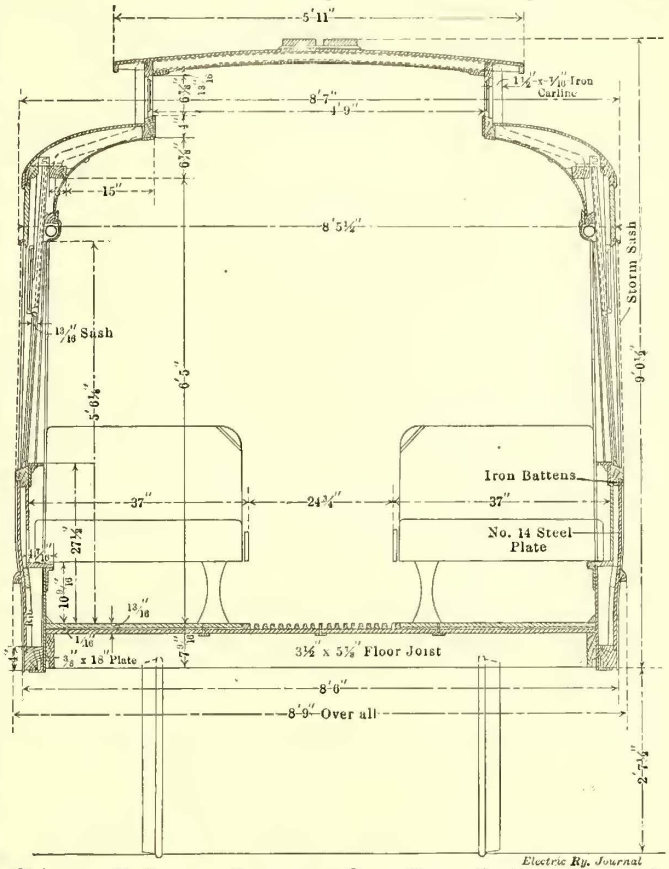
As earlier stated, the cars are designed for pay-as-you-enter service, and therefore the door arrangement peculiar to that service is used. Each end of the car body is fitted with two doors, 26¼ in. x 6 ft. 4 in., one of which slides in a pocket and the other swings. With the doors open the openings in the end of the car body are 23 in. wide in the clear. The swinging doors are arranged so that they may swing either into the car or out on to the platform. The sliding doors are hung on machined steel case-hardened



Chicago Railways Company Car—Interior View

ball sheaves with bronze hangers. The doors are made of 1⅛-in. solid cherry, glazed with double-strength glass set stationary in the frames with beading.

The vestibule doors also are solid cherry and are 1 in. thick. The folding door on the working side of the platform comprises four hinged sections supported at the front vestibule corner and hung from a specially designed carrier riding on metal guides. Fittings also are provided so that when this wide door opening is closed a ¾-in. pipe may be lowered into a horizontal position and wedge the door



Chicago Railways Company Car—Cross-Section Through Body

tightly into the opening. The sliding vestibule door is hung from ball-bearing sheaves, and is arranged to be opened by the passenger and closed and locked by the motorman. A portion of the platform enclosure into which this door slides is hinged to permit of washing the glass.

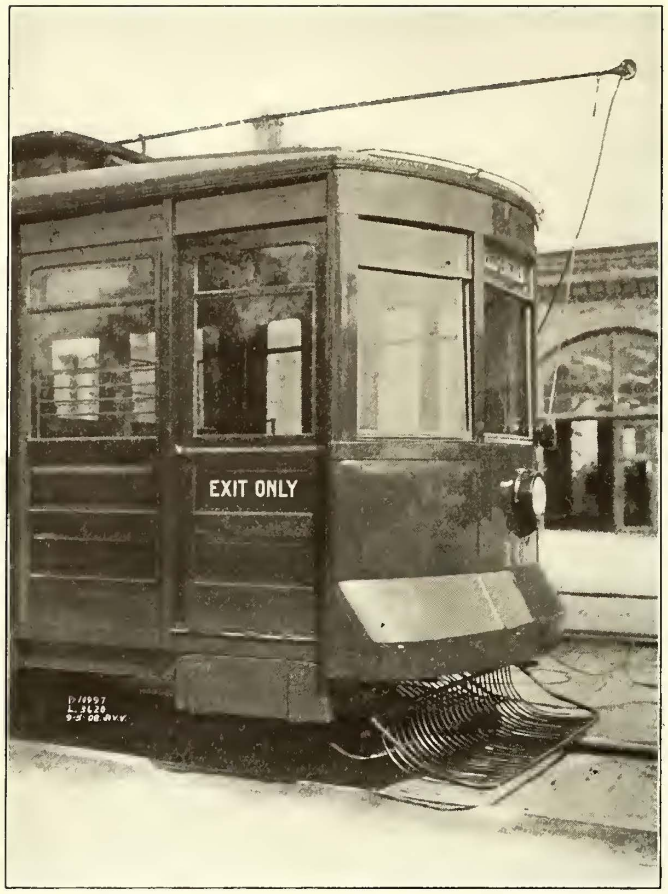
Folding steps are provided at all doors. The steps on opposite sides of the cars are so joined with a connecting rod and bell cranks that when one is let down for operation on one side of the car its mate on the opposite side of the car is folded up close against the platform.

There are 10 window openings on each side of the body of the car, each opening being fitted with an upper and lower sash, rectangular in shape. The two sash are arranged to raise independently. On account of the sill construction of the car, with the 18-in. side sill coming up above the level of the floor, all the sash raise into the roof. The deck sash, which also are rectangular in shape, are glazed with wire glass and are operated in runs of four by means of an improved anti-rattling device.

Storm sash and window guards are provided for all the body windows. The sash for all windows in the body of the car are made of metal. A ventilator is fitted to each end of the monitor deck. These ventilators comprise a hood surrounding a number of baffles similar to those in a hot air register. In the roof of each vestibule is a 4-in. Globe ventilator, which will serve to withdraw the smoke from the front platform.

A floor plan shows the seating arrangement of the car. It will be noted that the use of the deep steel-plate side sills affords the maximum seat length and aisle width

within the car as compared with the ordinary composite framing. The car body is 8 ft. 9 in. wide over all, and encloses 14 Walkover cross seats, each 37 in. wide, with an aisle 23¾ in. wide between seat end plates. There also are four 48-in. longitudinal seats at the corners of the car, set just far enough away from the bulkheads to permit of easy passage through the doors. The cross seats are spaced 3 ft. 8 in. between centers, and the longitudinal seats are 48 in. long, set 10 in. from the edge of the cross seats. The Walkover seats have flat pressed steel end plates and pedestals. The grabhandles on the seat backs are of malleable iron coated with heavy enamel, conforming in color to the interior finish. The seat edges, including the grabhandles, extend down along the seat back to meet the seat pedestal. The metal edging of the seat also is heavily enameled.

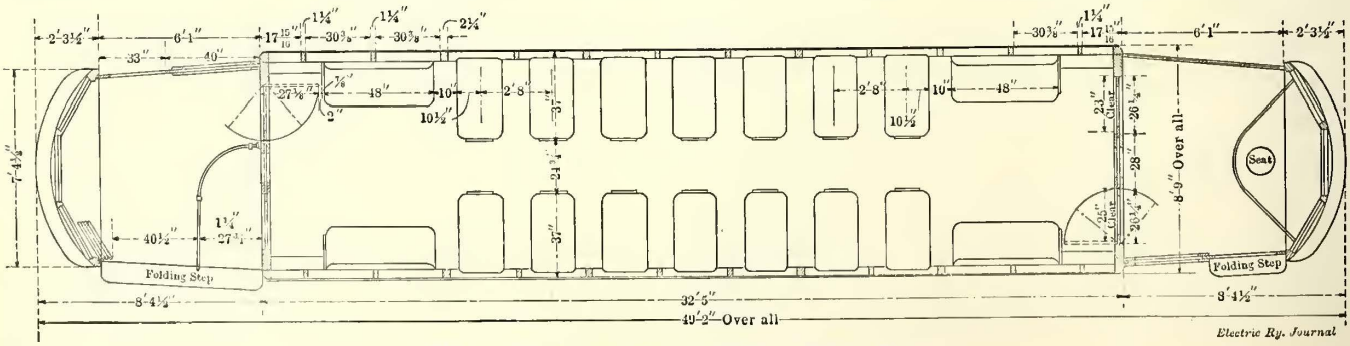


Chicago Railways Company Car—Front Vestibule, With Exit Door Closed

Chicago Railways Company Car—Rear Platform, Showing Extra Wide Entrance and Exits

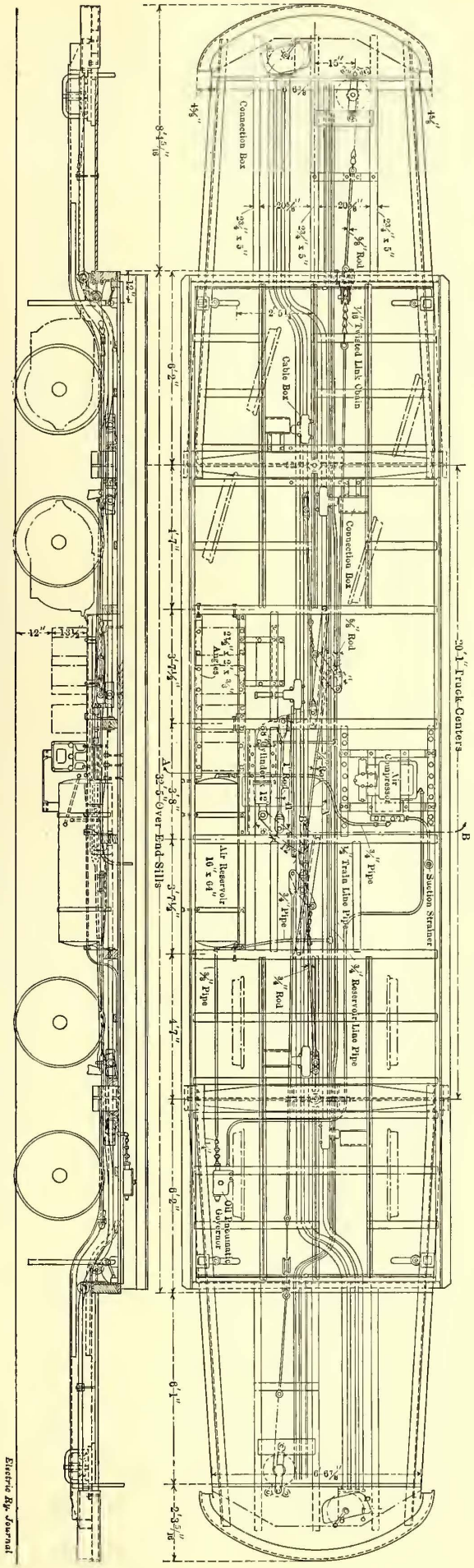
The inside of the car is finished in cherry, stained to a uniform color and rubbed dull. All moldings are of plain design, so they will not collect dust. The head lining is Agosote board secured in position by plain cherry molding. The ceiling is painted a light green color, with simple decoration in aluminum stripe. The inside finish is secured to the body by bronze oval-headed screws which match the interior metal trimmings.

A push button is provided at each side post opposite the top rail of the lower sash. These push buttons operate buzzers located in the vestibules, directly over the motorman's head. Current for operating the buzzers is taken from the trolley circuit and cut down in voltage by means of a high-resistance lamp mounted in a compartment in the car body end. Each car is equipped with four sand boxes lined with galvanized iron. The boxes, which are placed in the corners of the car body and have sloping tops so that the passengers may not sit on them, are 15 in. high and 4⅜ in. wide at the bottom, made to conform to the wall of the car. The sand is distributed by a Keystone air-sanding equipment, which includes a special feature in design providing against the malicious operation of the sander by a passenger on the rear platform.



Chicago Railways Company Car—Floor Plan

Each car is equipped at each end with a pull casting

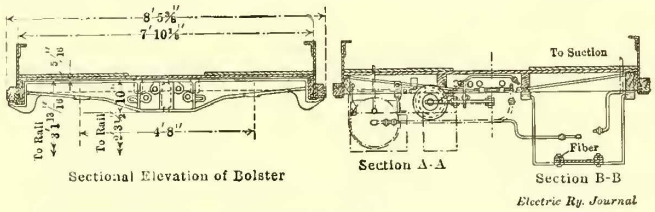


Chicago Railways Company Car—Plan of Piping and Conduit Under Body

carried under the bumper and arranged so that the draw-bar pin is removed from the pocket by reaching under the bumper. As the cars will be operated from either end, two fenders are carried. The type of fender used has been designed in the shops of the railway company. It is known as the De Clements fender, and comprises two baskets, as illustrated. These baskets are interconnected so that should the forward one ride over an object, the rear basket will be tripped and fall upon the rails.

An interior view of the car shows in general the arrangement of the lighting facilities. Along the deck rail on either side is a row of 16-cp frosted globes, one over each seat, for local illumination. General illumination is provided by three 32-cp frosted globes mounted along the center line of the ceiling. There is a 32-cp lamp placed on the vestibule ceiling near the car body at each end, providing light for the conductor when making change.

The heating equipment comprises 14 Consolidated No. 192-W cross-seat heaters and four panel heaters No. 146-X, and one No. 203-W heater in each vestibule. The bottoms of the seat cushions are protected by a sheet metal covering and deflectors. Each heater has a metal junction box through which mechanical connection is made with the metal conduit carrying the feed wires. The electric heaters for the car body are provided with three-point regulation, designed not to exceed the following



Chicago Railways Company Car—Sections Through Underframe

power consumption on 500 volts: First point, 3 kw; second point, 5 kw; third point, 7.5 kw.

All of the car wiring is carried in galvanized iron conduit provided with junction boxes and insulated bell mouths. Special care has been taken to lay out the wiring so that the various parts are readily accessible. The wire from the trolley base to the controller is No. 00, and is carried in iron-armored conduit extending from the trolley base along the roof and thence down the corner post to the fuse box. All the motor wiring and heater wiring also are run in similar conduit provided with junction boxes and rubber-protected outlets. The conduit is thoroughly grounded. Asbestos board, ¼ in. thick, protects the woodwork of the car body around the resistances, lightning arresters, choke coils, fuse boxes and circuit breakers. The layout of the conduit is shown in detail in an accompanying engraving. The terminals of the conduit at the controllers rise within the controller base and are protected by a metal sub-base supporting the controller.

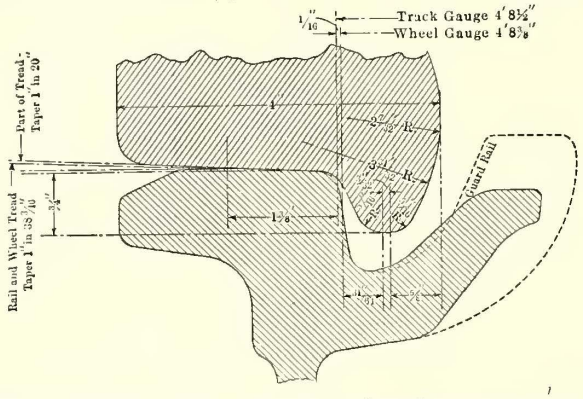
The cars are painted olive green, and especial care has been used to assure that the work will be thoroughly done. The following system of painting is used:

First Day—One coat of primer.
Second Day—Stand.
Third Day—Putty.
Fourth Day—First coat of surfacer.
Fifth Day—Second coat of surfacer.
Sixth Day—Third coat of surfacer.
Seventh Day—Stand.
Eighth Day—Rub.
Ninth to Twelfth Days—First, second and third coat of color.

Thirteenth Day—Lettering and striping.
Fourteenth Day—First coat of varnish (rubbing).
Fifteenth Day—Stand.
Sixteenth Day—Rub.
Seventeenth Day—First coat of finishing varnish.
Eighteenth Day—Stand.
Nineteenth Day—Second coat of finishing varnish.
Twentieth Day—Stand.
Twenty-first Day—Third coat of finishing varnish.

TRUCKS AND EQUIPMENT

The car body is carried on two Pullman No. 150 trucks, which are a modified type of the Baldwin short wheel-base



Chicago Railways Company Car—Standard Wheel Tread and Flange

truck with the equalizer bar carried horizontally over the journal boxes and supporting the coil springs at the ends. All parts of the truck and brake rigging are so arranged that they will neither strike nor bind on the sills of the car when the truck is on a curve of 35-ft. radius, and the brake rigging is hung so that it will clear the top of the rails at least 3 ft. 4 in. with the car mounted on 33-in. wheels. The trucks are designed for a maximum speed of approximately 30 m.p.h. The general dimensions of the trucks follow:

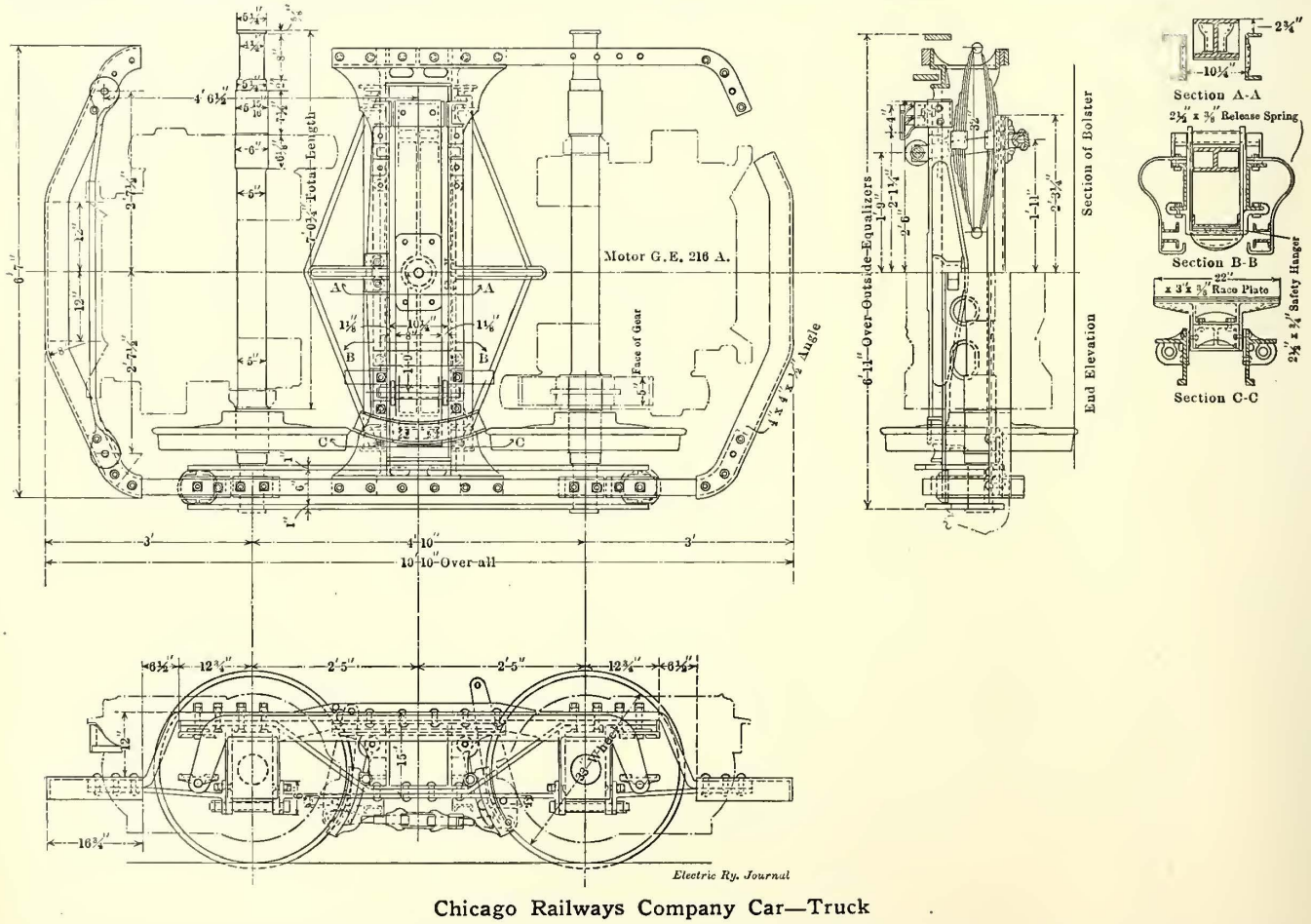
Wheel base	4 ft. 10 in.
Track gage	4 ft. 8½ in.
Wheel gage	4 ft. 8⅜ in.
Distance from top of rail to top of body center plate with light car, approximately	30 in.

The trucks are designed for the following loads per center plate:

With complete empty car body, approximately	13,500 lb.
With seated load of 40 persons in car, approximately	16,200 lb.
With load of 100 persons in car, approximately	20,250 lb.
With maximum load of 120 persons in car, approximately	21,600 lb.

Weight of passengers taken as 135 lb. each.

The truck transoms are one-piece steel castings with brake-hanger brackets, columns and gussets cast integral. The upper swinging hanger pivot bearings and dead lever guide brackets are steel castings. The bolsters are cast steel, of the Commonwealth Steel Company's I-section. The bolster springs are double full elliptic, with 32-in. centers. Trussed brakebeams comprising two channels and a truss rod carry the inside-hung brakes. The brake rigging is provided with slack adjusters, release springs and safety hangers. A large number of the cars will be equipped with 575-lb. cast-iron eight-channel-spoke wheels The remainder will be equipped with 34-in. steel wheels. Iron wheels are pressed on the axles at from 40 to 50 tons pressure. The wheel tread and flange are as shown in an accompanying engraving, the wheels at the thickest part of the flange being 4 in. wide and having a flange ¾ in. deep.



Chicago Railways Company Car—Truck

The axles are 5 in. in diameter at the center, with 4¼-

in. x 8-in. American Street & Interurban Railway Engineering Association standard journals and journal boxes with the McCord type of lid. Specifications for the open hearth steel used in the axles require that the chemical constituents shall not exceed: phosphorus, 0.05 per cent; sulphur, 0.05 per cent; manganese, 0.60 per cent; and shall have a tensile strength of not less than 80,000 lb. per square inch; elongation in 2 in. not less than 20 per cent; reduction in area not less than 25 per cent. The brake equipment comprises the Peacock hand brake and the National Brake & Electric Company's straight-air brake equipment. The air brake equipment includes a 16-cu. ft. compressor, ½-in. standard sliding type engineers' valve, Type N oil-pneumatic governor and an 8-in. brake cylinder.

Each car is equipped with four GE 216-A interpole motors and two K 35-C controllers. This type of motor is rated at 40 hp at 500 volts and 50 hp at 600 volts. The design of the brush holder embodies advanced mechanical and electrical principles. The brush holder insulation is of porcelain and each holder is supported directly from the motor shell; there is no brush holder yoke. The K 35-C controller has independent blow-out coils for each finger and a wooden cover. The special equipment used on these cars includes:

Air brakes	National Brake & Electric Co.
Center bearings	Barber and Ideal.
Center plates	General Railway Supply. Standard Car Truck.
Conduit	Richmond galvanized.
Control system	GE K-35 C.
Curtain fixtures	Acme.
Curtain material	Pantasote.
Destination signs	Hunter illuminated.
Door carrier	Duner.
Door fastenings	Pullman.
Dust guard	Positive.
Fare registers	International.
Fenders	De Clements.
Gear cases	Lyon sheet steel.
Hand brakes	Peacock.
Headlights	Adams & Westlake.
Heating system	Consolidated cross seat.
Interior finish	Cherry.
Journal boxes	McCord.
Motors	GE 216-A interpole.
Paint and varnish	Olive green.
Roofs	National standard.
Safety treads	Mason.
Sanders	Keystone.
Sash	Forsyth metal.
Seats	Hale & Kilburn 199-A.
Side bearings	Woods roller.
Signal bell system	Western Electric.
Springs	Pullman.
Trolley bases	U. S. No. 14.
Trolley catchers	Wilson.
Trolley poles and attachments	General Electric.
Trucks	Pullman No. 150.
Truck transoms and bolsters	Commonwealth Steel.
Ventilators (vestibule)	Globe Company's standard.
Ventilators (monitor)	Special design.
Wheels	Griffin 575-lb. CI.

The United States Department of Agriculture has printed a circular No. 151 on "The Preservative Treatment of Loblolly Pine Cross-arms." This bulletin contains a great deal of useful information on this important subject and is accompanied by numerous tables and curves giving the results attained. Particular attention has been given by the Department to the spacing of the timber to secure the best seasoning.

PUBLIC SERVICE COMMISSION ORDERS JOINT FARES AND THROUGH ROUTES IN NEW YORK

The New York Public Service Commission, First District, after concluding the series of hearings in relation to the proposed order requiring the establishment of joint fares and through routes between the Metropolitan Street Railway and the Central Park, North & East River Railroad, passed a final order on the subject on Oct. 30. This order establishes a joint fare of 5 cents between the lines of the receivers of the Metropolitan system and the Fifty-ninth Street crosstown line of the Central Park company, to be divided 3¾ cents to the Metropolitan and 1¼ cents to the Central Park line. The vote on the adoption of the order was four to one, Commissioner Bassett being in the negative. The joint fare as ordered is, the commission prescribes, effective in the territory between Thirty-fourth Street and 116th Street. The order states that it is to go into effect on Nov. 22 and the Metropolitan receivers and the Central Park company are directed to notify the commission on or before Nov. 6 as to whether they will accept and obey the terms of the order.

Before passing the order the commission heard final arguments from counsel for the receivers of the Metropolitan system. Testimony in addition to that which has been described in previous issues of the ELECTRIC RAILWAY JOURNAL was given, and statements of the points made by the witnesses, not reported heretofore, are presented in this article.

An abstract of the order of the commission follows:

ORDER OF THE COMMISSION

The Public Service Commission for the First District having, on or about Aug. 7, 1908, duly made an order for a hearing to inquire whether the regulations, practices and service of Adrian H. Joline and Douglas Robinson, as receivers of the Metropolitan Street Railway, and the regulations, practices and service of the Central Park, North & East River Railroad, in respect of the transportation of persons were unjust, unreasonable, improper or inadequate and to determine whether changes in the same ought reasonably be made by the receivers and by the Central Park company in respect of the making of a through route and joint rate by them over certain lines owned, operated, controlled or leased by them, and after the hearing held in pursuance of such order, the commission having on or about Aug. 11, 1908, duly made an order requiring Messrs. Joline and Robinson, as receivers, and the Central Park company to establish on or before Aug. 24, 1908, by proper connection between their respective lines of transportation and maintain in operation for a period of not less than one year from and after the said date, a through route for the transportation of passengers between the points and upon each of the lines hereinafter specified, and to establish and put in force a joint rate of fare for each passenger by the use of a transfer slip, coupon ticket or other sufficient token delivered to such passenger and apply the said rate of fare to the transportation of passengers over each of the routes hereinafter mentioned for and during the time aforesaid unless modified in accordance with the provisions of the Public Service Commissions law, and the receivers and the Central Park company having failed to comply with the provisions of the last-mentioned order and not having established the through routes and joint rate or any thereof, as therein required, and the commission having thereafter duly made an order that a hearing be had on Oct. 2, 1908, to inquire

(1) Whether the joint fare for passengers, upon the lines hereinafter specified, to be established and put in force by the commission, should be 5 cents per passenger or if such joint rate would be unjust or unreasonable, then what joint fare should be established or put in force.

(2) To what portion of such joint fare should the said receivers and the said railroad company, respectively, be entitled.

(3) In what manner should the respective portions of such joint fare be paid and secured to the said receivers and the said railroad company; and directing that the receivers and the said railroad company be given at least two days' notice of such hearing and afforded all reasonable opportunity to present evidence and to examine witnesses as to all the matters involved therein; and the said hearing under the order having come before the commisson on Oct. 2, 1908, and said hearing being continued by adjournments, and the proofs and arguments of the receivers and the railroad company having been at said hearing presented to the commission.

Now, it appearing to the commission that the rate, fare and charge as hereinafter established in and by this order for through transportation of passengers upon each of the routes hereinafter set forth is just and reasonable and that the portions thereof to which said receivers and said railroad corporation affected thereby are entitled should be declared and fixed as hereinafter in this order set forth.

It is hereby

Ordered, (1) That a joint rate of fare of 5 cents from each passenger for the through transportation of passengers upon the lines specified in the following schedule and between the points therein designated be and the same hereby is established and ordered to be put in force by the receivers and by the Central Park company, and be maintained by them for a period of four months from and after the taking effect of this order.

SCHEDULE

The Fifty-ninth Street line of the Central Park company means in this schedule the line on Fifty-ninth Street between the east side of First Avenue and the west side of Tenth Avenue.

(a) From any point on the Fifty-ninth Street line of the Central Park company to any intersecting line operated by the receivers of the Metropolitan company, and north or south on such intersecting line to 116th Street or Thirty-fourth Street.

(b) From any point between Thirty-fourth Street and 116th Street on any line operated by the receivers intersecting the Fifty-ninth Street line to the Fifty-ninth Street line, and east or west on said line to its terminus.

(c) From any point between Thirty-fourth Street and 116th Street on any line operated by said receivers intersecting the Fifty-ninth Street line to the Fifty-ninth Street line, and along said line to any other intersecting line operated by the receivers, and thence along said intersecting line in the original direction to any point between Thirty-fourth Street and 116th Street.

(2) That said joint rate be so established and maintained by the receivers and by the railroad company for through transportation of passengers upon each of the routes between the points designated as aforesaid thereon, by the use of a slip coupon ticket or other sufficient token to be delivered to each passenger upon his stating his said destination and at the time of his paying his fare, which shall identify such passenger so as to enable and require him, without other break in such transportation than a change of car, to pursue promptly his through trip to his destination.

(3) That the said fare of 5 cents for each such passenger so transported, in pursuance of this order, shall be apportioned between the receivers and the Central Park company, so that the receivers shall have of the same the sum of 3¾ cents and the Central Park company the sum of 1¼ cents, the right thereto to be evidenced by production of the identification slips taken from such passengers, and accountings to be had and payments made semi-monthly. And it is further,

Ordered, That the receivers and the railroad company each give to the other a bond to be approved by the commission in the sum of $1,000 conditioned for the payment of all moneys that may become payable for transportation of passengers, under the provisions of this order. And it is further

Ordered, That the receivers and the railroad company be and they hereby are allowed to put the joint rate into effect as herein directed by filing one day in advance of the date herein specified the proper tariff schedule, as provided by the rules in tariff circular No. 1 of this commission. And it is further

Ordered, That this order shall take effect on Nov. 22, 1908, and that the receivers and the Central Park company notify the Public Service Commission for the First District on or before Nov. 6, 1908, whether the terms of this order are accepted and will be obeyed.

ARGUMENT OF JOHN G. MILBURN

The hearing was continued on Oct. 24 for the purpose of hearing the argument of John G. Milburn, of counsel for the receivers of the Metropolitan Street Railway. An abstract of Mr. Milburn's argument is as follows:

I regard this as one of the most important cases that the commission will have to pass upon. I am referring not merely to the particular case, but to the principle which it involves, the precedent which may be established and to the far-reaching effect of any decision or order that may be made here. This is not a unique point in this great street railway system. When I look at the system on the map and appreciate the present condition of things, I see that this question may be raised at many different points, and as you solve it here you will have to solve it at those numerous other points. Any solution is bound to have a profound effect upon the street railway system of this city and its future.

A great system was welded together here through leases and stock ownership and by other expedients which the law provides for such purposes. There came to be developed as an outcome a system of transfers of far-reaching operation. The result is shown in the figures which are before you. There is no escape from the conclusion to be drawn from them. We have no question of capitalization, whether it is just or unjust. It is enough for our purposes here to have the revenues of this system and the expenses that it has to meet to operate and maintain it. Besides those there are taxes to pay, and whatever margin there is left goes as a return on the investment in the property. The situation is that that margin is not one that is involved in determining the questions which we have, excepting in the relations into which I shall bring it, because the earnings of this system under the conditions that developed fall enormously short of any even inadequate return upon any basis upon which anybody can figure out either the investment in the property or the value of the property.

We have a question here which touches revenues intimately. We have figures showing that through the years the ratio of transfers to the revenues and to the traffic has been increasing by leaps and bounds. The net return from a passenger has been going down, and down, and down. With the demands for better facilities and for greater speed and safety, and for all the superiorities in the direction of street railway operation, the expense of operation has been going up and up; so far as taxes are concerned I have yet to hear of them ever having gone down. Conditions cannot continue as they were; that welding together of that system with universal transfers has failed. We may recognize that fact as well now as any other time. When you have great systems like this, the prosperity of which is essential for the good of the public as well as the good of those whose money is invested in the enterprise, the necessary thing is to face the facts, and if we do not face the facts, but go on trusting to something to turn up, we go from bad to worse. The greatest sufferers from going from bad to worse are the patrons of the system, the people who are served.

SEGREGATION OF LINES

Therefore an application was made to the court to be relieved from the burden of the lease of this Fifty-ninth Street line and its operation as a part of the system. It was one step in the right direction. Previous to that time the Third Avenue system had been separated. The segregation was the result of judicial action which is binding upon you and everybody. Behind it you cannot go. It is an order of the court, and we have got to assume that that judicial action was founded upon adequate and proper considerations. The owners have taken possession of the property and the lease has gone.

Were the severance of the Fifty-ninth Street and the Third Avenue lines steps in the right direction? You have the results here so far as time has permitted them to be gathered together. For 70 days prior to April 11, 1908,

when the Third Avenue system was severed, the revenue passengers of the Metropolitan system were 50,000,000 odd; the transfers were 31,000,000 odd; the ratio of the transfers to revenue passengers was on the non-paying basis, because the transfer traffic was 61 per cent. For the 70 days subsequent to that time the revenue passengers were 56,530,000 odd, an increase; the transfer passengers were 29,000,000 odd, a decrease of 2,000,000, and the ratio of the transfers to the revenue service was 51 per cent. The average fare which the passengers had produced went up from 3.09 cents to 3.29 cents. The Fifty-ninth Street line was severed on Aug. 5. We have done the best we could in regard to furnishing figures as to it. For the six weeks ended Aug. 5, 1908, the receipts were, in round figures, $1,500,000, and the revenue passengers 30,000,000 odd; the transfer passengers 16,000,000 odd, and the average fare per passenger 3.2608 cents. For the six weeks ended Sept. 16, 1908, we have a decrease of 1,500,000 in the transfers and we have a revenue from each passenger of 3.3456 cents instead of 3.2608 cents. It, therefore, appears that both of these steps resulted in what was necessary if this railway system is to be preserved, in curtailing the free service resulting from this overdone system of transfers, and increasing the revenues which are necessary to the proper conduct of this system.

It is a function of this commission, according to my judgment, in such a case not to be a party to this litigation, not to be fighting one side of it, but to consider it with the impartiality of a tribunal which is deciding between conflicting claims, conflicting rights and conflicting interests.

What I have to urge here is urged in that spirit, that the mind of the tribunal which I am addressing is open, that it is bound to look on all sides of the question, is not enlisted in any interests, has no prepossessions which will close the door to a fair consideration of the evidence. I think that that spirit be sustained, especially in the earlier years in what you do, is a matter of great importance. Now, as strong a body as the original Interstate Commerce Commission was, it took a strong head when it began, and drove its horses hard, with the result that it never by any chance got sustained in the courts. I do not know what, but the percentage of affirmances in its earlier years was so infinitesimal that, like a famous vice chancellor in the English courts, the only certitude about his decisions was that people could act upon them with reasonable safety that they were wrong. Not a very different state of things has come about by the assumption more and more of the judicial attitude and function and hearing and listening and getting at the roots of things, so that to-day it is a very different situation, and the deliberate judgment of the Interstate Commerce Commission in any matter is a thing of great importance.

JOINT RATES AND THROUGH ROUTES APPLY TO STEAM LINES ONLY

I have expressed the opinion here that I do not think that the power of Section 49 under which you are acting relates to street railroads at all. I am not going to argue that question. I will simply mention as a very significant circumstance that if you will read that section—the power which it confers on this body about fares, about fixing them and about practices and regulations—it always refers to common carriers, railroad corporations and street railway corporations, until it comes down to the power which you are exercising, and then it leaves out street railway corporations and simply mentions railroad corporations, which are, as defined by the act, steam railroad corporations.

Street railways at this time, when it came to going from one line to another, used the phraseology "transfers." There is not a syllable about transfers in that section. If the Legislature had intended to invest this body with jurisdiction over transfers it would have said so. If we want relief from transfers to-day at any point we cannot come to this body for it. No power is conferred upon it. Transfers are regulated by provisions of the general railroad act, unaffected by this act. That is why I say that it is a matter of grave doubt whether that portion of the section under which you are acting applies at all to street railways.

But assuming that you have the power, to what does it apply? The law says: "The commission shall have power to require any two or more common carriers or railroad corporations whose lines, owned, operated or controlled or leased, form a continuous line of transportation or could be made to do so by the construction and maintenance of switch connections." You must have existing two or more carriers whose lines form a continuous line of transportation, or could be made to do so by switch connections. The Metropolitan system and the Fifty-ninth Street line are intersecting lines. They run at right angles to each other and are not continuous lines.

But supposing you have a continuous line, then I say that your power is confined over such a line to establishing a through route with a joint rate. You first order that to be done. If it is not done, then the act says that you shall establish just and reasonable rates, fares and charges to be charged for such through transportation, and direct the division of it among the lines. So you have to have a continuous line, and then your power is limited to ordering through transportation on that line. That means, I take it, that you can establish a through route and direct a car to be operated over that route. That is, a through route as distinguished from transfers from car to car, on passing from one line to another, and it is through transportation as distinguished from changing from one car to another from time to time.

I say that if the statute meant that you could order a transfer from line to line enabling a party to pass from one point in the city to another point of the city over independent lines by means of transfers it would have said so.

PHYSICAL CONDITIONS

You have to bear in mind that at many of the intersections of Fifty-ninth Street there are no connecting switches or tracks. With your through routes you would have to have connecting switches or tracks in Fifty-ninth Street and you would have to have construction at the termini of the zone, and that construction would cost money. That is one item you have to take into account. The other is the difficulty and danger of operating switch connections, particularly the delay. You have to take into account that you have the cars of two or more independent properties running over the same line. If you deal out to the Third Avenue Railroad the same sort of measure that you deal out to us, and you do establish through routes, then the Third Avenue road will have through routes and we will have the Metropolitan and the Third Avenue and the Fifty-ninth Street lines operating a go-as-you-please system over the Fifty-ninth Street line. Then you would have the delays of the zone cars, 116th Street at the north and Thirty-fourth Street at the south. You would have zone cars on these through routes. It would be the only thing you could do and it would be necessary, anyway, because there is no practical way of segregating the passengers. You could only have such through routes and joint rates by operating through cars between the termini of the zone over each through route that you lay out, and that involves expensive construction, expense of operation, danger and delay. And of all these things the vital one is delay. If you say you could run your cars outside of the zone, you would force some system of segregating the passengers; practical men say that that cannot be done.

Supposing you exercise the power and lay out through routes. What shall the joint rate be? First, is a 5-cent fare divided between the two companies permissible? I think that admits of a very short answer. Let us take the conditions as they exist. On our system we get 5 cents from every passenger. You know what the result is. You know to what extent the revenues fall short of meeting the cost of transportation, including in the element of cost the elements which belong to it. I do not think that a joint fare which gives us less than 5 cents would stand for a moment. You would be compelling us to carry that traffic at a lower rate than any other traffic which we carry over the whole system.

INCREASING EXPENSES AND FACILITIES

You cannot make it appear that the paying passengers do not have to give more than 5 cents each to realize the sum necessary if all expenses, taxes, charges and 10 per cent on the investment are to be obtained. We are in a period of increasing expenses, not diminution; increase of facilities, not curtailment. Conditions which we can see ahead of us demand that nothing shall be done arbitrarily or unjustifiably to reduce the paying quality of the passen-

ger to the company. I think that if you impose such a fare as 5 cents, it will be just as clear a case of depriving a person of property without due process of law, in violation of the constitution, as exists. You cannot make a man, person or corporation render a service such as this at a non-paying rate. As long as the fifth amendment to the constitution lasts, which prevents Congress from depriving anyone of his property or liberty without due process of law, and the fourteenth amendment lasts, which prevents a State from doing so, we are in pretty good condition.

What should be the joint rate? Can you find any warrant in the revenues of the company to take away any part of the 5-cent fare? You are being asked to reduce our revenues, our fares, to take something away from us, and you will have to give reasons for it. You will have to show that what you do does not impair the earning power of the company, does not reduce its means of paying operating expenses and taxes and a fair return upon the property. There is no inequity about it at all; we are all in the same boat as those people are. If we leave the line of the system and come back to the line of the system, we have to pay again. That is the inevitable result of the flat-fare system. You cannot inject a zone system into a flat-fare system without disrupting everything. The flat-fare system is a consistent thing; everybody who gets on pays the same, and the fellow who rides a short distance is helping out with respect to the fellow who rides a long distance. If you introduce your zone system, you are destroying the principle of the flat-fare system.

Supposing you made a zone; we will assume there is a great deal of traffic between this region, the city hall and the court house, and, we will say, Wall Street or a little below that. If anybody was to claim that it was a hardship to pay 5 cents every time he rode a few blocks, you could make a zone bounded on the north by Chambers Street with a lower fare. Those people would have just as good equity as the people whose interests are involved here. Could you accede to it? You would say: "If we take those points where there is considerable traffic and make a zone and do away with the 5-cent fare, we will disrupt the whole system." If you do that we shall have to have the zone system here, and that will mean that when you reach a certain point the fare will have to be more than 5 cents.

ABOLITION OF TRANSFERS A LEGITIMATE STEP

If you should construe your power to simply re-establish transfers, I think I have said enough to show that I think you do not have any such power. We have taken a perfectly legitimate step here, and it should be taken at other points. But every step of that kind should be taken with great consideration and deliberation. Experience has shown that an unlimited transfer system means death. If it continues here, we will have no system whatsoever. I say to this commission, whatever you may construe your powers to be, whatever you may formulate as a solution of this question, do not plunge us into a wide-open transfer business at Fifty-ninth Street, with all the abuses that there are on that system.

You may say that we could make up what we lost in this abuse by getting more out of our actual revenues from fares we have not collected. That is another abuse. Do not justify one abuse by saying that you can mitigate another abuse. We are doing our best to mitigate both. What we have done here, we have done in the interest of the property, and that means in the interest of the public. You have great power and great responsibility. This system has got to be fostered and developed by legitimate means into a good, sound, paying condition, that it may render the service that it should render and meet the public demands. You have got to exercise your powers with respect to that fact and with respect to the future. In determining this question, after a very calm review of the whole situation, take long views with reference to what is best for all interests concerned; that is the only settlement that will bring satisfaction to the people as well as the property interest.

Mr. Milburn was followed by Robert C. Beatty, of counsel for the receivers, who presented further argument against the order. Mr. Beatty said that the case was before the commission on evidence, but the evidence of not one witness presented had been in any way impeached; not one figure had been in any way contradicted. The Metropolitan system was now dealing with a deficit without return upon capital. Mr. Beatty reviewed in detail the principal operating and financial statistics presented by witnesses for the receivers. After the conclusion of his argument, Chairman Willcox announced that the hearing would be closed.

TESTIMONY OF E. W. WINTER

Edwin W. Winter, president of the Brooklyn Rapid Transit Company, was called as a witness on Oct. 16. Mr. Winter testified that he had been concerned with all the departments of the Brooklyn company, and that his acquaintance with the surface systems of Manhattan came from actual observation and from an active interest in the questions generally pertaining to the traction business. Mr. Winter said that his understanding of the term "through route" would be a route that was traveled by one vehicle continuously. A "transfer route," he said, was a combination of two or more through routes. Mr. Winter was asked by John G. Milburn, of counsel for the receivers of the Metropolitan Street Railway, to make a statement regarding the transfer system, the abuses to which it is subject, and to what extent it is practicable to prevent them.

Mr. Winter said he did not think it would be possible for him to cover the inquiry completely by any answer that could be given there, but, generally speaking, the transfer system of to-day was the materialization of what was originally an entirely proper and legitimate business proposition into an instrument of fraud and so excessive a burden upon the carriers that it had become a very great hardship. The hardship came through the abuse of the transfer system. Responding to a question by Commissioner Maltbie, Mr. Winter said he thought the topography of Brooklyn aggravated the situation for his company. He thought the abuse of the system might be designated as the extension of it, or the unreasonable and frequently dishonest extension.

In answering further questions by Mr. Milburn, it was stated by Mr. Winter that the transfer system with which he was immediately acquainted would describe the conditions prevailing elsewhere. The first difficulty was the temptation afforded to employees to handle transfers for various illegitimate purposes. The second difficulty concerned the traffic in transfers by the public; it had grown to be excessive. The third was the extent to which the transfer system, with the rapid and continued extension of lines and increase in mileage of separate companies, had developed naturally. The necessary stop-over right given by a transfer had been abused. There had been places in Brooklyn where stop-over transfers were exchanged regularly, but the traffic at a good many of these places had been broken up by the company.

Mr. Winter said that the abuse of the transfer system materially affected the revenues of the Brooklyn lines. The tendency was for the abuse to increase with the volume of business. Abuse existed with the Brooklyn lines to an extreme degree. Mr. Winter was not so certain, however, that the abuse was increasing on his system. The officials were making desperate efforts to check it, and he was a little uncertain whether it was increasing at the present time or not. The business of the company generally was not increasing, and the transfer evil kept pace usually with the development of the business. The larger the number of people that traveled the greater was the abuse of transfers.

In answering questions from Chairman Willcox, Mr. Winter emphasized that the company must check the abuse in some way. He did not think it would be a problem impossible of solution, but it was very difficult of solution until the evil of it and the absolute need of reform were recognized by everybody. The transfer system involved considerable expense of operation, and, of course, a large loss of revenue. A change of law would be necessary to enable the company to stop the abuse of transfers.

REASONABLE RESTRICTION OF TRANSFERS

Mr. Winter did not believe in the total abolition of transfers, but thought they should be restricted reasonably to the purposes which they were originally intended to serve. He would consider the number of changes and the distance traveled as factors which should be considered in reaching a conclusion as to what constituted a reasonable transfer system. The Brooklyn lines carried passengers in some cases 30 miles, and Mr. Winter thought that was an unreasonable length of ride. The use of the transfer was impracticable in some cases, because of the congestion which it would occasion, while in other places it might be granted. Where congestion existed the establishment of a transfer system might delay traffic. A good deal of trouble for the conductors resulted from the use of transfers that was not met in the collection of cash fares, because some people endeavored to use transfers improperly.

Mr. Winter spoke about the short-haul and long-haul passengers, and said he did not see how the flat fare and a partial zone system could be combined in one city and one railway system. He had not given much thought to the idea of the zone principle in this country. If an attempt should be made to seggregate passengers in cars, Mr. Winter did not see how it would be possible to segregate them successfully, and an attempt to use part of the equipment exclusively within a zone would result in inefficient and unsatisfactory operation.

Mr. Winter was asked by Chairman Willcox whether the service of the Brooklyn system to Coney Island was not essentially zone service. He replied that it was a zone system in its simplest form. When the train or car reached a certain point every passenger paid another fare if he proceeded. There was no distinction in operation as to passengers, no segregation.

Commissioner Maltbie asked Mr. Winter about the existence of what is called "the neutral zone" on the Brooklyn lines. This neutral zone permits a short trip for the accommodation of people living in one vicinity, so that they can ride from one side to the other of the neutral zone without paying an additional fare. A passenger crossing the farther side of the neutral zone pays an additional fare of 5 cents. This system was the best that could be devised to meet the requirements, Mr. Winter said, but it had difficulties.

INCREASES IN COST OF OPERATION

Responding to questions by Mr. Milburn, Mr. Winter said that the operation of a zone system would be very different in a congested center. The question of the increase in the cost of operation was brought up, and Mr. Winter said that the experience of the Brooklyn lines was hardly typical, because they had gone through a process of rehabilitation and reconstruction; his experience began with a physical condition which made a very high rate of expense in many features of operation that was abnormal, although the company had succeeded in reducing the expenses in some respects. Materials had increased rapidly in price in the last three or four years; the cost of labor had increased somewhat, but not so much relatively as the cost of materials. The requirements were more costly, while better appliances and all that contributed to make the service improved cost more money. The standard was being raised all the time, and equipment had to be discarded continually. It was Mr. Winter's judgment that it would be extremely difficult to procure very much capital on reasonable terms for the reconstruction and development of traction facilities in Greater New York, unless the properties could be made to show, after the payment of taxes, all proper expenses, and probably some reserves on account of renewals, 10 per cent on the investment. He would include in the operating expenses reasonable and proper maintenance. To speak from his own experience in investments with reference to the Brooklyn property, and the attitude of capitalists who had been inclined heretofore to advance funds for street railway properties, he thought it would be necessary in New York to make an attractive proposition if capital was to be interested.

Chairman Willcox said that Manhattan Railway stock, on which dividends of 7 per cent are guaranteed, was quoted at 136, and the point was made by Mr. Winter that what he emphasized was that the property must show an earning capacity of 10 per cent; that the capitalist wanted to have confidence in the safety of his investment.

LOSS IN LONG HAULS

Chairman Willcox referred to some long rides that were possible on the elevated lines for flat fares of 5 cents, in answer to which Mr. Winter pointed out that there was a loss to the company for every passenger that traveled long distances. If it were possible to segregate the cost per passenger, it would be shown that it was only the traveler that rode a short distance that made long rides for other passengers possible at the same fare. If the Manhattan elevated company, which had been quoted as earning 17 per cent on its stock, had a disproportionate amount of long-haul business it would change its results to a deficit. Mr. Winter did not mean that he thought it necessary for a property to pay 10 per cent dividends; what he emphasized was that a traction company, to induce the investor to risk capital, would need the credit which a reasonable and assured earning capacity of 10 per cent annually would give.

Chairman Willcox asked if the Brooklyn company had a transfer system by which it gave a certain number of transfers in cases where the law did not require such action. These were called reciprocal privileges in the schedules of the company. Mr. Winter, in answer to a question, stated that the company had the power, regardless of the law, to abolish those transfers.

The question was asked the witness whether provision should be made out of reserve for the expense due to discarded, obsolete and antiquated apparatus and keeping up to the times with reference to electrical and power equipment. He replied that it should, and that the reserve must come in the first instance from operation. It was immaterial whether such expenditures were charged to operating expenses or special appropriations. He felt that 90 per cent of the gross earnings should cover all payments, taxes, fixed charges and special appropriations, etc., while 10 per cent should be left for investors in stock, representing properly capitalized expenditures. A good part of the 10 per cent should be disbursed in dividends.

Answering questions by Commissioner Maltbie, Mr. Winter said that the operating expenses of the Brooklyn sys-

tem were not far from 60 per cent of the gross revenues. The company did not as yet set aside an appropriation for depreciation. Mr. Winter would not admit that the expenditures aggregating 60 per cent of the gross revenues had not been sufficient to keep the road, in his opinion, up to his standard of efficiency, but he said that he was not yet satisfied with the standard of efficiency that had been established. The question of the abuse of transfers was brought up again, and Mr. Winter said it seemed to him that the whole situation must be borne in mind, if accurate judgment was to be passed as to what might be fair in transfer privileges. Many hauls were so long that a sufficent number of them would absorb all of the revenue. It was the short-haul passenger that made the long haul possible.

In Brooklyn, the company was working on the broad proposition that a passenger could reach any point in Brooklyn from another point by taking the obvious route for one fare and two transfers. This had been figured out with great care and trouble and put into effect, so far as it was possible to put into effect any reformatory measure regarding the transfer system. The difficulty was that many people did not want to go directly to the limit point. They wanted to visit three or four other places which were not in the direct line of transportation, and transact business in them en route, and those conditions, if allowed to prevail, would destroy the scheme. Many people abused the transfer privilege and made stops before they reach their final destination.

Mr. Winter said he thought he was safe in saying that a passenger to-day could take one car at the Manhattan end of the Brooklyn Bridge and ride 34 or 35 miles and return to the point from which he started without violating the letter of the transfer rules. The Brooklyn company had looked into the question of losses from the failure to collect fares, or from fares that were collected and not returned to the company. He would say, in round numbers, that he had heard it estimated that the loss in fares not collected would probably reach more than $1,000,000 a year.

It was Mr. Winter's opinion that the company lost more from passengers who did not pay their fares than it did on account of fares that were collected and not returned; an estimate, however, as to the extent of the loss would be merely a speculative guess.

Mr. Milburn asked Mr. Winter whether he knew that it had been held by the courts that in using a transfer the passenger was not bound to take the most obvious route from the point of origin to the point of destination; that a circuitous route might be taken. Mr. Winter said he knew that such a decision had been rendered. Mr. Willcox asked whether that decision changed the opinion of Mr. Winter regarding the use and abuse of the transfers, to which Mr. Winter replied that it would take more than a court of law to change his opinion regarding the iniquities of the transfer system.

TESTIMONY OF GENERAL HARRIES

George H. Harries, vice-president of the Washington Railway & Electric Company, was called as a witness on the afternoon of Oct. 16.

General Harries defined a through route as one over which a car or cars or a train would be run without break from one terminus to another at the will of the corporation or corporations concerned. Where a passenger changed from car to car by a transfer, General Harries said that the route would be called a transfer route.

General Harries was asked to make a statement regarding the operation of the system of free transfers. He said that the Washington lines had had an uncommon amount of experience with transfers, and in large part a painful experience. When the lines were controlled by separate corporations, not connected in any way, there were no general transfers except, of course, when a company owned intersecting lines. When the Washington Railway & Electric Company acquired control of the companies that are now subsidiaries, Congress stipulated that as part of the consideration for the consolidation transfers should be given from one line to another at such points as the company might direct. Thereupon the management, which was influenced by an overliberal power in its directorate, opened the transfer privilege to a wide extent, so that the revenues of the underlying companies fell off immediately, and continued to decline so noticeably that amendment of the plan was essential. A reasonable estimate, based on some counts and a good deal of expensive observation, showed that about 6000 people were abusing the transfer system by round trips every day. It fell to the lot of General Harries to curtail the system, and a large percentage of the transfers was discontinued. The giving of transfers was at that time wholly voluntary on the part of the company.

Every transfer that could possibly lead to what might be called a fish-hook ride was eliminated, and a rule was adopted which has been followed since that time providing that only one transfer should be given, and that to a passenger moving in one general direction. There were two places where through cars were run in summer time. As the traffic was comparatively small in winter, at one end of each of these lines identification checks were issued during the winter months, and such checks were given in addition to the transfers.

ABUSE OF TRANSFERS

The effect of the change was to reduce materially the number of points of transfer, yet the company now had to expend an undue amount of energy and money to put a stop, as far as possible, to the abuse under the present system. These abuses developed from the use of transfers long after the time punched had expired, the stealing of transfers and their sale by conductors to proprietors of saloons and cigar stands. It was possible near any of the transfer points, even now, to secure transfers improperly. Clearing houses for traffic in transfers were found in department stores, and employees of such stores exchanged transfers. One company once had to ask the Secretary of the Treasury to discharge some of the watchmen in that department who were engaged in traffic in transfers.

General Harries thought that the establishment of a limited zone in New York City under the conditions existing, the traffic handled and the operating and financial questions involved would be impossible. Cars could be operated in such a zone if all passengers except those who wanted to ride in the zone were excluded from such cars. Any attempt to mix in one car both zone passengers and those who wanted to travel beyond the zone would result in legal difficulties. If any attempt should be made to segregate the passengers on through cars, so that when the end of the zone was reached passengers who were not entitled to ride beyond it would be forced to disembark, traffic would be delayed. He thought that any plan of this character would be impossible from an operating standpoint. An attempt to operate various through routes within a zone and to operate cars beyond such routes would cause considerable congestion.

General Harries thought that if the conductor neglected his car to pay attention to a single individual throughout an entire trip, he could identify one passenger who might be entitled to a through route in a car which handled all classes, but not more than one such passenger could be identified. The service was the vital thing to the public, and it was vital to the company, because delay in service meant a reduction in revenue. The greater the congestion due to delay, the greater was the difficulty in collecting fares. The important rule was to move the traffic and keep the line open. That was the fundamental rule in the instruction of every official and employee of the transportation department, and it was so throughout the entire transportation field. The cars must be kept moving at any cost, almost at any hazard; people must be transported as rapidly as possible. There was no surer road or shorter way to unpopularity on the part of the corporation than lax, inefficient, irregular or slow service.

To interest capitalists in investing in the street railway property in New York, General Harries thought that it would be necessary to show earnings equal to a dividend of 5 or 6 per cent on the stock and an equal amount for surplus. The company must have on hand a surplus which could be used for uncommon maintenance and emergencies. The street railway business was deemed to be an especially hazardous business in these days. The legislation and efforts at legislation in recent years had made it very difficult for street railway companies to secure capital except at very high rates.

BELIEVES IN ABOLITION OF TRANSFERS

During cross-examination, answering a question by Chairman Willcox, General Harries said he believed in the entire abolition of transfers. The only excuse of the transfer for existence was when a company with two lines that intersected accepted as one of the provisions of its charter the responsibility of carrying a passenger from one point on one line to another point on its other line for one fare. Chairman Willcox asked what reason there was for drawing a distinction between carrying a passenger four miles over a road of that length owned by one company, and over a road of similar length of which two miles was owned by one company and the rest by another company. General Harries said that if the property was owned by one company any benefit there might be in the transfer was obtained by the one company. If two companies were concerned, the first company received 5 cents for carrying the passenger two miles, and would carry him perhaps 40 miles for the same amount if he stayed on its lines. When the passenger went to the line of another company and wore out its equipment and demanded attention from its employees without compensation, the second company was carrying a burden which might not lawfully be required.

General Harries said that no conclusion could fairly be based upon a short-haul supposition or a short-haul case. The long haul and the short haul must be considered in the mass, and not separately. It was impossible to separate the two classes of passenger in any attempt to establish a joint-rate, because the ability of the company or companies to do business was made evident only in gross receipts and gross operating expenses and fixed charges.

CROSS-EXAMINATION OF MESSRS. FORD AND UEBELACHER

Frank R. Ford and Charles F. Uebelacher appeared before the commission for cross-examination during the hearings that preceded the closing arguments by counsel for the receivers. Mr. Ford and Mr. Uebelacher reviewed their testimony as published in the ELECTRIC RAILWAY JOURNAL of Oct. 24 and Oct. 31, 1908, respectively.

TESTIMONY OF OREN ROOT

Oren Root was called again as a witness on Oct. 19. Mr. Root's definition of a through route as applied to street railway transportation was a route by which a passenger may go from any given point to another given point, using the same vehicle for the trip. A transfer route seemed to imply necessarily a change or a transfer from one vehicle to another. Through transportation would be merely the carrying of an individual over a through route. When asked whether it would be practicable to establish through routes on longitudinal lines of the Metropolitan system and the Fifty-ninth Street Crosstown line between 116th Street on the north and Thirty-fourth Street on the south, Mr. Root said that he was not prepared to answer regarding the physical difficulties in the way. Great difficulties would attend the making of connections at the intersections. Even if such difficulties could be met, it would be impracticable to operate cars over any route within a limited zone of this character.

In discussing the principle underlying the fixed rate of fare of 5 cents, Mr. Root said that the railroads in the country generally are operated upon a flat 5-cent fare or on the theory that the short-haul passenger would compensate the company for the expense of carrying the long-haul passenger. In other words, there were opportunities for a passenger to ride in excess of a distance which would afford a reasonable compensation to the company. In order to make an average reasonable compensation per passenger there must necessarily be a certain amount of short-haul business. An average profit between the short-haul and long-haul business should, in theory, be permitted by a 5-cent flat rate. An attempt to set up a joint rate which would reduce the amount received from a passenger within a zone below the average return per passenger throughout the entire system would destroy the general principle of fares under which the New York surface roads and other roads generally have been operated in the country, and would seriously complicate the entire transportation situation. An attempt to set up joint fares and through routes on this plan would eliminate a certain proportion of the short-haul traffic to which it seemed to the witness the company was fairly entitled to compensate it for the long hauls, which would remain unchanged and not be reduced to any extent by the creation of a zone.

Assuming that the commission should determine to put into force the order, Mr. Root did not have in mind any possibility under which the conditions required by the order might be established in less than five or six weeks. He thought that no transfer modification had ever been accomplished on the lines within five weeks after the decision to make the change had been made. The reason why so much time was necessary was that the tickets could not be printed in a short period and instructions had to be prepared and issued for the conductors as well as the public. Numerous details of administration had to be worked out in connection with any modification, however slight it might be, because it affected almost all departments of the system in one way or another. Of course, any order of this character would require more time, because it would be an entirely new experience for the system, and there were no precedents on which action could be based.

SINGLE ZONE A COMMERCIAL IMPOSSIBILITY

Mr. Root was asked whether the order, if issued, could be followed if it provided for the use of transfers in such a way as to confine certain business within a zone and dis-

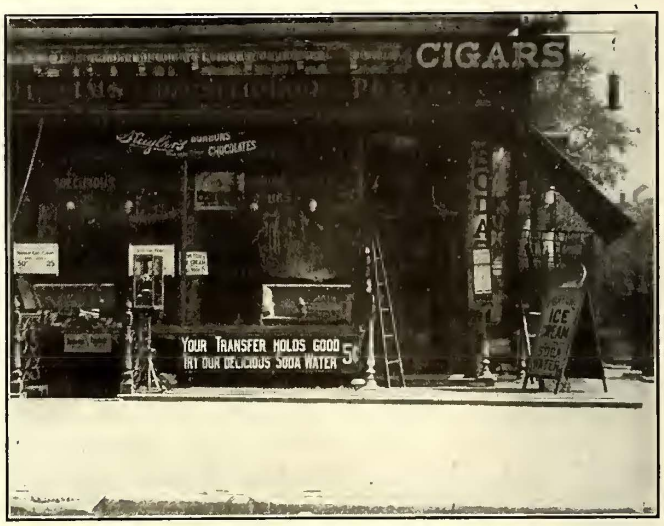
tinguish such business from the other general business that might develop within the zone, but extend beyond the prescribed district. He said that commercially it would be a practical impossibility. One possible way in which the order could be carried out would be to make an actual physical limitation which would necessitate the switching back of a certain proportion of the cars operating on the longitudinal lines. That would seem to be prohibitive from a practical standpoint, on account of the complications resulting from the actual switching of cars. It would be commercially impracticable for the reason that these cars, with a comparatively limited amount of traffic, would take up a certain amount of space on the tracks of the main longitudinal lines, to the exclusion of through cars, which unquestionably would do a much larger business than the zone cars. The result would be that the company would be carrying, say, 10 or 15 people on cars traveling between points in the zone and the entire longitudinal lines from the northern to the southern end of the island would be affected by the operation of a relatively small number of cars.

The question was asked what objection could be raised to operation of the longitudinal lines between their respective terminals with transfers from one system to the other. Mr. Root said that a transfer system, operative to the limited extent which would be necessary in one zone, would tend, on account of the customs of the people and the methods of transportation which had prevailed for years, to create confusion and friction. There would also be a great burden of expense for administration. Such a plan was inadvisable and practically and commercially impossible. Mr. Root was asked whether it would be his conclusion that the practical effect of an effort to operate under the proposed order would be to restore the transfer system as it existed prior to the delivery of the property to the Central Park, North & East River Railroad for independent operation, with the change that the same fare would not be received. Mr. Root would not want to say conclusively at this time that that would be the effect. The company would try to make some experiments which would be attended with less loss than it had to meet before, but he was not prepared to say that any other method which might be adopted would be a success. It was not improbable that the practical results to the company would be substantially a return to the conditions which existed when there was an interchange of transfers.

IMPOSSIBILITY OF IDENTIFICATION

In answering a question as to the objections to putting off passengers at Thirty-fourth Street or 116th Street, Mr. Root said that no conductor would be able to identify or remember the passengers who should be limited to the zone trip. Even if, for the sake of argument, it should be granted that a conductor could recollect the passengers, which, in Mr. Root's opinion, was not possible, any attempt to enforce rules would be attended by a great deal of friction between the public and the employees of the system. It might be possible that such a system could be adopted universally and that the entire traveling public, after a long period of time, would become educated to it, as in foreign cities. But, in the meanwhile, if attempts were made to enforce rules of this character, the ejection of passengers would be necessary and it would be very difficult for trainmen to live up to the regulations. The company had suffered so seriously from damage suits due to ejectments either on account of improperly used transfers or in other ways which would seem to be reasonable regulations in the conduct of its business, that it had been forced to make a rule to govern such cases. This rule forbade conductors to eject passengers under any circumstances, except in the existence of cases where there was danger to the other passengers or a person used improper language, so that the conductor had the excuse that other passengers in the car were suffering indignities. Except in these extreme cases, a conductor must report the circumstances to the first superior officer who might be met and could act only under order of that official, who would probably be a line inspector. These inspectors were ordered to eject passengers only in extreme cases. This rule was really the result of the difficulty, when cases for damages on account of ejectment were reached in court, of obtaining witnesses and of getting the facts before the jury in such shape that the sympathies of the jurors were not entirely with the individual.

Mr. Root spoke about the difficulties of attempting to separate passengers at Sixth Avenue and Thirty-fourth Street and Broadway, which he supposed was as congested an intersection as could be found anywhere in this country. He said that any attempt to limit certain passengers to rides to that point only would seriously retard the general movement of traffic and result in a reduction of the maximum number of cars which could be passed over the tracks at



Joint Rates in New York—Sign Promoting Abuse of Transfers

that point. Outside of the commercial and financial standpoint, he thought that that was the principal point against the operation of any zone of that character from a purely operating standpoint. One of the main problems of transportation in New York City was that of the limited number of cars that could be moved past a given intersection, or the number that could be moved on a given line. The problem became more important and would increase in gravity continuously, because as the surface street car traffic increased Manhattan Island was unable to increase its facilities and the railway was confined to certain longitudinal lines on which all the passengers had to be moved. No way existed of building any number of new longitudinal surface lines to take care of further development, so that anything which would interfere with the number of cars that could be moved past an intersection or over a straight track would be a serious interference with the proper operation of the line.

CONVENIENCE OF THE PUBLIC

Leaving aside any question of return, Mr. Root thought that the creation of a zone of that character would be of no great convenience to the traveling public. The unusual

character of the proceeding and the fact that the cars might be introduced only in one particular zone, contrary to the general methods which prevailed over the island and in other parts of New York and other cities of the country, would constitute a serious drawback to whatever advantages might accrue to the public. He would say that the inconvenience to the larger number of people resulting from a change of that character would greatly outweigh the convenience resulting to a smaller number of people that would benefit financially. This statement necessarily was based on the assumption, which Mr. Root did not believe was justified, that a change of this character was possible from a physical, commercial and financial standpoint.

A question was asked Mr. Root about the practicability of limiting the redemption of the transfer to 10 or 15 minutes after the time at which it was punched. He replied that any benefit which could be derived from any limitation of that character under the present law governing the use of transfers would not offset the disadvantages that would accrue from the fact that the conductor would be obliged to spend time in taking care of transfers which he could employ better in the collection of fares or in attending to his other duties. However, the controlling reason was that no limitation of time, even within an hour, with the amount of traffic which existed in New York and the frequency of car movement, was of practical use. Any passenger presenting a transfer within an hour or even two hours of the time when it was actually issued to him, with no evidence possible to the contrary, could successfully assert his right to ride on the transfer. Any attempt on the part of the conductor to exercise judgment and eject the passenger would result only in opening the way for a case for damages against the company. In other words, the company could not prove the time when the transfer was issued. It could not disprove the statement of a passenger that he received the transfer five minutes before he presented it.

In the judgment of Mr. Root, it was necessary to give transfers at every point of intersection. The law had determined that the railway company had no right to select the route, and that the passenger might travel in a circuitous route so long as he continued in the same general direction.

Mr. Root admitted that some Broadway cars were operated to Houston Street and then turned back; but he said that that interfered with the traffic on the road and with the ability of conductors to handle transfers. He said that the conditions at that point were similar in some respects to those which would be found at the end of a congested zone point like Thirty-fourth Street and Broadway, except that the conditions at the latter intersection were very seriously aggravated and that there was not at that intersection a logical transportation point where the cars could be turned back. In other words, the division of the traffic would be such that a reasonable maximum carrying capacity of the cars could not be attained if they were turned back at Thirty-fourth Street. The traffic was much heavier on the Broadway line to Houston Street than it was south of that point, and the number of cars operated that far down Broadway corresponded with the conditions of traffic. It did not interfere with the general convenience of the larger part of the public to switch cars back at Houston Street, but such interference would exist if an attempt should be made to turn cars at Thirty-fourth Street.

FLAT FARE AND ZONE SYSTEM

Mr. Root did not think it was practical to work out a combination of flat fare and a zone system. It was necessary either that every passenger pay the same fare for whatever distance he rode, or that the charge be measured for each passenger by the distance traveled.

Referring to the article published in the STREET RAILWAY JOURNAL of Oct. 5, 1901, to which reference was made at a previous hearing, Mr. Root said that subsequent to the time when he expressed the views outlined therein, the statutes were interpreted unfavorably for the company and the officials found that the power which they thought they had to regulate the use of transfers did not exist. The result was that notwithstanding the fact that a limit had been set regarding the direction in which a passenger could travel, the company was forced from time to time to extend the transfer system, until three or four years after the date on which he wrote the article a universal transfer system existed. At the same time, the abuse of the transfer system continued to increase. The situation became greatly aggravated and the abuses much greater than they had been previously and the income of the company was affected materially. Decreasing income and increasing expenses finally reached the point where the income and outgo overlapped.

With the knowledge which he had of the situation at present, it was Mr. Root's opinion that a transfer system that permitted only a single transfer would be susceptible of such regulation that the abuse that would unquestionably exist would be so limited in amount that the system now operated by the Metropolitan receivers, other things being substantially as they are to-day, could afford to operate under that restriction. He had not committed himself previously to that extent and he was not prepared to go on record with that as his final judgment, but in the light of conditions as he saw them to-day he believed that if no excessive burdens were placed on the company, that is, no further increases in taxation or other changes that would make the expenses greater than they are now, the system could, perhaps, be operated with a reasonable profit with a single transfer for one fare.

LOSS DUE TO FARES NOT RECEIVED

During the hearing before the commission a question has been raised several times as to the amount of loss to the railway company from the failure of conductors to collect fares or their failure to turn in all of the fares collected.

As this subject is of considerable interest, the ELECTRIC RAILWAY JOURNAL asked Mr. Root if any definite statement concerning it could be made at this time. Mr. Root stated that the matter had been made the basis of a very thorough inquiry, which had been completed recently; that the conclusions were based upon the written reports of the observations of detectives who had been riding on the lines under the jurisdiction of the receivers of the Metropolitan Street Railway during a period extending over six months, and that a careful analysis of the situation, based on these reports, indicated that the loss due to the causes mentioned is very evidently less than 3 per cent of the total traffic for which cash fares should be received, and that in all probability the figure is very slightly, if any, in excess of 2 per cent.

CROSS-EXAMINATION OF FREDERIC T. WOOD

Frederic T. Wood, secretary to Oren Root, general manager of the Metropolitan Street Railway, took the stand again and testified regarding the abuse of transfers. He presented a letter from John Akarman, of New York, describing a trip he had taken involving rides on 11 different cars for a single fare of five cents during eight hours of one day.

THE CLEVELAND TRACTION SITUATION

After expressing his desire for a peaceful settlement of the street railway trouble in Cleveland last week and stating that he was now willing to relinquish all claim on the old Forest City and Low Fare lines, Mayor Johnson in a frenzied speech before the City Council on Saturday morning of last week reiterated his intention to fight to the bitter end because the officers of the Cleveland Railway refused to meet his ideas.

On Friday evening the Cleveland *Press* issued a call for a public meeting to be held at the City Hall at 9:30 o'clock on Saturday morning to consider the traction situation. This call was followed by another, however, a few hours later, asking that a meeting of the City Council be held at that hour. It was expected that representatives of the Cleveland Railway would be present, ready to listen to propositions or to make known its plan of settlement. Instead, the Mayor was notified that the failure of the Municipal Traction Company to relinquish its hold on the property of the Cleveland Railway made it impossible to discuss the question of settlement at this time, as the property was being held in contravention of the wishes of the people and the rights of the company. Furthermore, the company has in its hands no property with which to carry out any plan that it might propose and for this reason is not now in position to discuss the matter.

Mr. Johnson expressed his anger in no uncertain words over the refusal of the company to treat with him under present conditions. He said that he would now hold the lines and that the owners would come to him as suppliants before they recovered possession. A receiver had not yet been appointed, he said, and the people were still riding for 3 cents. Moreover, he expressed his belief that members of the Council were with him in this decision. Following his address, a resolution was adopted expressing the willingness of the Council to treat with the railway company on terms of operation of the lines.

A statement was issued by Mayor Johnson on Friday morning in which he said he was willing to give up claim to the Forest City and Low Fare Company lines in order to secure traction peace on broad lines. He declared that private profit, except for a legitimate return on the investment, must be eliminated; that provision must be made for good service and that fares must be reduced as fast as increased profits would permit. The Mayor declared that he would "never consent to ignominious surrender in the appointment of a receiver. That would mean the forfeiture of the lease and would take away our power to fight for the rights of the people in settling the war. Such surrender would jeopardize the interests of the creditors and would rob the people of all the fruits of their eight years' battle for better street railway terms."

STATEMENT OF POSITION OF CLEVELAND RAILWAY

At noon on Friday of last week after the board of directors had been in session several hours the Cleveland Railway issued the following statement:

We are ready to take up at once the discussion of the terms of a new street railway grant with representatives of the public in an entirely candid and frank manner.

We would suggest that discussions shall be open to the public, that the ultimate plan arrived at shall be the result of the best thought that may be brought to bear on the subject from the whole people of Cleveland.

Under the new referendum law any ordinance passed must receive the approval of the public by popular vote. It is, therefore, wasteful of time and energy to devise an ordinance which shall not be in the interest of the public while affording the company an adequate return upon its capital and the additional capital required for enlargement of the service as the city grows.

Such compensation, in justice to the public, should be no more than will admit of such return to the company as will place it in position to give the best service possible and to progressively develop the growing needs of this city.

This cannot be done by mere savings-bank interest. Capital cannot be found in the large amounts that are necessary unless it is adequately compensated to take the risks of political attacks and increasing taxation without fair compensation.

Just what this should be should result from a broad discussion of the subject by all interested.

The subject should be approached with open minds on all sides and the antagonism created by years of fierce contention should be forgotten.

TRUSTEE ASKS FOR RECEIVERS

On Wednesday of last week the Central Trust Company of New York, trustee under the three mortgages covering properties of the Cleveland Railway, filed a petition in the United States Circuit Court asking that receivers be appointed for the properties of the Cleveland Railway and the Municipal Traction companies, the Neutral Traction Company's lines on Central Avenue and Quincy Street alone being exempt. Judge Tayler at once issued an order that no money should be paid out except for payrolls. This has since been modified to the extent that the Municipal Traction Company may use what it is deemed necessary for current operating expenses.

Attorneys Joline, Larkin & Rathbone, of New York, and Hoyt, Dustin, Kelley, McKeehan & Andrews, of Cleveland, filed the suit for the trust company. The petition reviews the traction situation and asserts that since the security grant has been rendered inoperative the position of the Municipal Traction Company has become dangerous. The bond issues aggregate $8,276,000. The terms of the trusteeship are such that the mortgages cover the properties at the time they were executed and properties that may have come into possession of the company thereafter. The purchase of the Forest City and Low Fare properties by the Cleveland Railway brought them under the mortgage.

It is then asserted that the Cleveland Railway, in contravention of its duty and obligation to maintain the properties and apply its earnings to the payment of bond interest and principal, leased its properties to the Municipal Traction Company for 50 years and thereby deprived itself of all means to pay bond interest, taxes, charges and other liabilities except so far as it could rely upon the holding company to furnish the funds for these purposes, as provided in the lease.

The Municipal Traction Company, it is stated, had only such financial responsibility as could reasonably be attributed to a corporation with $10,000 authorized capital and $1,000 paid in, although it undertook to pay 6 per cent on the Cleveland Railway's capital stock and retire the floating debt of $1,288,000 by the sale of Cleveland Railway stock. It is stated further that the Municipal Traction Company, instead of charging the rate of fare provided in the ordinance, has been operating at a much lower fare and has thereby incurred a loss.

Reference is made to the statement in the lease that there must always be 15 years of unexpired franchise to keep it valid, as well as the repudiation of the franchise by the referendum vote. As there is not now 15 years of unexpired franchise, it is stated that the lease has terminated and that the Municipal Traction Company is no longer entitled to possession. The refusal of the Traction company to deliver the properties on demand of the Cleve-

land Railway is related and it is asserted that all the bills and accounts receivable and cash are now the property of the Cleveland Railway subject to the trustee's lien. The Municipal company is now demanding that the properties of the Forest City and Low Fare companies be returned, which would be a serious impairment to the security of the bondholders, the petition says, because a specific lien has been created against the properties.

The petition states that the Municipal Traction Company has been insolvent from the beginning; that it has so managed the property that a floating debt of $500,000 has been created, which it is unable to pay; that it has sold stock of the Cleveland Railway Company under a guarantee to redeem it at par and 6 per cent interest, and that by reason of these facts it is insolvent beyond hope of redemption. The fact that obligations have not been met when due, that several suits have already been filed against it, and that it is in default of one installment of rental amounting to $220,134, are mentioned as further proof of inability to pay.

The Cleveland Railway, according to the petition, has a floating debt of $1,288,000 unpaid and past due, which it cannot meet because of default in rental and the refusal of the holding company to deliver its properties. The Municipal Traction Company is alleged to be diverting the rents, issues and profits for the payment of its own debts.

On account of the dispute as to the possession of the properties and the debts and claims against the companies, it is alleged that there is danger that legal action will be brought and the system dismembered. On account of the Municipal Traction Company's lack of credit, it is claimed that its further possession of the lines will result in deterioration and that loss will fall upon the bondholders. The appointment of a receiver is asked, and it is requested that he shall operate all the properties now in the hands of the Municipal Traction Company, and that the receipts above necessary expenses be placed in a fund for the payment of bond interest and principal. The hearing was set for Monday, Nov. 2.

GUARANTEED STOCK

The next most important feature of the situation is the dispute regarding the claim that the Municipal Traction Company must make good the guarantee on the stock of the Forest City Railway and Cleveland Railway stock sold through the free stock exchange. It seems that the agreement to redeem this stock at par, with 6 per cent interest, at any time was contained in the advertisements in newspapers and magazines, and that nothing in the way of a guarantee appears on the certificates or in any other way. Mr. Johnson and President A. B. duPont, of the Municipal Traction Company, state that the persons who purchased this stock will be taken care of, but say they are under no legal obligations to redeem the stock.

In regard to the liability of the company on the stock guarantee, John G. White, one of the most prominent attorneys of the Cleveland bar, has rendered an opinion to the creditors' committee of the Municipal Traction Company. An abstract of this opinion follows:

The advertisement contains the statement that the stock exchange department buys and sells stock just as a savings bank receives and pays deposits; the further statement that the stock can be redeemed at any time; the further statement that this makes the stock equal in security to a government bond; the further statement that the money is ready for any person who wishes to resell the stock, with no loss of interest, and no 60-day clause.

Various reasons are suggested why this does not create a liability. The first is, that it is said that here there is no contract, nothing but an advertisement; nobody has any agreement. I see no force to this suggestion.

When the stock is bought under this advertisement a contract is formed to repurchase on the terms specified in the advertisement. Contracts made by advertisement and action thereunder are very common and have been uniformly upheld. A contract therefore is made by such a transaction.

Our next question is as to the validity of the contract thus made. It may be suggested that it is a wagering contract. A short investigation suffices to show that this is not true. It is an agreement, in effect, on the part of the vendor to buy back the stock at a certain price—the vendor being the owner and in possession of the stock at the time he sells. Even "puts," properly so called, namely, agreements to buy stock which the person has not at the time in his possession, have been held to be legal.

That a corporation may guarantee the stock or bonds of a corporation with which it is as closely allied as are the Municipal Traction Company and the Cleveland Railway Company is abundantly settled by the authorities quoted in 3 Cook on Corporation, section 775.

The next question is, Is this particular form of guarantee of the value of the stock of the Cleveland Railway Company valid? By the terms of the lease the Cleveland Railway Company and the Municipal Traction Company could never be competing companies. The Municipal Traction Company clearly had the right to purchase or acquire stock in the Cleveland Railway Company. Having this right, they have the power to sell. Having power to sell, they have the power to attach such agreements as are necessary to enable this stock to be sold at the price obtained.

The last objection to the validity is one which has cost me more study than either of the others. The promise is: "We will at any time redeem in cash at $100 a share plus interest at 6 per cent from the payment of the last dividend on any stock that has been sold through our free stock exchange." Here there is no limitation on time. Does this invalidate the promise? I have come to the conclusion that so far as is material for your consideration it does not. There is no case of restraint on alienation. The purchaser of the stock does not agree to reconvey to the Municipal Traction Company on demand of the latter company. The purchaser of the stock may sell to whom he pleases, when he pleases and on such terms as he pleases. The agreement of the Municipal Traction Company is a purely personal contract. The rule against perpetuities does not apply to personal contracts.

A variety of meanings may be given to this advertisement. It may be that it means that they will buy any stock that is presented for redemption in a reasonable time. So short a time has elapsed since the sale of the stock that this interpretation is sufficient to make a liability. It seems, however, quite probable, owing to the language of the advertisement, that it was intended to mean the company would rebuy the stock at any time upon demand by the purchaser of the stock.

If this is so by analogy with the rule applicable to a promissory note payable on demand there would be an obligation to rebuy at any time within the statute of limitations. I, however, incline more to the belief that it means the promise to rebuy within a reasonable time.

The only remaining question is: Was there sufficient consideration for the promise? As to this, there can be no doubt. The amount paid for the stock by the purchaser formed also a consideration for the agreement to reconvey. I conclude therefore that the sum which would be payable from the Municipal Traction Company to the purchasers of stock on its free stock exchange must be counted as a liability. It is quite evident that this whole transaction was improvident, and one not contemplated by the statute under color of which the action was taken.

A number of stockholders have united to test the liability of the company on these guarantees, and Attorneys Klein & Harris have been appointed to represent them. A suit was filed for that purpose late on Saturday evening.

ACTION OF CREDITORS' COMMITTEE

About 100 creditors met in the offices of the Municipal

Traction Company last Wednesday afternoon to consult with Mr. Johnson and Mr. duPont regarding a plan for their protection. At that meeting Mr. duPont stated that the total liabilities of the company, exclusive of the claims of the Cleveland Railway, were $269,000 on Oct. 1, and that they had been increased only about $30,000 since that time. After the meeting the creditors appointed a committee of seven to look after their interests, as follows: F. L. Taft, chairman; Attorney A. V. Cannon, Attorney A. B. Thompson, Drake T. Perry, of the Barrett Manufacturing Company; A. Lowry Verner, of the Cleveland office of the Lorain Steel Company; Mr. Bloss, of the Ohio Brass Company; B. S. Hammill, of the Monongahela Consolidated Coal & Coke Company, and C. W. Troll, of the C. L. Ayers Coal Company. The personnel of the committee has been changed somewhat since that time. Ernst & Ernst were employed to make an examination of the books of the company and report to the committee. The committee sent a letter to creditors which stated:

The committee feels that as to the figures given in this summary it should make certain suggestions. Of the reported assets, practically all of the items are claimed by the Cleveland Railway Company by reason of the termination of the lease. In reference to the item of "betterments," the Municipal Traction Company claims that it is entitled to receive from the Cleveland Railway Company stock at par of said company to the amount of $617,049.76. By the terms of the lease in order to obtain such stock it is necessary for the Municipal Traction Company to present certain evidence of the making of betterments in the form of certificates. As we are informed, the Municipal Traction Company has not presented any certificates to the trust company appointed for that purpose, but has presented to the Cleveland Railway Company certificates for $55,000. This amount has not yet been approved by the railway company. The question as to what constitutes betterments under the terms of the lease and the amount to which the Municipal Traction Company is entitled are questions which will undoubtedly have to be determined by the courts. The committee, although it has had the benefit of expert accountants and has had conferences with the officials of both roads, is unable at this time to form an opinion as to what amount the Municipal Traction Company is entitled under this item.

Of the items which appear among the detailed statement of the assets many were turned over by the Cleveland Railway Company and are claimed by the Municipal Traction Company as belonging to it, which claim is disputed by the Cleveland Railway Company. The committee, although it has spent some days in investigating the assets of the company, feels that it cannot determine the correct amount of assets of the Municipal Traction Company, in view of the claims of the officials of both roads, and that, undoubtedly, many of the items which are claimed by the Municipal Traction Company will be seriously questioned by the Cleveland Railway Company, and it will require the determination of a court as to who is the owner of such property.

In the accounts receivable and bills receivable are many items which were originally turned over from the Cleveland Electric Railway Company at the time of the transfer of the property, the value of which is questionable, and all of which are claimed by the Cleveland Railway Company as its property.

The estimated liabilities include open accounts, taxes, both excise, real and personal taxes, together with the rent down to Oct. 28, 1908. The statement includes for accident reserve, $19,823. The committee, however, in view of the large number of damage cases pending, is unable to determine whether this amount is a sufficient one or not, but is inclined to think it will not suffice. In addition to this there is an alleged liability growing out of the sale of stock through the free stock exchange.

The committee has within the short time allotted to it used every endeavor to secure all information that it could and trusts that this statement will be of assistance to you.

The report is signed by the following committee: F. L. Taft, A. V. Cannon, A. B. Thompson, Drake T. Perry, C. W. Troll and F. S. McGowan.

The summary of the statement to which the report refers is as follows:

ESTIMATED ASSETS.

Cash	$335,245.18
Securities	237,860.11
Bills receivable	163,658.00
Accounts receivable	119,343.29
Miscellaneous assets	92,605.70
Deferred charges	21,497.27
Betterments, etc.	617,049.67
	$1,587,259.22

ESTIMATED LIABILITIES.

Accounts payable	$911,738.54
Deferred liabilities	183,605.99
Maintenance reserve	14,777.12
Accident reserve	19,825.75
Ticket float	36,068.81
	$1,166,016.21

Note A.—Contingent liabilities on $182,000 notes of Cleveland Railway, indorsed and used to pay accounts payable.

Note B.—Contingent liability on $248,800 of stock sold through free stock exchange since May 5, 1908.

Note C.—Liability on payments amounting to $5,206.53 made on stock of Forest City Railway, not delivered but subscribed for; total subscription, $17,420, questioned.

Note D.—Liability for guarantee on sale of $1,594,700 Forest City Railway stock, questioned.

Note E.—Liability on account of guarantee fund, showing credit balance of $150,000, questioned.

Note F.—Charges for betterments, maintenance and accident reserve not verified.

OTHER DEVELOPMENTS

A number of suits have been instituted against the Municipal Traction Company within the past few days, the most important being that of the G. C. Kuhlman Car Company for the recovery of $30,000 incurred in changing several of the cars into pay-as-you-enter cars. The company asks that the cars be sold and the proceeds used to pay this debt.

Dr. J. E. Cook has brought suit for $2,767 for services. Dr. Cook was the company surgeon up to within a few weeks ago.

Liens have been filed for amounts ranging from a few hundred dollars to over $9,000, the total amount being between $16,000 and $17,000.

The board of election canvassers certified the result of the referendum vote, after the members were satisfied that they had no right to hear complaints regarding the manner in which the voting was done on some of the machines. It was found that the correct majority is 606, instead of 605, as at first supposed.

After the vote had been certified, Secretary H. J. Davies made another formal demand upon the Municipal Traction Company for the properties.

Attorney H. H. McKeehan placed his resignation as a trustee of the Municipal Traction Company in the hands of Mr. Goff, chairman of the board, last week. In transmitting this resignation to Mr. Johnson, Mr. Goff wrote that the only conditions upon which he was willing to continue to act as trustee are:

First—That the Municipal Traction Company consent, or at least enter no opposition to, the appointment of a receiver in the suit brought yesterday by the Central Trust Company. It seems to me quite immaterial whether the action has been prematurely or improperly brought, for the reason that the appointment of a receiver in the present complicated conditions seems to me not only wise, but, certainly in the near future, inevitable.

Second—That you publicly express your willingness as Mayor to again take up at once with representatives of the Cleveland Railway the consideration upon broad and fair lines of an equitable settlement of the traction question.

Mr. Goff said he firmly believed that both the mayor and the Municipal Traction Company should publicly express a willingness to take up the matter of settlement with

the Cleveland Railway upon the lines indicated whenever the directors of the latter company were willing. Mr. Goff added:

I am firmly convinced that the referendum election, as announced by the canvassing board, ought not to be contested, but appreciate that a determination of this and other questions involved in the dispute between the Municipal Traction Company and the Cleveland Railway Company can be long delayed if desired by the parties. In my opinion the public would justly regard such a delay as intolerable. If I am not mistaken, the public still want peace, not in one year or ten years, but now, and will welcome any settlement which will insure high-grade service at the lowest rate of fare consistent with a just return to actual capital invested.

I can serve no purpose whatever on the board of trustees unless it be to assist in reaching a speedy settlement along the lines above indicated, and am unwilling to be identified with the Municipal Traction Company, as trustee or otherwise, if such policy be inconsistent with the wishes of your board of directors.

Mr. Johnson was not willing to consent to the receivership, and Mr. Goff insisted that his resignation be accepted.

S. H. Tolles, law partner of Mr. Goff, who had been retained by the Municipal Traction Company to defend the receivership suit, on Thursday notified the officers that he had decided to withdraw. This action was taken because of the large number of clients with opposing interests who had retained his firm.

HEARING IN RECEIVERSHIP CASE

The hearing in the receivership case of the Central Trust Company of New York against the street railway companies was begun before Judge Tayler, of the United States Circuit Court, on Monday. Judge Tayler said he had understood that the appointment of a receiver would *ipso facto* result in the termination of the lease, and that if this action, if taken, would result in the finality of the instrument, very serious consideration should be given to the matter in the hearing and the decision of the court. It ought to be a very clear case, if the consequences went beyond a mere receivership. The question had come up whether the Municipal Traction Company had any right to a restoration of the property owned previous to the settlement, and it might be thought that this claim should not be allowed. He might have to ask the Cleveland Railway to waive the claim that a receivership terminates the lease and that receivers, if appointed, should represent both parties, as well as the court.

Henry J. Davies, secretary of the Cleveland Railway, testified regarding different items of expense as shown through past experience. Regarding the reserve fund for accident claims, for which the Municipal Traction Company had set apart $19,000 since it took hold of the property, Mr. Davies said that the old company had set apart $156,000 in 1905, $195,000 in 1906, and $220,000 in 1907. An attempt was made to reduce this to a car mile basis in order to apply it to the present situation. Mr. Davies said that the old company computed this expense both according to the car-mileage and the number of people carried, as both factors had to be taken into consideration.

A member of the firm of Ernst & Ernst, accountants, said that the books of the Municipal Traction Company were in poor condition, and that the accounting department was far behind in posting. His testimony showed that the entire cost of construction work and improvements had been charged to capital account, whereas only 80 per cent of it should be covered by an issue of Cleveland Railway stock under the lease. There is a conflict as to the construction of the loops in the public square. The books do not show that the city paid for these additions, whereas it was supposed that such had been the case. The money to be used was that which the Cleveland Electric Railway paid as rent on the Central Avenue and Quincy Street route after the expiration of the franchise.

A. V. Cannon, representing the Cleveland Frog & Crossing Company, and S. H. Tolles, representing the John A. Roebling's Sons Company, asked to be made parties to the receivership suit.

The amount of liens now filed against the company is $64,233, the last one being filed by the Monongahela Consolidated Coal & Coke Company, which has a claim of $23,390.

PENNSYLVANIA AWARDS CONTRACT FOR TERMINAL

The Pennsylvania Tunnel & Terminal Railroad Company, the subsidiary company of the Pennsylvania Railroad which is constructing and will operate the new terminal which is now under construction in New York, has awarded to the Westinghouse Electric & Manufacturing Company the contract for its power house, substation and motive-power equipment for the operation of the new electrified zone extending from Newark, N. J., to Jamaica, L. I. This contract, when fully executed, will constitute by far the largest single order for electrical apparatus ever given, and it is said will aggregate over $5,000,000. It was accepted by the board of directors of the Pennsylvania Railroad late in the afternoon of Nov. 2, and was based largely upon the results of a series of tests which have been conducted on the Long Island Railroad by George Gibbs, chief engineer of electric traction of the Pennsylvania Tunnel & Terminal Company.

It is understood that the contract includes an order for 100 electric locomotives. No decision has been announced as to whether the line will be equipped with direct current or alternating current, but it is understood that the chances are very much in favor of the adoption of alternating current.

CAUSES OF FAILURE OF LIQUID INSULATING MATERIAL

A little understood point in connection with the use of liquid or plastic insulating materials in the manufacture and installation of electrical apparatus is the necessity of avoiding the use on the same job of different materials which are, so to speak, incompatible with each other. There is a tendency in some shops to apply successive coats of different kinds of insulating materials on the work in hand. This practice is often the cause of disappointment in the behavior of the insulations in service, for the reason that many which are good individually are thereby robbed of their good qualities. This loss of quality by intimate physical association is here termed "incompatibility," and its cause and effects among certain insulating substances are due to radical differences in their chemical and physical properties. It is well known that shellac is soluble and may be carried in solution by liquids of the alcohol group, paraffine may be dissolved by liquids of the naphtha group, and still other insulating materials by liquids of the coal-tar group. But these different substances will not mix with each other, and when solutions of them are applied as successive coats as insulation on a winding or other part of a piece of electrical apparatus, the result is a composite but non-homogeneous layer which will give trouble sooner or later. The two parts of the layer will not only have no affinity or adhesiveness toward each other, but will

mutually repel and injure each other. It is impossible to mix shellac and paraffine together, and it is also impossible to produce a strong enough flux, or solvent, to make the compound homogeneous. These two different solids in suspension or solution in a plastic mass in which they are free to flow will separate in exactly the same way as liquids, and any exposure to heat will cause chemical disturbances to be set up that will eventually break down and destroy the insulation.

An instance of this behavior of good insulating materials is in the improper use of the well-known Armalac, manufactured by the Massachusetts Chemical Company. This material is a permanently plastic compound, and when used alone forms a reliable insulation, which remains unimpaired for long periods. Applied to the windings, leads, etc., of electrical apparatus, it will remain "live" and plastic, and will afford throughout the service life of the apparatus the same high dielectric strength as when first applied. But if inexperienced users contaminate it with other materials—as, for example, by dipping the part to be insulated in shellac first and then in Armalac—the definite physical structure of the latter will be disturbed, and the material will chip and fly off, rendering the insulation of absolutely no value after a comparatively short time. A short time ago an officer of the Massachusetts Chemical Company received a complaint from one of the large street railway companies that Armalac was proving brittle in service. On visiting the company's winding room and examining the methods used, it was found that the bodies of the coils insulated were in first-class condition, but that the insulation of alternate leads was brittle. This condition was due to the fact that the winders were marking every other lead with a colored stocking, so as to keep track of the winding. An explanation of the incompatibility of the ingredients of the two products that were being used convinced the foreman of the winding department that there was a material in the stocking that was detrimental to the Armalac used for the insulating coating. Accordingly the company gave up the use of the stocking, which put a stop to all complaints. Trifling mistakes of this kind cause a large percentage of insulation troubles. Discerning purchasers and users of insulating materials should be guided by the many years' experience of the manufacturer of standard products such as Armalac, and not run any risk of vitiating the known quality of such products by permitting careless or ill-advised employment of other compounds in conjunction with them.

THE SARGENT RERAILER

Car replacers are used only in emergency, and therefore the design of such devices should provide for the quick transfer of car wheels from the pavement to the proper location on the rails. George H. Sargent, of the Sargent-Hollingshead Company, 1616 Fisher Building, Chicago, has recently designed a replacer which differs from the types heretofore used in electric railway work, and includes this desired principle in its makeup. The new "rerailers" are built for use on steam roads, as well as on street and interurban lines. The new underlying principle of design is that the car wheel is returned to the rail by traveling over the rerailer on its tread, rather than on its flange.

The accompanying illustration shows a pair of rerailers designed for city service as placed for practical testing on the tracks of the Chicago Railways Company. These rerailers are single steel castings, weighing but 15 pounds each. One casting is designed for use on the right-hand rail and one on the left. The design is such that no tools are required for making the rerailers ready for use, and they work equally well on grooved, tram or T-rails.

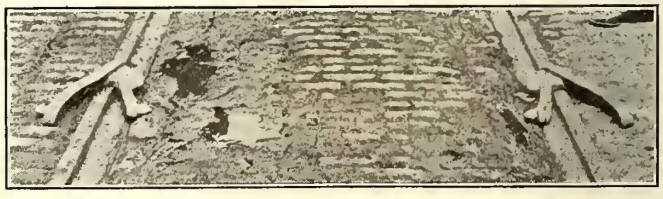
The rerailer is V-shaped and has three points of support: The intersection of the runways which rests on the rail head and is held against lateral thrust by a ¾-in. downward projecting flange, and the ends of the two runways, which rest on the pavement and are provided with ½-in. calks. This three-point support, combined with the controlling principle of the design, viz., that stresses all act vertically, renders the use of spiking and blocking unnecessary.

Sargent Rerailer

The Sargent rerailers were exhibited at the Atlantic City convention, and the actual castings are so small in comparison with other rerailers that several of those inspecting these castings thought them to be only models, when, in fact, the exhibit comprised the rerailers as used in actual service.

The usual type of wheel-replacing device raises the derailed wheels for replacement by running the points of the flanges onto shell-shaped inclines. The point of contact between the edge of the flange and the shell-shaped casting is small as compared with that in the new device which raises the wheels on their treads, and therefore the probability of slipping and failure to rerail with the shell type of rerailer is said to be greater than with the Sargent type.

The new type presents a line bearing for wheel treads which, for the initial pickup of the wheel, is below the angle of slippage; and therefore it is not necessary to bump the wheels on to the rerailer, but in any ordinary situation they will, with the power of the car, mount the guiding arm of the rerailer easily and accept flange guidance for lateral transference to the rails. With city cars and rerailers as designed for service on paved streets, it is only necessary when replacing wheels for this replacer



Sargent Rerailers in Place on Rails

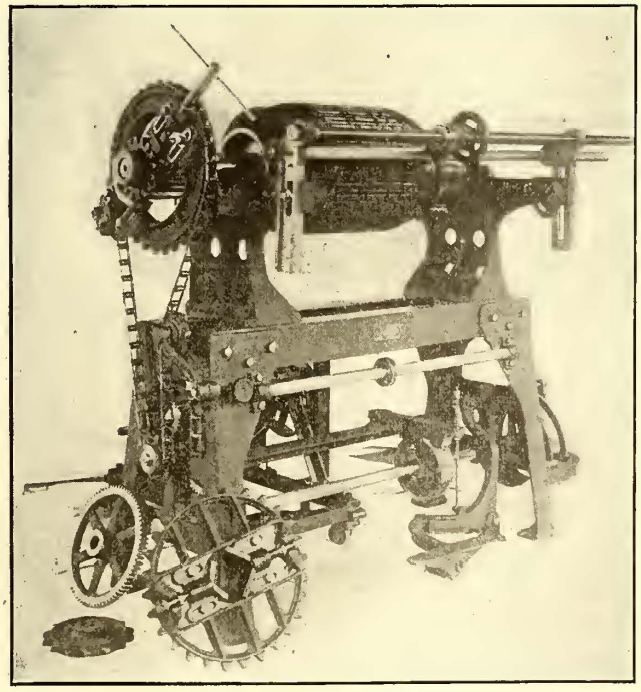
to lift the wheel 2 in., and this lifting is carried on the tread of the wheel, and not on the flange. The tread-bearing feature is considered valuable in that it will assure the least damage to the flanges of chilled wheels.

Recent tests made in derailing and rerailing a car on the Chicago Railways Company's lines in Chicago demonstrated the ease with which a 41,000-lb. car could be rerailed with its own power. It was also shown that if the wheels after derailment had run a considerable distance away from the track, they could be steered toward the

track, and the trucks swung into line by using the rerailers as shift rails. These experiments performed in Chicago were so satisfactory that the Sargent-Hollingshead Company now announces that the Sargent rerailers are available for electric railway use.

IMPROVED BANDING MACHINE

The Device Improvement Company, Hanover, Pa., has modified its armature banding machine somewhat. The new machine is lower than the one first produced, and the legs are heavier. The foot treadle has been made very much more convenient for the operator by making the footpiece longer, so that it can be reached from any part of the machine. The brake to hold the armature against the tension of the band wire remains practically the same. The driving shaft, the yoke supporting the back end of this shaft and the belt shifter rod have also been made heavier. The adjusting hand nut for the chain idler has been placed at the front of the machine instead of the back. The rod carrying the lower traveling grooved pulley has been made larger, preventing any spring. The bed pieces have been doubled in size and are accurately planed. The heads are now practically doubled in weight and are machine fitted throughout. The feed rod supported from the heads is now of 1½-in. cold rolled steel with square threads, and on account of the coarser pitch of these threads it is possible to feed from band to band much more quickly. This rod can be adjusted vertically and in and out to suit the convenience of the operator and the requirements of the work. The feed wheel is now larger and is fully machined, permitting a better grip for faster feeding. The

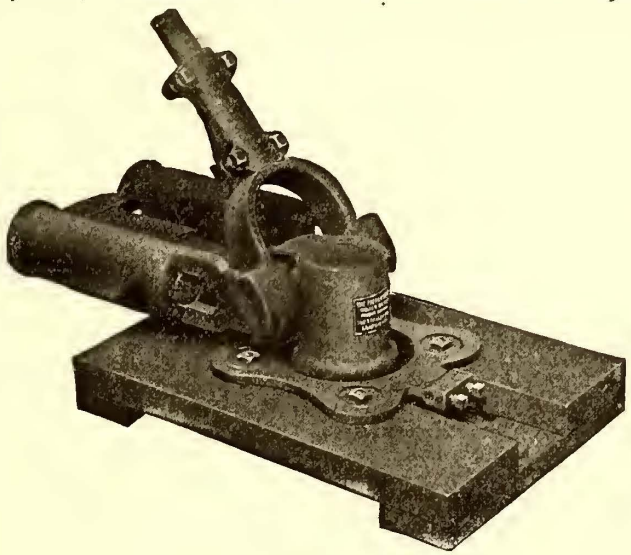


Improved Banding Machine

left-hand head is made adjustable along the bed the same as the right-hand head, thus obviating the use of any set collars. Two sprockets are now supplied. One is for application directly to the shaft and holds by friction; the other is applied on the pinion and has a projecting tooth, which engages between the teeth of the pinion, making a positive drive. The pinion sprocket is used exclusively for railway armatures, while the friction spocket is used for stationary armatures and air compressor armatures. Four speeds are now provided, two by change of gears and two by change of small sprockets. The gears are now machine cut from solid metal. The driving chain is larger and the breaking strain is 2000 lb. The field coil winding attachment has also been improved in detail.

ROLLER BEARING TROLLEY BASE

The Trolley Supply Company, of Canton, Ohio, is now making for general sale the "Peerless" roller bearing trolley base, which was shown for the first time at the 1908



Roller Bearing Trolley Base

convention in Atlantic City. The features of this base emphasized by the manufacturer are its frictionless operation in all directions; the enclosure of the springs, adjustable screw and roller bearing so that their action cannot be impaired by rain, sleet, snow or dust; the fact that no lubricant is required, and the attainment of a perfectly even tension at any angle of the pole. The last quality is asserted to be unique to this design of trolley base.

The new base is adapted for both city and interurban service. The base can be used either way, so that should a pole leave the wire suddenly it will not result in the breakage of the pole or base, since the former is free to swing in either direction. The present model of this trolley base is 6 in. above the running board, or 5½ in. above the base plate. The manufacturer is planning, however, to build one only 4 in. above the running board, and otherwise will meet special conditions.

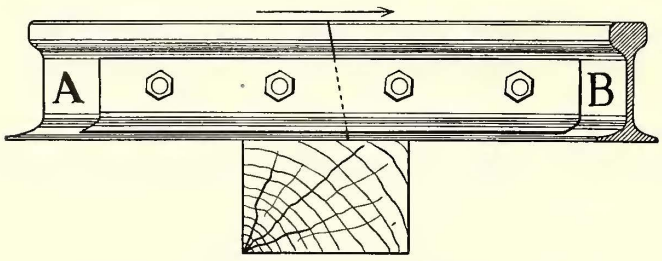
The frictionless quality previously mentioned is asserted to reduce the tension on the trolley wire about 20 per cent; that is, a "Peerless" base with a uniform tension of 32 lb. will hold the pole against the wire as easily as others with 40 lb. tension, because no power is lost in overcoming spring friction. This feature in itself should greatly lessen overhead wire and wheel troubles.

Two of the 57 storage-battery motor cars ordered for the Prussian State Railways have been delivered, and are in service near Berlin. The design of the cars differs from that of the original cars in use in Maintz in that instead of placing the cells under the seats of the passenger compartment they are arranged in special shallow compartments in front of the driver's cab. Each unit consists of two four-wheel cars, each car being equipped with one 80-hp motor and a battery of 84 cells. A run of over 60 miles can be made on one charge.

THE JONES RAIL JOINT

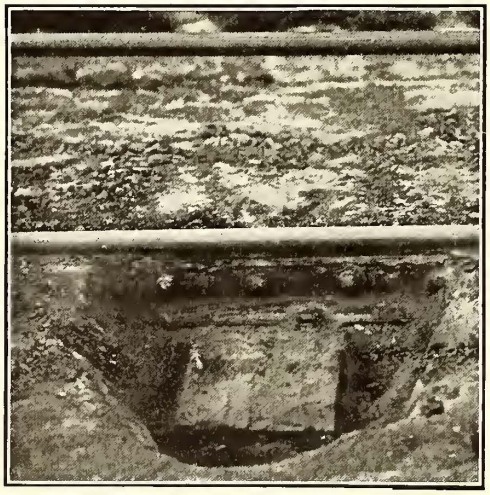
An account has been published in these columns of the beveled rail joint used in Denver for a number of years. It has given such good satisfaction there that steps have been taken to put it on the market by Duncan Bond, of Denver, who controls the patent. Fig. 1 is reproduced from a photograph and shows a beveled joint after four years' service.

The Jones beveled rail joint, as it is called, consists of rail sections having abutted inclined ends. The ends of the rails



The Jones Rail Joint

are cut off at a slight angle in the vertical; 1 in. in 6 in. seems to give the desired results. The joint is supported on a tie and the traffic can be in either direction, that is the joint is suitable for either double or single track. To acquire the best results, it has been found that a binding action should be created at the abutting inclined ends of the rail by drawing them firmly together. This is effected by drilling the splice holes so that those nearest to the ends of the rails will be spaced 3/16 in. farther apart than the corresponding holes in the splice plates to allow for the usual differences between the diameter of the hole and the track bolt. A drift is used to draw the rails together until the bolts can be placed in position, after which all nuts are



Jones Rail Joint After Four Years' Service

tightened securely in the usual way. Only the ordinary track tools and force of laborers are required. The entire absence of expensive special appliances and its enduring qualities are important features of this joint.

No trouble has been experienced in Denver from expansion or contraction or from pounding at the joint.

Arrangements have been made between the Chicago & Milwaukee Electric Railway and the Milwaukee-Northern Railway for interchange of transfers between the two lines, to go into effect as soon as the cars of the Chicago & Milwaukee Electric are running into Waukegan over the Sixth Street viaduct.

LONDON LETTER

(*From Our Regular Correspondent.*)

The excellent weather that London has been enjoying lately has indirectly benefited all means of communication in the Metropolis. We say "indirectly" because in the case of tubes and underground railways in general, favorable weather very often drives passengers to the surface, but in this instance the attendance at the Franco-British Exhibition at Shepherd's Bush was so enhanced by the absence of cold and rain that the number of visitors at the exhibition has been phenomenal. The following are the aggregate increases on the underground electric railways for the 15 weeks ended Oct. 30: Metropolitan, £17,537; Metropolitan District, £22,999; Central London, £38,440; Great Northern, Piccadilly & Brompton, £15,195; Baker Street & Waterloo, £29,605; Charing Cross, Euston & Hampstead, £11,325. The increases on the tramways are as follows: London County Council, £104,292; London United, £3,697.

The omnibus companies record an increase of £7,648 for the London Road Car Company and £11,246 for the London General Omnibus Company.

The highways committee of the London County Council, which has had the subject of extending and electrifying the London County Council Tramways under discussion for some months, at the instance of John Burns, president of the Board of Trade, has decided on immediately electrifying or constructing 17 miles of tramways at a cost of £281,265, of which £253,950 is for track work and £27,315 for cables, ducts, overhead equipment, etc. The new lines are those in Crowndale Road, from Streatham to Norbury, and in Swinton Street. The lines to be converted are between King's Cross and Kentish Town Road; in Prince of Wales Road, between Camden Town and Hampstead Heath; Prince of Wales Road and Highgate Archway; Clerkenwell Road and Pentonville Road; and in Essex Street. All except the Streatham line are to be equipped with the conduit system. In addition to these new proposals the London County Council has given notice of its intention to construct tramway lines between Hammersmith, Broadway and Putney, and another between the same point and Brook Green Road, and still another between Battersea Bridge and Shepherd's Bush. The last line is opposed by the Kensington Borough Council.

The London County Council has not yet overcome the troubles in the Mile End Road. It is stated that the president of the Institution of Electrical Engineers, who was called in to advise on the G. B. contact system, has reported that it can be worked with safety. Even if this be true, the question of the cost of such working has still to be considered.

Curiously enough, both the large power stations of the London County Council were recently forced to shut down temporarily, thereby giving those who object to one large power station for the Metropolis an instance to cite as an argument to further their ends, although it does not follow that because the station is concentrated in one place no arrangements can be made for the independent working of different lines and for enabling these independent lines to assist one another in case of failure on any one of them, as indeed was done in the following case. On Sept. 21, owing to an accident at the Greenwich power station, current was cut off for about an hour, beginning at 6:30 p. m. at the peak of the evening rush, and it is estimated that on the 96 miles of the Council's system 800 cars were suddenly brought to a standstill. The cause of this stop was the temporary failure of one of the engines. It took an hour to shift the load.

At 2:35 p. m. on Oct. 3 there was a still more serious interruption to traffic on the lines served by the Lots Road station of the London Underground systems. Not only were the street cars on the Wimbledon, Tooting and Surbiton lines stalled, but power was cut off from the trains and lifts on the Bakerloo, Piccadilly and Hampstead and Metropolitan District tube railways, all served from that station. In this case the interruption lasted four hours. Although much inconvenience was caused no one was hurt. Passengers imprisoned in trains got out at the end by the help of steps provided for that purpose and walked to the nearest station. Those in the lifts were lowered by hand and then made their way to the streets by the stairways. At the time of the accident the five 5500-kw turbo-generators were all carrying very nearly their full load, when one phase suddenly earthed. This made it necessary to trip the circuit-breakers on the exciters and shut down the generators and the 26 substations. The total damage at the main station was trifling; at the substations a few rotaries flashed over, but of the 357 miles of three-phase cable leading to them not one failed. The accident showed that 2½ ft. of

air space and a 6-in. concrete floor are not sufficient between one of these series transformers and the oil switch, and the distance will be increased to 8 ft. In addition to this, all space between the cable and the inside walls of the insulator will be caulked tight.

The Board of Trade report on the fire that occurred on the City & South London Railway last July is not very illuminating. It is attributed to the ignition of the iron and carbon dust, cotton waste, etc., which accumulated on the sleepers and insulators, by a leak between the power and the running rails or by a spark off a brake-shoe. The inspecting officer's recommendations apply to all tubes or underground railways; they may be summed up as follows: greater cleanliness, more whitewash, filling up of inverts, all wires and cables to be fixed "neatly" to side walls, crossing of cables to be overhead, timber to be eliminated as much as possible, all traffic to be stopped immediately on the occurrence of a fire and the fire brigade to be notified at once.

As if the competition of the London County Tramways and the Underground Railways was not bad enough, plans are being considered for a line linking up the present north and south tramways at King's Cross with the western system by running along the Euston and Marylebone roads. The Middlesex County Council is constructing valuable links in the outer area of North London. An extension from the Great Northern Railway bridge at Southgate to the Great Northern Road at Tally-Ho Corner will shortly be opened and will connect with the lines of the Metropolitan Electric Tramways Company. An extension has just been begun from Tally-Ho Corner by the Finchley Road to Cricklewood, a distance of 6 miles. At Golder's Green the line will pass a terminus of the Hampstead tube and also along the Hampstead Garden suburb. These lines are all double tracked on the overhead system and will be leased to the Metropolitan Electric Tramways Company.

The following table submitted by the highways committee of the London County Council shows the growth of electric traction in London on one system alone. The comparison is for the 11 weeks preceding Oct. 3, and there were 17½ additional miles electrified in the 12 months:

Miles open Oct. 3—	1908.	1907.
Electric traction	78.67	61.33
Horse traction	43.74	54.23
Passengers carried—		
Electric traction	73,997,632	58,030,749
Horse traction	16,287,755	21,972,670
Receipts—		
Electric traction	£334,889	£263,653
Horse traction	63,687	89,490
Net increases—		
Miles in operation	....	6.85
Passengers carried	....	10,281,968
Receipts	....	£45,433

For the six months to Oct. 3 last, the total traffic receipts were £942,585, against £839,293 for the corresponding period last year, an increase of £103,292.

According to a list recently published, 98 of 290 electric tramways, mostly constructed since 1900, are worked by municipalities and 114 by companies. Of late years the municipal undertakings have increased much faster than private ones. The municipalities have £41,000,000 invested in tramway lines and carry 2,545,000,000 passengers. A majority of the undertakings show some profit after payment of interest and sinking fund charges, but, in most cases, the margin is so small that the ratepayers derive little, if any, benefit. In Birmingham, Glasgow, Leeds, Liverpool, Manchester and Sheffield, however, substantial sums are paid in relief of rates, although fares are low and wages, as a rule, generous.

Many novelties are introduced on the different municipal lines. The London County Council, for instance, prints a diminutive map on the back of its transfer tickets showing points where a change is necessary. It is proposed to erect a movable shelter on the Victoria Embankment to protect intending passengers. This is quite common on the Continent, but new to England, Britishers taking pride in being "wind and weather-proof." Another novelty is the issue of photographic passes to employees, instead of celluloid tokens which, in spite of the opinions expressed at the last Municipal Tramway Convention, it is proposed to issue to large employers of labor and to the Council's special schools at a reduced rate of payment.

The experiment of running first-class cars in Liverpool on a route, the center of which is much affected by men who do not wear overalls at their work and whom it is difficult to keep from riding inside in wet weather when there are no top covers, is being watched with interest. Opinions are divided as to its success.

The deputations sent to Germany by the Councils of Manchester and Dundee to inspect a trackless trolley system of omnibuses that has been working for some time at Mulhausen and in seven other towns, have reported favorably, and the Board of Trade making no objection, the system is to be tried in both towns and is being talked about for Liverpool. They will compete directly with the present motor omnibuses, and if run in connection with existing tramways and strictly as feeders to them, they are likely to pay on routes where the present traffic does not justify the capital outlay required for laying rails. There is this further advantage that the system could be worked from the present power stations, and that the overhead wires would be utilized should tracks have to be laid at some future time.

The Bradford Tramways committee inspected the various proposed new tramway routes recently. These include an extension to Oakenshaw, an extension from Wyke to Bailiff Bridge, joining with the tramway at Hipperholme, and a possible circular route round Bradford. It was decided to recommend the parliamentary committee of the Corporation to include in the bill which is being promoted powers for several extension schemes, one to include an alternative provision for the trackless trolley system. At the meeting of the Council, Alderman David Wade made his annual financial statement on the trading concerns of the Corporation. These, he said, showed a net credit balance of £19,190, the largest surplus being shown by the tramways (£17,238). During the current financial year there had been expended upon renewals of permanent way up to date £22,000, and all that account had not been received. If they assumed that a similar balance was carried to the renewal fund as that of last year it would stand at the end of the present year at £47,000. For the year ending March, 1910 and 1911, it was estimated that there would be required for renewals the sum of £22,000 and £17,000 respectively, and if they assumed a similar balance to that of last year was carried to the fund each year (£17,000), the amount to credit at 1910 and 1911 would be £42,000, or less by £10,000 than at the end of the last financial year, March 31, 1908.

The inspecting officer of the Board of Trade has reported on the accident which happened at Bournemouth on May 1. He criticises the organization of the Tramways Department, and the Town Council has decided to appoint J. B. Hamilton general manager of the Leeds City Tramways, to advise as to what alterations, if any, it is necessary for the Council to make in the organization and working of the tramway system. The officials have strongly objected to many statements in Major Pringle's report, and they point out that, for some of the matters respecting which he complains, the responsibility rests with the Board of Trade, the Council having proposed and the Board having opposed the very things now advocated.

On Oct. 4 a car containing 30 passengers overturned in Birmingham while going cautiously over a portion of the road that was being relaid. It was derailed at a bad place and the wheels on one side dropped into a trench, causing the car to topple over slowly. The passengers clung to the hand rails and escaped without serious injury. In London and at Nottingham cars have been on fire, but with little damage to the vehicles and none to the passengers.

The Electrical Exhibition at Manchester has been so successful that it is proposed to make it an annual fixture. The largest attendance on one day has been 20,000. Several times, however, as many as 15,000 persons have been present in a day. Existing railway facilities are being improved and it is not unlikely that the idea will be carried out.

The first meeting of the International Conference on Units and Standards was opened by Winston Churchill on Oct. 12, and the first meeting of the Council of the International Electrotechnical Commission was opened by Mr. Balfour on Oct. 19, at the new home of the Institution of Electrical Engineers on the Victoria Embankment. Both these meetings are consequent on a resolution passed at the Electrical Congress in St. Louis in 1904.

During the four years ending June 30, 1907, profits were well maintained by Dick, Kerr & Company, varying only between £86,354 and £80,476, the 10 per cent ordinary dividend being regularly covered during that period about twice over. A severe decline was, however, experienced in 1907-8. Profits fell to £59,558, and though the ordinary dividend is maintained at the old figure, the margin beyond is trifling. High cost of coal and materials on the one hand, and rather severe trade depression on the other, with a consequent increase in competition, are probably the causes of this sharp decline. How soon recovery will set in is difficult to say, but it may at least be hoped that there will be no further fall in profits. A. C. S.

News of Electric Railways

Meetings of the Central Electric Associations

Meetings of the three railway associations in the Central Electric territory will be held at the Lima House, Lima, Ohio, on Nov. 18 and 19.

The first of the three organizations to meet will be the Central Electric Traffic Association, which will be called to order at 10 a. m. on Nov. 18. In calling this meeting, A. L. Neereamer, chairman of the association, says:

"Each member is urged to be present or authoritatively represented, as we desire to start on the compilation of the basing and selling fare tariff, and each representative should come prepared to check in his interline or through rates.

"It will be necessary for the chairman to have the power of attorney and concurrence before he can proceed with the authorized publication and filing of tariffs. If you have not already done so, please issue same at once or notify the chairman of your intention of not doing so, in order that he may know the lines and stations to be included in the association rate sheets."

The meeting of the Central Electric Accounting Conference will be held at 1 p. m. on Nov. 18. The call for the meeting, signed by C. B. Baker, secretary, and M. W. Glover, the chairman, says that a full attendance is desired as several important subjects will be brought up for discussion, among which are the following:

"Uniform blanks for interline freight and passenger business. The committee appointed at the meeting on Feb. 11, 1908, will make a report and will recommend blanks to be used by all lines.

"Accounting for the new Central Electric Traffic Association mileage, and the settlement of interline freight and ticket accounts between lines.

"The classification of operating revenues, operating expenses and expenditures for road and equipment of electric railways, as adopted by the Interstate Commerce Commission and the Railroad Commissions of Ohio and Indiana, effective on Jan. 1, 1909."

Mr. Neereamer announces the following program for the meeting of the Central Electric Railway Association, which will be called to order at 10 a. m. on Nov. 19:

"Purification and Heating of Water for Feed for Boilers," by a representative of the Harrison Safety Boiler Works, Philadelphia, Pa.

"Possibilities of Handling United States Mail and Compensation Paid by the Government," by C. M. Paxton, secretary and general manager, Dayton & Troy Electric Railway, Tippecanoe City, Ohio.

"The Claim Department," by Frank Talmedge, president of the Frank Talmedge Company, Columbus, Ohio.

"Railroad Crossings," by W. C. Sparks, superintendent of tracks, Indiana Union Traction Company, Anderson, Ind.

The subject for general discussion is: "Effect of Financial Depression on Interurban Roads During the Past Twelve Months."

J. I. Beggs on the Rights of Street Railways

John I. Beggs, president and general manager of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., in a speech delivered on Oct. 24 before 2000 people at Thirtieth Street and Fond du Lac Avenue, Milwaukee, on the occasion of the celebration of the completion of the paving on Fond du Lac Avenue from Twenty-seventh Street to Thirty-fifth Street, after three years of agitation by the residents, paid his compliments to what he termed "the moral cowards who make political capital out of opposition to street railways and seek to set up their limited knowledge against the experience of years." Mr. Beggs is quoted by the Milwaukee *Sentinel* as having said in part:

"It makes no difference what you think of the manager of the Milwaukee Electric Railway & Light Company, give the property credit for what it is and what it has done. You may travel over the length and breadth of this land, or you may go abroad, and I challenge you to find another street railway system better than Milwaukee's.

"This pavement represents $80,000 of improvement. Our extension on this street from Twenty-seventh Street to Thirty-fifth Street means more to you than that, and you secured it without the expenditure of a cent. It means hundreds of additional residents, and I predict that this section will be doubled in population within a few years.

"In years gone by it was popular to denounce the company. It is not so popular to-day. In the progress of the street railway system you are vitally concerned. It means more than all the factories in Milwaukee put together. But the system cannot be extended while you are denouncing it.

"The Thirty-fifth Street extension is being held up by injunctions in two different localities. There has been resting in musty pigeon holes in the city hall an application for a franchise. The injunction can be removed by the passage of that franchise, and I challenge any member of the Council to deny this. When that franchise is granted or the injunction removed the extension will go ahead as rapidly as possible. We are building this system on a broad basis, not to accommodate the Milwaukee of 350,000, but the Milwaukee of the future, the Milwaukee of millions.

"There is nothing secret about the Milwaukee Electric Railway & Light Company. Its books are always open, and I am always glad to receive any citizen or delegation of citizens on matters concerning criticism or improvements of the service."

Pittsburg Fender Tests

The Public Service Commission of New York, First District, is making good progress with its second series of street car fender and wheel guard tests. The second week of the tests ended last Saturday, up to which time 19 of the 61 devices entered for competition had been tried out and more than 500 separate tests made. It will take two or three weeks more to finish the series. The conditions under which the tests are being carried on are much the same as at the September tests held at Schenectady, N. Y., for the benefit of Eastern manufacturers. The number of devices to be tested, however, are fully one-third greater at Pittsburg than at Schenectady. At the Schenectady tests, 40 devices were entered and 35 tested. The Commission has made arrangements with the Westinghouse Electric & Manufacturing Company, whereby it rents from the electric company, track, cars, power and the services of motormen and other labor, and pays for all changes in track and equipment made necessary for the proper conduct of the tests. The track used for the tests is a part of the Interworks Railway of the Westinghouse companies and runs along the banks of Turtle Creek, just east of Pitcairn station. A section of the track, 240 ft. long, has been paved 120 ft. with asphalt and 120 ft. with cobblestones, reproducing as nearly as possible actual street surface conditions in New York City. Power is furnished from the Westinghouse works at East Pittsburg.

Each of the three dummies is used in several different tests on each kind of pavement, and a fender to go through the whole series must pass 72 trials. For projecting fenders the dummies are placed in a number of different positions, both standing and lying on the track, but to test the wheel guards, prostrate figures only are used. Photographs of each test are made as the car comes to a stop after striking the dummy. These photographs, as well as those taken at the Schenectady tests, will be incorporated in the report which the Commission will publish. The tests are being held under the supervision of the Committee on Safety Devices of the Public Service Commission. This committee consists of A. W. McLimont, electrical engineer, chairman; George F. Daggett, chief of the bureau of accidents, and Daniel L. Turner, chief of the bureau of transit inspection. Only Mr. McLimont and Mr. Daggett came to Pittsburg, Mr. Turner being detained in New York by other business. Mr. Daggett remained only for the first week, as his duties called him back to New York. Mr. McLimont, who also conducted the Schenectady tests, has been on the grounds from the start and will remain until the tests are completed. Other members of the staff of the Public Service Commission are here assisting him, including R. H. Nexsen and W. R. Thompson, electrical engineers; R. S. Wright, secretary to the committee on safety devices, and Avery M. Schermerhorn, inspector of the accident bureau.

Arrangements for the tests, including the paving of the track and the erection of buildings and other structures, were in charge of M. N. Blakemore, of the Westinghouse Electric & Manufacturing Company, while W. L. Conwell, the New York representative of the Westinghouse Electric & Manufacturing Company, and J. R. Ellicott, the New York representative of the Westinghouse Traction Brake Company, looked after the arrangements for the comfort and convenience of the Commission's staff.

The devices tested so far include the following: Project-

ing fender, invented by H. D. Gardy, and owned by Hawthorne & Chadwick, of Chester, Pa.; the Philipson tramcar life guard, a wheel guard invented by William Philipson and manufactured by Philipson & Company, of Bolton, England; the Nelson-Clemmings automatic air fender, a projecting device operated by compressed air, manufactured by the American Automatic Fender Company, of Minneapolis, Minn.; the Rosario Genovese wheel guard, owned by Rosario Genovese, of New York City; the Roeder projecting automatic fender, invented by Frederick Roeder, of Buffalo, N. Y.; the automatic shearing fender, entered by D. H. Brazil, of Montgomery, Ala.; the Watson wheel guard, entered by William T. Watson, of the Toronto Railway Company, Toronto, Ont.; the Schulze automatic, double-acting projecting fender, entered by George H. Schulze, of Kansas City, Mo.; the Worcester wheel guard, entered by the Worcester Railway & Supply Company, of Worcester, Mass.; a projecting fender, entered by J. J. Rhine, of Trafford City, Pa.; a projecting fender, entered by George H. Bolduc, of Detroit, Mich.; a wheel guard, entered by Mountain & Gibson, of Bury, England; the Jenkins automatic fender, entered by the Jenkins Automatic Fender Company, of Toronto, Ont.; a projecting fender, entered by Wilfred Braithwaite, of New Haven, Conn., and a projecting fender, entered by the Eclipse Railway Supply Company, of Cleveland, Ohio.

The following are some of the visitors who witnessed the tests:

Public Service Commission of New York City: William R. Willcox, chairman, and Milo R. Maltbie, commissioner.

Interstate Commerce Commission, Washington, D. C.: H. C. Eddy, executive officer and secretary, District Railway Commission.

Pennsylvania State Railroad Commission: John P. Dohoney, Harrisburg, Pa.

Ontario Railway and Municipal Board, Ontario, Canada: James Leitch, chairman, Toronto; A. B. Ingram, vice-chairman, Toronto; J. F. H. Wyse, engineer, Toronto.

Toronto Railway Company, Toronto, Canada: W. R. McRae, master mechanic.

Brooklyn Rapid Transit Company, Brooklyn, N. Y.: William G. Gove, superintendent of equipment; Arthur N. Dutton, superintendent of transportation.

Chicago Traction, Board of Supervising Engineers, Chicago, Ill.: George Weston, assistant chief engineer; W. Thorn, division engineer.

Mexican Consulate at Pittsburg, Pa.: Arnold A. Rutis, assistant consul and mechanical engineer.

City of Newark, N. J.: Joseph Crawford, electric engineer and inspector of trolleys.

Dayton Franchise Case in Ohio Supreme Court.—The case of Thomas B. Herrman, city solicitor of Dayton, against the Oakwood Street Railway has been taken to the Supreme Court on a petition in error. The suit involves the validity of the franchise granted the company.

To Arbitrate Chester Cases.—At the opening of court at Media, Pa., on Oct. 23, there were to be presented 25 cases against the Chester (Pa.) Traction Company growing out of the recent strike. The claims ranged from $5,000 to $25,000 each. Because of the difficulty in obtaining impartial juries, however, these cases have all been submitted to arbitration.

Mileage and Capital Account of Roads in Ohio Increased.—The reports of the electric railways to the State Railroad Commission show that 148 miles of new road were constructed since the former report was issued. The aggregate increase in common stock for the year was $10,378,000 and of preferred stock, $11,755,000, making a total increase in capital stock, $22,134,000. The bonded debt increased $6,388,000, and this added to the capital increase makes a total increase in capital liabilities of $28,522,000.

Meeting of the A. S. M. E.—The November meeting of the American Society of Mechanical Engineers will be held in the Engineering Societies Building, New York, on Nov. 10. Franklin Phillips, president of the Hewes & Phillips Iron Works, Newark, N. J., will make an address on "The High Powered Rifle and Its Ammunition—Instruments of Precision," illustrated by lantern slides. As Mr. Phillips is primarily a mechanical engineer as well as a marksman, he will explain to his audience the practical bearing of his investigations upon the construction of arms and the elements entering into ammunition.

Opening of the St. Clair Tunnel.—The electrical equipment of the St. Clair tunnel of the Grand Trunk Railway, between Port Huron, Mich., and Sarnia, Ont., is to be officially put in service Nov. 12. On that day, a special train will leave the Grand Trunk station at Port Huron at 1 p. m. for Sarnia, where lunch will be served. After the return to Port Huron, which will be by special train, an opportunity will be afforded the invited guests to visit the power station at the Port Huron end of the tunnel. The latter is one of the longest submarine tunnels in the world, and its equipment by the single-phase system cost more than half a million dollars.

Violence Resorted to in Ohio.—On Oct. 27, Mayor Squibb and the members of the Council of Delhi, Ohio, directed a gang of laborers in tearing up part of the track of the Cincinnati, Lawrenceburg & Aurora Street Railway in Delhi in an effort to force the company to obey instructions from the Council. The company was accused of violating the terms of its ordinance in hauling freight through the town and the grant was repealed some time ago. Fourteen or 15 employees who attempted to repair the tracks were arrested. C. E. Hooven, general manager of the company, by appealing to the courts at Cincinnati, secured an injunction restraining the Mayor and the other officials of Delhi from interfering in any way with the operation of the road, and the track was relaid.

Connection Completed Between Cleveland and Columbus.—At 3 p. m. on Oct. 27, the tracks of the Columbus, Delaware & Marion Traction Company were connected at Bucyrus, Ohio, with the tracks of the Cleveland & Southwestern Traction Company, thus completing interurban connections between Cleveland, Columbus, Cincinnati and Indianapolis. The extension from Marion to Bucyrus is on a 50-ft. private right of way with light curvature and practically a level grade, and when ballasted will be one of the fastest pieces of track in Ohio. This extension of the Columbus, Delaware & Marion Traction Company's line pierces further into the "Heart of Ohio," and within the next two years the "Route Through the Heart of Ohio" will probably be completed. This is almost a north and south line, connecting Portsmouth on the Ohio River with Sandusky City on Lake Erie. Leaving Portsmouth the line will pass through Waverly, Chillicothe, Circleville, Columbus, Delaware, Marion, Bucyrus, Attica, Bellevue and Sandusky City, a distance of about 215 miles.

Illinois Supreme Court Confirms Agreement Between Chicago and Chicago City Railway.—The Illinois Supreme Court has affirmed the decision of the Cook County Circuit Court in the case filed by Charles H. Venner and stockholders of the Chicago City Railway involving the legality of the franchise ordinance granted by the city of Chicago to the company requiring 55 per cent of the earnings of the company as compensation for the use of the streets. Venner and others demanded that all moneys paid to the city since the passage of the ordinance be turned back to the treasury of the street railway company. The Supreme Court finds that the ordinance of Feb. 11, 1907, was not "ultra vires" to the city or the Chicago City Railway, and that the acceptance of the ordinance by the directors of the corporation was binding upon all stockholders. The court says: "To hold otherwise would be to hold that the Chicago City Railway had the right under the ordinance of 1858 to occupy all the streets on the South Side of Chicago until such time as the city should, under the terms of that ordinance, purchase the railway system, and the city is now indebted to the constitutional limit and could never purchase for want of funds, which would, in effect, confer upon the railway company a perpetual right."

Details of Freight Tunnels for New York Explained.—Henry J. Pierce, president of the Amsterdam Corporation, New York, and formerly president of the International Traction Company, Buffalo, N. Y., explained in detail to the Traffic Club of New York on Oct. 27 the plan for a system of freight tunnels in New York to meet the demand for means to transport adequately New York's rapidly increasing freight tonnage. Mr. Pierce said that the very geographical surroundings which have made Manhattan Island great as a port for water-borne commerce isolate it from direct connection with 8 out of 10 railroads centering in the vicinity of New York, and that while 25 years ago it seemed as though the great harbor facilities for ocean shipment and for lighterage afforded by Manhattan Island would be sufficient for an indefinite time, the tremendous development of the country has poured upon Manhattan Island so great a population and such a volume of the nation's products as to have absorbed all the waterfront and to have made New York the most congested for movement of people and goods in the world. Mr. Pierce proposes a freight system to consist of a freight terminal belt line in New Jersey, having connecting yards at its intersections with the eight railroads that have their terminals on the North River, the freight to be transferred in these yards to 10-ton cars of the terminal railroad, and afterward assembled in classification yards at a central point and taken by tunnel under the Bergen Hills, N. J., and under the Hudson River to the freight subways to be established in New York.

Financial and Corporate

New York Stock and Money Markets

November 4, 1908.

Now that anticipation has become certainty, and the bright prospect of Taft's winning is converted into an overwhelming victory, traders expect a strong stock market, with advancing prices and public buying. While business has been depressed in all commercial lines during the last six months, stocks have been strong and buoyant and prices have advanced from 10 to 40 points.

The market opened this morning very strong and active. London prices were strong and active, adding to the boom movement. Stocks advanced in the first hour from 2 to 5 points and then, on heavy profit taking by speculators, sold off from ½ to 2 points. After the first flurries were over the advance was resumed, but it proceeded more moderately. Westinghouse common was one of the strongest stocks, jumping up to 89 a few minutes after the opening.

During the week previous to the election the market was strong but very dull. Almost every trader seemed to be holding off, waiting for the period of disquiet to pass before making commitments. What little trading was done added strength to the market, and at all times buyers in evidence were more eager than the sellers. Any activity in any stock caused the price to advance. Traders did not risk short sales.

The money market was practically unchanged from the conditions that have prevailed during recent weeks. The supply was plentiful and the borrowers few. The banks had already begun to gains funds from the Interior and the surplus reserve is increasing. The rates for money on Nov. 2 were: Call, 1¾ to 2 per cent; 90 days, 3 per cent.

Other Markets

In the Boston market there was little trading in traction securities during the last week. Boston Elevated was the most active issue on the list and a number of small lots were sold at prices ranging from 129 to 130. Massachusetts Electric common sold at 10 and preferred at 54½ to 55.

In the Philadelphia market Rapid Transit continued to be the leader. The price was not so well maintained as during the previous week, but trading was fully as active. Sales were made at 22½ to 22¾. Union Traction was also active, selling at about 51¾. Philadelphia Traction sold at 89.

Chicago Railways certificates were the feature of the Chicago market. Series 1 sold up to 112 on Nov. 2, and series 2 was traded in freely at 44½ to 44¾. Other traction issues were stagnant.

In Baltimore the United Railways issues have been very active during the last week. On Nov. 2, alone, 85,000 of the income bonds were sold at 53½ to 53⅞. The 4s sold at 85 and the funding 5s at 80½.

In the New York market the following traction securities were sold at auction on Oct. 28: 56 shares Coney Island & Brooklyn Railroad at 85; 124 shares Dubuque & Sioux City at 52½; 9 shares New Orleans Railway & Light preferred at 30½, 17 shares common at 13½; 115 shares Capital Traction of Washington, D. C., at 130½; $3,000 Chicago Railway Company Series A bonds at 90⅜, 125 shares St. Joseph (Mo.) Traction & Lighting common at 151.

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

	Oct. 27.	Nov. 2.
American Railways Company, Philadelphia	44	44½
Boston Elevated Railways	134	130
Brooklyn Rapid Transit Company	50	49⅝
Chicago City Railway	a175	—
Cleveland Railway	—	—
Consolidated Traction Company of New Jersey	a69	a69
Consolidated Traction Company of New Jersey, 5 per cent bonds	a104	a104
Detroit United Railway	43½	43½
Interborough-Metropolitan Company	10	10
Interborough-Metropolitan Company (preferred)	29¾	*29
Manhattan Railway	*137½	137
Massachusetts Electric Companies (common)	a9½	a10
Massachusetts Electric Companies (preferred)	a52	a54½
Metropolitan West Side Elevated Railway, Chicago (common)	a13	—
Metropolitan West Side Elevated Railway, Chicago (preferred)	a43	—
Metropolitan Street Railway	*28	*24
North American Company	65	65¼
Philadelphia Company, Pittsburg (common)	38	39
Philadelphia Company, Pittsburg (preferred)	40	40⅛
Philadelphia Rapid Transit Company	23½	22¾
Philadelphia Traction Company	89	89
Public Service Corporation, 5 per cent collateral notes	a97	a97
Public Service Corporation certificates	a67½	a67½
Twin City Rapid Transit Company, Minneapolis (common)	90¾	90
Union Traction Company, Philadelphia	51⅝	51⅜

a Asked.
* Last sale.

Report of Bondholders' Committee, Chicago & Milwaukee Electric Railroad

The committee representing bondholders of the Chicago & Milwaukee Electric Railroad, Wisconsin division, has made a report under date of Oct. 10, 1908, in relation to the condition of the property. The committee is composed of John V. Clarke, C. B. Shedd, Miller Lash, George A. Somerville and Robert Cassels. An abstract of the report follows:

"The construction of an electric railway between Chicago and Milwaukee was begun by the organization of the original Chicago & Milwaukee Electric Railway, which, for brevity, will be called the 'original Illinois company.' This company authorized an issue of $1,500,000 bonds, secured by a trust deed to the Cleveland (Ohio) Trust Company; of this issue only $1,080,000 bonds were sold.

"The original Illinois company was absorbed in 1902 by a second corporation known as the Chicago & Milwaukee Electric Railroad, which, for brevity, will be called the 'Illinois company.' This company owns and operates the 'Illinois division,' extending from Evanston to Waukegan, together with a branch starting at Lake Bluff and running west to Rockefeller. Since the receivership proceedings a question has been raised as to whether the Illinois or Wisconsin division owns the line running from Lake Bluff, on the west side of the North Western Railway's right of way, north to the Wisconsin State line. There are two double-track lines between Lake Bluff and Waukegan; the one on the east side belongs to the Illinois division and the one on the west side, running straight north from Lake Bluff to the State line and thence to the city of Milwaukee, we claim is the sole property of the Wisconsin company.

"The right of way runs through Zion City, and immediately to the west of Kenosha and of Racine. At both Kenosha and Racine the local street railway runs alongside the Chicago & Milwaukee stations. North of Racine there are a number of towns and villages situated close to the lake, which are 1 to 2 miles distant from the company's tracks. In this respect the sacrifice of local traffic has been made for the fast through service. It may be profitable to build stub lines of light construction to give the towns south of Milwaukee more convenient access to the company's lines.

"The Illinois company authorized an issue of $5,000,000 bonds; $4,000,000 of the bonds of this issue were sold and are now outstanding; the remaining $1,000,000 bonds are held by the trustee for the purpose of retiring $1,000,000 of the bonds issued by the original Illinois company; apparently no provision was made for retiring the remaining $80,000 of said bonds. The capital stock of the Illinois company is $5,000,000.

"For the purpose of completing the road from Lake Bluff to Milwaukee, a third corporation known as the Chicago & Milwaukee Electric Railroad was organized in 1904, which will be called the 'Wisconsin company.' This company authorized an issue of $10,000,000 of bonds. This entire issue is now outstanding; about $2,500,000 bonds have been sold to investors, and the remainder are held as security for loans made thereon from time to time; of this $10,000,000 issue, $6,832,000 have been deposited and are now held by the Chicago Title & Trust Company of Chicago and the National Trust Company, Limited, of Toronto, Canada, as trustees, under the bondholders' agreement, dated Feb. 24, 1908, to which the holders of said $6,832,000 of bonds and the undersigned committee are parties.

"The capital stock of the Wisconsin company is $300,000, which is held by A. C. Frost, but pledged by him as collateral to secure loans.

"The interest on the bonds of the Illinois and Wisconsin divisions which fell due Jan. 1, 1908, was met by certain parties in interest who paid the larger portion of the coupons and now hold the same uncancelled. The interest due July 1, 1908, was deferred on all issues, except the first issue of $1,080,000, upon the Illinois division due in 1919, upon which the interest has been paid by the receivers. The Illinois division will probably be able in the near future to provide for the interest on its bonds; but the interest on the Wisconsin division bonds must remain in abeyance until the line is completed to Milwaukee and the earning power of that division demonstrated. Some of the creditors of the companies objected to the payment of interest by the receivers and insisted that the earnings, over and above the operating charges and taxes, belong to the creditors and do not belong to the bondholders; the court reserved this question for future determination. We believe that the bondholders are entitled to have all surplus earnings applied upon their bonds.

"On Feb. 10, 1906, the Wisconsin company made a lease to the Illinois company for 50 years; under this lease the Wisconsin company is obligated to complete the road from

Lake Bluff to Milwaukee and turn over the completed road to the Illinois company for operation; on its part the Illinois company is obligated to pay all taxes, expenses and operating charges, and is entitled to receive all income and earnings; and for this the Illinois company guarantees the payment of both principal and interest on the foregoing $10,000,000 bond issue of the Wisconsin company.

"There being a question as to the authority of the Wisconsin company under its charter to operate its line on the streets within the city of Milwaukee, a second Wisconsin corporation was organized under the street railway act of Wisconsin, for the purpose of operating that portion of the line within the corporate limits of Milwaukee, under the name of the Chicago & Milwaukee Electric Railway, which will be called the 'Milwaukee company.' No bonds were issued by this company. Its capital stock is $100,000 which is held by the Western Trust & Savings Bank as further security for the payment of said $10,000,000 issue of bonds of the Wisconsin company.

"For the purpose of completing the line from Chicago to Milwaukee, A. C. Frost organized the Republic Construction Company, with capital stock of $50,000, substantially all of which is owned by Mr. Frost, who, as its president, has had full control of the company from the time of its organization. Your committee has been unable to discover any formal written contract between the construction company and the Illinois company, for the purpose of completing the work to Waukegan, Ill.; but the bonds and stock of the Illinois company were issued to the construction company in payment for the work done.

"A formal written contract was entered into between the Wisconsin company and the Republic company, under which the latter agreed to secure the right of way, to build and equip the Wisconsin division at cost, plus 15 per cent as contractors' profit, the work to be paid for in bonds of the company at 85 cents on the dollar.

"From the best information we have been able to secure, it seems that the Republic company transferred all the bonds and stocks which it received for construction work to A. C. Frost, or A. C. Frost & Company, who in turn sold about $2,500,000 of these bonds to investors and pledged about $7,500,000 as security for certain loans made by the Wisconsin company, and certain other loans made from time to time to A. C. Frost & Company, of Chicago, and Osborne & Francis, of Toronto, and upon which loans, or most of them, A. C. Frost & Company or Osborne & Francis are personally liable. The committee is advised that these loans were made with large margins, the loaning basis varying from 50 to 90 per cent of the face value of the bonds pledged to secure the same.

"The net proceeds arising from the foregoing loans, officers of the company state, were used to pay for the work of completing the road from Lake Bluff into the city of Milwaukee.

"In 1907, the Wisconsin company authorized its officers to execute its notes, aggregating $2,000,000, to be secured by a deposit of $2,500,000 of the bonds of the Wisconsin company; as a matter of fact only $121,000 of these notes were issued and $203,000 of the Wisconsin company bonds deposited as security for the payment of the same with the Western Trust & Savings Bank of Chicago; these outstanding notes will mature March 1, 1909.

"Along the line of the road are certain properties which have been more or less connected with the construction and operation of the line, but whether there is any strict legal connection has not been determined, and that matter can only be settled in some court proceeding. These properties are known by the following names: Ravinia Park, Racine Stone Quarries, Libertyville Trotting Association Track, Kenosha Electric Railway and Waukegan Electric Railway.

"The foregoing properties have been controlled by A. C. Frost and his associates, who state that they have been of great value in the operation and earnings of the electric railway. Most, if not all, of these properties are heavily bonded and the securities have been pledged with various banking and other financial institutions. We do not go into details with respect to these properties, because definite data are not at hand, and as to whether you are or are not, as bondholders, substantially interested therein, can only be determined by proper legal proceedings; but these matters should be carefully investigated.

"On Dec. 31, 1907, proceedings were begun in a State court at Chicago, by a holder of 25 shares of the Illinois company, against all the corporations, including the foregoing electric railroad companies. Receivers of all of the corporations were appointed by Judge Tuthill; Gordon A. Ramsay, a former vice-president of the Illinois company, alone qualified, and immediately took possession of the books, records and property of these corporations. This receivership, however, continued only two or three days, and was then vacated.

"On Jan. 27, 1908, receivership proceedings were instituted in the United States Circuit Court at Chicago and at Milwaukee, under which D. B. Hanna, of Toronto, Canada; W. I. Osborne, vice-president of the Central Trust Company of Illinois, and A. C. Frost, of Chicago, president of the two roads, were on Jan. 27, 1908, appointed receivers of the Illinois company and the Wisconsin company by Judge Grosscup. At the same time, the same court appointed G. M. Seward, of Chicago, receiver of A. C. Frost & Company and A. C. Frost. All the foregoing receivers duly qualified, and are now acting as such receivers, except A. C. Frost. The appointment of A. C. Frost was criticised by some of the bondholders, and thereupon Mr. Frost voluntarily withdrew, and upon such withdrawal H. A. Haugan, president of the State Bank of Chicago, was appointed the third receiver; thereafter, Mr. Haugan, finding that the work required more time than he could give it, resigned, and on May 7, 1908, George A. Moore, of Detroit, was appointed in his place and is now acting as the third receiver.

"When the foregoing receivers were appointed, the road was completed from Evanston to Milwaukee, with the exception of about 8 miles immediately south of the city of Milwaukee, and between 50 and 75 per cent of the work upon this uncompleted section had been done. The committee believes from the best information it has been able to obtain that the road itself has been exceptionally well constructed, and in fact, the work has been criticised as having been too well and too expensively done, but the organizers of the enterprise insist that the highest grade of construction was justified in order to safely and economically handle through express passenger traffic from Milwaukee to Chicago in competition with the Northwestern and the St. Paul railroads, through whose territory your property runs.

"It was and, we believe, still is practically impossible to purchase a right of way into the city of Chicago. An arrangement for interchange of passengers, express, etc., has been made between the Chicago & Milwaukee Electric Railroad and the Northwestern Elevated Railroad, by which passengers to and from Chicago make close connections at Evanston. Although this arrangement has been in operation for only about two months, its effect has already been felt in increased earnings. Negotiations are also under way for a through express and passenger service without change, and there is every prospect of this being consummated at an early day; and when done, the Chicago & Milwaukee Electric Railroad will be able to take up its passengers in the heart of Milwaukee and land them in the center of the business district of Chicago; then it is manifest that the earnings of the road will be very greatly increased.

"The receivers and the court reached the conclusion that whatever else might be necessary, the first and most important thing was to complete the road into the city of Milwaukee. Careful investigation convinced the receivers that to complete the road, pay for lands required for right of way, and make certain payments to the city of Milwaukee for terminal facilities and equip the road for operation, would require about $1,000,000. The court authorized the receivers to borrow $1,000,000 upon receivers' certificates for the foregoing purposes, and this has been done. The work of completing the road, we are advised, will be finished during October. The receivers' certificates were sold at 95 to the Investment Registry Company of London, England; this company purchased outright about $1,200,000 of the bonds issued by the Wisconsin company. The certificates are payable in three years and bear interest at 6 per cent per annum.

"In April, 1908, certain creditors of the Milwaukee company instituted proceedings in a State court at Milwaukee for the appointment of a receiver, and accordingly in April, 1908, the Fidelity Trust Company was appointed receiver of that corporation and ever since has been in charge of its property. Certain important work had to be done on the viaduct over which the road will enter into the city of Milwaukee, and any delay beyond the time fixed in the ordinances would have seriously jeopardized the Milwaukee terminals of the road, which all agree cannot be duplicated. The Wisconsin company's receivers are now doing the work and making the payments required, and this work is practically completed, so that these valuable terminals are placed beyond danger. The total cost of this work is limited to $170,000, and is to be paid out of the $1,000,000 receivers' certificates authorized at Chicago.

"The receivers employed Arthur Young & Company, public accountants, to examine the books. The report is very voluminous and contains so much contentious matter that the committee believes it would be of little profit to the bondholders to submit the report to them. Should any bondholder wish a copy, the committee can no doubt arrange to transmit it at the cost of copying. The report of Arthur Young & Company shows that there is a floating

indebtedness of about $2,169,100.51, subject to some minor deductions. The legal name of the two corporations is identical, and in dealing with creditors the officers of the respective companies have seemingly failed to designate or distinguish for what particular corporation they were contracting; hence, it is difficult to determine what portion of this floating indebtedness applies to the Illinois company, and what portion to the Wisconsin company. This question will have to be decided by judicial proceedings, or negotiation and adjustment.

"The present receivership proceedings were instituted by creditors, and the bondholders should make their formal appearance in court and take such steps as may be necessary, so that their rights and interests may be preserved. The creditors contend that the earnings of the entire line belong to them and not to the bondholders, and if the bondholders do not appear in court to contest this unjust demand, naturally, if there be no opposition, the court will give these earnings to the creditors who are demanding them. If the claims of creditors are paid, they can only be paid at the expense of the bondholders.

"Some of these creditors are getting ready to press their claims for the purpose of having the railroad property sold to pay their demands. If the bondholders permit this to be done, the present confusion will be greatly increased and the property of the bondholders seriously endangered.

"The individual members of your committee own and represent over $3,360,000 of the whole issue of the Wisconsin bonds, and one-half of the total Wisconsin bonds which have heretofore been deposited with the two trust companies; under these circumstances, the committee believes that it is justified in asking you to assent to a new bondholders' agreement, which has been deposited with the Chicago Title & Trust Company of Chicago, and the National Trust Company, Limited, of Toronto."

Merger Hearing in Massachusetts

A hearing was held before the Massachusetts Railroad Commission at Boston on Oct. 28, on the question of trolley mergers and steam and electric railway relations. The specific cause of the hearing was a resolve of the Massachusetts Senate on June 12, 1908, requesting the commission to consider the expediency of permitting the Berkshire Street Railway to purchase the franchise and property of the Bennington & North Adams Street Railway, and of permitting or prohibiting any railroad corporation chartered under the laws of the Commonwealth to become or continue a stockholder in the Berkshire Street Railway, and what relations, if any, should be permitted between railroad corporations and street railway companies, with a view to the improvement and development of transportation facilities by the use of electric motive power, and to include the results of their investigations with any expedient recommendations to the Legislature in its next annual report.

The Berkshire Street Railway was represented by Bentley W. Warren, of Boston, who pointed out that the consolidation of transportation facilities has long been favored in Massachusetts. He cited a large number of quotations from the annual reports of the Commission indicating the advantages of consolidations and their demonstrated benefits in the line of greater economy of operation, efficiency of management and improvement in service. In 1897 the Legislature passed the general laws authorizing the leasing and consolidation of street railways, under the supervision of the commission. The board had pronounced this wise legislation. In 1902 the board reported that recent consolidation had brought lower fares and transfer facilities. In 1906 a law was passed authorizing the Hoosac Valley Street Railway to lease any connecting street railway in an adjoining State, and as the Berkshire system now includes the Hoosac Valley line, it might, under this law, lease the Bennington & North Adams line. A consolidation was to be preferred, however, In 1905 the board practically recommended the policy of favoring the purchase of street railways by steam railroads. The Joint Special Committee of 1906 and the Committees on Railroads and Street Railways sitting jointly in 1908, with the Commission on Commerce and Industry recommended that steam railroads be allowed to purchase street railways. In the spring of 1908, however, the Supreme Court of Massachusetts decided that the existing laws prohibited the New York, New Haven & Hartford Railroad from acquiring street railway stocks in Massachusetts.

Mr. Warren urged that the laws should allow the consolidations and purchase discussed, since the only chance of the extension of trolley service and improvement of Berkshire County thereby lay in the assumption of the burdens by strong financial interests. The New Haven system was able to develop this territory on account of the indirect profits accruing to the steam road from the improved conditions brought about by the trolley lines. Extensions were greatly desired by the public, and the New Haven road acquired the property in the belief that if the section could be developed it would increase its business to Pittsfield indirectly. Until the Supreme Court decision was rendered in 1908 the New Haven road had planned to spend about $2,000,000 in extensions, including: A line from Great Barrington to Sheffield and Egremont; a line from Huntington to Lee, making a through connection from Boston to Pittsfield by trolley, and a line to the summit of Mt. Greylock, the highest elevation in Massachusetts. Mr. Warren stated that of 32 towns in Berkshire County, 16 showed a decrease in population from 1900 to 1905. Of the latter, 13 had no trolley service in 1905. In Hampden County 9 towns out of 23 showed a decrease in population, all the 9 having no trolleys. In Hampshire County 15 towns out of 23 showed a decrease, and 14 had no trolley service.

A number of prominent citizens from the Berkshire region then testified to the need of additional trolley facilities, emphasizing the value of the electric railway in enabling abandoned farms to be taken up, improving business and social intercourse, and contending that local capital would not attempt the task. All the witnesses favored the assumption of the trolley lines by the New Haven road. Water powers of small but useful capacity awaited better transportation facilities for development.

J. B. Eastman, secretary of the Public Franchise League of Boston, opposed the purchase of trolley lines by steam roads. He claimed that such action would ultimately lead to a complete monopoly of the transportation systems of the State, pointed out that the Legislature had never authorized the purchase, and argued that steam and electric railway competition was not destructive, but desirable for the broadest possible development of transportation progress. He claimed that initiation, rivalry and progress would be suppressed if the steam railroads absorbed the trolley lines, and could find no noticeable improvements in the management of street railways by the New Haven road in the past three years, compared with the quality of management of the independent trolley systems. Mr. Eastman concluded with the argument that the passing of legislation to permit the New Haven road to purchase the Berkshire system would establish a bad precedent, and the result would not be as profitable financially as the opposite side had claimed. He admitted the need of additional facilities, but urged that the local communities or the State should take hold of the matter and solve the problem.

Atlantic City & Suburban Traction Company, Pleasantville, N. J.—The property of this company was sold for $91,000 on Oct. 31 by Willard Morgan, of Camden, special master in chancery, to Robert Wetherill, Chester, Pa., representing private interests, and a committee of the bondholders. Creditors of the company secured the appointment of John L. Clawson, of Philadelphia, as receiver, two years ago.

Boston (Mass.) Elevated Railway.—The stockholders of the West End Street Railway, Boston, at a special meeting on Oct. 28 sanctioned the proposal of the directors to ask the Legislature to amend chapter 551 of the acts of 1908, which permits the purchase of the West End Street Railway's property by the Boston Elevated Railway so that the second preferred stock, which the Boston Elevated Railway is to give in exchange for the common stock of the West End Street Railway, shall be entitled to 8 per cent dividends instead of 7 per cent after June 10, 1922, when the original lease was to end. The Boston Elevated Railway now leases the West End Street Railway, but it was given authority by the Legislature this year to buy the property, giving Boston Elevated Railway 8 per cent first preferred stock for West End Street Railway preferred and 7 per cent second preferred stock for West End Street Railway common.

Hudson Companies, New York, N. Y.—The preferred stockholders of the Hudson Companies, to whom were recently offered subscription rights of the company's new issue of $5,000,000 three-year 6 per cent notes, have taken the entire issue. The notes are secured by the bonds of the Hudson & Manhattan Railroad, equal to 150 per cent of the principal of the notes, and the subscribers receive a bonus of common stock of the railroad company equal to the par of the notes taken. This completes the financing of the Hudson Companies, and enables it to carry out the proposed settlement between it and the Hudson & Manhattan Railroad.

Louisville & Eastern Railroad, Louisville, Ky.—Henry

Glover, Louisville, Ky., has been appointed receiver for the Louisville & Eastern Railroad.

Oneonta, Cooperstown & Richfield Springs Railway, Oneonta, N. Y.—At the special term of the Supreme Court at Binghamton on Oct. 27, the motion to confirm the referee's report upon the resale of the property of the Oneonta, Cooperstown & Richfield Springs Railway to Joseph A. Starrett, New York, at Cooperstown, on Oct. 9, was made, and also an application for an order requiring the purchaser in the resale to make a further payment on the purchase price of $200,000. Under the judgment of foreclosure and sale, the purchaser was required to deposit with the referee the sum of $50,000 on account of the purchase price. The motion made on Oct. 27 was to require the purchaser to make a further payment. Judge Lyon, before whom the hearing was had, made a further order, after hearing the various parties interested in the matter, requiring the purchaser to make a further payment in cash to the referee of $50,000, account of the bid, before Nov. 20, 1908. Judge Lyon also ordered that the motion in all other particulars stand adjourned until Nov. 25. The sale of the property under the receiver's certificate judgment, by the Rochester Trust & Safe Deposit Company, which was to have taken place on Oct. 23 at Cooperstown, was adjourned on that date to Nov. 5. It is probable that there will be a further adjournment of that sale under the judgment for 30 days.

Philadelphia (Pa.) Rapid Transit Company.—The stockholders of the Union Traction Company, Philadelphia, voted in favor of the $5,000,000 loan to the Philadelphia Rapid Transit Company on Oct. 29. After the announcement that the loan proposition was carried, John B. Parsons resigned as president and director; Geo. D. Widener, as vice-president and director; P. A. B. Widener, W. H. Shelmerdine, George H. Earle and J. J. Sullivan as directors. John H. Chestnut, William P. Katz, Jacob S. Disston, Henry Fernberger, Edward M. Story and J. J. Sullivan were elected to the vacancies. After the meeting of the stockholders of the Union Traction Company the stockholders of the Philadelphia Traction Company held a special meeting and ratified the Union Traction Company $5,000,000 loan.

Tarrytown, White Plains & Mamaroneck Railway, White Plains, N. Y.—Default having been made Sept. 1 on the payment of interest on the first-mortgage bonds of the Tarrytown, White Plains & Mamaroneck Railway, a committee, consisting of Charles Remsen, chairman; G. Howland Leavitt and William Manice, with David B. Kirby, secretary, 55 William Street, New York, has asked the holders of the bonds to deposit them with the Knickerbocker Trust Company, under the terms of a deposit agreement.

Virginia Passenger & Power Company, Richmond, Va.—Judge Waddill, of the United States Circuit Court, on Oct. 24 filed a decree looking to the final sale of the property of the Virginia Passenger & Power Company, which means the termination of the receivership and litigation in which the company has recently been involved. If the security holders do not agree upon a sale price within 30 days the properties will be offered for sale to the highest bidder. The decree provides that the property of the company shall be offered separately as parcel one; that the property formerly owned by the Southside Railway & Development Company (being the property at Petersburg) shall be offered separately as parcel two, and that the property owned by the Virginia Passenger & Power Company, embracing all the different properties subject to the prior mortgages, shall be offered as parcel three, and that then all the properties shall be offered as a whole. The special masters are directed to accept conditionally the highest bids for each parcel separately, and then to accept conditionally the highest bid for the properties as a whole, and to report the same to the court, the court reserving for future determination all questions as to whether the separate bids for the property shall be accepted, or the bid for the properties as a whole.

The Stone & Webster Engineering Corporation, Boston, Mass., owing to the interest regarding the company, has issued an announcement outlining its organization and scope. The corporation embodies the former engineering, construction and purchasing departments of Stone & Webster, which were separated and had been given a distinct identity in order to afford clients the benefit of the experience which had accrued from doing the engineering work in connection with the 40 properties under Stone & Webster management. The corporation designs and builds railways, water powers, lighting and power plants, high-tension transmission and distributing systems and reinforced concrete and steel-frame buildings. The electric railways constructed include several hundred miles of both third-rail and overhead systems in various parts of the country.

Traffic and Transportation

Public Service Commission Not Superior to the Courts.

Justice Gerard criticised the Public Service Commission of the First District of New York in granting a motion on Oct. 31 for a temporary injunction to restrain the Metropolitan Street Railway, New York, from storing cars in upper Eighth Avenue opposite the Polo Grounds. Complaint had been made about the storing of cars in the street by a resident, and Justice Gerard said that, however great the advance in government by commission, "we have not reached the point where the courts have been ousted of their right to protect the private citizen in the enjoyment of his property." The justice had been led to believe that the Public Service Commission had given the company permission to store cars at the point in question. In reply, Chairman Willcox, of the Public Service Commission, said that the Commission had never ordered the companies to store their cars on the streets, but that, on the contrary, the Commission had, in a number of proceedings and cases, insisted to the receivers of the Metropolitan Street Railway that the storage of cars in the streets cease at the earliest moment. During the summer when the windows were open and noise much more bothersome than now, the Commission insisted that all employees of the company be prevented from making any more noise than absolutely necessary, and that the minimum number of cars be placed in the streets. As soon as possible the Commission required the storage of cars on Lexington Avenue to cease, and required a reduction in the number of cars stored on the streets in the vicinity of Eighth Avenue and 145th Street. As to the necessity for any storage of cars in the streets, Chairman Willcox referred to a letter from him to President McGowan, of the Board of Aldermen, in response to a resolution adopted by the Board of Aldermen requesting the Commission to compel the stopping of all storage of cars.

Order Against Platform Riding in Pennsylvania.

As a result of a conference on Oct. 28, between the State Railroad Commission of Pennsylvania and a committee representing the electric railways of the State, the commission has prepared an order covering the matter of passengers riding on platforms of electric cars. The recommendation of the commission follows:

"Information obtained in the investigation of recent street car accidents by this commission, has led to the conclusion that the carriage of passengers on front platforms of the cars interferes, more or less, with the motormen in the discharge of their duties, and thus increases the risk of accidents, as well as subjects the passengers to greater danger when accidents do occur.

"And, therefore, it is hereby recommended and directed that on and after November 15, 1908, no passengers shall be permitted to ride on the front platforms of closed cars, and on open cars the carriage of passengers on the front platforms shall be strictly limited to the number that can be conveniently accommodated upon and do occupy the seat provided on said platform. And also, that those occupying said seat shall be prohibited from engaging the attention of the motorman, by conversation or otherwise."

Massachusetts Railway Applies for Freight Franchise.—The Springfield & Eastern Street Railway, Palmer, Mass., has petitioned the Railroad Commission to allow it to carry freight and express matter on the Palmer-Springfield line of the company in the town of Monson.

City Pays School Fare in St. Louis.—As a matter of economy the city of St. Louis has closed two schools in the outlying districts because the attendance at them did not justify the expense of operating them, and is now transporting the children who formerly attended those schools to schools within the city limits at its own expense. Tickets purchased from the United Railways of St. Louis are distributed by the teachers each afternoon to the pupils entitled to them. The teachers are held accountable for the tickets by the principals.

Council of Hartford Seeks a Reduction in Fare.—The Council of Hartford, Conn., through its transportation committee, has suggested to W. P. Bristol, local manager of the Connecticut Company in Hartford, that the company offer 6 tickets for 25 cents, 12 for 50 cents or 25 for $1. Mr. Bristol said he did not believe the company would consider it practicable. The whole field had been reviewed by the officials, and had been rejected, but he would be glad to present the views of the committee to the company again. He said that 1½ cents per mile is about the cheapest rate the company can make per passenger. The suburban lines

gradually are to be extended further on the 5-cent fare, which will tend to increase the growth of the suburban communities and the traffic on those lines.

Electric Car for Campaign Tour in Ohio.—The Lake Shore Electric Railway furnished a special car for a campaign tour over northern Ohio on Oct. 29 and 30 so that Governor Harris, the principal speaker, would not have to change cars or depend upon the regular schedule of the various roads over which he wished to pass. The itinerary included Woodville, Genoa, Fremont, Clyde, Bellevue, Monroeville and Norwalk on the Lake Shore Electric Railway; Elyria, North Fairfield, Plymouth, Shelby, Mansfield, Galion, Crestline and Bucyrus on the Cleveland, Southwestern & Columbus Railway, and Marion and Delaware on the Columbus, Delaware & Marion Railway. The car carrying the Governor was the first one to make the trip through from Cleveland to Columbus over the recently completed connection in Bucyrus.

Partial Discontinuance of Exchange Tickets in Philadelphia.—As part of the plan to readjust and equalize fares, the Philadelphia Rapid Transit Company on Oct. 26 discontinued the sale of exchange tickets on five lines, because the exchange and transfer points were identical. Some patrons paid 8 cents for an exchange ticket when a 5-cent fare and a transfer would have taken them over the same route and distance. The new exchange tickets have been placed on 24 of the 80 lines operated by the company. Chas. O. Kruger, vice-president and general manager, announced that the new form of six-for-a-quarter tickets will be placed on sale on Nov. 8 on all lines. Both the old transfers and exchange tickets will be honored until out of circulation. The new package ticket is good for the payment of only one fare at a time, is nontransferrable and must be detached by the conductor.

Special Church Service in Brooklyn.—The Brooklyn Rapid Transit Company has arranged for a shuttle service to be operated between the ferry and Borough Hall in the nonrush hours to provide ample accommodations for the residents of the Heights. In connection with service operated in lower Fulton Street during church hours on Sunday morning operation toward Fulton Street is exactly the same as it has been for more than a year past. To prevent passengers being carried over the bridge deck and to Park Row, inspectors are stationed at the turnouts at Tillary Street on both Fulton and Washington Street sides, whose duty it is to see that announcement is made by conductors that passengers should disembark there if destined to churches in the Heights section. To care for home-going travel cars of Fulton, Greene and Gates, Putnam and Flatbush lines are routed through Fulton Street at the time the church service ends.

Modification of Routes in Pittsburg.—Proposed changes in the routes of several lines to take effect on Nov. 1 for the benefit of the service were announced by the Pittsburg Railways on Oct. 28. In addition, a new line was to be put in operation called the "Wilmerding via Ardmore" line to run between Pittsburg and Wilmerding, shortening the run between East Pittsburg and Wilmerding 18 min., and give direct connection with Wilmerding and points in the Turtle Creek Valley, from Oakland, Squirrel Hill and Wilkinsburg. The distance from Pittsburg to Wilmerding by the new line is 14 miles, and cars will be operated every 15 min. The fare has been fixed at 15 cents. Commencing Nov. 1 the Wilkinsburg and East Pittsburg line was to be discontinued west of Wilkinsburg, being operated only between that point and East Pittsburg. The Ardmore route was on the same date to be extended to Penn and Highland Avenues, East Liberty.

Passenger Reports in St. Louis.—The United Railways Company, of St. Louis, has reported the number of passengers carried on its cars during the second and third quarters of 1908. James Adkins, secretary and treasurer of the company, announced that the company would begin making the daily reports, as required in the 1-mill-per-passenger tax ordinance, on Nov. 1. For the first time the report showed the number of half-fare passengers carried, which average about one in every 30 full fares. The total passengers carried for the quarter ending June 30 was: Half fares, 1,568,922; full 5-cent fares, 50,088,600, a total of 51,657,522. For the quarter ending Sept. 30, the number decreased to 51,185,813, of which 1,678,837 were half fares. As compared with the same quarters last year, the figures show a decrease in business of nearly 5,000,000 passengers for each quarter. The total trips made by the company's cars aggregated 1,432,762 and 1,446,330, respectively, for the two quarters, a decrease from 1,530,196 and 1,549,516, respectively, for the same quarters last year. The first 9 months of the present year show 224,200 less trips made and 10,625,973 less passengers. The revenue to the city for the present year to date at 1-mill-per-passenger rate will be $151,914.

Personal Mention

Mr. C. M. Graves has been appointed general manager of the Inland Empire System, Spokane, Wash. The duties of general manager have heretofore been performed by Mr. Jay P. Graves, president.

Mr. G. Franklin Smith, chief clerk in the engineer's office of the International Railway, Buffalo, N. Y., has resigned to accept the position of auditor of the New York & North Shore Traction Company, Roslyn, L. I.

Mr. W. A. Bixby, vice-president and general manager of the Springfield (Mo.) Traction Company, has been appointed general manager of the Hutchinson Interurban Railroad, which controls the People's Water, Light & Gas Company, Hutchinson, Kan.

Mr. Louis Schlayer has been appointed chief engineer of power stations of the New London lines of the Connecticut Company, New Haven, Conn., to succeed Mr. John M. Burke, resigned. Mr. Schlayer was formerly chief engineer of power stations of the Connecticut Company at Berlin, Conn.

Mr. Waldo G. Paine, heretofore general passenger agent of the Inland Empire System, Spokane, Wash., has been appointed traffic manager, in charge of both freight and passenger business. Mr. J. H. Lothrop, heretofore general freight agent of the system, has resigned to engage in other business.

Mr. H. M. Sloan, general manager of the South Chicago City Railway, Chicago, Ill., laid the cornerstone of the new South Chicago Hospital at Chicago on Oct. 25. The Calumet Electric Street Railway and the South Chicago City Railway, Chicago, were among the principal contributors to the fund for the new hospital.

Mr. A. A. Anderson has resigned as general manager of the Indianapolis & Louisville Traction Company, Louisville, Ky., and will remove his headquarters from Seymour, Ind., to Columbus, Ind. Mr. Anderson is general manager of the Indianapolis, Columbus & Southern Traction Company, and after Nov. 1 will devote his entire time to the affairs of that company.

Mr. A. C. Tully, who has been purchasing agent of the Metropolitan Street Railway, New York, and its successor, the New York City Railway Company, for the past 15 years, resigned on Oct. 31. No direct successor to Mr. Tully will be appointed, as the work will be divided among several officials. Mr. Tully is planning to engage in the real estate business in New York.

Mr. Thomas Penney, Mr. T. E. Mitten and **Mr. Nelson Robinson** have been elected members of the executive committee of the International Traction Company, Buffalo, N. Y. Mr. Penney was recently elected president of the company to succeed Mr. H. J. Pierce, resigned; Mr. Mitten is president of the Chicago City Railway, and Mr. Nelson Robinson was elected a director on Oct. 27.

Mr. Clarence G. Fields has resigned as superintendent of the O. W. P. Division of the Portland Railway Light & Power Company, Portland, Ore. The office has been abolished and the duties of superintendent of the division will be performed hereafter by Mr. Hunt, traffic manager. Mr. Fred G. Sykes, General Manager of the light and power departments of the company, has also resigned to engage in business for himself.

Mr. P. L. King, who was recently appointed auditor of the San Antonio (Tex.) Traction Company, has been connected with the company since January, 1901, when he entered its employ as a clerk. Mr. King served in all the departments of both the San Antonio Traction Company and the San Antonio Gas & Electric Company, and in October, 1907, was appointed paymaster of both companies and assistant to the secretary. Upon the resignation of Mr. R. C. Jones as auditor, Mr. King was appointed to succeed him.

Capt. E. A. Sawtelle, lately with the British Westinghouse Company, was given a farewell banquet at the Hotel Cecil, London, recently by some 75 of his most intimate friends, previous to his departure for the United States. The chair was occupied by Mr. Blunt and speeches were made by Mr. Oscar Baldwin and Mr. George Flett. Captain Sawtelle has been in England for 10 years, and during this time has established himself very firmly in the confidence and affection of the English as well as with those of his own countrymen who are settled in London. He will be connected with the Westinghouse interests in this country.

Mr. E. T. Wagenhals, for the past three years superintendent of construction of the Mobile Light & Railroad Company, Mobile, Ala., has resigned from the company to become general manager of the Logan Light & Power Com-

pany, Logan, Ohio. Mr. Wagenhals will enter upon his duties at once, and expects to have the strect and commercial lighting equipment for the Logan Light & Power Company in operation by Jan. 1. Prior to going to Mobile, Mr. Wagenhals was superintendent of the Trenton & New Brunswick Railroad, Trenton, N. J. For some months after leaving Trenton, Mr. Wagenhals was connected with the Wagenhals Construction Company, which held contracts for railroad construction in Ohio and Indiana.

Mr. J. A. Cunningham, whose appointment as assistant general manager of the Bay City Traction & Electric Company, Bay City, Mich., was announced in the ELECTRIC RAILWAY JOURNAL of Oct. 24, graduated from Lehigh University in 1902. Mr. Cunningham's first position after graduation was with the Lincoln Gas & Electric Light Company, Lincoln, Neb. In 1903 Mr. Cunningham became connected with the Columbus Railway & Light Company, Columbus, Ohio, and in 1904 he entered the employ of the companies operating the public utilities of Saginaw and Bay City. During his connection with these companies Mr. Cunningham was employed in constructing the Saginaw power house and reconstructing the Bay City power house. Mr. Cunningham was formerly superintendent of lighting for the Bay City Traction & Electric Company.

Mr. Robert G. Young has been appointed general manager of the Chatham, Wallaceburg & Lake Eric Electric Railway, Chatham, Ont., Can. Mr. Young was formerly connected with the Utica & Mohawk Valley Railway, Utica, N. Y., and at one time was general superintendent of the Utica Belt Line Railroad, with which he began his railroad career as engineer. When the Utica Belt Line Railroad was electrified, Mr. Young went into the shops of the company, and in a short time was promoted to the position of master mechanic. Later he became assistant superintendent of the company and was finally promoted to the position of superintendent, which office he held for 9 years, until the road was taken over by the Utica & Mohawk Valley Railway. Since the purchase of the Utica Belt Line Railroad by the Utica & Mohawk Valley Railway, Mr. Young has been superintendent of construction and roadmaster of the Utica & Mohawk Valley Railway. The Chatham, Wallaceburg & Lake Erie Electric Railway, of which Mr. Young becomes general manager, extends from Wallaceburg through Chatham to Lake Erie and embraces about 40 miles of line. At the Lake Erie end of the road a summer resort is being established, which will come under the supervision of Mr. Young.

Mr. Alexander McIver has resigned from the position of superintendent of rolling stock of the New York City Railway to accept that of electrical engineer of the Annapolis Short Line, which was described on page 238 of the ELECTRIC RAILWAY JOURNAL of July 4. As stated in that issue, the line was formerly operated by steam and now has single-phase equipment. Mr. McIver was graduated from Johns Hopkins University in 1895 as an electrical engineer, and soon after entered the employ of the Sprague Electric Company, with which he was connected with the railway department until 1902. In the latter year he entered the railway and engineering department of the General Electric Company, at Schenectady, where he remained until July, 1906, when he accepted the position of master mechanic of the Chicago & Milwaukee Electric Railway Company. Mr. McIver has been connected with the New York City Railway Company for about 18 months. On Oct. 31 he was given a farewell dinner at the Engineers' Club by the Deportation Club, an organization of railway and supply men in New York, whose province it is to "speed the parting guest." The 60 members present extended their wishes to Mr. McIver for success in the new work.

Mr. C. O. Mailloux, consulting electrical engineer, of New York, who went abroad in August to represent the American Institute of Electrical Engineers at the International Electrical Congress at Marseilles, has been retained, while abroad, to advise a very powerful financial syndicate in connection with important projects involving electric traction, electric transmission, power, lighting, etc. He will make investigations in France and in Switzerland and will return to Marseilles to start on a trip by water to various Mediterranean cities, and to various countries in the Levant. He will probably visit Constantinople and possibly other points still further East, one of his clients being interested in the electrification of the tramway system in Odessa, Russia. He expects to return late in November to Paris, to deliver a course of lectures, in French, on electric train movement, with special reference to the technical study of electric traction problems, methods of predetermination, and also a special lecture on the electrification of steam roads. The paper presented by him at Marseilles, entitled "Sur la dèfinition et la mesure industrielles de l'accélération des trains," created something of a sensation by its bold, vigorous defense of the American unit of measure, the mile per hour per second, and, especially, by its attack of the European units, the foot per second per second and the meter per second per second, from the mathematical aspect, which has always, hitherto, been supposed to be its strongest side. Some of his colleagues, desirous of hearing further discussion of electric traction science from the American point of view, requested him to repeat portions of the courses of lectures given by him at the University of Pennsylvania and at Columbia University, to a special audience composed of engineers and others who are specially interested in electric traction and in electrification, including the chief engineers and engineering staffs of all the steam railways in France, also of the "Metropolitan" (Paris subway) system, and various engineers, specialists, teachers and students. A committee has been formed to make the arrangements and issue the invitations.

Mr. H. L. Weber, who recently resigned as chief engineer of the Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind., has had an extended experience as an engineer, his work covering city, commercial and railroad engineering problems. Mr. Weber was appointed county engineer of Crawford County, Ohio, on April 8, 1879, and served as county engineer and city engineer of Bucyrus, Ohio, until 1894. During this period he did a great deal of sewage and sewage disposal engineering and street paving, superintending during 1892 and 1893 the manufacture of street paving brick by the Bucyrus Brick & Terra Cotta Company. In September, 1894, Mr. Weber resigned as city engineer of Bucyrus to become city engineer of Richmond, Ind., and while acting in the latter capacity he located the Richmond Interurban Railway, known as the Chicago, Cincinnati & Louisville Railroad, and assisted in financing the company and building the road from Cincinnati to Chicago, acting during the period of construction as consulting and bridge engineer. In June, 1905, Mr. Weber resigned as city engineer of Richmond, and took charge of the construction and maintenance work of the Fort Wayne & Wabash Valley Traction Company as chief engineer, with headquarters at Fort Wayne, Ind. While with this company, Mr. Weber built two extensions, one of 25 miles from Fort Wayne to Bluffton, Ind., and one from Logansport to Lafayette, 38 miles, both of which are equipped for operation at high speed. Mr. Weber also reconstructed the division from Fort Wayne to Logansport, 76 miles, eliminating curves and equipping it for operation at high speed. During the past two years, the track construction and reconstruction, including the paving in Fort Wayne, has been entirely done by the regular track force of the Fort Wayne & Wabash Valley Traction Company under Mr. Weber's supervision. Mr. Weber is a frequent contributor to the engineering press, several articles by him on track construction having appeared in the ELECTRIC RAILWAY JOURNAL within the last year.

H. L. Weber

Prior to the introduction of the new pay-as-you-enter cars on the Madison Street line of the Chicago Railways Company, on Nov. 1, booklets descriptive of the cars were distributed on the cars by conductors. Announcement of the proposed equipment of this line with the new type of cars was also made by means of large placards posted at the forward end of the cars then in service. On these placards were printed a large picture of the new standard car in colors and a formal, brief statement of the advantages of the new cars and suggestions as to the manner in which patrons of the company might co-operate in making the new system a success. The pamphlet was addressed to the company's patrons, with the announcement that there are 650 of the new cars in process of construction, and that, beginning with the Madison Street line, they would be placed in service at the earliest possible date. To illustrate strikingly the advance made in street railroading, pictures were presented of cars in service in 1861, 1888 and 1895. The advantages of the new cars were then set forth in short paragraphs, following which the instructions to the public were printed and the public asked to co-operate with the company in making the cars a success.

Construction News

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

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

FRANCHISES

San Pedro, Cal.—Application has been made to the city trustees by William Peck and E. D. Seward for a railway franchise connecting with the Point Firmin line at the junction of Fifteenth Street and Pacific Avenue, running thence along Fifteenth Street to Mesa, to Seventh, to Palos Verdes, and along Palos Verdes Street to Santa Cruz. This line would practically make a complete system from Point Firmin on the south to the northern end of the city.

Stockton, Cal.—The San Joaquin Valley Electric Railway has presented a petition to the City Council asking for a franchise to build single or double tracks from South Street along Lincoln, over the Lincoln Street bridge to Washington Street, thence east to Sutter Street along Washington, and from that intersection to Main Street. It was also specified that a line was desired along Monroe Street from Washington to Weber Avenue, and from the intersection of Monroe and Weber to a point about 200 ft. east of the intersection of Monroe along the waterfront. It is provided in the terms of the application that both freight and passengers are to be carried over the proposed lines. [E. R. J., Oct. 31, '08.]

Wilmington, Cal.—Hancock Banning and Frank Carr, representing William Banning, have applied to the Wilmington Board of Trustees for two double track franchises for a period of 50 years, to connect the Southern Pacific and Pacific Electric Company's tracks with Mormon Island. One franchise asked for is for two double tracks from the Southern Pacific, 1500 ft. in length. The other is for 3000 ft. of double track.

***Parsons, Kan.**—It is stated the Parsons, Chanute & Cherryvale Traction Company will soon apply to the City Council for a franchise to operate a street railway in Parsons. The company plans to construct an electric railway connecting the cities named in the title. William Jones, Indianapolis, Ind., is the local representative of the company.

Amityville, N. Y.—The Town Board and Board of Highway Commissioners have extended the Huntington (N. Y.) Railroad Company's franchise to May 1, 1910, for the completion of its line.

Oneida, N. Y.—The Oneida Railway, at a joint meeting of the Board of Public Works and the Common Council last week, applied for a right of way to construct an electric railway from the main road at Sherrill to Kenwood.

Shamokin, Pa.—The Commissioners have given the Shamokin & Edgewood Street Railway the right to build its line through that township to Ferndale. From thence it will continue to Edgewood. It is expected to have the new line completed by Jan. 1, 1909.

***Ephrata, Wash.**—The County Board of Commissioners is reported to have granted a franchise to O. A. Kuck to construct an electric railway connecting Adrian, Ephrata and the Soap Lake health resort.

Lynden, Wash.—The Nooksack Valley Traction Company, Bellingham, Wash., has been granted a franchise to operate an electric street railway through Lynden.

Spokane, Wash.—The County Commissioners have granted to the Spokane & Inland Railroad a franchise to build a single or double track street railway on streets and roads from the east city limits as follows: On First Avenue through the whole of Sprague Avenue addition. Also on First Avenue to Miller's Park addition. The proposed line extends just 3 miles east of the city limits.

RECENT INCORPORATIONS

Stockton Terminal & Eastern Railroad, Stockton, Cal.—This company has been incorporated in California to build an electric railway from Stockton to Jenny Lind. Capital stock, $600,000, of which $30,000 has been subscribed. Directors: A. Shane, Indianapolis; W. H. Newell, Stockton; A. A. Grant, Sonora; N. W. Condon, Berkeley; E. F. Davis, S. L. Steidley, Oakland; J. E. Adams, Berkeley; Robert F. Burns, Berkeley. [E. R. J., Oct. 10, '08.]

***Springfield & Jacksonville Electric Railway, Springfield, Ill.**—This company has been incorporated in Illinois to construct an electric railway through the counties of Sangamon and Morgan, from the city of Springfield to Jacksonville. Headquarters, Springfield. Capital stock, $100,000. Incorporators: D. H. Sims, Latham, Ill.; D. B. Sims, Latham, Ill.; S. T. Stanley, Chicago; C. R. Cronk, Chicago; O. J. Lucas, Latham, Ill.

***Dowagiac (Mich.) Railway.**—Incorporated in Michigan to build an electric railway from Eau Claire to Dowagiac. Capital stock, $200,000. Incorporators: C. K. Minary, H. S. Grey, Henry C. Mason, Benton Harbor, Mich. The incorporators of this company are identified with the Benton Harbor-St. Joe Railway & Light Company, which operates a line from Benton Harbor to Eau Claire.

***Richmond, Urbana & Peninsular Railway, Richmond, Va.**—This company has been chartered in Virginia to build an electric railway from West Point to Urbana, a distance of 16 miles. The main line extending from Urbana to West Point has been surveyed and the right of way secured practically the entire length of the road. The counties which will be served by this proposed system have a population of at least 80,000. Capital stock of the company is placed at from $100,000 to $300,000. Officers: John C. Robertson, Chesterfield, Va., president; Boyce D. Brooker, Richmond, vice-president; George C. Bland, King and Queen C. H., Va., treasurer; James T. Robertson, Chesterfield, secretary. Alexander B. Guigon, Richmond, is counsel for the promoters.

TRACK AND ROADWAY

Pacific Electric Railway, Los Angeles, Cal.—It is reported that this company has under consideration the construction of two extra tracks between North Long Beach and Watts, which will make it a four-track line.

Chicago (Ill.) Railways Company.—The Board of Supervising Engineers, Chicago Traction, has approved the plans of the Dearborn Street Improvement Association, Chicago, for paving Dearborn Street from Van Buren Street to the Chicago River, about 4000 lin. ft., with creosoted wood blocks. The Chicago Railways Company is just completing the reconstruction of its double tracks through the length of this street and will surface the street between rails and tracks with block similar to those to be used from tracks to curbs by the city.

Rockford & Interurban Railway, Rockford, Ill.—This company is reported to have started improvements on the line between Freeport and Rockford. The tracks will be overhauled, repaired and reballasted, new joints will be put in and the curves will be reduced. T. M. Ellis, Rockford, manager.

Kalamazoo, Elkhart & South Bend Traction Company, South Bend, Ind.—The officials of this company, it is said, have announced that contracts have been signed whereby the finances to construct the road will be secured, and it is their intention to commence work soon. A new franchise has been secured to construct and operate the road through the city of Elkhart. The right of way has been agreed upon and a portion thereof secured. A. D. Harris, South Bend, president. [E. R. J., Aug. 22, '08.]

Winona Interurban Railway, Winona Lake, Ind.—At a meeting of the directors and officials of this company at Warsaw, Oct. 28, over $300,000 was subscribed, to be used in the early completion of the Peru division of the road. It was decided to resume work immediately. The completion of this division will give through service from Benton Harbor, Mich., to Louisville, Ky.

***Glasgow, Ky.**—It is reported that negotiations are in progress between local capitalists and the Ohio Valley Construction Company for building a railway to be operated electrically, from Hodgensville to Burkesville by way of Columbia and on to Glasgow. It is said that surveys for the route are now being made.

Houghton County Traction Company, Houghton, Mich.—It is stated that this company will put into operation its extension between Calumet and Mohawk by the end of November. The Stone & Webster Engineering Corporation is in charge of the work. The grading has been finished for the entire distance of the line and the ties and rails have been laid from Wolverine to the other side of Ahmeek. Work on the laying of the ties and rails between Ahmeek and Mohawk is being pushed, and it is expected that this portion of the road will be completed within two weeks. The big trestle over the tracks of the Mineral Range Railroad, built at Wolverine, is also nearing completion. The poles for the wires and trolley are up all the way from Wolverine to Mohawk and the cross bars have been hung. A small station is to be built at Wolverine and a foot trestle is to be erected across the small swamp between Wolverine and the line from the town to the site of the proposed station.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y.—A party of 50 people were the guests of this company on Oct. 29 on an inspection trip from Buffalo to Farnham, the trip being the formal opening of the line from Angola to Farnham, a distance of 5 miles. The line from Farnham to Silver Creek, 5 miles, is to be opened next week.

New York, Westchester & Boston Railway, New York, N. Y.—An application has been made to the Public Service Commission of the Second District by the New York, New Haven & Hartford Railroad, on behalf of the New York, Westchester & Boston Railway, for the necessary certificate to resume construction work on its road. A public hearing on the application will be given on Nov. 9.

Oneida, N. Y.—D. C. Hadcock writes that he is raising money for the construction of an electric railway from the city of Rome to the State Custodial Asylum, a distance of 2 miles. Mr. Hadcock states that nearly all of the roadbed is now ready for the ties and rails. A company is to be organized as soon as the capital stock is raised, which is to be $25,000. It is planned eventually to extend the projected line to Oneida Castle and there connect with the West Shore Railroad, a distance of 13 miles. [E. R. J., Oct. 10, '08.]

Patchogue, N. Y.—The Public Service Commission of the Second District has approved of the agreement made between the South Shore Traction Company and the Suffolk Traction Company, as to the operation of these two companies' lines in the town of Islip. The granting of this approval makes the way clear for the construction of the two railroads.

Ohio Electric Railway, Cincinnati, Ohio.—It is reported that this company is planning to make a number of improvements to its railway system in Dayton. The company, it is said, will spend $11,000 in rebuilding its tracks on South Main Street.

Wasco County Electric & Power Company, Portland, Ore.—At a meeting of the directors of this company on Oct. 20, the survey of the first section, made by Shipman, Denny & Ryan, was submitted and met the approval of the company's engineers and the board of directors. A map of the definite location of the dam site and power plant on the Deschutes and John Day Rivers has been made and filed with the Department of the Interior. The lines projected extend over 300 miles, through Gilliam, Wheeler, Crook and Wasco Counties, and the power plants will give 100,000 hp. A trust deed covering the property of the company was authorized to be made in the sum of $15,000,000 to cover a bond for a like amount. R. L. Donald, Portland, general manager. [E. R. J., Sept. 5, '08.]

***Chester, Pa.**—Joseph Shortledge, Concordville, Pa., is reported to be promoting an electric railway to be built from Chester to Llewellyn, Concordville and West Chester.

Pittsburg (Pa.) Railways.—It is stated that this company has practically completed the building of the line to connect Pittsburg with the Washington & Cannonsburg Traction Company, which it recently purchased, and will place it in operation in a few weeks. This line affords a through traction road to Washington, Pa.

Pittsburg, Harmony, Butler & New Castle Electric Railway, Butler, Pa.—Officials of this company are said to have announced that the line between Brush Creek and East Street, Northside, Pittsburg, will be completed by Nov. 15 and through service inaugurated to Liberty Street. The time between East Street and Butler will be 1 hr. and 30 min.

Montreal & Southern Counties Railway, Montreal, Que.—This company, which some time ago secured an entrance into Montreal from the South Shore via Mill, Common, Grey Nun and Youville Streets, it is said, will start construction work on the Montreal section this week. John Quinlan & Company have secured the contract for the concrete work, and the United States Steel Company for the rails and other special work. [E. R. J., July 4, '08.]

Augusta & Edgefield Electric Railway, Edgefield, S. C.—At a meeting last week at Augusta, Ga., between a committee from the Chamber of Commerce and delegates representing citizens of Edgefield, Greenwood and Newberry, S. C., interested in the construction of the proposed Augusta & Edgefield Electric Railway, the members of the delegation were assured that the Augusta Chamber of Commerce, with the assistance of other local organizations, will undertake the work of making the survey. The Carolina delegation was headed by W. P. Calhoun and M. C. Butler. [E. R. J., Oct. 17, '08.]

Aberdeen, Huron & Southern Railway, Huron, S. D.—A mortgage deed to the Carnegie Trust Company, New York, has been filed with the register of deeds in Aberdeen by the Aberdeen, Huron & Southern Railway. The amount is given as $2,500,000. The company proposes to construct an electric railway between Huron and Aberdeen. J. A. Cleaver, Huron, president. [E. R. J., July 4, '08.]

Mesilla Valley & El Paso Interurban Railway, El Paso, Tex.—Organization of this company has been effected by the election of the following officers: Z. T. White, president; O. H. Baum, first vice-president; B. J. Viljoen, second vice-president; W. A. Sutherland, secretary, and Oscar Snow, treasurer. Directors: Z. T. White, Horace B. Stevens, Felix Martinez, El Paso; W. A. Sutherland, Fay Sperry, J. F. Satley, Las Cruces; Oscar Snow, Mesilla Park; B. J. Viljoen, Chamberino; A. Courchesne, E. E. Roudebush and O. H. Baum, El Paso. The company will be incorporated in New Mexico with the above-named officers and directors with a capitalization of $1,000,000. Felix Martinez states that surveying parties will enter the field at once and surveys will be made on both sides of the Rio Grande to determine the most practical route. As soon as the surveyors report the officers and directors will select the route for the upper valley interurban, to connect Las Cruces and other Mesilla valley towns with El Paso. [E. R. J., July 4, '08].

Temple, Tex.—At a joint meeting of citizens of Temple, Waco and Marlin, Tex., resolutions were adopted offering $100,000 cash, besides all franchises and right of way between and in those cities, for an interurban electric railway, the St. Louis parties who have been investigating being entitled to the courtesy of the first option, but the proposition to be then open to others. [E. R. J., Oct. 17, '08.]

Nooksack Valley Traction Company, Bellingham, Wash.—It is officially announced that this company plans to let contracts in about 90 days for building its proposed railway from Bellingham to Blaine, and from Bellingham to Sumas, Ferndale, Lynden, etc. The road will be 60 miles in length. The right of way has been secured and first section of survey has been made. The line will have an easy grade which will not be over 2 per cent. J. S. Wheeler, Seattle, Wash., president. [E. R. J., Sept. 26, '08.]

Spokane & Inland Electric Railway, Spokane, Wash.—Jay P. Graves, president, is said to have announced that the company has no intention of giving up its franchise to build a tunnel through the city. It is stipulated that work begin next February, and the company has three years in which to have one track in operation. The tunnel will be in Front Avenue, and, it is estimated, will cost $1,000,000.

Spokane, Columbia & Western Railway, Spokane, Wash.—Alex. M. Lupfer, chief engineer of this road, is said to have announced that this company plans to build a line from Spokane to the mouth of the Spokane River, via Davenport and Peach on the Columbia River, 70 miles in length. The surveys have been made and the company is now obtaining rights of way. Clyde M. Graves, Terminal Building, Spokane, Wash. [E. R. J., Sept. 12, '08.]

POWER HOUSES AND SUBSTATIONS

Kansas-Colorado Railroad, Pueblo, Col.—F. Sargent, Chicago, Ill., and W. J. Davis, Jr., are reported to be preparing final plans for the 2000-hp power station, which this company plans to erect at Garden City, Kan. [E. R. J., Oct. 31, '08.]

Noblesville, Ind.—Wallace Campbell, Anderson, Ind., who is promoting an electric railway from Anderson to Crawfordsville, via Noblesville and Lebanon, has arranged with the White River Light & Power Company for power to operate the road, which Mr. Campbell says will be constructed next year. The White River Light & Power Company is completing a hydraulic power dam near Noblesville. [E. R. J., Sept. 12, '08.]

Great Northern Railway, Seattle, Wash.—Announcement is made that electrically propelled passenger trains will be running through the Cascade Tunnel in central Washington before Jan. 1. Turbines and transformers to develop 12,000 hp are assembled at Leavenworth, ready for installation. The wood-stave pipe line which is to carry a considerable portion of the Wenatchee River to the turbines is 10,950 ft. in length and 8 ft. 6 in. in diameter inside measurement.

Seattle (Wash.) Electric Company.—The ELECTRIC RAILWAY JOURNAL is advised that this company has ordered four 1000-kw, 600-volt motor generator sets from the General Electric Company to take care of the railway load during the A. Y. P. Exposition next summer. The General Electric Company is changing the generator on the small turtion. The wood-stave pipe line which is to divert water from the Wenatchee River to the turbines is 10,950 ft. in length and 8 ft. 6 in. in diameter inside measurement.

Washington Water Power Company, Spokane, Wash.—It is said that work will be started immediately by this company on the construction of 30 miles of high-tension line for power purposes from Cataldo, Idaho, to Wallace and vicinity. With the completion of this work a double power line will connect the power station at Post Falls with the Coeur d'Alene mining district. The last 30 miles of the second line will be completed this winter.

Manufactures & Supplies

ROLLING STOCK

Mississippi Valley Interurban Railway, Springfield, Ill., has purchased two cars which are about ready to be shipped from the St. Louis Car Company's works. These cars have 28-ft. bodies and measure 42 ft. over the bumpers. They are mounted on St. Louis Car Company No. 47 standard double trucks.

Ardmore (Okla.) Traction Company has placed an order with the St. Louis Car Company for 4 city cars of the manufacturers' standard, 21 ft., semi-convertible type, mounted on No. 46 du Pont trucks.

Texas Traction Company, Dallas, Tex., has placed an order with the St. Louis Car Company for 12 combination express and baggage cars and one specially designed work car. All of these equipments will be mounted on the St. Louis Car Company's type No. 62 M. C. B. truck.

Seattle (Wash.) Electric Company has recently placed an order for 100 city cars with the St. Louis Car Company. This is in addition to a recent order for 40 cars just completed.

TRADE NOTES

G. A. Kroener has resigned as sales manager for Harold P. Brown, New York. Mr. Kroener has not definitely settled his plans for the future.

Darley Engineering Company, New York, N. Y., engineers and contractors, owing to the necessity for more space, have located their New York office at Rooms Nos. 2404-5-6-7, Singer Building Tower, 149 Broadway.

George B. Crane has recently entered the sales department of the Albert & J. M. Anderson Manufacturing Company, Boston, Mass., in its home office in Boston. For the past four years Mr. Crane has been connected with the Lord Electric Company, New York.

Jones & Tompson, Boston, Mass., manufacturers of the new Jones & Tompson fare collector and change making machines for pay-as-you-enter cars, have overcome the difficulties that arose in their machine shop preventing them from exhibiting at the recent convention, and have opened permanent offices at Room 309, John Hancock Building, Boston, Mass.

Dossert & Company, New York, N. Y., report the receipt recently of the following orders: 350 cable taps for feeder cable, from the Chicago City Railway; 1750 2-way, 3-way and fuse-box plugs from the Edison Electric Illuminating Company, Brooklyn, and 800 connectors of various sizes and styles from the Western Electric Company, New York, for export to South Africa and the Klondike.

McClintic-Marshall Construction Company, Pittsburg, Pa., through a typographical error in the Electric Railway Journal's Dictionary of Electric Railway Material for 1908, was credited under the department, Bridges and Buildings, with an output of only 15,000 tons of finished steel per annum for its three plants, whereas the output should have been given as 150,000 tons, making the company by far the largest independent fabricator of steel in the United States.

St. Louis Car Company, St. Louis, Mo., announces that many inquiries point to the renewal of normal business conditions after Jan. 1. A considerable number of orders already have been placed with the company for the new street-car seat, exhibited at the Atlantic City convention by the company, and the "Spiral" journal bearings manufactured by the company are selling satisfactorily. One purchaser reports that bearings have just been removed from a car that had run 120,000 miles.

Warren L. Boyer, who for many years was connected with the Peckham Truck Company, Kingston, N. Y., and later with its successor, the New York Car & Truck Company, has joined the engineering department of the American Brake Shoe & Foundry Company and will make his headquarters in future at Mahwah, N. J. While with the Peckham Company, Mr. Boyer occupied various positions until he was appointed assistant to the manager, and under the New York Car & Truck Company he was superintendent of the Kingston works.

Rail Joint Company, New York, N. Y., at its annual meeting on Oct. 28, elected the following directors: Geo. G. Frelinghuysen, Fred'k T. Fearey, E. Y. Weber, C. P. Wheeler, Mark T. Cox, Marcus L. Ward, F. C. Runyon, L. F. Braine, Percy Holbrook, Benjamin Y. Wolhaupter and Geo. A. Weber. The directors subsequently organized as follows: Geo. G. Frelinghuysen, chairman of the board; Fred'k T. Fearey, president; L. F. Braine and Percy Holbrook, vice-presidents; Benjamin Y. Wolhaupter, secretary, and F. C. Runyon, treasurer.

A. H. Sisson has resigned as general manager of the St. Louis Car Company, St. Louis, Mo., to become associated with the Forsyth Brothers Company, Chicago, Ill., as general manager. He will enter upon his new duties on Nov. 15. Mr. Sisson has been connected with the St. Louis Car Company as general manager for three years, prior to which he was general manager of the Jewett Car Company. Mr. Sisson has been actively engaged in the manufacture of steam and electric cars for more than 12 years, and his extended knowledge of car construction and his extremely wide circle of friends in the manufacturing and the steam and electric railway fields should make his services very valuable to Forsyth Brothers Company. Mr. Sisson is treasurer of the American Street & Interurban Railway Manufacturers' Association and a member of the executive committee of the association.

Waddell & Mahon Corporation, New York, N. Y., which was engaged by the New York Taxicab Company to break the strike of the chauffeurs of the company, which was declared on Oct. 3 and is now about settled, had the full number of cabs operated by the company in service within three days after the strike was declared, and the normal schedule was thereafter maintained. The chauffeurs were strongly unionized. Before the strike the men were paid by taking 20 per cent of all receipts for fares as well as tips; they were required by the company to pay for the gasoline used while the cars were in service, and also to pay for their uniforms at the rate of 20 cents per day until the uniform was paid for. Their demands were for a salary of $2.50 per day and all tips, with 40 cents per hour for overtime; uniforms and gasoline free, and recognition of the union. The company was willing to accede to all demands except the recognition of the union.

Edge Computer Sales Agency, New York, N. Y., is making a small computer designed to assist structural engineers in figuring the weights of all structural shapes of any length. The machine consists of two disks, one rotating upon the other, each marked with logarithmic scales representing the dimensions in feet and inches of the various shapes and the results in pounds. The operation of computing the weight of any plate consists in turning the upper disk until the thickness of the plate required, found on a plate marked "for plates only," corresponds with the required width on the lower disk. The weight of any length of that plate is then seen on the lower disk, opposite the length. The weight for an angle of any length is found by rotating the upper disk until the thickness of the angle corresponds with the number equal to the sum of the two sides of the angle; the weight of any length of that angle is seen opposite that length. Either of these operations entails only one movement of the disk and results can be found with rapidity. The computer is being used by many of the larger railroads and by such industrial firms as the American Bridge Company, Westinghouse Electric & Manufacturing Company, R. W. Hunt Company, Pennsylvania Steel Company, etc.

ADVERTISING LITERATURE

National Tube Company, Pittsburg, Pa.— This company has issued an 8-page folder, in which its exhibit at the Pittsburg Sesqui-Centennial Exhibition is illustrated and described. The exhibit is said to have been the most complete ever made of tubular products.

J. Norman Jensen, Chicago, Ill.—Mr. Jensen has issued a sheet of his logarithmic cross-section paper, on the back of which he explains the principle of the paper, its advantages and uses and gives directions for using the paper. As its name implies, the Jensen logarithmic paper is divided logarithmically, the distances of the abscissae and the ordinates from the origin being proportional to the logarithms of the numbers instead of the numbers themselves. Mr. Jensen says his paper has the advantage over other logarithmic papers of being the only one graduated from 10 to 10,000 logarithmically.

Carnegie Steel Company, Pittsburg, Pa.—This company has issued a publication in which its steel cross tie and Duquesne rail joint are described and illustrated. The introduction of the steel tie for steam railroad service is reviewed and typical installations of steel ties on a number of railroads are described. The use of steel ties in street railway work is also reviewed. Street railway track reconstruction is expensive, retards traffic and frequently results in protests from citizens, and it was to afford a permanent roadbed that the Carnegie Company developed steel ties for street and interurban railways. The I-beam type of steel cross tie meets the requirements of most street railway companies, but where the distance between the base of the rail and the sub-grade is too small to admit any of the I-beam ties the company has developed a special section known as M-27. Details of typical concrete street

construction are presented. A list of 27 companies using Carnegie steel ties concludes that part of the publication devoted to street railway track. Among the companies mentioned are the Boston Elevated Railway, Brooklyn Rapid Transit Company, Cleveland Electric Railway, Denver City Tramway, International Railway, Syracuse Rapid Transit Railway and the Twin City Rapid Transit Company.

American Blower Company, Detroit, Mich.—This company has had so many inquiries as to how the A. B. C. blower exhibited by it at recent conventions, including the meeting of the American Street & Interurban Railway Association at Atlantic City, is able to keep a ball in suspension in a jet of air at the angle at which it stood at the company's various exhibits, that it has printed for general distribution a card on which the phenomena involved are explained. A sketch shows the blower and ball in action with three men gazing on with open-mouthed wonder. The explanation is introduced with the question, "Still Guessing?" The card goes on to say that the suspension results from the action of the air current flowing with great velocity from the outlet of the blower. This current acts in a manner not unlike that of a rapidly moving train, creating about it an intense suction toward itself. This is indicated by the fact that if smoke is blown toward the air current, and at a distance not too great from it, the smoke will be sucked into the blast. Thus is the ball got into the current. Now, the distance at which the ball will stand from the blower outlet depends upon the intensity with which the air hits the surface of the ball and the weight of the ball itself. By changing the speed of the blower the ball will stand closer or farther off, as the speed is slow or fast.

ELECTRIC RAILWAY PATENTS

[This department is conducted by Rosenbaum & Stockbridge, patent attorneys, 140 Nassau Street, New York.]

Railway Signal, 901,958; Heinrich Diehl, Berlin, Germany. App. filed April 23, 1907. A signal system in which the control of the signals is secured by selenium cells placed along the trackway and sources of light on the cars.

Electric Railway System, 901,997; Horace E. Parshall, London Wall, London, Eng. App. filed Aug. 19, 1904. The trolley wire has a higher elevation at its high potential portions than at its low potential portions. A switch is controlled by the movement of the trolley pole so as to connect the motors properly for the high potential or the low potential current.

Signaling System for Railroad Trains, 902,014; Shellman T. Stewart, Newark, N. J. App. filed Jan. 31, 1908. Comprises a circuit for a signal made and broken by the closing and opening of the train gates, latches for holding the gates shut and a second circuit to operate the latches.

Electric Car Truck, 902,017; Fernando F. Stowe, Worcester, Mass. App. filed March 10, 1905. Has spring-pressed cone bearings for holding the motor in place in the truck frame.

Rail Bond, 902,026; Eugene W. Vogel, Chicago, Ill. App. filed Feb. 9, 1906. A rigid terminal for an electrical bond, adapted to be driven into a hole in a conductor and having shallow superficial grooves in the portion thereof, which is adapted to engage with the wall surrounding the hole.

Electric Railroad Switch, 902,035; Merle J. Wightman, New York, N. Y. App. filed Jan. 2, 1908. Relates to mechanism for moving the switch point, and includes an electric motor having worm gear connections for operating the switch point and having its circuit controlled by a trolley contact.

Ball-Bearing Railway Track Curve, 902,053; William R. Clark, Jamestown, N. Y.. App. filed June 12, 1908. Ball-bearings placed in a guide rail, having a ball race therein, which bear upon the outer side of the wheel flange.

Motor Controller, 902,061; Henry F. Elshoff, Norwood, Ohio. App. filed June 30, 1908. Has a rotatable drum, a switch biased toward closed position, but arranged to be opened by said drum when the latter is moved between certain positions, and clockwork mechanism for retarding part of the closing movement of the switch only.

Motor Controller, 902,101; Anthony L. McHugh, Cincinnati, Ohio. App. filed June 30, 1906. Controller arranged to impress different voltages on a motor armature, a resistance in the motor armature circuit, and a mechanically operated switch separate from the controller drum and its co-operating contact fingers and arranged to normally short-circuit said resistance, but to open said short-circuit whenever the voltage impressed on the motor armature is varied.

Motor Controller, 902,108; William D. Pomeroy, Norwood, Ohio. App. filed Dec. 31, 1908. Comprises a controller consisting of a rotatable drum and a switch arranged to be opened by the drum when the latter is moved between certain positions, together with means which tend to close the switch and friction mechanism for retarding such closing.

Fluid Pressure Brake System, 902,114; William H. Sauvage, New York, N. Y. App. filed May 28, 1908. Means operated by deficiency of pressure in the brake cylinder and independent of the usual connection through the triple valve to admit fluid under pressure from the train pipe to the brake cylinder.

Signal System, 902,118; Burt A. Slater and Michael J. McDermott, Boise, Idaho. App. filed March 5, 1908. Includes a spring impelled tappet adjacent to the usual track rails and depressed by the wheel of the engine in passing.

Railway Car Brake, 902,137; Seth A. Crone, East Orange, N. J. App. filed Aug. 5, 1908. Means carried by the brake-head for securing the same comprising a hinged bar, a screw and nut for moving and securing the free end of the bar and a locking block above and engaged by the bar.

Safety Appliance for Street Cars, 902,156; Lowell Mason Maxham, Boston, Mass. App. filed March 26, 1908. Details of construction of a collapsible fender of the cow-catcher type.

Railway Signaling System, 902,176; Carl J. Schwarze, Adrian, Mich. App. filed July 18, 1906. A pair of special trolley connections are hung adjacent to the usual trolley wire and engaged by a laterally projecting rod from the trolley harp so as to become temporarily electrified.

Electro-pneumatic Brake, 902,184; Walter V. Turner, Wilkinsburg, Pa. App. filed March 20, 1905. An automatic fluid pressure brake, having an electric application valve for controlling the supply of air to the brake cylinder, and a normally open electric release valve for controlling the exhaust port of the pneumatically operated valve.

Car Fender, 902,210; Dana E. Conn, Hyde Park, Mass. App. filed Jan. 14, 1908. Details of construction of a pivoted fender, having counterweights to aid in quickly and easily adjusting the same.

Switch Point Thrower, 902,249; Rechichi Pasquale, Oil City, Pa. App. filed April 11, 1907. A rotary cam device, having a link connection with a switch point, and which is rotated by a depending tappet on the car.

Conduit, 902,285; John A. Garey, Mound City, Mich. App. filed Aug. 12, 1907. The third-rail has a cover which flexibly moves over the same, and is supported during the passage of the collector shoe by the engagement of the latter.

Railway Signaling Apparatus, 902,297; Winthrop K. Howe, Buffalo, N. Y. App. filed Nov. 27, 1905. Means for operating two blades of a semaphore signal independently from a single motor. The motor has separate clutches for the separate blades.

Guard Rail for Passenger Cars, 902,368; Samuel T. Bole, Philadelphia, Pa. App. filed Aug. 18, 1908. The guard rail is mounted above the car platform and divides it into ingress and egress passageways, and is capable of being raised or lowered bodily into and out of position.

Passenger Car, 902,381; Samuel M. Curwen, Haverford, and Warren M. Smith, Moores, Pa. App. filed May 4, 1908. A guard rail separating the platform into ingress and egress sections, which rail extends into the car past the doorway and yet permits the closing of the doors.

Car Body, 902,402; William H. Heuling, Jr., Philadelphia, and Warren M. Smith, Moores, Pa. App. filed April 17, 1908. The object of this invention is to provide large window openings without detracting from the appearance of the car and without weakening the construction.

Trolley Guard, 902,420; William D. Lewis, Plymouth, Pa. App. filed April 11, 1908. The trolley harp has a pair of arms with curved extremities spring impelled vertically upward on both sides of the trolley wheel.

Electric Locomotive, 902,476; William Dalton, of Schenectady, N. Y. App. filed July 22, 1907. Designed for a locomotive, in which the weights are comparatively low, and in which injury due to nosing or lateral motion of the locomotive on the trucks is prevented. Has eight pairs of wheels forming part of two bogie trucks.

Non-Chattering Brake Hanger, 902,477; William Dalton, Schenectady, N. Y. App. filed June 16, 1908. Has end bearing sections recessed to fit on brake hanger pins, a rotatable intermediate strut interposed between said bearing sections, an inclosing strap forming the outer abutments of the bearing sections, and means for automatically rotating the intermediate strut and thereby increasing its operative length in correspondence with wear of the parts.

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
AKRON, O. Northern Ohio Tr. & Light Co.	1m., Sept. '08	172,675	91,650	81,025	43,412	37,613
	1 " " '07	185,341	96,174	89,168	43,279	45,889
	9 " " '08	1,420,553	822,041	598,511	392,008	206,504
	9 " " '07	1,459,784	832,588	627,197	383,160	244,037
BELLINGHAM, WASH., Whatcom Co. Ry. & Lt. Co.	1m., Aug. '08	29,417	17,268	12,149	7,976	4,173
	1 " " '07	31,696	16,686	15,010	7,710	7,299
	12 " " '08	359,739	205,266	154,472	93,877	60,596
	12 " " '07	332,528	189,941	142,587	80,060	62,527
BIRMINGHAM, ALA. Birmingham Ry., Lt. & Pwr. Co.	1m., Sept. '08	177,892	*122,266	55,625	43,617	12,008
	1 " " '07	198,579	*126,827	71,751	42,389	29,363
	9 " " '08	1,586,027	*1,037,924	548,102	394,772	153,330
	9 " " '07	1,604,295	*1,062,411	541,884	351,871	190,013
CHARLESTON, S. C. Charleston Con. Ry. Gas & Elec. Co.	1m., Sept. '08	58,125	40,269	17,856	14,737	3,119
	1 " " '07	56,731	38,516	18,215	14,744	3,472
	7 " " '08	445,096	285,971	159,125	104,289	54,836
	7 " " '07	424,110	264,583	159,527	103,774	55,753
CHICAGO, ILL. Aurora, Elgin & Chicago Ry. Co.	1m., Sept. '08	137,387	70,804	66,583	27,624	38,958
	1 " " '07	139,194	72,335	66,859	27,840	39,020
	3 " " '08	440,030	214,188	225,842	83,027	142,815
	3 " " '07	442,043	220,706	221,337	82,334	139,003
CLEVELAND, O. Cleveland, Painesville & Eastern R.R. Co.	1m., Aug. '08	32,132	16 088	16,045	7,374	8,671
	1 " " '07	35,125	16,584	18,540	6,796	11,744
	8 " " '08	190,468	106,915	83,553	58,392	25,161
	8 " " '07	192,712	100,954	91,758	56,868	34,890
DALLAS, TEX. Dallas Electric Corporation.	1m., Aug. '08	94,739	63,553	31,186	28,329	2,857
	1 " " '07	94,294	63,451	30,843	27,071	3,772
	12 " " '08	1,147,851	773,020	374,831	343,844	20,986
	12 " " '07	1,079,196	751,720	327,476	299,357	28,119
DETROIT, MICH. Detroit United Ry. Co.	1m., Aug. '08	696,446	*443,939	252,507	134,859	117,648
	1 " " '07	732,047	*427,767	304,280	133,112	171,168
	1 " Sept. '08	673,517	*423,136	250,381	135,049	115,332
	1 " " '07	670,105	*422,663	247,442	132,964	114,478
	9 " " '08	5,369,910	*3,395,252	1,974,658	1,218,860	755,794
	9 " " '07	5,424,399	*3,368,982	2,055,417	1,167,176	888,241
DULUTH, MINN. Duluth St. Ry. Co.	1m., Sept. '08	76,870	45,848	31,021	18,917	12,105
	1 " " '07	74,398	35,439	38,959	17,922	21,037
	9 " " '08	653,261	398,575	254,687	166,750	87,937
	9 " " '07	625,672	309,624	316,048	159,808	156,241
E. ST. LOUIS, ILL. East St. Louis & Suburban Co.	1m., Sept. '08	170,027	87,161	82,866	.....	.....
	1 " " '07	199,579	94,071	105,507	.....	.....
	9 " " '08	1,487,855	781,239	706,617	.....	.....
	9 " " '07	1,582,899	836,645	746,254	.....	.....
EL PASO, TEX. El Paso Cos.	1m., Aug. '08	41,399	30,889	10,510	7,076	3,434
	1 " " '07	42,131	32,451	9,680	5,994	3,686
	12 " " '08	531,943	372,864	159,079	81,639	77,440
	12 " " '07	465,224	349,674	115,550	63,663	51,887
FAIRMONT, W. VA. Fairmont & Clarksburg Tr. Co.	1m., Aug. '08	40,236	12,356	27,880	1,072	26,808
	1 " " '07	36,025	14,825	21,200	945	20,255
	8 " " '08	267,208	95,493	171,715	8,585	163,130
	8 " " '07	244,366	99,299	145,067	7,111	137,956
FT. WAYNE, IND. Ft. Wayne & Wabash Valley Tr. Co.	1m., Aug. '08	125,587	66,420	59,167	.....	.....
	1 " " '07	125,118	70,047	55,071	.....	.....
	8 " " '08	856,257	492,496	363,762	.....	.....
	8 " " '07	811,890	487,028	324,862	.....	.....
FORT WORTH, TEX. Northern Texas Elec. Co.	1m., Aug. '08	92,503	53,530	38,973	17,434	21,539
	1 " " '07	97,930	55,097	42,833	13,830	29,003
	12 " " '08	1,058,200	617,009	441,191	183,122	258,070
	12 " " '07	1,001,144	589,323	411,821	151,534	260,287
GALVESTON, TEX. Galveston-Houston Elec. Co.	1m., Aug. '08	101,708	55,101	46,607	20,527	26,080
	1 " " '07	99,467	52,898	46,569	19,281	27,289
	12 " " '08	1,065,863	626,700	439,163	240,614	198,549
	12 " " '07	1,010,543	596,531	414,012	215,987	198,025
HOUGHTON, MICH. Houghton County St. Ry. Co.	1m., Aug. '08	25,952	12,772	13,180	4,603	8,577
	1 " " '07	25,337	12,482	12,856	4,826	8,030
	12 " " '08	257,651	148,644	109,007	56,877	52,130
	12 " " '07	246,392	143,469	102,923	55,999	46,924
JACKSONVILLE, FLA. Jacksonville Elec. Co.	1m., Aug. '08	36,271	19,142	17,129	8,252	8,877
	1 " " '07	34,695	20,095	14,600	6,949	7,651
	12 " " '08	413,226	251,142	162,084	95,895	66,189
	12 " " '07	380,795	219,369	161,427	66,724	94,703
KANSAS CITY, MO. Kansas City Ry. & Lt. Co.	1m., Aug. '08	537,499	306,609	230,890	155,540	75,350
	1 " " '07	523,641	263,230	260,411	155,906	104,505
	3 " " '08	1,576,543	922,807	653,736	465,349	188,387
	3 " " '07	1,552,902	810,017	742,885	463,734	279,151
KNOXVILLE, TENN. Knoxville Ry. & Lt. Co.	1m., Sept. '08	48,634	*23,478	25,157	11,858	13,298
	1 " " '07	52,823	*29,720	23,103	11,278	11,824
	9 " " '08	421,701	*220,146	201,554	103,502	98,052
	9 " " '07	447,072	*242,716	204,356	94,725	109,632
LEXINGTON, KY. Lexington & Interurban Rys. Co.	1m., Aug. '08	63,246	35,844	27,402	.....	.....
	1 " " '07	59,085	32,917	26,169	.....	.....
	8 " " '08	402,540	260,593	141,947	.....	.....
	8 " " '07	361,588	235,188	126,400	.....	.....
LITTLE ROCK, ARK. Little Rock Ry. & Elec. Co.	1m., Sept. '08	54,656	*27,340	27,315	13,605	13,710
	1 " " '07	57,020	*26,753	30,267	8,674	21,593
	9 " " '08	495,818	*254,909	240,909	117,796	123,113
	9 " " '07	466,801	*243,310	223,491	75,738	147,753
MEMPHIS TENN. Memphis St. Ry. Co.	1m., Sept. '08	143,045	*88,971	54,073	38,032	16,041
	1 " " '07	140,903	*83,663	57,239	36,935	20,304
	9 " " '08	1,199,765	*760,319	439,446	337,469	101,977
	9 " " '07	1,198,675	*738,644	460,031	323,994	136,038
MILWAUKEE, WIS. Milwaukee Elec. Ry. & Lt. Co.	1m., Sept. '08	339,132	160,078	179,054	100,810	78,244
	1 " " '07	345,728	171,388	174,339	104,073	70,266
	9 " " '08	2,909,950	1,486,615	1,423,335	893,670	529,665
	9 " " '07	2,890,838	1,449,335	1,441,503	880,947	560,556
Milwaukee Lt., Ht. & Tr. Co.	1m., Sept. '08	139,169	34,665	104,504	62,802	41,701
	1 " " '07	138,180	36,720	101,461	59,447	42,013
	9 " " '08	1,068,064	280,458	787,606	538,296	249,310
	9 " " '07	815,760	267,447	548,313	390,121	158,192
MINNEAPOLIS, MINN. Twin City R. T. Co.	1m., Sept. '08	583,876	276,589	307,288	138,667	168,621
	1 " " '07	561,446	251,276	310,170	115,142	195,029
	9 " " '08	4,765,802	2,372,025	2,393,777	1,145,122	1,248,655
	9 " " '07	4,540,273	2,180,437	2,359,836	1,036,742	1,323,095
MONTREAL, CAN. Montreal St. Ry.	1m., Aug. '08	329,772	164,262	165,510	70,078	95,433
	1 " " '07	329,755	184,844	144,911	67,208	77,703
	11 " " '08	3,329,060	1,978,659	1,350,401	585,966	764,435
	11 " " '07	3,164,399	1,946,389	1,218,010	524,555	693,455
NASHVILLE, TENN. Nashville Ry. & Lt. Co.	1m., Sept. '08	151,751	*82,826	68,924	32,817	36,107
	1 " " '07	151,675	*81,911	69,763	30,495	39,268
	9 " " '08	1,167,534	*703,392	464,142	286,790	177,351
	9 " " '07	1,152,950	*686,535	466,415	263,581	202,833
NORFOLK, VA. Norfolk & Portsmouth Tr. Co.	1m., Aug. '08	174,873	94,575	80,298	.....	.....
	1 " " '07	307,488	171,544	135,944	.....	.....
	8 " " '08	1,232,296	740,436	491,860	.....	.....
	8 " " '07	1,681,686	1,038,747	642,939	.....	.....
PENSACOLA, FLA. Pensacola Elec. Co.	1m., Aug. '08	19,562	13,142	6,421	4,488	1,933
	1 " " '07	21,045	12,620	8,425	4,070	4,355
	12 " " '08	213,875	152,483	61,392	51,130	10,263
	12 " " '07	207,024	130,779	76,245	44,287	31,958
PHILADELPHIA, PA. American Rys. Co.	1m., Sept. '08	240,740	.....	.....	.....	.....
	1 " " '07	270,084	.....	.....	.....	.....
	3 " " '08	785,031	.....	.....	.....	.....
	3 " " '07	866,243	.....	.....	.....	.....
PLYMOUTH, MASS. Brockton & Plymouth St. Ry. Co.	1m., Aug. '08	16,515	9,275	7,240	2,213	5,027
	1 " " '07	17,327	9,079	8,248	2,411	5,837
	12 " " '08	119,733	91,775	27,959	27,491	468
	12 " " '07	118,337	74,001	44,336	26,646	17,690
PORTLAND, ORE. Portland Ry., Lt. & Pwr. Co.	1m., Sept. '08	373,288	173,342	199,946	.....	.....
	1 " " '07	361,582	186,760	174,822	.....	.....
	9 " " '08	3,222,109	1,597,127	1,624,982	.....	.....
	9 " " '07	2,925,548	1,663,821	1,261,727	.....	.....
ST. LOUIS, MO. United Railways Co of St. Louis	1m., Sept. '08	887,344	*554,164	333,180	234,380	98,800
	1 " " '07	930,606	*588,883	341,723	232,404	109,319
	8 " " '08	7,860,625	*5,073,068	2,787,557	2,097,332	690,225
	8 " " '07	8,116,337	*5,299,015	2,817,322	2,083,732	733,590
SAVANNAH, GA. Savannah Electric Co.	1m., Aug. '08	51,544	30,858	20,686	15,835	4,851
	1 " " '07	54,417	34,799	19,618	15,250	4,369
	12 " " '08	596,288	401,540	194,748	185,297	9,451
	12 " " '07	580,851	366,144	214,707	166,387	48,320
SEATTLE, WASH. Seattle Elec. Co.	1m., Aug. '08	382,742	219,660	163,082	94,834	68,248
	1 " " '07	365,531	204,671	160,861	83,901	76,959
	12 " " '08	4,398,998	2,607,043	1,791,955	1,043,557	748,399
	12 " " '07	3,839,022	2,222,997	1,616,024	831,427	784,598
TACOMA, WASH. Puget Sound Elec. Ry. Co.	1m., Aug. '08	166,594	103,844	62,750	42,928	19,822
	1 " " '07	165,079	97,693	67,386	38,705	28,682
	12 " " '08	1,676,362	1,070,296	606,065	507,747	98,319
	12 " " '07	1,576,378	968,422	607,956	416,640	191,317
TAMPA, FLA. Tampa Elec. Co.	1m., Aug. '08	45,474	29,723	15,751	4,388	11,363
	1 " " '07	45,022	34,468	10,554	1,587	8,967
	12 " " '08	542,907	371,063	171,844	23,881	147,963
	12 " " '07	510,259	351,629	158,630	20,845	137,786
TOLEDO, O. Toledo Rys. & Lt. Co.	1m., Sept. '08	222,952	*111,899	111,053	71,976	39,077
	1 " " '07	209,594	*119,520	90,074	68,819	21,255
	9 " " '08	1,867,894	*1,019,823	848,071	635,743	212,328
	9 " " '07	1,896,784	*1,092,218	804,566	585,062	219,504