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### The Accounting Department

Mr. Wright's paper on "The Accounting Department," published elsewhere in this issue, is an admirable discussion of the value of system in office work. Even if it be assumed that a force of employees is composed of those coveted characters who want to give their time wisely for the best interests of the company which employs them, it is often the fact that some have not learned the importance of making good use of the minutes. While men may try to be economical in the use of their time, and to make their

results excellent in quality and satisfactory as to quantity, many have not had the benefit of a training sufficiently good to enable them to appreciate the importance of these matters. Since the system described by Mr. Wright is applicable to other departments than that which accounts for the receipts and expenditures, it will be of interest to railway officials and employees generally.

### Standardizing Car Painting

The responsibility for poor results in car painting rests between the painter and the paint manufacturer. Good paint improperly applied will give no better results than poor paint, and even the most skilled painter cannot get long life from cheap and inferior mixtures. The proper painting of a car from the wood up requires a number of distinct operations and materials, each successive step depending on the thoroughness and skill with which the previous stage of the work has been done. Paints are complex compounds of liquids and solids having chemical and physical properties widely different. Between the filler coat and the surface varnish there are probably no less than 20 elements intimately in contact with each other. Chemically, some of these elements may have an affinity for each other, while others may tend to dissociate. The importance of selecting the right combination of paints for the successive coats, therefore, is self-evident. All paint manufacturers do not use the same vehicle or liquid nor the same pigments in grinding paints of the same color for the same purpose. The first and second color coats of two paint manufacturers, for example, may be of equally good quality. If the second coat of one make follows the first coat of the same make the result will be good, but if the first coat is of one make and the second coat of another, the mixture may have little or no stability.

Too many of the smaller electric railway companies buy their painting supplies piecemeal; a few pounds of filler from one maker, color coats from another, and a gallon or two of varnish from a third. Some cars are painted with one kind of paint and a different combination is used on other cars. Usually no record is kept of the kind of paint used for each coat, the weather conditions, time allowed for drying and the condition of the woodwork at the time the car was put through the shop. How is it possible, under these circumstances, to place the responsibility for poor results on either the painter or any one of the several manufacturers from whom the company buys its supplies?

Standardization is the tendency of the day in all the other shop departments. There is a big field for standardizing the methods and materials used in the paint shop. Buy all the paint and varnish from some one manufacturer, apply it strictly in accordance with the directions of the manu-

facturer's experts, who can devise a system to meet almost any condition of cost, time and climate, and then hold the single manufacturer responsible for the results.

### **Pneumonia Overcoats**

An editorial in a New York paper of May 28 refers with some irony to the appearance of "the pneumonia cars" on "almanac time." As this is a sample of the character of editorial material which is found in many newspapers of leading cities at this season of the year, it may be remarked that the regulation of cars according to the weather is one of the most trying problems of the street railway manager, and of a nature kindred to that which, with most people, is insistent and incessant, especially in the late Spring. Unfortunately, when one wakes up in the morning and looks at his thermometer he cannot always be sure whether it is wise to don his winter flannels or not. Nor are the government weather predictions an unfailing guide as to whether to carry an umbrella—whichever course he decides to follow may be a cause of regret before night. When one endeavors to reconcile the views of several persons, however, on this subject of personal comfort, the problem grows. The frequent controversies between the traveler who must have the window open and the one who will die of chill and exposure if it is not closed, are testimony to the strangely conflicting desires of humanity. Yet it is the responsible and undenied duty of the traction manager to provide some closed cars when a sudden cold change takes place in warm weather, and to regulate the equipment, so far as it is possible, with the vagaries of the climate. It is still more the duty, however, of every individual to carry an overcoat or protect himself otherwise against the sudden changes which seem to be inevitable during the spring and the autumn.

### **Operating Rules for Interurban Railways**

The conference called in Washington last week to discuss the subject of rules for the government of employees of interurban railways resulted in the adoption of numerous tentative amendments to the code presented to the Transportation & Traffic Association last year at Atlantic City. Underlying nearly all of the proposed changes was the desire manifested by most of the railway managers present at the conference to draft the new rules as nearly as possible in accordance with the standard code of the American Railway Association. There are differences in the methods of operating steam railways and most electric interurban railways which make the adoption of the American Railway Association standard code as a whole undesirable. The purpose of the interurban code is to provide a set of rules which can be used in their entirety by all electric interurban railways, omitting special rules covering local conditions, which can always be added by the management. The American Railway Association code does not meet this requirement, but it does form a sound basis for the development of a satisfactory set of rules which if lived up to will permit safe and efficient operation of cars.

There are two reasons why the American Railway Association code is a good one to copy. First, because it is the result of many years of experience and is a consensus of the best ideas of two generations of practical railroad men.

Second, because large numbers of former steam road employees who are thoroughly familiar with its provisions are now in the train service of interurban lines and the fewer differences there are between the old and the new rules under which they work the less chance for confusion, mistakes and accidents. Codes of rules are not easily changed from year to year to meet new conditions and in adopting a set of rules as the standard the Transportation & Traffic Association must look ahead to the traffic developments of the future. The time will inevitably come when interchange of traffic, through routing of trains and joint operation of tracks by steam and electric railways will be an accomplished fact. Uniformity of operating rules will then be imperative. The plan of following as closely as possible the American Railway Association code is to be commended.

Some of the rules included in the American Railway Association code have been wisely omitted from the interurban code. We refer particularly to those relating to superiority of direction, use of time orders and superseding of time-tables. Employees of interurban railways as a whole do not have the benefit of a long apprenticeship and years of experience in subordinate positions in the train service as do the employees of steam roads. It is safer therefore to eliminate long and puzzling definitions or outlines of procedure to cover every contingency and to restrict the responsibility and rights of train crews when thrown on their own resources. Doing away with superiority of direction may delay trains under some circumstances, but the possibility of error in assuming rights to the track is overcome and safety in this respect is assured. The same argument applies to the abandonment of the time-order form which on more than one occasion has resulted in an accident due to its misunderstanding or disobedience. With this exception, however, all of the train-order forms in the American Railway Association code were tentatively adopted, after the necessary slight changes in verbiage were made to adapt them to electric railway service.

The protection of trains when stopped for any cause on the main track is one of the most important points covered by the rules. Rule No. 219 in the interurban code is framed in the same language as Rule No. 99 of the American Railway Association code with the addition that 1000 ft. is specified as the minimum distance which the conductor or flagman must go back. No rule in the American Railway Association code has been more consistently violated or slurred and it is questionable whether the introduction of a specific minimum distance for the flagman to go back will altogether correct the fault. It will be hard to enforce such a rule strictly, but its efficiency depends on its enforcement. The rule suggested by Mr. Crafts, patterned after that of the Chicago & Northwestern Railway, is an excellent one, but is open to several objections. One of these is that it is too long and complicated and therefore difficult to understand and to enforce rigidly. In this connection it might be suggested that the railway companies provide each train crew with a standard signal tube containing flags, torpedoes and fuses such as are supplied to the steam roads and require the conductor to carry it with him on each trip. Means for protecting the car would then be available quickly in case of any emergency.

### Distant Railway Investments

For many years Philadelphia was the most important center of street railway investment in this country. Individuals in that city owned large portions of the capital stock of the principal street railway systems in New York, Baltimore, Chicago, Pittsburgh and in other important cities, and the securities of these traction companies were active on the Philadelphia stock exchange. During recent years, as street railway systems have increased in number and importance, the position of Philadelphia as the most important center of this class of investment has been largely wrested from it by New York, although many important railway enterprises are still controlled by Philadelphia capitalists.

In Europe, outside of the British Empire, Brussels occupies the place corresponding to that formerly possessed by Philadelphia here. This may be due to the fact that the neutral position of Belgium between the larger European states permits continental capitalists to unite more easily to control foreign enterprises under its laws than under those of any other country, or it may be because such investments have always been popular in Belgium, and particularly in Brussels. Whatever the reason, Brussels has long been and still is the headquarters from which the affairs of tramway companies in many of the leading cities in Asia Minor, Russia, Turkey, Greece and other countries of eastern continental Europe, as well as in South America and Central Asia, are directed. Next to Brussels, London and Berlin rank high as centers of tramway control. The capitalists in both cities have not only promoted many tramway enterprises wherever the flags of their respective countries have flown, but have not hesitated to invest heavily in similar enterprises elsewhere.

These facts are cited because but few American capitalists up to this time have yet attempted much in the way of electric railway promotion outside of this country and its possessions. This seems somewhat of an anomaly at first thought, when one considers the extent of electric railway development here and the very wide use of American apparatus in all electric tramway work. If we attempt to seek a reason for this condition several explanations can be given. One has undoubtedly been the seeming opportunities here for investment. Another reason is undoubtedly the "insularity" of the average American so far as his investments are concerned. Although residents of this country have the reputation of being extensive travelers, their trips abroad are usually for pleasure and do not include much more than a quick tour of some of the largest European capitals and watering places with perhaps a few weeks in Switzerland or a trip up the Nile. The investing public in America as a whole does not travel. At all events, the average American investor has very little real knowledge of foreign methods, languages and laws and consequently has little faith in the security of investments located abroad. This is shown by the almost complete absence of trading on the New York stock exchange in any foreign securities except a few issues of Japanese and Mexican national securities. With the opportunities for profitable investment in this country, however, becoming, as they are, more restricted, partly by the occupation of the best territory and partly by adverse legislation, the at-

traction for electric railway investment outside of this country is becoming much greater. As Americans have for years taken a pessimistic view of this class of investments, it is worth while to consider certain conspicuous advantages in their favor.

In the first place, as a rule, the transportation facilities in foreign cities are very much under-developed, judged even according to local standards of travel. Again, the laws in most of the countries outside of those in Western Europe, are on the whole very favorable to freedom of operation and amount of the return permitted on the investment, compared with similar laws of this country. Finally, while the fares which can be charged are low, the expenses for labor are also low and the net return is not greatly affected.

Of course, the railway owner and manager should not expect to find that the same operating conditions will prevail as exist in America. If they do, they will be disappointed. Some of these differences will appear strange at first, such as the provision of two classes of cars, the use of graded fares, the necessity of employing a different language and currency and of conforming to alien customs. But after one becomes habituated to these features of foreign life they will no longer seem peculiar. Business can be done where they prevail often as well, sometimes better, than under the conditions that exist at home. After all, one is dealing with individuals, and human nature does not differ greatly, whether observed in New York, Cairo, Mexico or Calcutta. The foundations for successful electric railway management are nearly identical in each place. Traffic in every country can be increased by attractive and clean cars, by polite service and by convenient schedules, and it is equally easy to drive it away by a neglect of all these features. The success of a tramway enterprise or of a tramway manager abroad can best be predicated from the results which would follow corresponding efforts of the same persons or companies at home.

### The Mexican Tramways

There have been a few marked exceptions to the general practice of American capitalists in keeping their electric railway investments in this country. One of them is in the case of the group of capitalists who control the Mexican tramways and other important electrical enterprises in countries in America south of the United States. Readers of this paper will find in this issue a continuation of the account of the Mexican system, printed in the issue of May 1. The article in that number was devoted largely to an account of the conditions of electric railway operation in Mexico City. In the present article the subjects treated are the constructional and operating features of the system.

The great distance which separates Mexico from the base of all electric railway supplies has necessitated the adoption by the company in that city of many features which, as a rule, are omitted from the systems here. The company is obliged to do a large part of its own manufacturing and necessarily has to have extensive facilities for repair work. It has also put in service special designs of cars to suit the conditions found in Mexico. Fortunately, however, the experience acquired by those in charge of the property in the direction of their other for-

eign enterprises has undoubtedly been of assistance in solving this particular problem. Through their European and American connections also they are able to keep in touch with the development of the industry in Europe and here. This, in fact, is a condition upon which the greatest degree of success in foreign tramway enterprise is contingent. The management of an American road, however small, can usually keep pretty closely informed about modern improvements, but if the enterprise is abroad it is much more difficult to do this. The management of a company may go on in a narrow groove, making few changes in apparatus or methods and satisfying the local conditions fairly well, but by no means living up to its greatest opportunities. Indeed it may be the case in America if the officers of the road do not know what the others operating similar properties are doing. But for this there is far less excuse.

### Accident Releases

In these days of ambulance chasers, competition is so keen for the opportunity to prosecute accident cases against railroads that attempts are occasionally made to get clients among those who have signed releases of claims for accidents. It is not unusual, nor perhaps unnatural, for a person who has been injured and has made a settlement promptly to come to the conclusion afterward that he might have demanded and obtained better terms if his case had been presented differently. Frequently his friends tell him that if he had stood out for a larger sum he could have obtained three or four times as much money, and an unscrupulous lawyer would have no hesitation in trying to make a man believe this if he thought that he could secure a fee for bringing suit against the company again. Fortunately, it is a maxim of the law to encourage settlements and discourage unnecessary litigation. Consequently the law can be relied upon to sustain settlements made out of court, unless there is some special reason for setting them aside. Several cases of this kind have occurred recently, and as each was appealed until it reached the highest court in the State, they throw interesting light upon the importance of being able to substantiate by outside evidence that the injured person was competent to sign the release at the time he did, and that he fully understood its import.

In the first case, which occurred in Maine, the plaintiff's leg was fractured so that it became necessary to amputate it above the ankle, and, later, above the knee. The liability of the company for damages was not denied, and 25 days before the first amputation it settled with the plaintiff for \$500 and the payment of medical expenses. Later, the settlement was repudiated by the plaintiff on the ground that, owing to his feeble condition of body and mind at the time, he had not the power of connected thought nor the will to make a legal contract. The jury before whom the case was tried accepted this plea and awarded additional damages of \$1,612.50. The evidence showed, however, that at the time the payment was made the plaintiff had expressed a desire to settle with the company without the intervention of a lawyer, and had said that he was satisfied with the amount. It was also proved that on the day of signing the release there was nothing in his physical condition that would indicate any impairment of his mental processes. The question turned upon this point, because the plaintiff

did not claim that the release was obtained by fraudulent methods, and under these circumstances the court refused to set the verdict aside.

Another decision bearing somewhat along the same lines was rendered in Maryland some time ago. An employee who could not read English and who was also a member of an employees' relief association, from which he received money after an accident, signed a release, and afterward claimed that he thought he was signing receipts for the money received from the relief association. The injured man did not ask to have the papers read to him, and it was held that there was no evidence to show the releases were obtained by fraud.

In another Eastern State, however, a release was disregarded under the following conditions: The plaintiff proved that in an accident he had received a shock which later resulted in serious injury; that an hour and a half after the accident, in the superintendent's office, while still "dazed and rattled," the railroad agent had prepared for his signature two papers, one a release, which he told the injured man was merely a form, the other a receipt, which was stated to be for the injuries to plaintiff's clothes. The release was, in fact, a comprehensive document, while the receipt included "also, injury to person." The plaintiff signed the papers without reading them or knowing their contents. The agent swore that nothing was claimed or allowed for personal injuries, and it was held that the jury was justified in disregarding the papers as relating to personal injuries.

### Central Rating Organization for Electrical Risks

The question of fire insurance ratings on electrical risks has become quite acute during the past few months. As most of our readers know, these rates are established, for the most part, by different rating organizations, each of which has jurisdiction over a particular territory. Practically the only properties exempt from the control of these rating organizations are those belonging to the large steam railroads and to a few of the very large manufacturing companies. These latter risks, though scattered throughout the country, are covered by blanket policies issued through the main offices of the insurance companies in New York, Chicago or elsewhere. The result of this condition has been that with the exception of the comparatively small amount of property already described as not being subject to the rating organizations, the fire insurance rate on the same kind of risk has varied greatly, depending upon where it is located. Thus, an insurance company may charge 1 per cent for insuring a car house in the New England district, 1½ per cent for an exactly similar car house which is no greater risk in Pennsylvania, and 2 per cent for a precisely similar building in Texas, and there has been no redress.

Rating organizations had their origin in a desire on the part of the different insurance companies to prevent the disastrous cutting of rates which would follow unrestrained competition, and have been in existence so long that they now constitute an integral part of the business of fire insurance as conducted by the old line companies. But each rating organization is independent of every other in the matter of making rates, rules and schedules, so that a great many inconsistencies will be found in their methods, if the

practices in different parts of the country are compared.

These variations, of course, are not particularly apparent to a person whose property is all in one place. He has to pay the rate demanded, or else seek some mutual company or Lloyds, or else carries his own insurance. But if an individual or company has property in different parts of the country, the widely divergent rulings and rates often come as a disagreeable surprise. It does not seem reasonable to him to have to pay the same fire insurance company twice as much, or even five times as much, as has been the case, for insurance on the same class of property and subject to the same hazard, simply because the two pieces of property are on opposite sides of an imaginary line drawn through the country, and because the rates on each side of this line are fixed by different organizations. The owner may be able to prove absolutely that the cost of the insurance is the same in one case as in the other, but if he takes the matter up with the insurance company which writes both policies it is powerless to help him. Its rates in each territory are fixed, not by itself, but by an association in which it has but one vote, and it must be governed as to its charges in each district by the vote of the majority of the representatives of the insurance companies who are members of the rating organization of that particular district. As has been explained, the steam railroads and some of the larger industrial corporations which have widely scattered risks are exempt from this condition, and are permitted to deal directly with the insurance companies, through a central rating organization. It has been the proposal to follow a similar plan in the case of electrical risks during the last few months which has brought matters to the crisis already mentioned.

Those in favor of the change include the large insurance companies, which realize the necessity of some reform. With their co-operation, identical resolutions have been presented before all of the rating organizations which have met since April 1. The text to these resolutions was published in our issue of May 1. Up to the present time about an equal number of rating organizations have accepted and have rejected the plan. Among the former are the Middle Department, which operates in the Middle States; the New York State Association, which operates in New York State, and the Newark Board. Among the latter are the New York Fire Insurance Exchange, the Boston Board and the Philadelphia Board.

The opposition has come largely from the local insurance brokers, most of whom act as agents on a percentage basis for several insurance companies, and are consequently independent of any one company. The advocates of the central rating bureau deny that the plan includes the discontinuance of the services of the local agents, but the latter seem to see in it some plan by which their influence and receipts will diminish. As opposed to this, the advocates of the change claim that the plan constitutes the only salvation of all interested, because unless business is done in a sensible and economical way, the owners of the electrical properties will leave the stock companies altogether and seek some other means of fire protection, and that it is time that the present chaotic condition is discontinued. The next few weeks will undoubtedly see some important developments in this situation.

### The Maintenance Department and Accident Prevention

It goes without saying that unless the work of the maintenance department is well done, the tendency toward accidents to rolling stock and passengers on the road is increased. On the other hand, the present necessity on most roads of looking at both sides of a cent before spending it requires the most careful administration to secure proper repairs without undue expenditure. It is not so much a matter of doing the physical work as of accomplishing it at minimum cost. In considering the relation between maintenance and accidents, however, it is desirable to realize that sometimes very small oversights in the shops lead to serious conditions on the road. Thus, in one case, the failure of the car cleaner to remove the dirt from beneath a trap ring in the floor caused trouble through the tripping of a passenger over the projecting metal, since the ring did not lie flat and flush with the floor level. In this particular instance the company was obliged to pay the claim, which amounted to several thousand dollars. If the car had been properly inspected after cleaning, it is probable that the defect would have been discovered. Nothing can be done carelessly without opening the way to a future penalty.

Too much care cannot be given by the mechanical department to the construction and location of fuses and circuit-breakers on cars. Long experience has shown that the cost of a suitable fuse, which will not create a panic among the passengers when it blows, is as nothing to the damage claims that often result from a harmless but startling flash when a poorly built or badly located fuse goes out. In this connection the proper maintenance and inspection of the overhead switches in cars is of the utmost importance. Grab-handles and steps also need frequent consideration.

A point of some concern to large city companies on whose tracks the rolling stock of foreign cars is run in interurban or other service is the responsibility for accidents due to defective equipment. This must be provided for in the operating agreement if trouble is to be avoided, and even then it is sometimes difficult to place the responsibility. It is therefore desirable that, when a foreign car comes into the shop of a local company after an accident, that a thorough inspection of it should be made, with a full report of all abnormal conditions upon which the proper responsibility can be assigned. In some cases where an accident of slight nature has occurred, say with the cut-out switch in one of the vestibules, the local company's maintenance force has gone over the car so far as the immediate location of the trouble is concerned, and has testified that the whole car, with the possible exception of the circuit-breaker, was in good condition when it pulled into the house. Unless the whole car has been gone over it is undesirable to thus give it a clean bill of health, since such a course makes it harder to fix the responsibility for the final settlement, and also tends to discredit the local company's shop force in case the plaintiff introduces evidence to show that the car was not in the best of condition at the time of the accident. The conduct of an electric railway is, after all, a business of well-nigh infinite detail, and experience shows that there is nothing too small to create trouble if not properly taken in hand.

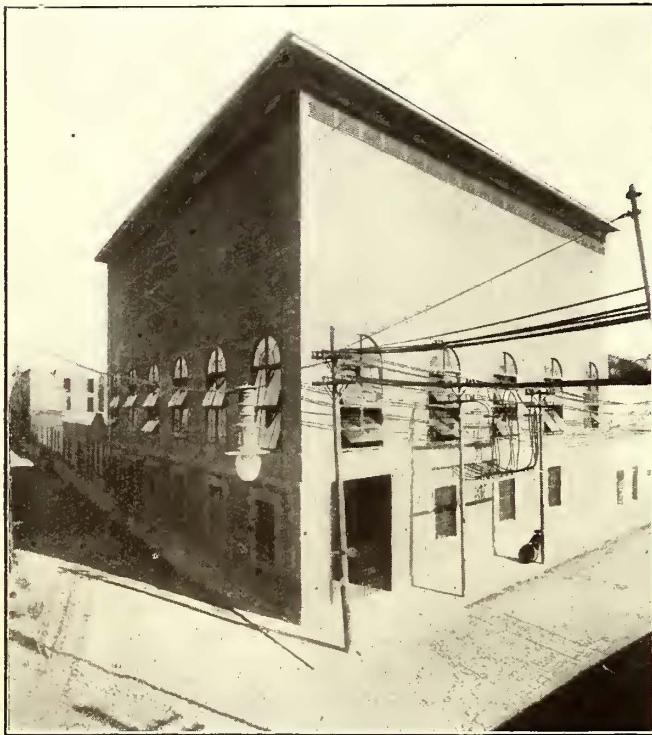
**CONSTRUCTIONAL AND OPERATING FEATURES OF THE MEXICO CITY TRAMWAYS**

A previous article in the *ELECTRIC RAILWAY JOURNAL* of May 1, 1909, described the organization and traffic of the Mexico City tramway system. The details of construction and methods of operation which form the subject of this article present many features of interest.

**TRACK**

A number of types of construction have been tried in Mexico City in an endeavor to build track which will remain in good surface and alignment under the very trying conditions which exist. The soil underlying the entire city is unstable and is constantly settling owing to the weight on the surface of the large buildings, street paving and heavy traffic. The Government has recently completed extensive works for draining the valley in which the city is built and this has also contributed to the settling of the

wood treated with creosote, but steel ties have also been put down in considerable numbers. Creosoted ties are obtained at the present time mostly from Galveston and New Orleans in the United States, but the company is conducting some experiments in treating native woods with the



Mexico City Tramways—La Nana Substation

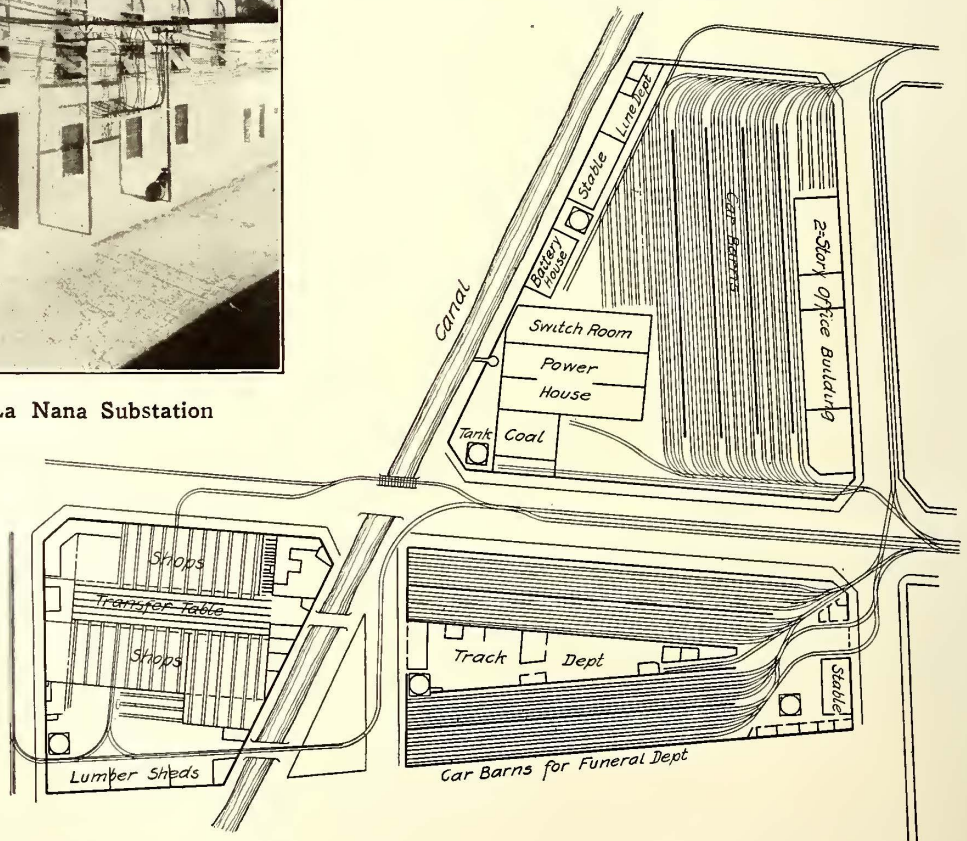
soil. The type of track construction which is now used for all new work in paved city streets consists of a solid mattress of reinforced concrete under each track in which steel channel ties spaced 10 ft. apart, center to center, are partially embedded. The rails are 7-in. girder section, cross-connected with tie rods and joined with ordinary angle bars or Continuous rail joints. The space between tracks is paved with sheet asphalt or stone blocks, but owing to the continuous and irregular settling of the underlying soil much repaving is constantly being done.

On the lines running through reservations or parked streets and on the suburban lines running out from the city 70-lb., 4 $\frac{5}{8}$ -in. T-rails are used. Part of the ties are of



Mexico City Tramways—Mule and Automobile Tower Wagons

idea in view of doing its own creosoting of ties at some future time. Girder rails are fastened to steel ties with rail brace plates. Part of the rails have welded joints,



Mexico City Tramways—Plan of the General Headquarters at Indianilla

but Continuous joints are used for most of the lines. For bolting the joints Harvey grip bolts and Ideal recessed nuts are standard. All rails are bonded at the joints with an electric bond-welding machine. Most of the suburban and interurban lines are well ballasted with

broken stone. Manganese hard-center type frogs, mates, switches and crossings, mostly of American manufacture, are used and the rails also are the product of American mills.

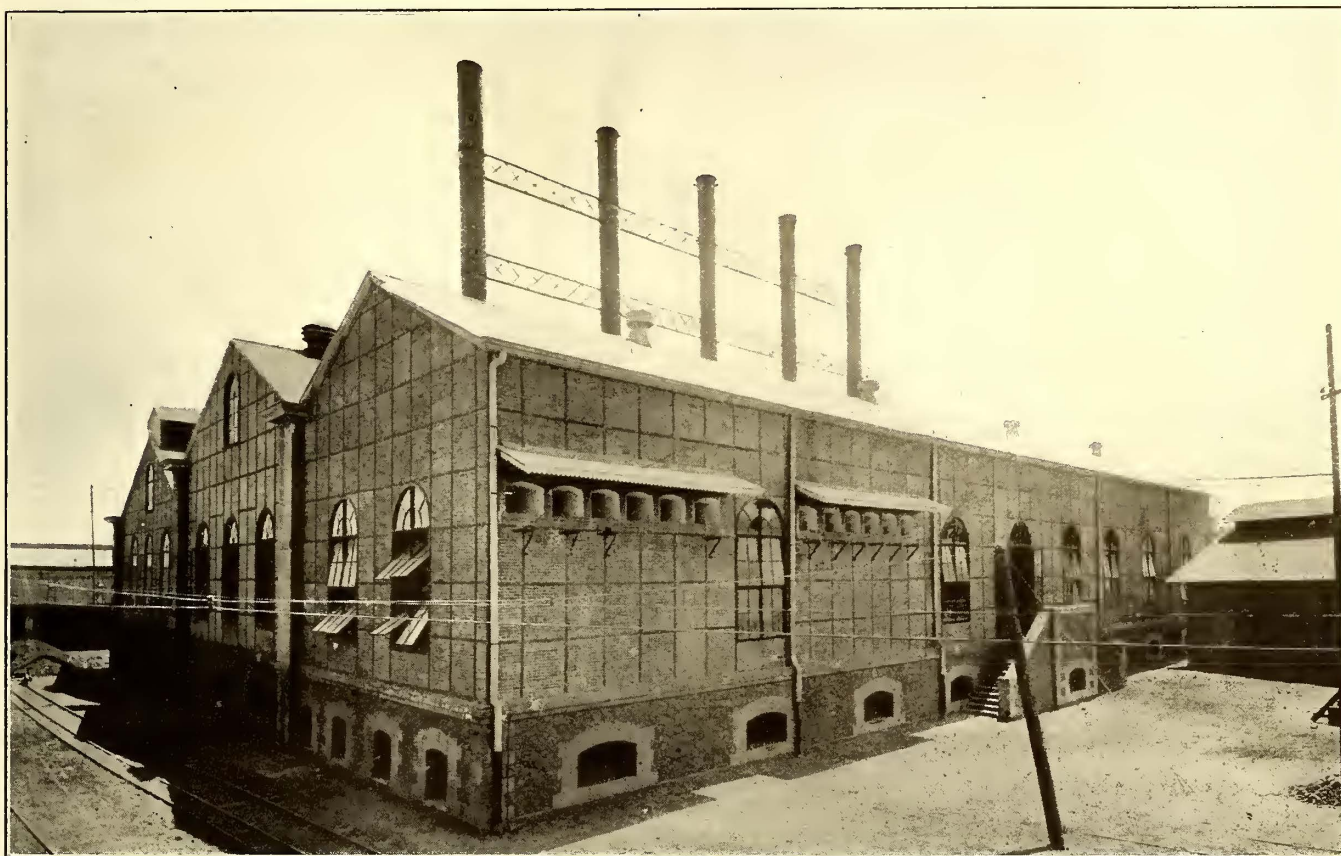
Ballast is obtained from extensive quarries of lava and other volcanic rock owned by the tramway company on the outskirts of the city. A stone crusher has been installed here and good ballast ready to put down in the track is obtained at moderate cost. The track department has extensive rail storage yards and a well-equipped shop for the manufacture and repair of special work and other material. The experimental creosoting plant already mentioned is also under the charge of the head of this department.

#### OVERHEAD TROLLEY

The overhead trolley is used throughout the system. Center pole construction is common on both city and in-

at Necaxa, 100 miles away. The company maintains, however, a large steam-power station adjoining the shops and car barns at Indianilla, about  $1\frac{1}{4}$  miles from the Plaza. This station, which is used only in emergencies and to assist in carrying the peak load at seasons of heavy traffic, contains 11 250-hp Babcock & Wilcox water-tube boilers and five McIntosh & Seymour engines direct connected to three 850-kw and two 400-kw generators.

Current from the hydro-electric generating station at Necaxa is brought into the city at a potential of 60,000 volts by an overhead transmission line carried on steel towers. It enters the main substation at Nonoalco, and from here it is distributed to four substations, called respectively La Nana, near the Alameda; Indianilla, adjoining the steam power station; Tlaxpana, in the northwestern district, and Churubusco, in the southeastern part of the city, all receiving the current at 20,000 volts and dis-



Mexico City Tramways—Indianilla Reserve Steam Plant, Substation and Storage Battery House, Showing Incoming 20,000-Volt Power Lines

tributing it at 600. Another substation is to be built at Mixcoac, a suburb southwest of the city, which is the center of a large population. Two of these substations contain two 500-kw motor-generator sets each and the other two each contain two 1000-kw units with the necessary transformers, switchboards and other auxiliary apparatus. In addition to these permanent substations the tramway company has built a portable substation of 500-kw capacity. The electrical apparatus, which consists of a 500-kw motor-generator set taking 3300-volt three-phase alternating current at one end direct from low-tension distribution circuits within the city and delivering 600-volt direct current at the other end, together with incoming and outgoing switches, lightning arresters, etc., is mounted on a car of special design which is shown in one of the accompanying engravings. The motor-generator is placed at one end of the car and the

#### POWER SUPPLY

Most of the power for operating the tramway system is obtained from the hydro-electric generating station located

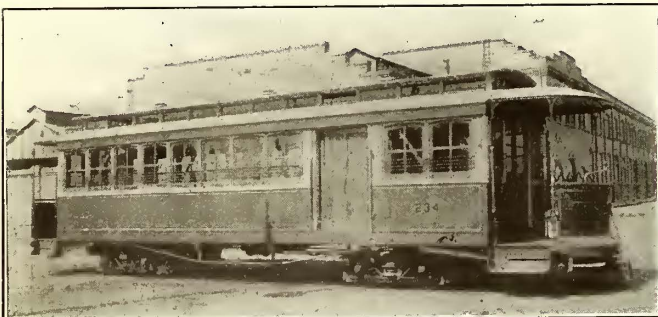
tributing it at 600. Another substation is to be built at Mixcoac, a suburb southwest of the city, which is the center of a large population. Two of these substations contain two 500-kw motor-generator sets each and the other two each contain two 1000-kw units with the necessary transformers, switchboards and other auxiliary apparatus. In addition to these permanent substations the tramway company has built a portable substation of 500-kw capacity. The electrical apparatus, which consists of a 500-kw motor-generator set taking 3300-volt three-phase alternating current at one end direct from low-tension distribution circuits within the city and delivering 600-volt direct current at the other end, together with incoming and outgoing switches, lightning arresters, etc., is mounted on a car of special design which is shown in one of the accompanying engravings. The motor-generator is placed at one end of the car and the

a.c. and d.c. switchboard at the other end. This portable substation is moved from place to place as required at times of heavy traffic, such as special days at Chapultepec Park or when extraordinary crowds are to be handled to and from the bull ring.



Mexico City Tramways—Churubusco Substation, Illustrating the Use of Motor-Generator Sets

The permanent substation buildings and the steam power station building at Indianilla are constructed in a manner not common in the United States, but often employed in Europe, especially in Germany. The foundations are of



Mexico City Tramways—Exterior of Second-Class Trail Car with Package Compartment

concrete and the side framing, columns, crane girders and roof trusses are of structural steel. The walls, however, are made up of a grill work of light steel sections which



Mexico City Tramways—Second-Class Motor Car

divide the surface into a series of rectangles as can be seen in the accompanying engravings from photographs. In this network of steel paneling a brick wall having the thickness of only one brick, or 4-in., is laid. This construction

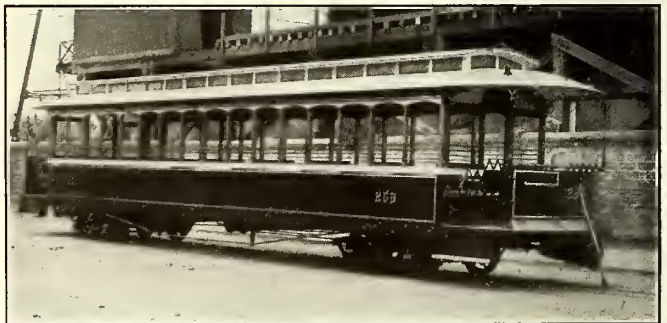
has several advantages, chief of which is the great saving in weight of the walls. As mentioned previously the City of Mexico is built on a thin crust of firm soil underlying which is an unmeasured depth of soft and unstable mud and the weight of all large buildings causes them to settle to a marked degree after erection. Even with this construction of walls of light weight all of the tramway company's buildings have settled somewhat since they were put up.



Mexico City Tramways—Standard City Line Car

The roofs of the substations and power station are of corrugated iron laid on the steel roof trusses.

At the Indianilla power station a large storage battery has been installed. The battery floats on the d.c. feeder network and has a capacity for carrying the entire tram-



Mexico City Tramways—Latest Type Second-Class Car, Built by the Company

way load for short periods when for any reason the hydroelectric transmission line fails or any of the substations shut down. It frequently happens during the rainy season that lightning strokes temporarily disable the transmission lines, and at such times the battery automatically picks up the load.



Mexico City Tramways—Second-Class Trail Car

The d.c. feeder lines and tie lines between substations are all carried overhead on steel poles with metal cross-arms.

#### OPERATION OF CARS

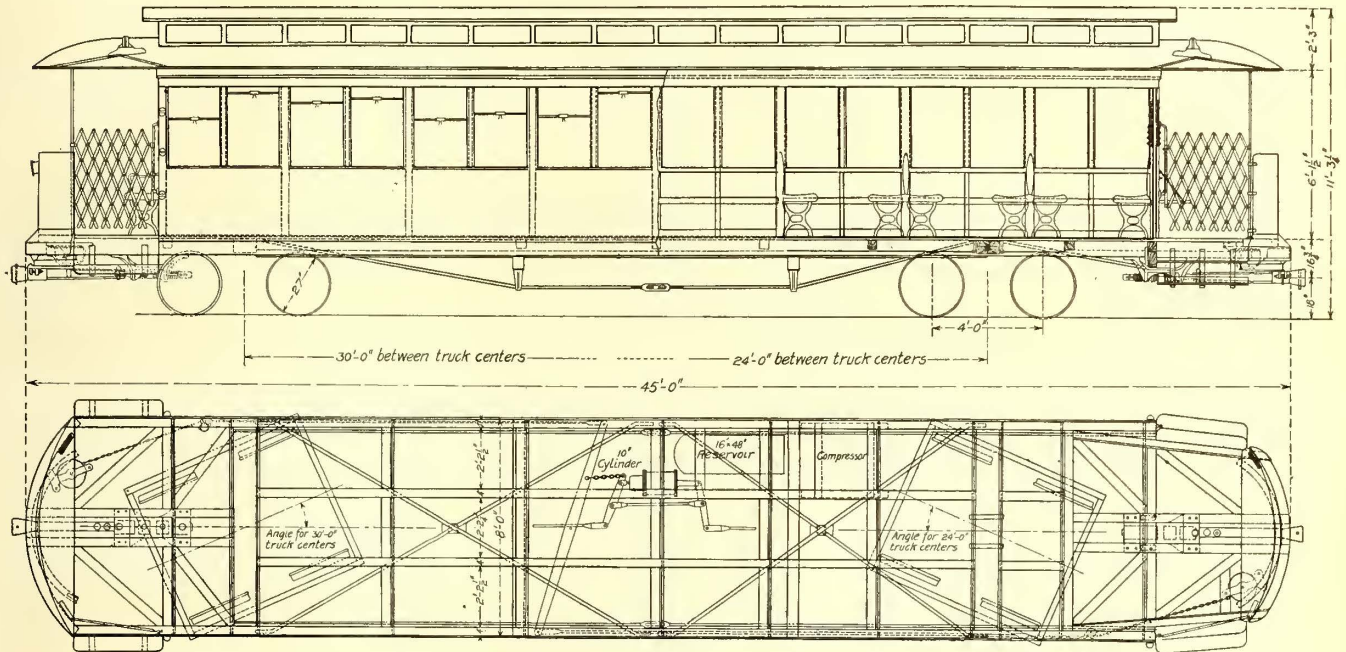
The ignorance and stupidity of the average Mexican peon



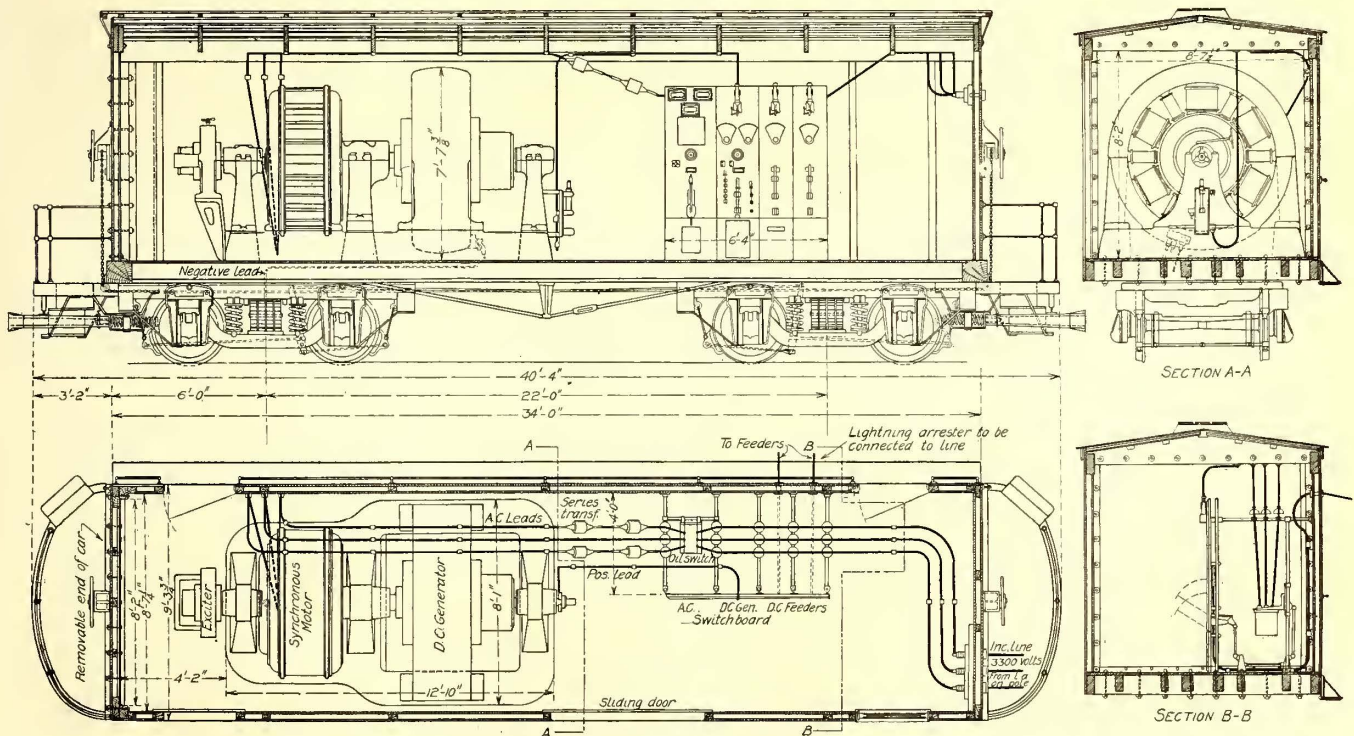
conductor, who is held in contempt by the upper classes, has made it necessary to adopt many peculiar practices in the operation of the tramway cars. Some of these methods would not appeal to managers of street railway systems in the United States, but they are successful in Mexico and are worthy of mention. The responsibility for the safe operation of the cars is delegated almost entirely to the motormen, who are a superior class of employees, and the duties of the conductors are limited to collecting what fares

fuse to pay and frequently have to call on the motormen or uniformed inspectors to collect the amount due. The fact that they are in uniform gives them some little authority over the lower-class passengers. As mentioned in the previous article, no fare registers are used, but graded fare receipts are issued instead to each passenger. These receipts are subject to frequent scrutiny by inspectors who board the cars and check up the loads.

Not only is the fare-register bell silenced, but the usual



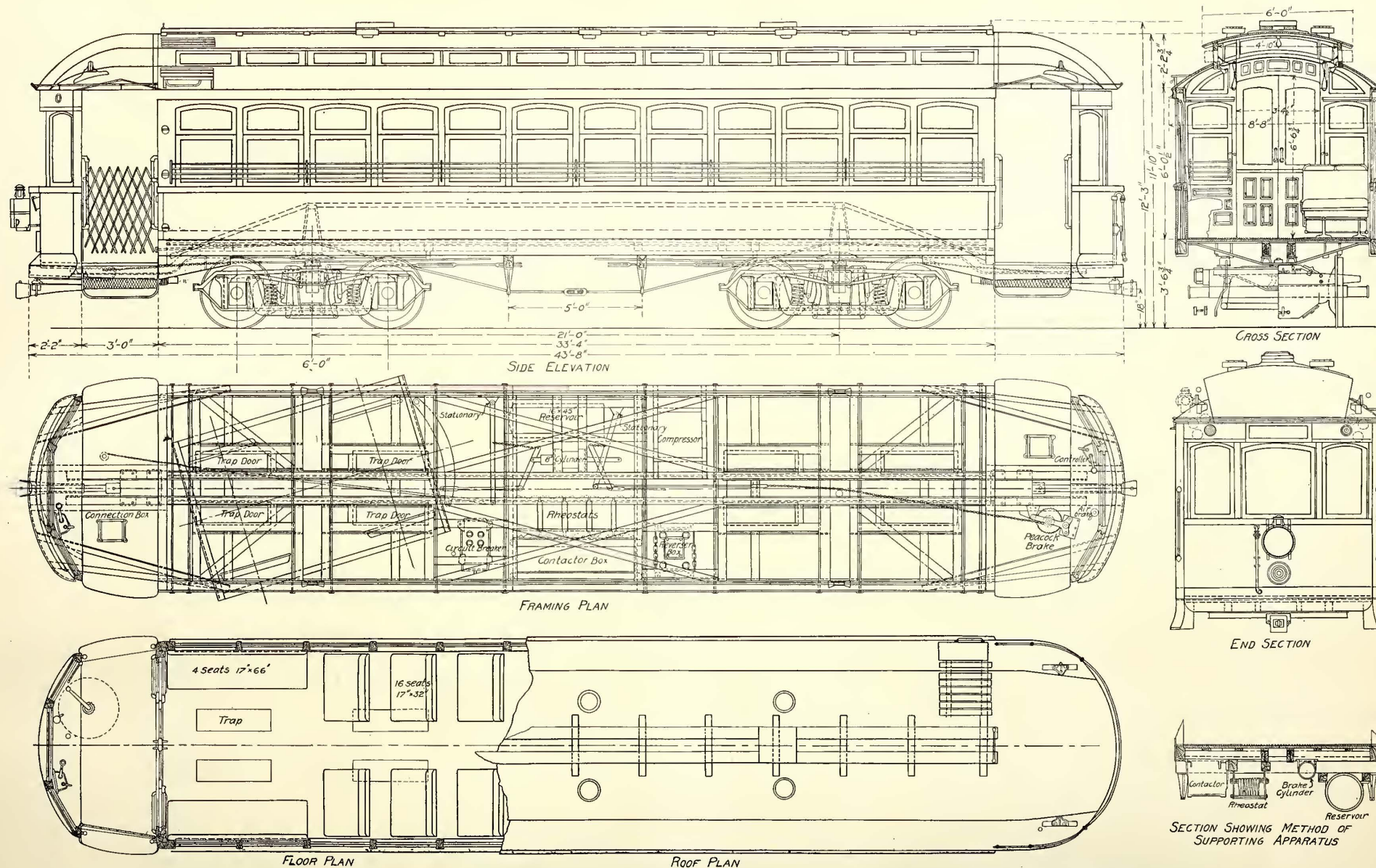
Mexico City Tramways—Plan and Elevation of Latest Type of Trail Car



Mexico City Tramways—Plan, Elevation and Sections of the Portable Substation, with Motor-Generator Equipment

they can and attending to the trolley pole. The conductors for most part know little about the location of streets and buildings and care little about the safety of passengers getting on and off, the proper ventilation of the cars or their own personal appearance. They are afraid to insist on the payment of fare by passengers who deliberately re-

signal bell for the motorman is dispensed with also. A city ordinance requires passengers to board cars at the rear end only and leave by the front end. Mirrors are mounted at an angle on each corner of the motorman's vestibule so that he can see the rear step on each side without moving from his position in front of the controller.



Mexico City Tramways—Plans, Elevations and Sections of the Standard Closed Motor Car for Suburban Service

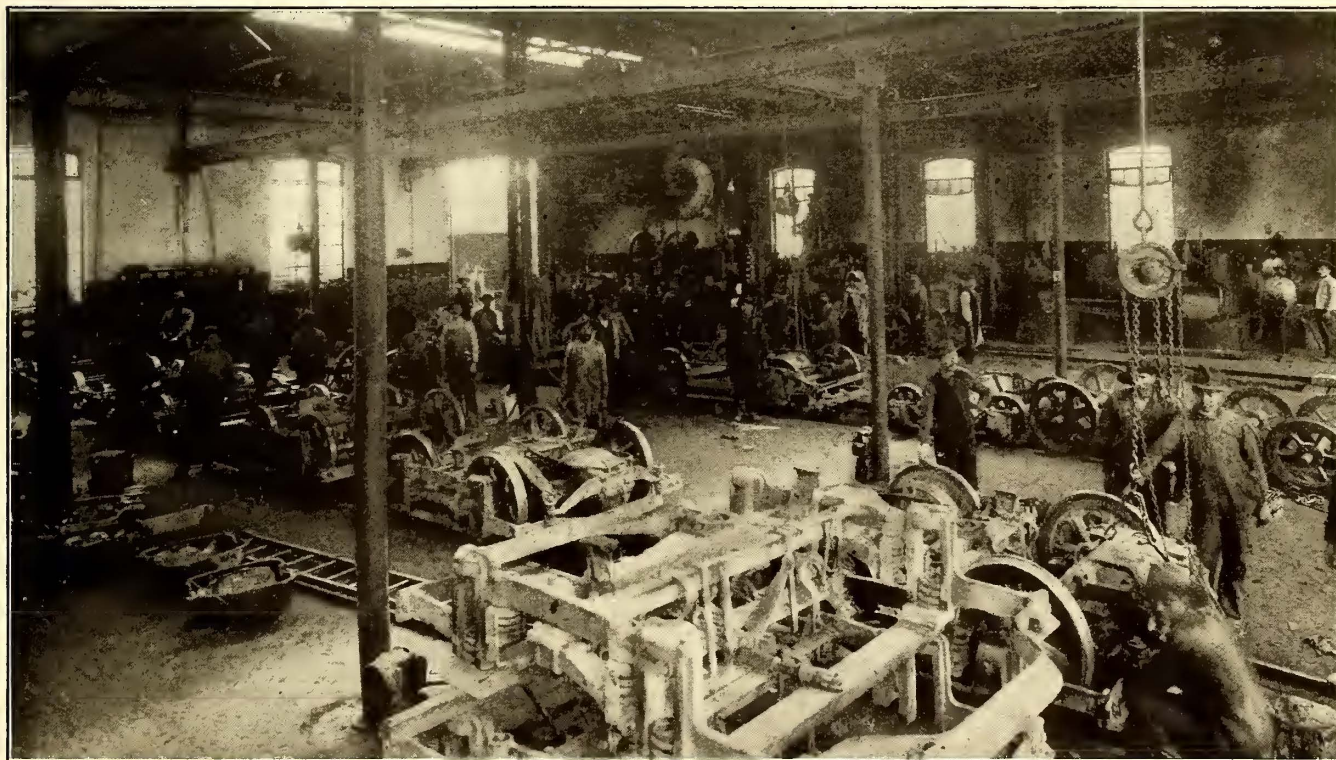
He does not start the car until he sees that all passengers are safely on board and, as all passengers leave from the front end, he also has control of alighting as well. Under extraordinary conditions, of course, such as when large crowds are handled at the plaza or the bull rings, these

ers and natives alike, little difficulty is experienced in enforcing the regulations.

The motormen in general are very careful in the operation of the cars, but all of them enjoy the sensation of running fast. In the central zone it is necessary on account of



Mexico City Tramways—Paint Shop



Mexico City Tramways—Motor and Truck Assembly Shop

strict rules are relaxed to some extent. Arrests for breaking the rules regarding boarding and alighting and keeping the front platform clear are made whenever it is necessary, and as confinement in Mexican jails is dreaded by foreign-

the congested streets to limit the speed of cars. To control the maximum speed absolutely special controller handles are used having a lug cast on them which prevents turning the controller beyond the notch designed to give

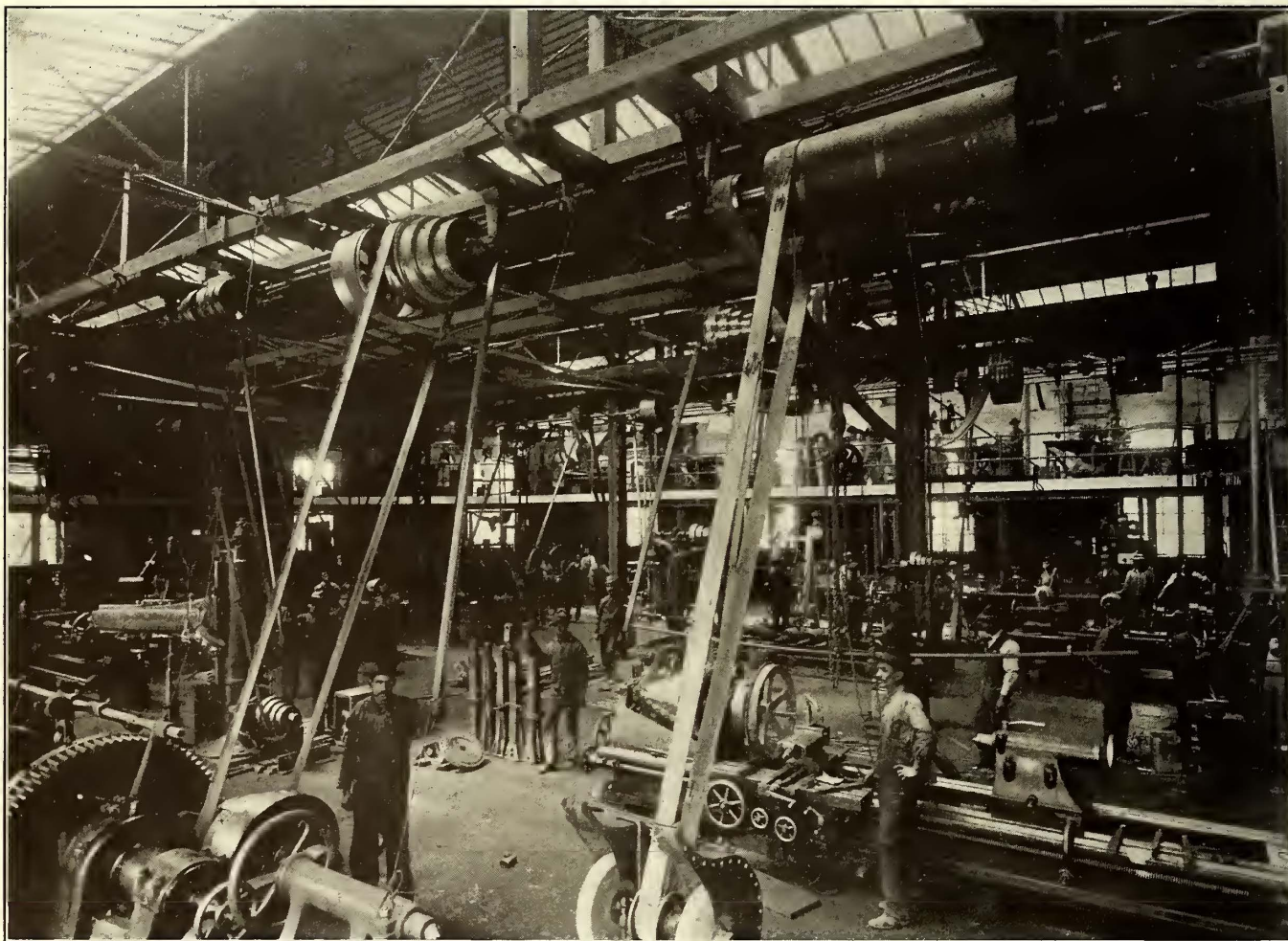
the maximum reduced speed. These handles are kept in booths located on all lines at the limits of the congested zone and attendants on duty exchange handles with motormen as cars enter the congested zone and again as they leave.

Cars stop on the near side of all intersecting streets except at points on the reservations or parked streets where shelter sheds have been erected; stops are made directly opposite these shelters. Accidents to passengers and pedestrians occur quite as frequently as in large cities in the United States, but they are caused in the main not by careless operation of the cars, but through the ignorance, stupidity or indifference to possible danger of the lower classes of natives. Many accidents are due to the injured person being drunk, a vice which has a strong hold on the

second-class cars or trains are run independently on most of the lines, in some instances the desire to obtain a seat overcomes all class distinctions. All first-class cars are painted an orange color, while second-class cars are painted green.

#### SUBURBAN SERVICE

The service given on the suburban lines in the Federal district depends on the population of the towns reached and the amount of travel. On some lines cars run on a five-minute headway while on other lines cars run only once an hour. The suburban territory has been built up rapidly since the inauguration of mid-day express or "rapido" service in addition to that given in the morning and evening. Men who live in the suburbs and work in the city are enabled to go home for luncheon and the noon



Mexico City Tramways—Machine Shop

peons. The trainmen have a strong incentive to avoid causing accidents because if a person is injured on or by a car the motorman and conductor are immediately arrested and confined in jail until a magistrate has made a thorough investigation. Witnesses are also clapped in jail and held for examination. If in the judgment of the examining magistrate a motorman is to blame for causing an accident he is criminally prosecuted as a responsible agent of the tramway company.

Smoking is permitted on all cars both inside and on the rear platform. Owing to the extreme heat in the middle of the day it is customary to operate trains of one closed motor car and an open trail car. Both cars are reserved for passengers paying first-class fare, but there are no compulsory distinctions of caste or color. While both first and

siesta. Two-car multiple-unit trains are used in this express service. The longest run is 11 miles, which is made in 30 minutes from the plaza in the center of the city. All other cars yield the right of way for these express trains.

#### FREIGHT AND EXPRESS TRAFFIC

The tramway company conducts a large freight and package express business over its city and suburban lines. Bulk freight is shipped in open gondola cars of a capacity of from 5 to 22 tons. Closed motor express cars are used for hauling package freight, milk in cans and other similar commodities. The freight charges are based on suitable classifications and vary according to the distance hauled. In addition to this service a compartment is provided in the second-class motor cars in which small packages, bags and crates of produce, fruit and flowers and even small live

stock, such as pigs and goats, are carried. Parcels shipped in this way must be accompanied by a passenger, who alone is responsible for the loading and unloading. Charges are made for this accommodation, but the tramway company assumes no liability. This service is very popular with the suburban farmers and the city merchants. It is locally known as "Furgon" service.

The company is not permitted to haul more than two trailer freight cars behind a motor car through the city streets. All freight trains are under the jurisdiction of a freight train dispatcher to whom the train crews report at certain points as ordered.

#### ROLLING STOCK

Although the City of Mexico is situated in a tropical lati-

est interurban cars are mounted on two M. C. B. type trucks having a 6-ft. wheel base and are equipped with four GE-87 60-hp motors and Type M multiple-unit control for interurban use, but on the city cars GE-70 motors are used. Wrought-iron or cast-steel center steel-tired wheels 34 in. in diameter are the standard for all motor cars. Most of these wheels are imported from England and are made by Baker or Hadfield. All motor gears are of the keyed-on solid type. The trolley stock is well suited to the service which it has to perform, and but little trouble is experienced in keeping it in good and serviceable condition. Frequently every car which the company owns is pressed into use on holidays.

Owing to the indifference of trainmen to proper ventila-



Mexico City Tramways—Carpenter Shop

tude its elevation of 7500 ft. above sea level gives it a mild equable climate throughout the day. After sundown, however, there is sudden fall of temperature and the nights are quite cool. For this reason closed motor cars are used in preference to open cars. A few first-class open trailer cars are used during the rush hours, but not at night, when the travel is light. All passenger cars, both of the open and closed types, are wide enough to permit the use of a center aisle. Transverse seats are used on all but a few second-class cars. Both platforms of the closed cars are vestibuled and the steps are guarded by folding gates.

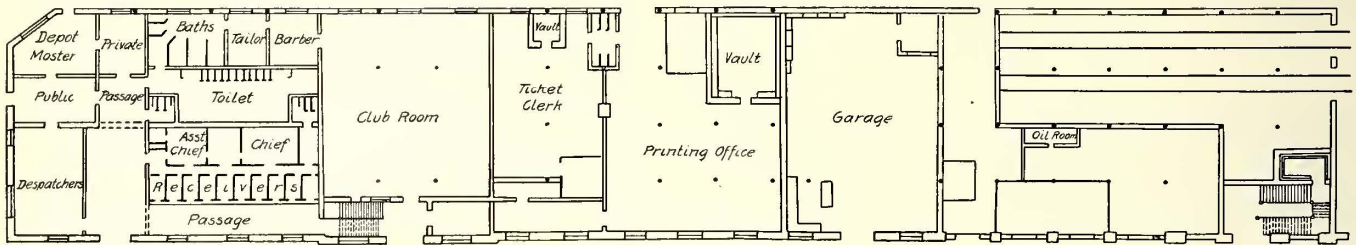
Of the 325 electric motor and trailer passenger cars owned by the company 49 are mounted on single trucks and the remaining 276 are mounted mostly on short wheel-base double trucks with outside-hung motors, but the new-

est interurban cars are mounted on two M. C. B. type trucks having a 6-ft. wheel base and are equipped with four GE-87 60-hp motors and Type M multiple-unit control for interurban use, but on the city cars GE-70 motors are used. Wrought-iron or cast-steel center steel-tired wheels 34 in. in diameter are the standard for all motor cars. Most of these wheels are imported from England and are made by Baker or Hadfield. All motor gears are of the keyed-on solid type. The trolley stock is well suited to the service which it has to perform, and but little trouble is experienced in keeping it in good and serviceable condition. Frequently every car which the company owns is pressed into use on holidays. Owing to the indifference of trainmen to proper ventila-

The tramway company maintains a special private car for the exclusive use of the President of Mexico and his family and has built a track into the grounds of Chapultepec Castle, the summer home of the President, over which the car can be run. There is frequent demand for chartered private cars to make short runs between the city and the outlying towns, where many of the Government officials and foreigners have summer homes. The company makes a special effort to provide good cars and in every way encourage this source of traffic. The last 25 motor cars purchased were built by the St. Louis Car Company from de-

A general plan of the buildings is shown in one of the engravings.

All of the buildings are constructed with steel framing and masonry walls with corrugated iron roofs laid on steel roof trusses. The car repair shop buildings are divided into two groups separated by a transfer table pit. One group contains 11 transverse tracks and the other group 14 tracks. In the wood-working shop an exhaust system for disposing of dust and shavings from all of the wood-working machinery has been installed. The refuse collected is burned in a furnace which supplies heat for the brass foundry



Mexico City Tramways—Utilities Building Alongside the Main Car House

signs made by the engineers of the tramway company. In the future all new cars will be built in the company's own shops from native woods. The electrical and miscellaneous equipment will be purchased in the United States. The company has had considerable experience in car building, having built at its shops a large number of first-class trailer cars, second-class motor cars, all of its freight equipment and its funeral cars. The present car equipment of the tramway system consists of the following:

- 255 first-class motor and trailer cars.
- 8 second-class motor combination passenger and freight cars.
- 45 second-class trailer cars.
- 5 special first-class motor cars.
- 28 freight motor cars.
- 40 freight trailer cars.
- 75 flat cars.
- 3 steam locomotives for narrow-gage steam line.
- 70 passenger mule cars for narrow-gage steam line.
- 21 electric funeral cars.
- 8 horse or mule funeral cars.
- 1 pay car.

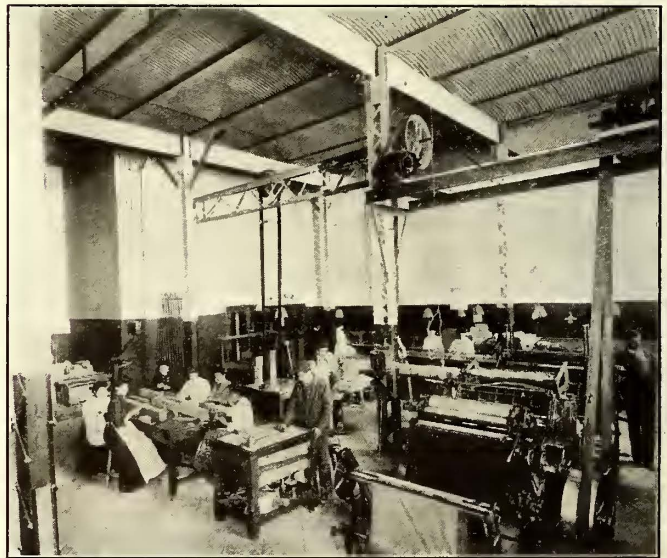
559 total.

#### SHOPS

The Mexican Government has endeavored to encourage the construction of public utility projects in many ways, believing that they aid in the development of the country. To this end import duties on material and apparatus intended for new construction or extensions of existing systems are frequently waived or greatly reduced. High duties, however, are charged on all materials imported for repairs and maintenance and these duties, combined with the very high freight rates from the United States and England make it almost imperative for a system of the size of the Mexico City Tramways Company to manufacture most of the material needed for the up-keep of the property. The tramways company now manufactures most of its overhead line material, trolley wheels, car bodies and trucks, and has facilities for repairing special track work. The shops are comparatively new and are equipped with all of the necessary machinery. They are located in the suburb of Indianilla, adjoining the steam power station. The shops, power station, car barns, storage tracks, offices and stables occupy a large irregular area which is divided into three sections, each enclosed by a high masonry wall.

crucibles and for the armature drying ovens. Compressed air is piped throughout all of the shops; the supply is taken from a tank and compressor interconnected with a duplicate in the steam-power station near by. All tools in the machine shop are group-driven by electric motors mounted under the roof, and in the wood-working shop most of the tools are separately driven by individual electric motors. Pneumatic and chain hoists have been installed at convenient points in the truck shop and machine shop.

The car barns and shops at Indianilla have recently been equipped with a complete system of wet-pipe aisle and roof



Mexico City Tramways—Printing Department

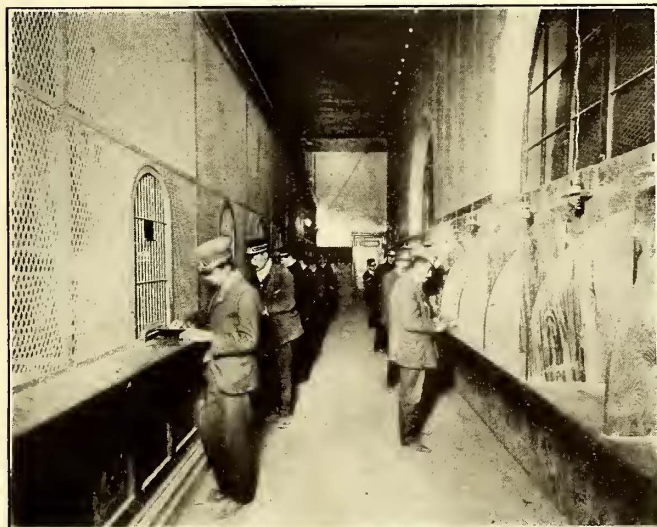
sprinklers. The sprinkler system is supplied by five 30,000-gal. overhead pressure tanks which are interconnected. The system is also connected to a motor-driven high-pressure fire pump which can be started in case of fire. The motor-driven fire pump also supplies numerous stand-pipe connections throughout the shop buildings, to which hose and nozzles are attached. Every precaution is taken to ensure a supply of water and electric current for operating the fire pump at all times. The company has a number of artesian wells on the shop tract and an intake has been built to one of the city canals which crosses the property.

The engineering department employs only Mexican draftsmen in charge of a chief draftsman who is an American. Construction drawings are made in either the metric or English system of measurement and all notes and lettering are printed in either Spanish or English, depending on the destination or purpose of the drawings. In the shops all work is done to English measurements. The entire shop force, numbering several hundred men, has been trained by an American master mechanic. On the whole, the Mexicans are skilful and proficient workmen and the company is able to carry on the manufacture of nearly all of its supplies.

#### CAR HOUSES

The main car house of the system adjoins the steam power station at Indianilla. A few small car houses have been built in the outlying districts, but these are used chiefly for storing passenger cars in the daytime and for temporary storage of freight and work cars. All car houses are built with open ends, as the climate is so mild that closed buildings are not required. Division walls separate the main car house into three bays, each containing four tracks. The walls of the car houses are brick and the roofs are corrugated iron. All of the car barns are equipped with inspection pits, but it is the practice to have all car repairs made at the main shops. The centralization of all repairs, inspection and cleaning at one point results in economy and efficiency in the maintenance of the rolling stock.

In the morning all cars pull out from the Indianilla barns and run to the Plaza in the center of the city, from which point the regular trips begin. In the Plaza the company has erected a building locally called the "Kiosko," which is used as an office for the superintendent of the central division and for the chief train dispatcher. Conductors



Mexico City Tramways—Employees Making Returns to Receivers

obtain supplies of change and fare receipts at this point and the building serves as a general headquarters for the company in the center of the city.

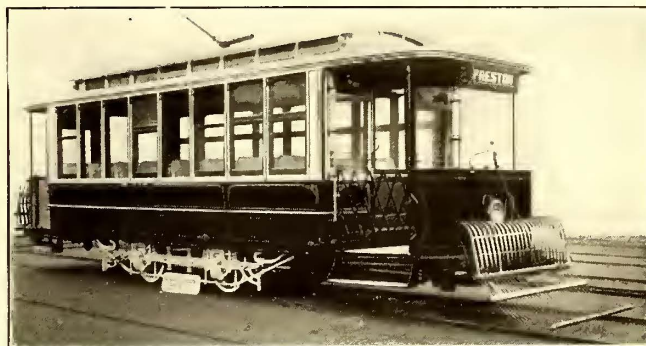
#### OFFICES

The main offices of the tramway company are located in a large two-story building adjoining the car barns at Indianilla. The first floor of this building is given over largely to accommodations for the employees. Here are located the offices of the chief train dispatcher, the receiver's cages, barber shop and bathroom, employees' clubroom, the printing office, where all fare receipts are printed, and

the company garage. On the second floor of the building are the offices of the manager, the auditor and of the engineering and purchasing departments. The company has a private telephone system connecting all offices, dispatching booths, car houses and substations and at the switchboard this private system is also connected to the public telephone system. Operators who speak both Spanish and English are on duty day and night.

#### ENGLISH SEMI-CONVERTIBLE CAR WITH HIGH WINDOWS

The accompanying illustration shows one of the new semi-convertible cars built by the United Electric Car Company, Ltd., Preston, Lancaster, England. A large number of these cars have been shipped to South America, and 20 are now on order for the Bahia Blanca section of the



Semi-Convertible Car for Buenos Ayres

Buenos Ayres & Pacific Railway. This design was prepared chiefly for foreign countries where the extremes of climate are greater than in England, and its construction also embodies features which enable it to be shipped with boxed sash and without removing the inside finish.

One of the special features of the car body is the high window opening of 3 ft. 9 $\frac{3}{8}$  in. secured by the use of wall pockets. Both the upper and lower sections of the sash may be dropped by the passenger without leaving his seat. This feature has been attained by a special window post construction, which allows the upper sash to be lowered on the inside of the bottom sash and to stay on the arm rest if desired. When both parts are in the pocket they are covered by the arm rest which locks into the lower sash.

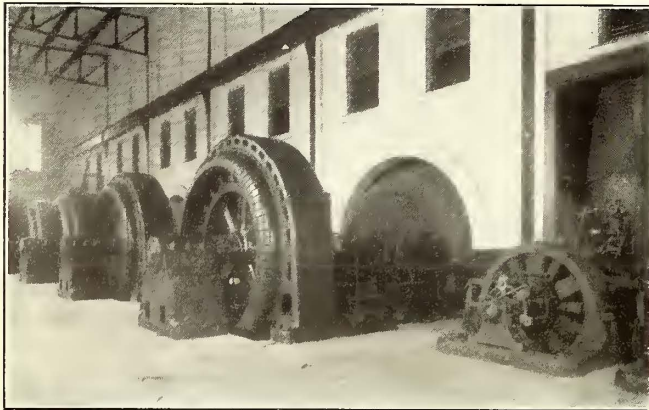
It is asserted that no rattling takes place, as there is nothing to guide the sash but the post. The use of drop sash, of course, allows a much lighter roof construction. The extra width gained across the car between the lower sashes gives the maximum shoulder room possible.

The truck used under these cars is of the Preston compensating type illustrated and described in the STREET RAILWAY JOURNAL of Jan. 4, 1908. In addition to the usual spiral side and semi-elliptic journal springs, this truck has special leaf springs at the ends. The forward end is under ordinary compression when the car is light and the rear end becomes compressed only when the load increases beyond a predetermined point.

The principal dimensions of these cars are as follows: Length of body over corner posts, 20 ft. 11 in.; length over platforms, 30 ft. 1 in.; total length over all, 31 ft. 9 in.; width over body, 8 ft.  $\frac{1}{2}$  in.; width over roof, 8 ft. 3 $\frac{1}{2}$  in.; clear height inside at center, 7 ft. 10 in.; over-all height from rail to trolley board, 11 ft. 2 in.; width between side posts, 2 ft. 2 $\frac{3}{8}$  in.; clear opening when side lights are lowered, 3 ft. 9 $\frac{3}{8}$  in.; clear opening when top light only is lowered, 1 ft. 6 $\frac{3}{4}$  in. The seating capacity is 32.

## POWER GENERATING SYSTEM AND RECORDS OF THE TWIN CITY RAPID TRANSIT COMPANY

Several articles have been published within the past year in the *ELECTRIC RAILWAY JOURNAL* upon improvements made during the past three or four years by the Twin City Rapid Transit Company, particularly in the construction of its Snelling Avenue repair shops, at which all of the repair work on the system is done, and in the erection of extensive car houses at the same point. In the power department changes of almost equal importance have been made. They



Twin City System—Interior View of Hennepin Island Station

include additions to the substations, which are now 10 in number, and the completion of arrangements for the receipt of current from a new water-power station at St. Anthony Falls.

Power for the operation of the company's system is now obtained from the original St. Anthony Falls station, the property of the St. Anthony Falls Water Power Company, from the steam-power station of the Twin City Rapid Transit Company and from the new Hennepin Island power station. From the first the company secures power on a 24-hour basis. The greater part of the remaining power is taken from the steam-power plant of the company on the east bank of the Mississippi River just below the Tenth Avenue bridge in Minneapolis. This station operates for about 20 hours a day and has a capacity of about 30,000 hp supplied by four vertical-compound reciprocating engines of 5000 hp each and two Curtis turbines of 5000 kw each. In addition, power is also taken from the Hennepin Island water-power station, which utilizes the overflow from the St. Anthony Falls. This station has been in use only since last summer. Through the courtesy of E. H. Scofield, engineer of power and equipment of the Twin City Rapid Transit Company, and of R. D. Thomas, assistant engineer of the St. Anthony Falls Water Power Company, this paper is enabled to publish an account of the new Hennepin Island power station and the accompanying diagrams, showing the power output of the different stations and other interesting data.

### THE HENNEPIN ISLAND POWER STATION

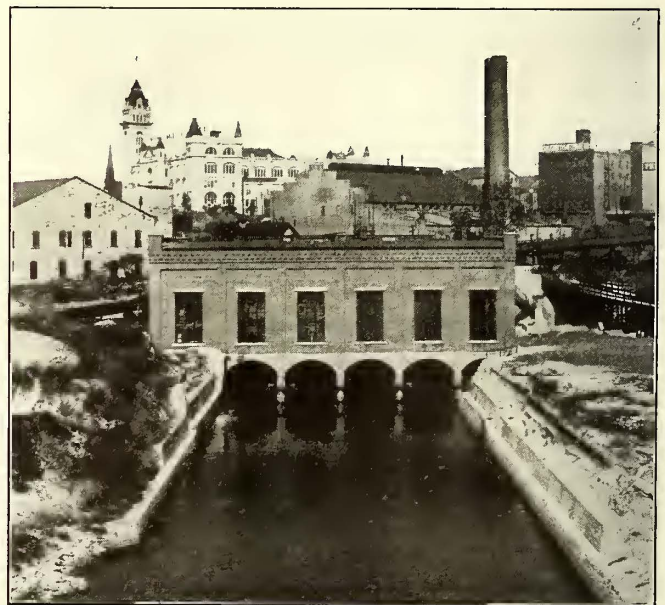
With the recent completion of a new hydro-electric station at the Falls of St. Anthony, Minneapolis, Minn., the St. Anthony Falls Water Power Company has entered a field which is somewhat novel in the exploitation of hydraulic power development.

This plant is located at what is known as the Upper Falls, which have for many years furnished power to the Minneapolis flouring mills and to other minor industries, and is intended to utilize water for power only at such times

as the supply may exceed the demands of all earlier lessees. In other words, it is purely a surplus power development, utilizing the flood waters of the river up to the maximum capacity of the hydraulic installation. Furthermore, the plant is ready at all times to use water when the other lessees shut down their wheels, as they do on Sundays and holidays.

In order to sell power of this nature, with its uncertain availability, it was necessary to find a market where its withdrawal at any time would not seriously affect the user, and, at the same time, the price must be low enough to make its use economical even under these conditions. A favorable location provided for a relatively cheap development, and, upon the assurance of a probable market, construction was begun in the spring of 1906.

The wheelpit division walls rest upon a heavy steel reinforced concrete mattress, which also serves as a protection for the soft underlying sandrock. This sandrock forms the foundation of the entire structure from the forebay wall to the wheelpits. When properly protected, it makes a perfectly safe and solid foundation, and in its virgin state is so hard that a pick will make scarcely any impression upon it, but when subjected to the action of the weather or to the erosive effect of water it rapidly disintegrates and washes away. As the tail race was through this sandrock for its entire length, it was deemed advisable to protect it both on the bottom and on the sides. The bottom was paved with limestone blocks, and then covered with a cement grouting. The sides were protected by means of rubble masonry walls laid nearly to the top of the excavation.

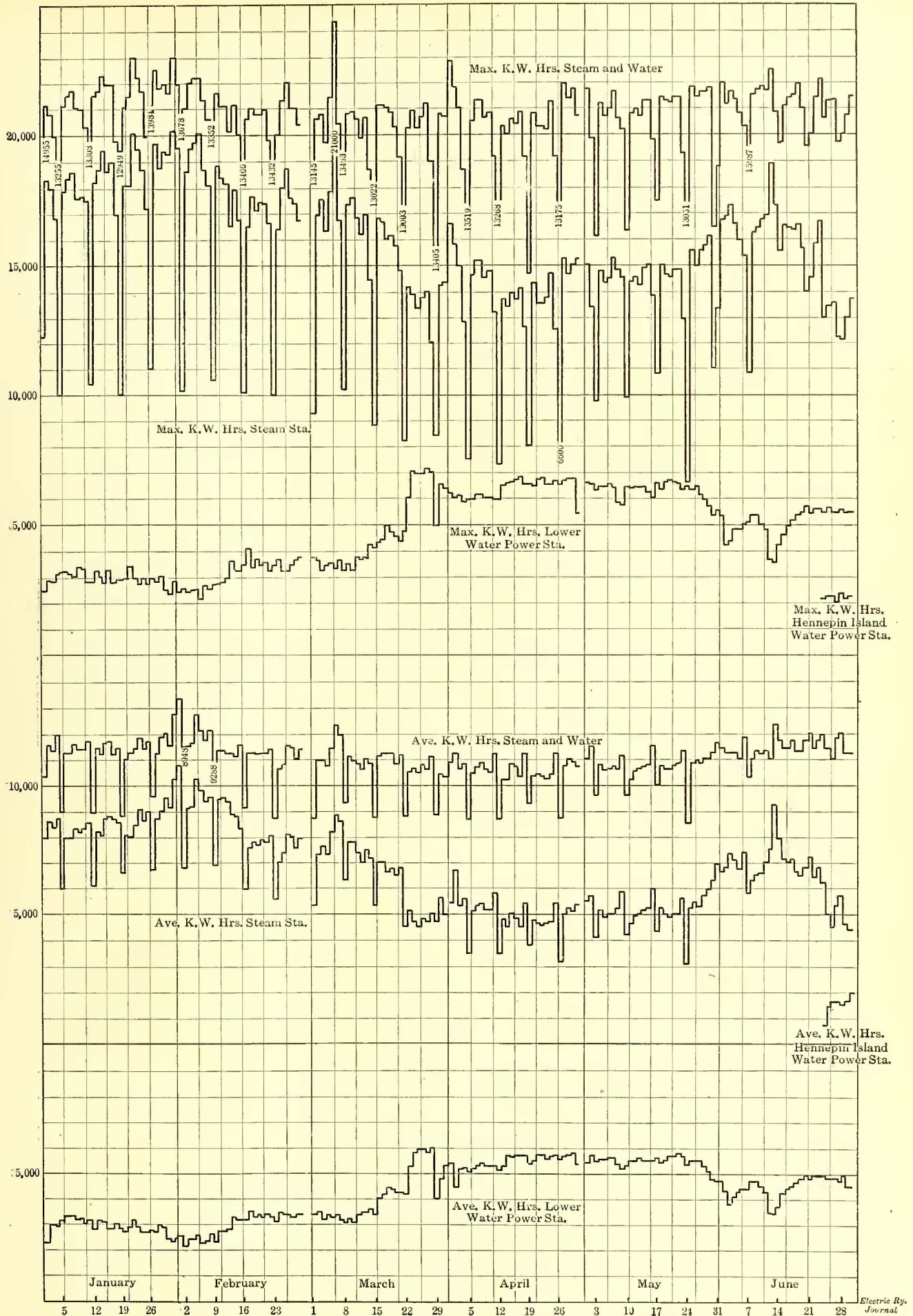


Twin City System—Hennepin Island Power House from Lower End of Tail Race

The generating installation consists of four main units, each of 2250-kw capacity, and two exciter units, each of 150-kw capacity. Each main unit consists of a pair of 48-in. wheels set horizontally in a  $\frac{3}{8}$ -in. steel plate casting, and direct-connected to a 2250-kw, three-phase, 35-cycle generator running at 210 r.p.m. The exciter units are each connected to a 24-in. horizontal McCormick wheel running at 225 r.p.m. The generator room is provided with a 50,000-lb. Pawling & Harnischfeger hand-operated traveling crane.

Water is taken from the canal through a trash rack ex-





Twin City System—Graphical Record of Output of Different Stations by Weeks, from January to June, 1908

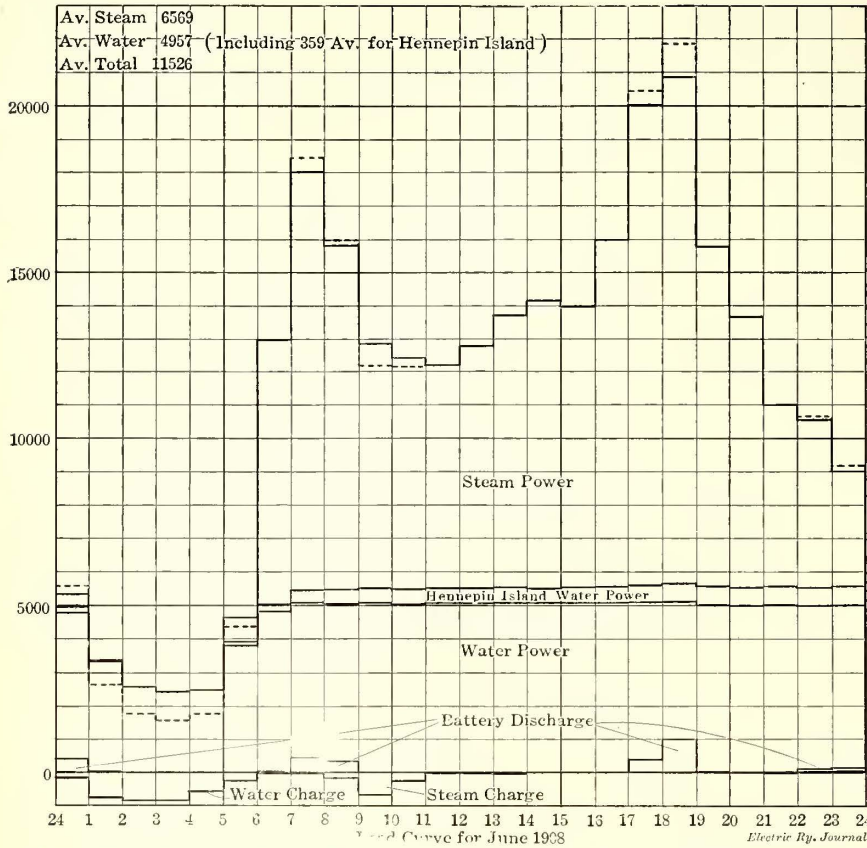
tending the entire length of the power house. This rack is built of 3½-in. x 5/16-in. flat steel bars, securely bolted together with ¾-in. round bolts and spaced with extra

The plant is situated on the east shore of the Mississippi River, taking its water from the original mill pond through a canal 350 ft. in length. The water is discharged

below the power house into a tail race 280 ft. in length, returning again to the river just above the lower development, known as the Lower Dam.

The canal stands upon a solid limestone ledge, with heavy masonry walls of the same material. It has a clear width of 55 ft. and an average depth of 17 ft. At the upper end there are provided three Stoney type headgates, each gate being 16 ft. 4 in. wide by 18 ft. high. The gate hoist is so arranged as to be operated either by hand or by motor, and the gates may be handled singly or all together. The gates are built with steel frames of 15-in. I-beams decked with 6-in. pine planks, having steel gate-stems which are seated upon roller nests peculiar to the Stoney gate.

The power house is a brick structure 84 ft. x 136 ft. x 42 ft. high, with a steel skeleton frame supporting the traveling crane and roof trusses. A brick partition wall divides the building longitudinally, with the water wheels and penstocks on the upstream side and generator room and switchboard gallery on the downstream side. A series of heavy concrete arches resting on the wheelpit



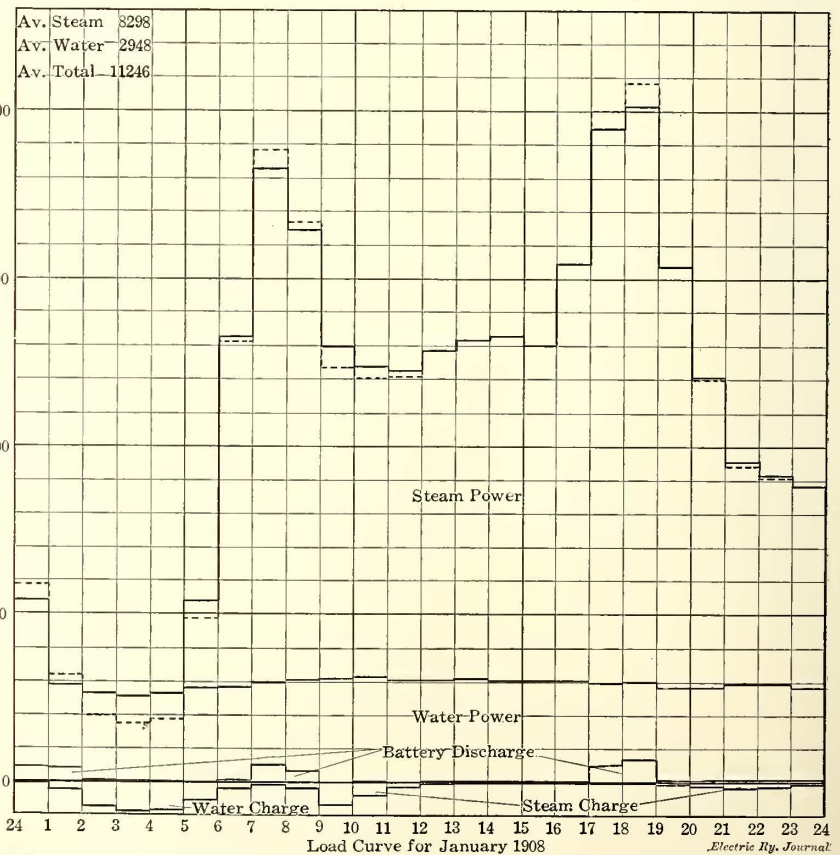
Twin City System—Load Curves for Different Stations, Summer Month

heavy 1-in. pipe thimbles. A structural steel frame provides support for the rack and also for a traveling carriage used for operating the penstock gates.

The large penstock gates, of which there is one for each unit, are each 14 ft. wide x 13 ft. 3 in. high, and are built of pine timbers securely bolted together and provided with steel bearing plates. These gates are operated by means of a motor-driven hoist, which is mounted on a carriage traveling over the head gates on two parallel 55-lb. T-rails. The hoisting mechanism consists of a series of gearing belted to a 5-hp motor and drives two ball-bearing bronze nuts engaging two long screws which serve as gate stems. In moving from one gate to another, these screws are disconnected from the gates and travel with the carriage. Each gate is provided with a small hand-operated filler gate which is used for filling the penstocks before raising the gates, thus relieving the hydrostatic pressure on them.

For the exciter penstocks two small hand-operated gates are provided. These gate hoists are of a standard pinion and rack pattern, made by the Dayton Globe Iron Works, of Dayton, Ohio.

The penstocks all pass through a heavy forebay wall and end with a 90-deg. elbow entering the wheel-cases at the top.



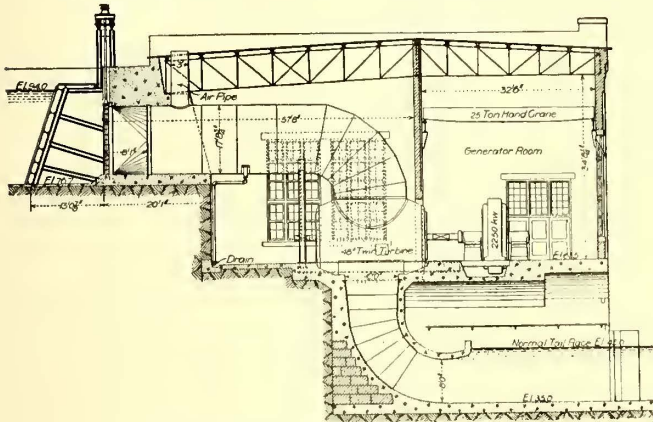
Twin City System—Load Curves for Different Stations, Winter Month

walls provides suitable support for the machinery and superstructure of the building.

The water wheels are of the "Smith" type, manufactured

by the S. Morgan Smith Company, of York, Pa. They are set in pairs, horizontally, with center-discharge draft chests. Each unit is provided with a lignum vitæ center bearing suspended from the top of the draft chest by means of heavy steel rods. The entire turbine setting is supported upon steel I-beams securely embedded in the concrete floor.

The draft tubes are of the elbow type, making a right-angle turn at the bottom, thus discharging the water horizontally into the wheelpit. The top diameter at the exit of the draft chest is 10 ft., and from this point to the

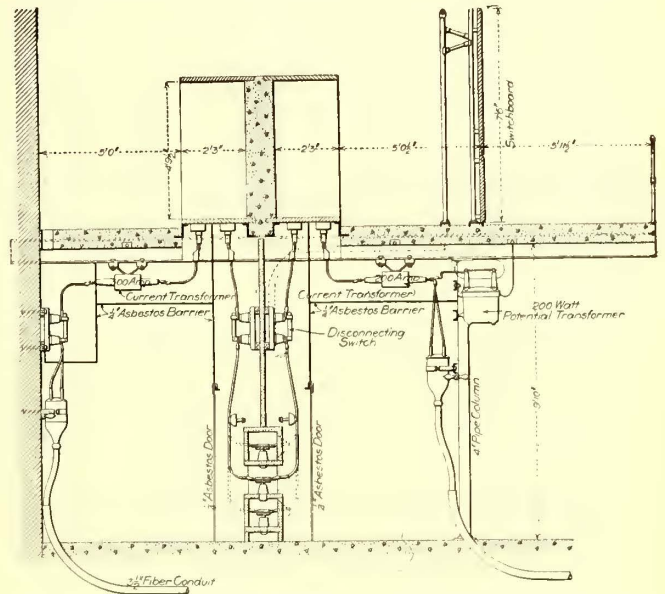


Twin City System—Cross Section Through Hennepin Island Station

lower end it gradually enlarges in area and changes in shape until at the mouth it is oblong, being 8 ft. high x 19 ft. wide. The total draft-tube length is about 26 ft., and the normal draft head is about 21 ft.

The draft tubes are built of concrete, with a steel-plate lining for about two-thirds of the length. This steel lining was used as a substitute for wooden forms, and also to provide a wearing surface. Although the design of these draft tubes was somewhat novel at the time they were built,

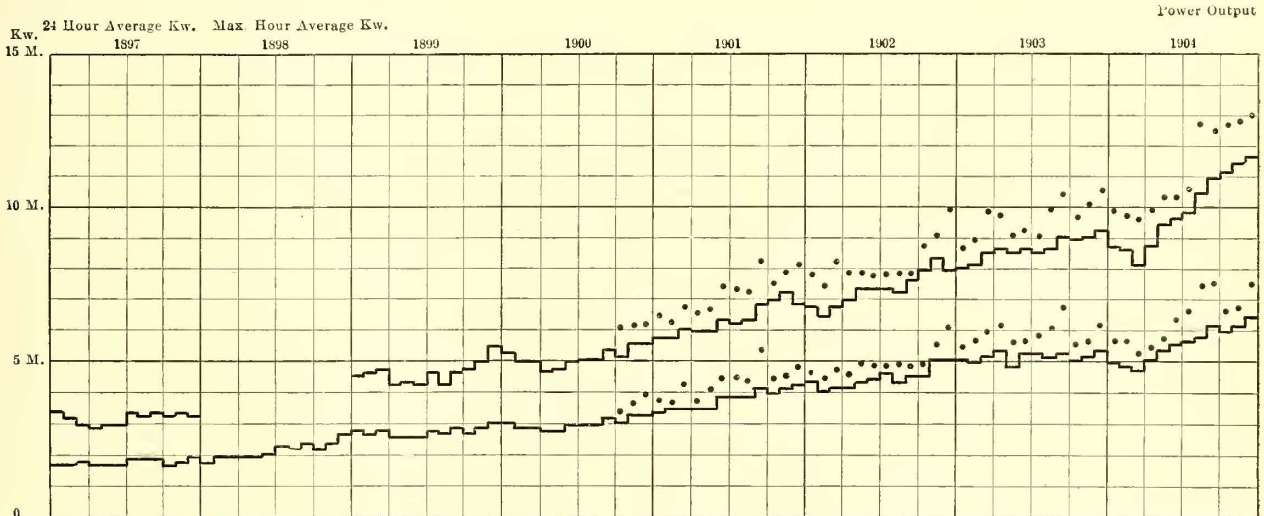
35 cycles and 13,200 volts when running at 210 r.p.m. Each machine has a rated capacity of 2250 kw at 100 per cent power factor. The generators are separately excited by a 150-kw, 110-volt water-wheel-driven exciter. The exciter installation is in duplicate.



Twin City System—Cross Section Through High-Tension Compartment, Hennepin Island Station

A small motor-driven air compressor is provided for cleaning the electrical machinery.

The switchboard is located on the gallery floor at one end of the generator room, and is made up of 14 panels of blue vermont marble, of which there are four generator panels, four line panels, one exciter panel, one station lighting panel, one storage battery panel and three spare panels for future extensions. Each generator panel is equipped with three ammeters, one power-factor indicator,



Twin City System—Output of Power Stations from 1897 to 1904, Showing Average for 24 Hours for Entire Period, and Maximum Hour Average Since October, 1901

tests have proved them to have an efficiency of over 99 per cent.

Each main turbine unit is provided with a Type N Lombard governor and each exciter unit is provided with a Type D Woodward governor. Both of these governor types are too well known to require any detailed description.

The main generators are of the revolving field type, and are designed to deliver three-phase alternating current at

one voltmeter and one field ammeter on the front of the board, and a polyphase recording meter on the back. The outgoing line panels are each equipped with three ammeters, one remote control oil switch and one triple-pole, time-limit overload relay similar to those on the generator panels.

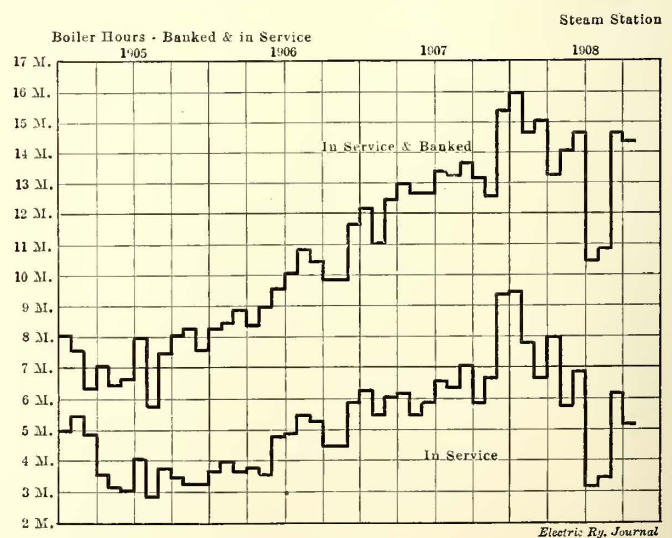
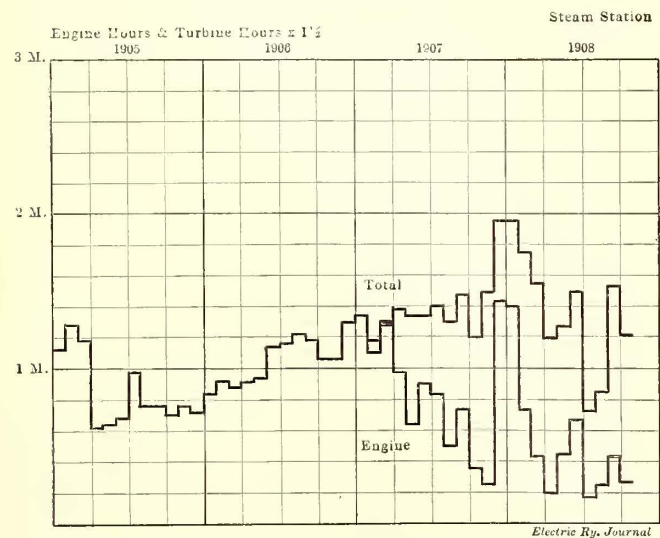
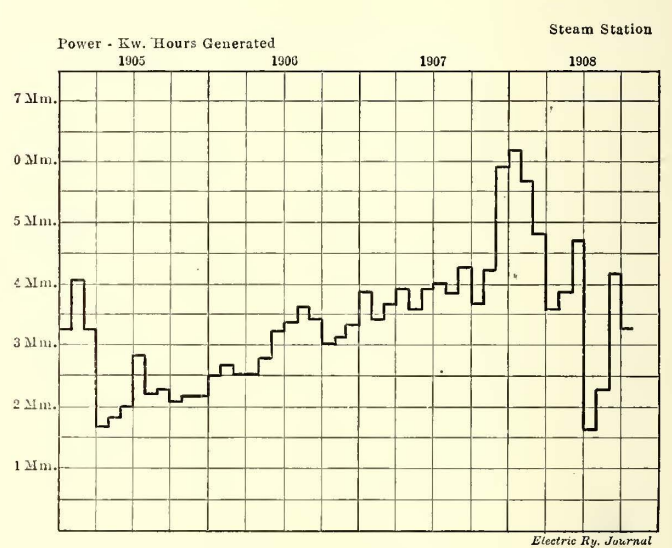
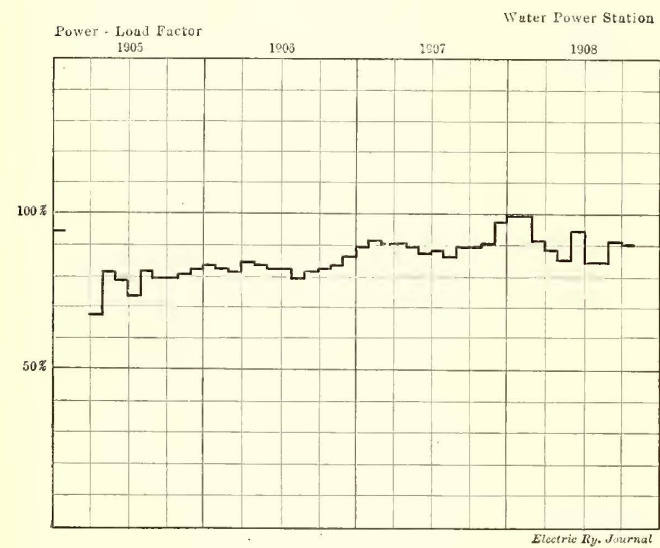
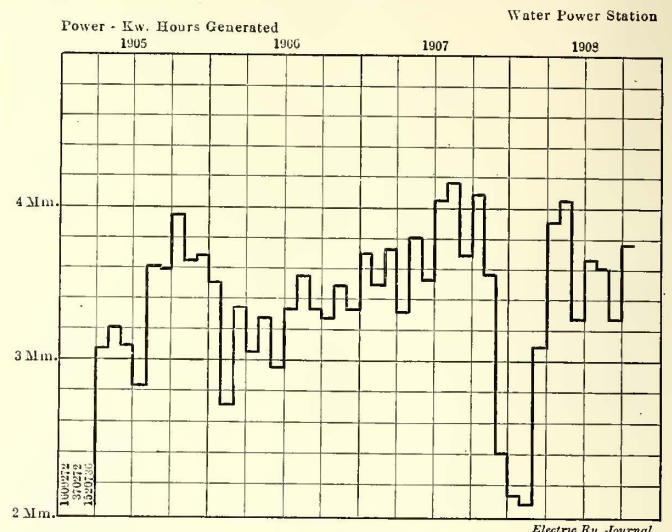
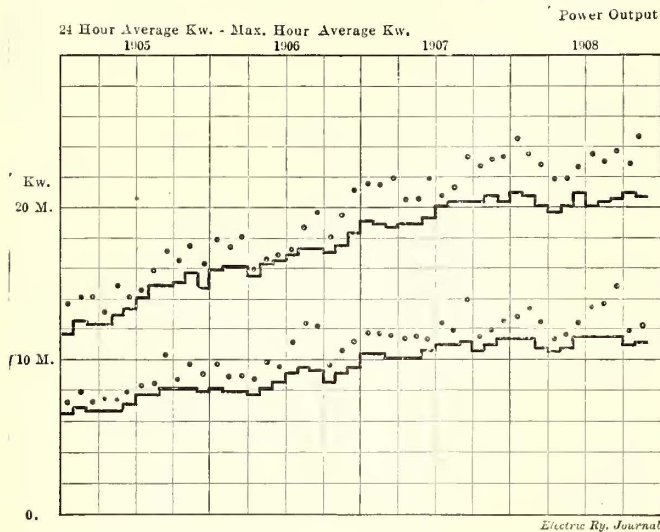
The oil switches and generator field rheostats are all operated from the generator panels by means of control switches. In addition to the equipment previously men-

tioned, each generator panel is provided with a field switch, potential and synchronizing receptacles and a time relay connected with the automatic high-potential oil switches.

Both exciters are connected to a single panel, upon which

the generator and line panels. These switches are triple-pole, single-throw, 15,000-volt, 300-amp form H<sub>3</sub> and are motor-operated.

Directly under the oil switches and resting on the main



Twin City System—Graphical Records of Power Station Statistics

is mounted a Tirrill regulator, together with necessary indicating meters and switches.

On the switchboard gallery directly back of the switchboard are placed the high-potential oil switches for both

floor are the busbar compartments. The partition walls of these compartments, and also of the oil-switch cells, are built of concrete in which is embedded expanded metal lath for reinforcement. Asbestos board doors are

provided for the stalls in this structure. There are three buses, each of 1/4 in. x 2 in., copper supported longitudinally in position by heavy insulators. The busbar compartments and general arrangements of switches and connection are shown in the cross-section through the switchboard gallery.

All wires and cables are concealed by the use of metal and fiber conduits wherever possible. The gallery floor is constructed of concrete in which are placed iron-pipe conduits sufficient in number to provide for all necessary wiring for the present plant and possible future extensions. For the generator cables and outgoing line cables 3 1/2-in. bituminized fiber conduits were placed in the main power house floor, the cables being pulled in after the completion of the plant. All cables are lead covered and all other wiring is heavily insulated.

The power generated at this station is sold entirely to the Twin City Rapid Transit Company for the operation of its street railway service in Minneapolis and St. Paul. The station is operated in parallel with another hydro-electric station of 7000-kw capacity located at what is known as the "Lower Dam," about 1/2 mile below on the river; and also with a steam station of 24,000-kw nominal capacity. The power from these three generating stations is distributed to the various substations in the two cities and there converted into direct current for street railway service.

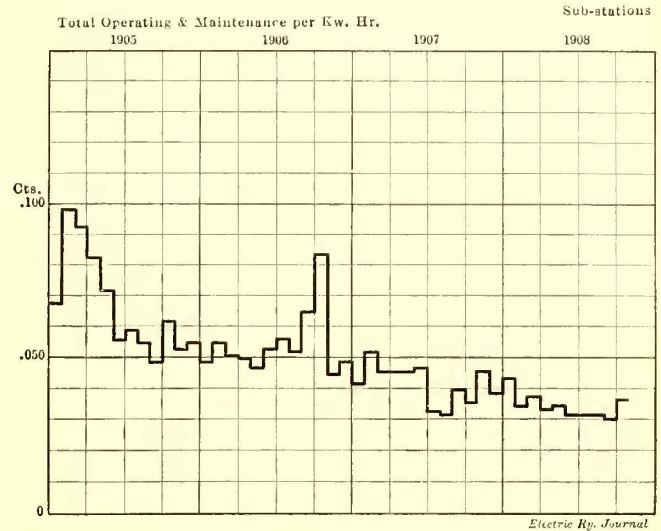
It is interesting to note the very low cost of this development, which, including all electrical and hydraulic machinery, was about \$26 per horse-power. This cost was subdivided as follows:

Head race and tail race excavation and construction, complete .....	\$6.00
Power house, complete .....	6.50
Head gates, cofferdams and miscellaneous structures .....	1.50
Electrical machinery .....	8.00
Hydraulic machinery .....	4.00

Total cost ..... \$26.00

In this connection it should be stated that no dams were built, the water being used from the existing pond already

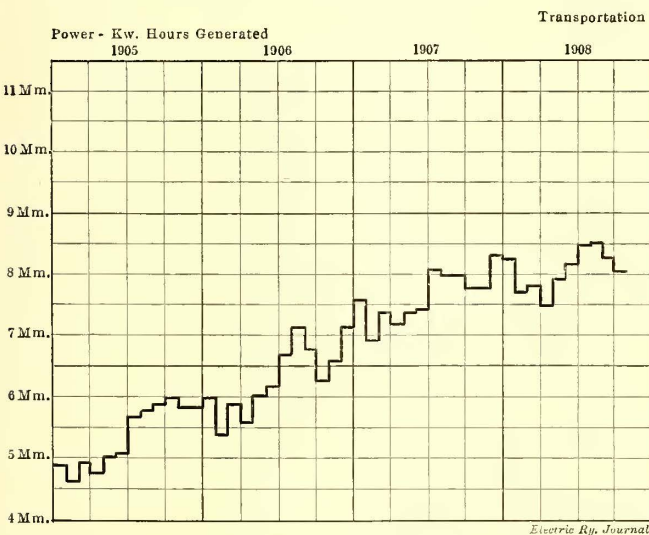
suitied for building purposes. The construction plant was so arranged that, as this stone was removed from the quarry by derricks, it was set upon flat cars and thus hauled directly to the point where it was to be used. The larger stones were used in laying up the masonry canal and forebay walls, whereas the smaller pieces and spalls



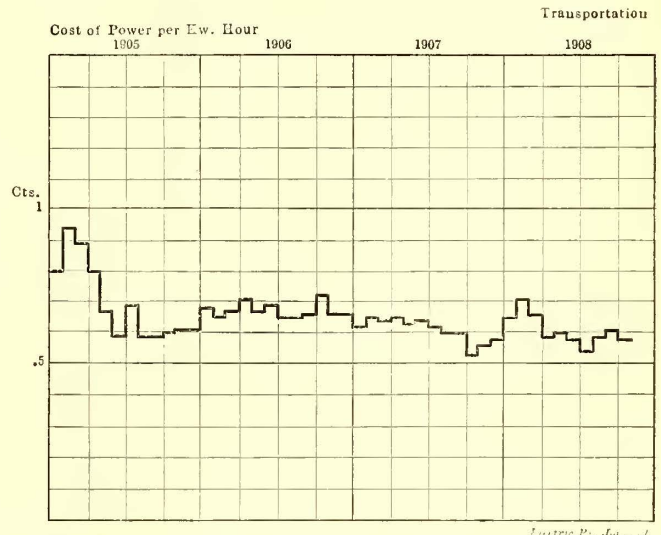
Twin City System—Substation Operating Cost per Kw-Hour

were all hauled to the crusher and subsequently used in the concrete work.

The complete electrical equipment was furnished by the General Electric Company, of Schenectady. The electrical design and installation were made under the direction of E. H. Scofield, M. Am. Inst. E.E., engineer of power and equipment of the Twin City company. The entire plant, exclusive of the electrical equipment, was designed and built by the water power company's forces under the direction of its chief engineer, Wm. de la Barre, M. Am. Soc. C.E. The first unit was completed and put in operation in June, 1908, and the entire plant was running by July 20.



Twin City System—Records of Total Kw-Hours Generated and Their Operating Cost



STEAM POWER STATION

created by the dam of the water-power company. Another factor aiding materially in this low cost was the presence upon the site of all stone required for masonry and concrete work.

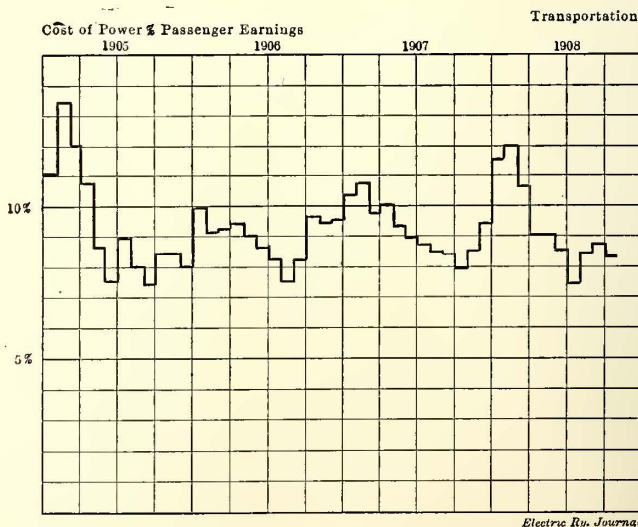
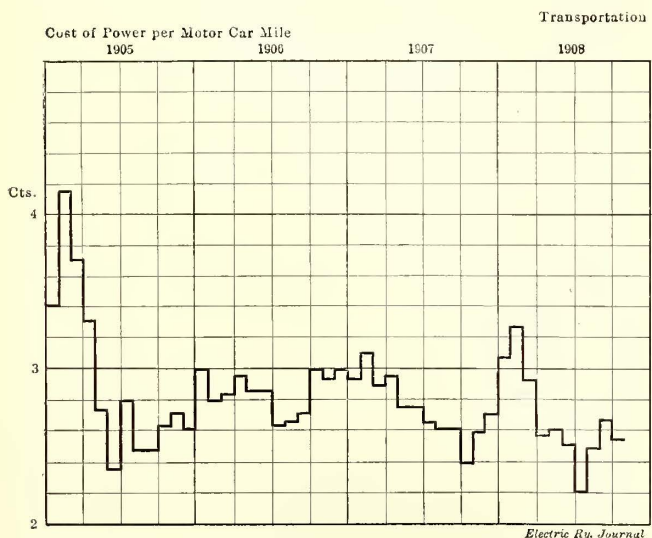
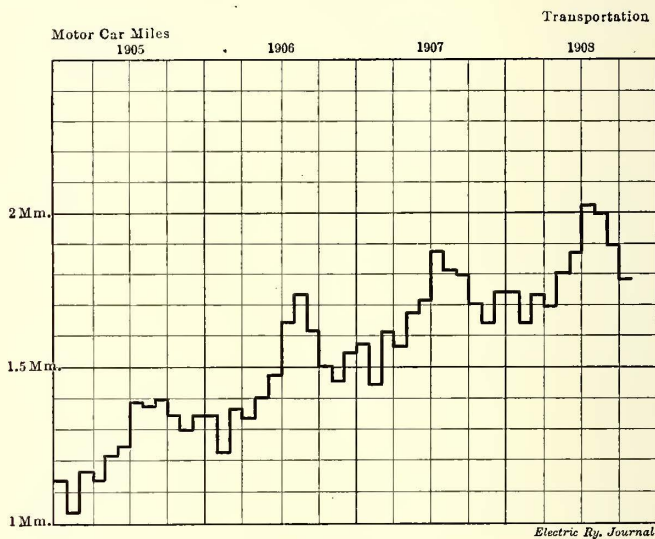
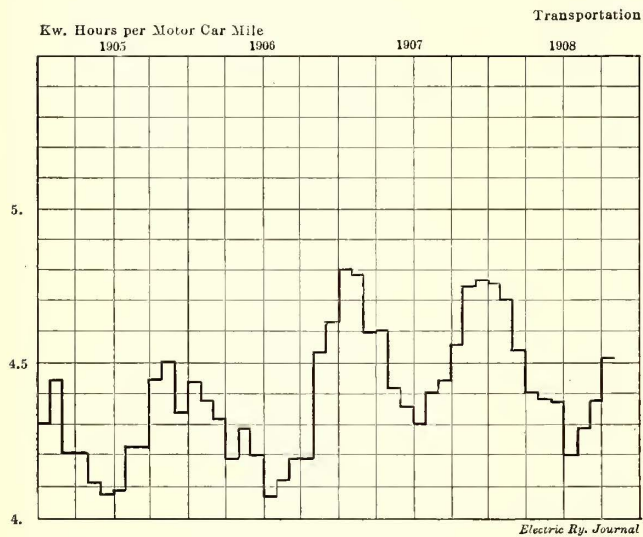
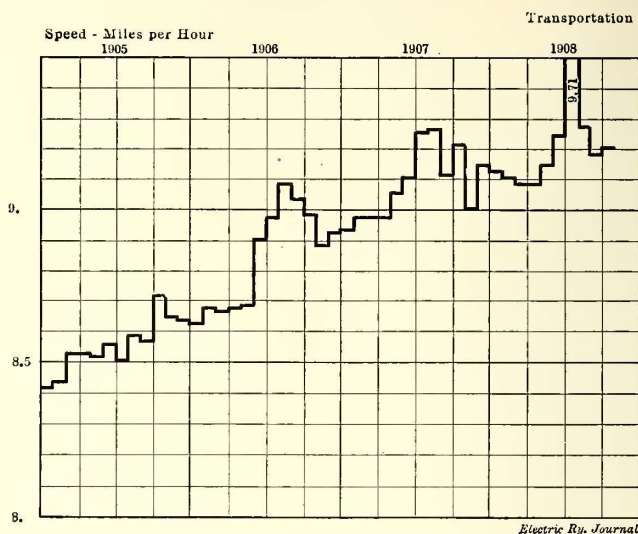
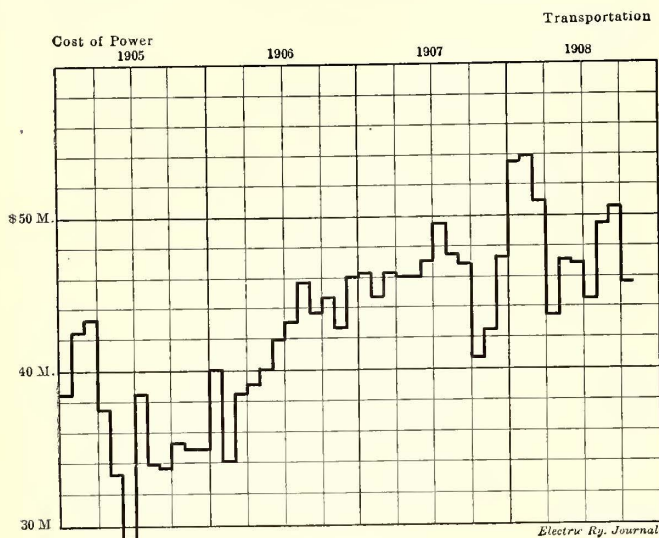
The excavation for the power house necessitated the removal of several thousand yards of a limestone well

The steam-power station of the Twin City Rapid Transit Company was described in the STREET RAILWAY JOURNAL for July 27, 1907. Since that time additions have been made to the power equipment, and the station now contains two 5000-kw Curtis five-stage turbines, as well as

the initial equipment of four vertical cross-compound Allis-Chalmers engines, whose cylinder dimensions are 46 in. and 94 in. x 60 in. The guaranteed steam consumption of the turbines per kw-hour at 175-lb. pressure, 2 in. back

is guaranteed not to exceed 2 per cent, except in the case of momentary variations, which may be as high as 4 per cent.

The turbines are connected to independent Worthington



Twin City System—Graphical Records of Transportation Statistics

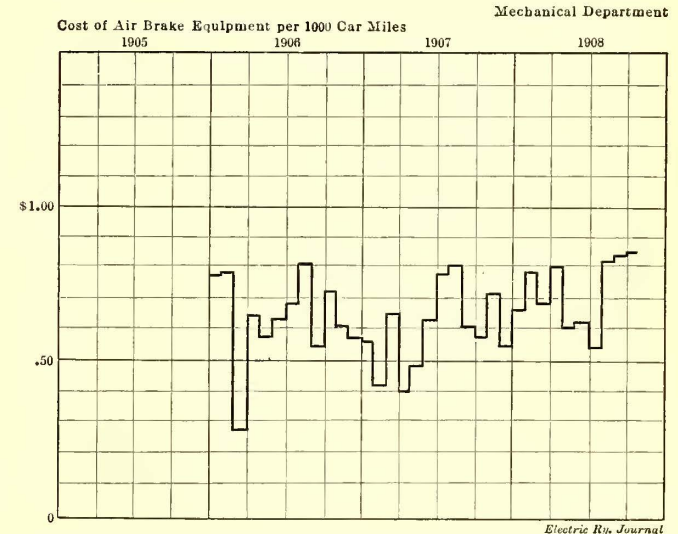
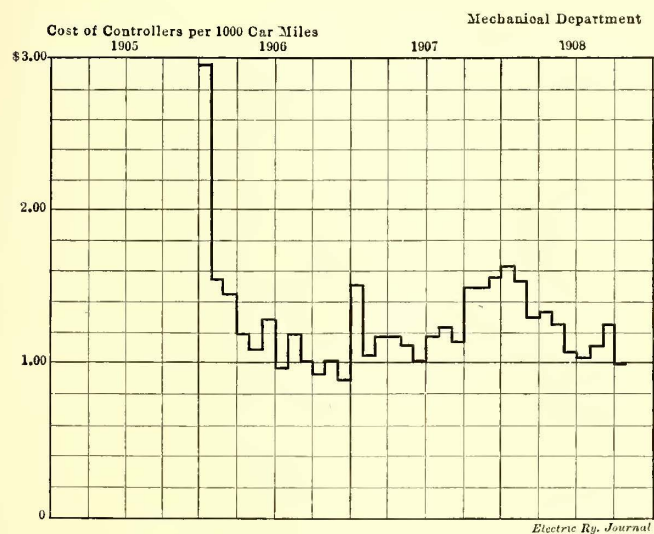
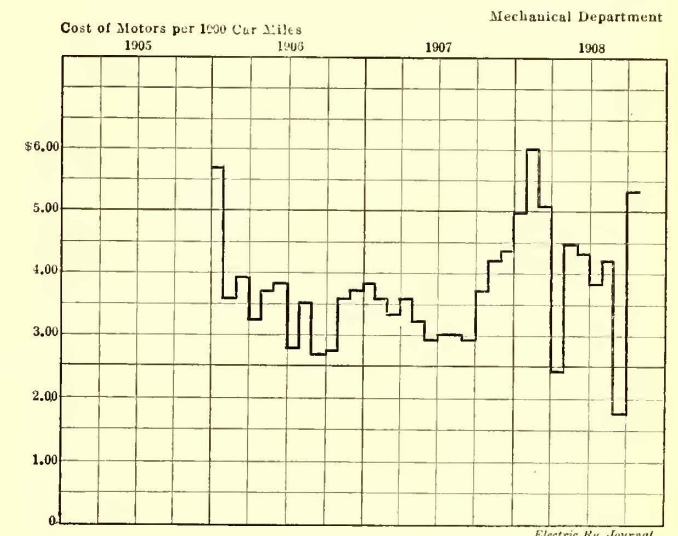
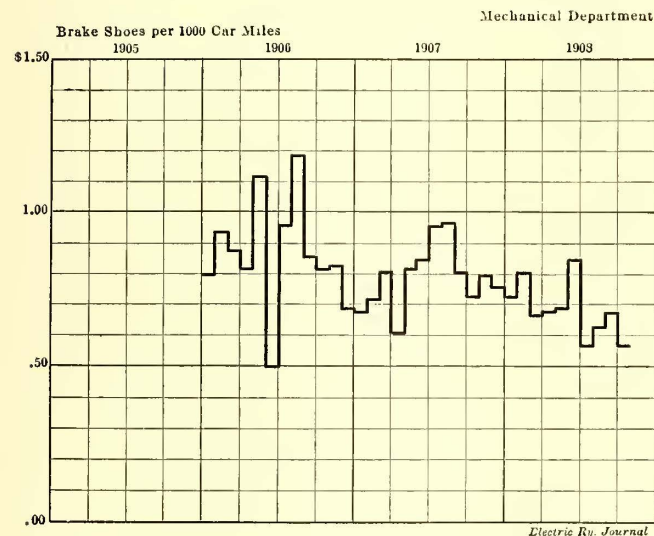
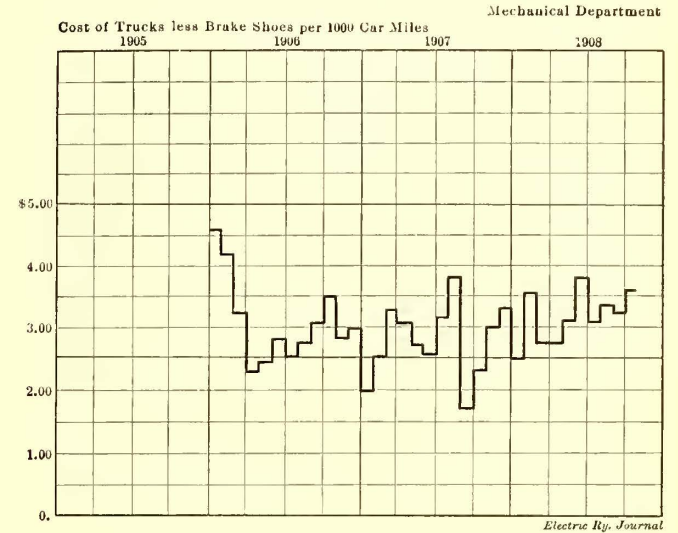
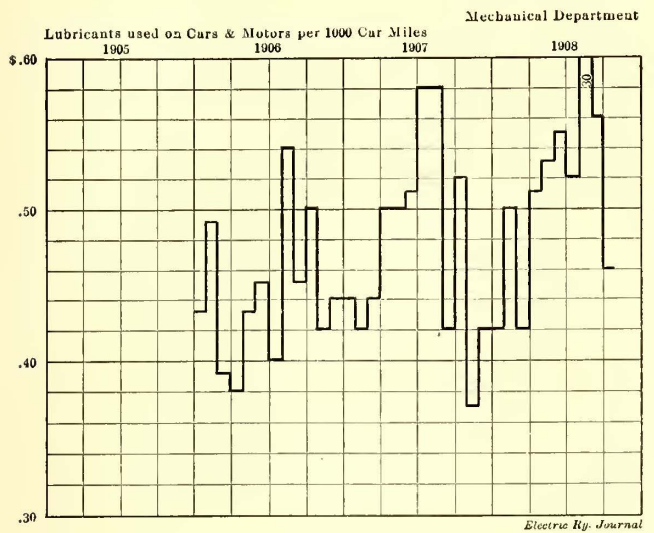
pressure, 100 deg. Fahr. superheat is: At half-load, 18.3 lb.; at full load, 17 lb.; at one and a half load, 17.5 lb.; variable between one-half load and one and one-half load, 17.8 lb. The speed variation between no load and full load

surface condensers, each with 20,000 sq. ft. of surface and a capacity for condensing 130,000 lb. of steam per hour with condensing water at 70 deg. Fahr.

The step bearings are lubricated by oil supplied at a

pressure of 550 lb. per square inch from a Wood accumulator and two Worthington twin pumps with steam cylinder 7½ in. x 6 in. and oil cylinder 2 in. x 6 in. These pumps are connected in relay, so that if one fails to main-

ained height. The discharge from the step bearing and governors flows into closed settling tanks, from which the oil is drawn by the pumps. A bleeder removes water and sediment from the bottom of the tanks to the filter.



Twin City System—Graphical Records of Statistics from Mechanical Department

tain the required pressure the second will start. There is also one electric triplex pump connected to the step-bearing oiling system for emergency use and arranged to start automatically if the accumulator falls below a predeter-

The low-pressure oil supply for general lubrication is under 80-lb. pressure.

GRAPHICAL RECORDS

The diagrams on pages 1025 and 1026 show the output of

the steam-power station and of the St. Anthony Falls station for railway purposes for the months in 1908 indicated. The other diagrams are part of the graphical

they go back as far as 1897, and in the case of maximum demand, are shown on the power chart as black dots, to 1900.

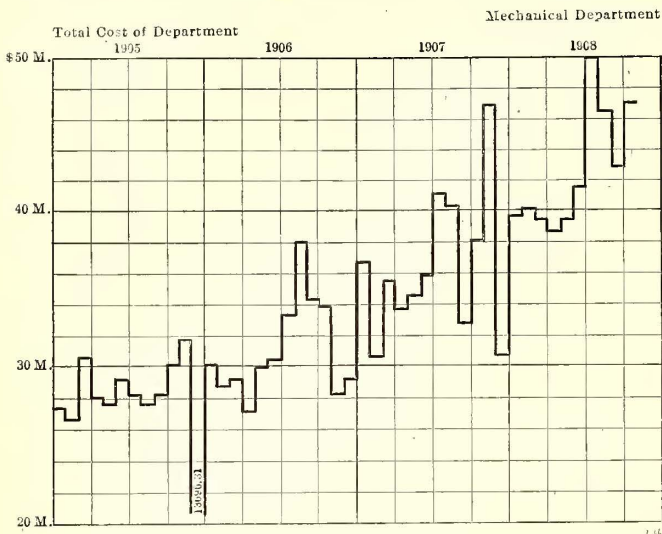
The statistics in other charts are plotted as far back in most cases as 1905. This method is used, in conjunction with the compilation of the actual figures, as a continuous record, the data for each month being added as it becomes available. As the charts carry their own story, no especial comment upon them is necessary, except to point out the evidence of increasing load and traffic and decreased maintenance cost per unit in most of the cases in point.

### TRANSMISSION SYSTEM OF BOSTON & NORTHERN AND OLD COLONY STREET RAILWAY COMPANIES

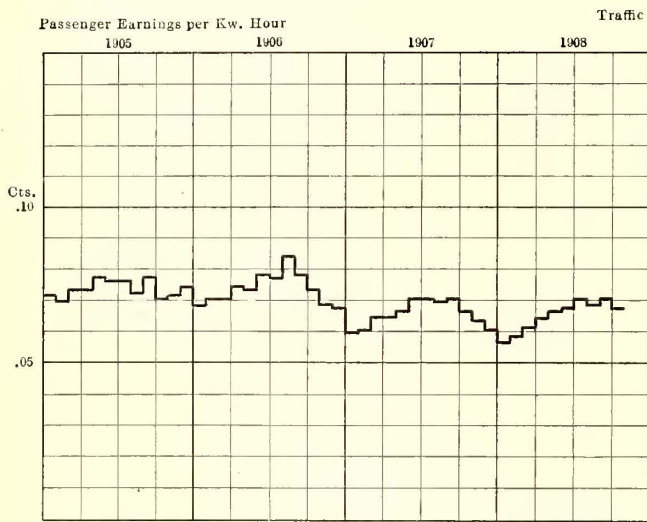
The last regular meeting of the New England Street Railway Club for the season was held at the American House, Boston, on May 27, with President Wright in the chair. George W. Palmer, Jr., electrical engineer of the Boston & Northern and Old Colony Street Railway companies, read a paper on the "Construction and Operation of the Transmission System of the Old Colony Street Railway Company." On this system are 380 miles of track, extending from Boston southerly to Newport, R. I., 54 miles, and westward from Hull to Needham 24 miles. Forty-two municipalities, with a population of 658,000 persons, are served. The company is the result of the consolidation of 22 smaller roads. At present about 320 cars are operated. The power supply for the component roads was drawn from about a dozen plants of moderate size and relatively antiquated equipment. As a result of the combination of the roads and the growth of business it became necessary to centralize the power generating equipment in a main plant which was located by the engineering department at Quincy Point, Mass., with substation installations for local distribution to the trolley lines. At Newport, R. I., a new turbine station of 2000 kw capacity was erected.

Mr. Palmer fully described the Quincy Point station, which was built about six years ago, and which has since been the mainstay of the system south of Boston. This is a plant of 10,000 kw capacity, in five units, Curtis turbines being in service. There is a coal-storage capacity of 18,000 tons at the plant, and an automatic coal-handling plant which operates at a cost of not over 6 cents per ton from the coal barge to the bunkers above the boilers. This station has been described in the *ELECTRIC RAILWAY JOURNAL*, and has many interesting features, one of the most prominent being the extensive use of electrically driven auxiliaries. The operation of the plant has been especially smooth, flexible and particularly pleasing to the company, amply fulfilling its expectations.

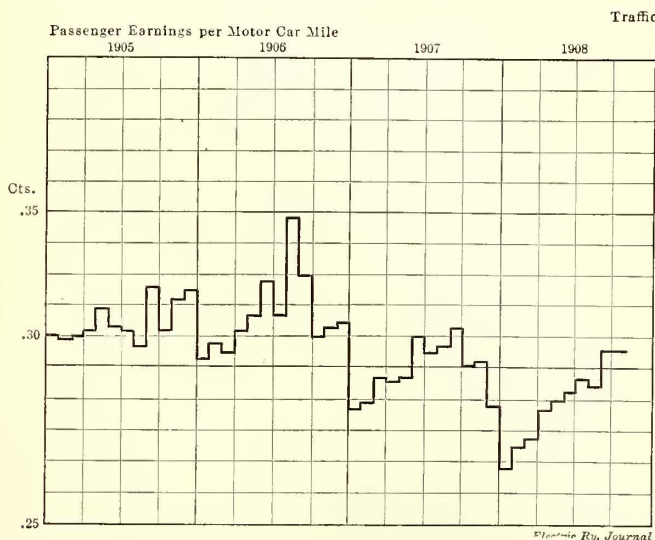
Substations are located at Milton, Rockland, Brockton, Bridgewater, Taunton, Lakeville, Portsmouth, R. I., Quincy Point, Fall River and Newport. These substations are connected with the main stations by a 13,200-volt transmission line. Rockland, Milton, Brockton and Bridgewater are normally operated from the Quincy Point plant, and Lakeville, Taunton and Portsmouth from the Fall River station. The system as planned included a second generating station at Fall River, which is not yet necessary. A tie line was erected between Bridgewater and Taunton, so that in case of trouble with either main station the other could operate the entire chain of substations; or if any section of the through transmission line had to be taken out of service, all the substations of the main line could still be operated. This feature gives in itself the same re-



Twin City System—Cost of Mechanical Department



Twin City System—Passenger Earnings Per Kw-Hour



Twin City System—Passenger Earnings Per Motor Car-Mile

records of the Twin City Rapid Transit Company, and are made public through the courtesy of the engineering department and management. In the case of power output



sult as duplicate lines from one station, entirely isolated from each other. Further, the entire through line is in duplicate, enabling operation by either line singly or by a line made up of selected links of each main line. The underground cables from the power stations to the points where aerial service begins are also multiplied in several cases.

The line was built of stranded aluminum cables on wooden poles. The underground construction aggregates about 1 mile of conduit in Quincy,  $\frac{1}{4}$  mile in Brockton and  $2\frac{1}{2}$  miles in Fall River. A right of way was secured, except for  $\frac{1}{4}$  mile in Brockton, for the entire length of the pole line, with an easement in some cases to keep clear a strip 50 ft. in width, in most instances to keep a path clear 8 ft. wide, and to cut whatever trees, in the company's opinion, were a menace to the line, and all other rights incident to the construction and maintenance of the lines. The right-of-way man had a strenuous time bargaining with the farmers, and in some cases the route had to be altered thousands of feet on account of the prohibitive prices asked.

The line consists mainly of three-phase stranded aluminum circuits of from 262,000 to 502,000 circ. mil. carried on 35-ft. poles, chestnut being used. On straight line the cross-arms are  $3\frac{3}{4}$  in. x  $4\frac{3}{4}$  in., and on curves or angles, 4-in. x 6-in. yellow pine arms. The wires are spaced on 36-in. measurements, with reversed double delta construction. The insulators are brown glazed porcelain, built to stand a 70,000-volt dry test and a 40,000-volt rain test. Angle insulators are of a special original design, with pin hole entirely through the center, the angle pins being 2 in. in diameter, of sound selected hickory boiled in paraffin, and supported at the upper and lower ends by separate cross-arms. All angle poles are double armed, and line angles are turned on from one to four poles, depending on the degree. Where foreign wires were crossed the line wire was suspended from messenger cables.

The line has given extremely reliable service. It went into use without any preliminary weeding out of troubles before the final connection for continuous work. When the current went on, it covered 195 miles of regular line wire, and it went on to stay without a single bad insulator or leak. On the Fall River-Taunton section one insulator was overlooked. To date, there have been six stoppages of the system due to line trouble. Two cases were caused by trees blowing across the line; in another a Blue Hill Observatory kite broke away, and its piano-wire string short-circuited two circuits. In another case the line grounded on account of a broken insulator, believed to have been "shot up," and in the last two a wire got down upon the cross-arm and lightning struck a pole.

Terminal houses are in service where the underground cables join the overhead lines. A four-wire telephone line is in use on the transmission system only, extending the entire length of the line. Emergency boxes are located on the poles about 1 mile apart, and they contain tools and telephone sets. The entire line is patrolled every day, and every foot of it is sighted. Many incipient faults are thus picked off. The patrolmen carry portable telephones. The underground conduits are of the built-up type, the manholes being of brick, with brick shelves. The cables are three-phase, paper-covered, lead-insulated, from No. 0 to No. 000 in size, with  $\frac{1}{4}$ -in. paper around the bunch and a  $\frac{5}{32}$ -in. lead sheath. In manholes the cables are further protected by a double thickness of asbestos, to protect each one from possible short-circuits or burn-outs on an adja-

cent cable. The cables were built to stand a 40,000-volt test after installation. No troubles have occurred which have shut down the installation. The condition of the cable sheaths is regularly examined and recorded, in order that it may always be kept electrically negative to other structures and the ground, to avoid electrolysis, and all sheaths are solidly connected to the d.c. 600-volt bus.

The new system is much more flexible than the old one, and the voltage has been much improved by the redistribution of the feeder copper. This, with the capacity of the substations to respond to all demands for power, together with their quiet and reliable operation, has totally changed the character and quality of the power supply to the cars.

DISCUSSION

In the discussion which followed the paper, Mr. Palmer stated that no trouble had been experienced from locomotive stack discharges where the line insulators are located above railroad tracks. The line repairs are made, so far

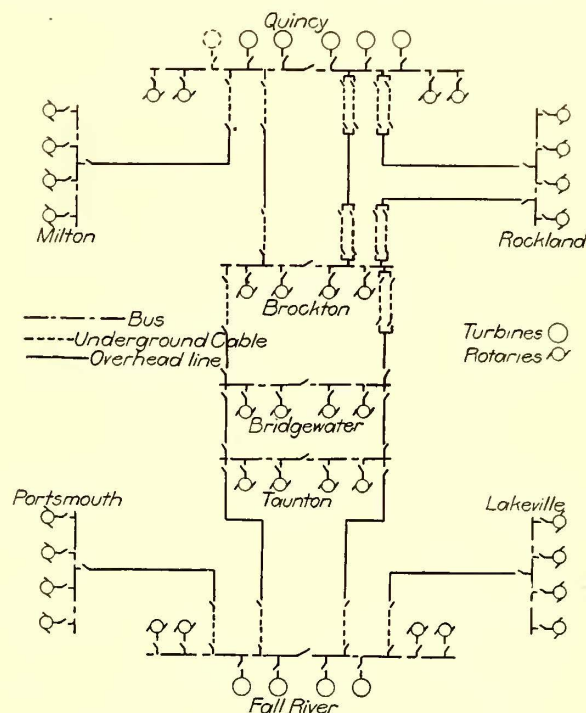


Diagram of Transmission System of Old Colony Street Railway

as possible, in the early morning, and the most stringent precautions are taken to red-tag all switches and open and close them only under orders from the proper authorities. The tag has a space on which the name of the man ordering a switch manipulated is inscribed, with the reason for the action. The operation of the entire system is directed from Quincy, the chief engineer of the station at that point having full charge of all lines and substations, as well as the local station. The line is built to withstand operation at 22,000 volts if the load requirements become such as to call for an increased potential.

M. V. Ayres, electrical engineer of the Boston & Worcester Street Railway, stated that his company has recently adopted a special clip on the disconnecting knife switches of its 13,200-volt circuits, so that when the switch is opened the phases are grounded at the station or substation. This prevents current from coming back from any possible source.

Mr. Palmer said in conclusion that his linemen ground the phases on which they are working to prevent any possibility of shock.

## ORGANIZATION AND OPERATION OF A CLAIM DEPARTMENT\*

BY W. C. FORBESS, GENERAL CLAIM AGENT, NORTHERN TEXAS TRACTION COMPANY, FT. WORTH, TEX.

As to the best manner of organizing and conducting a claim department, this must largely be governed by the amount of money allotted to the department and by the ability of its head to adopt effective methods to accomplish desired results.

In one company with which I am familiar, the organization consists of a clerk whose duty it is to keep all the records and to make out from the accident reports a daily report of all accidents, which consists of a statement sufficient to show their nature and extent. This report is in triplicate and reaches the manager, general superintendent and claim agent, and upon examination of the report the claim agent indicates whether or not the accident shall be investigated or the accident report merely filed. In addition to this report, these officials have monthly reports showing in detail the number of accidents during the previous month, number and amount of claims made and how settled, number of suits filed and amount of each suit and its disposition; and, further, a yearly recapitulation report. This clerk also does the claim agent's stenographic work and takes written statements of such witnesses as come to the office. The card system is employed.

For the investigation of accidents the claim agent has one regular assistant, whose duty it is to secure written statements of witnesses. These statements reach the claim agent's desk each morning, and after examination by him, are stamped with his initials and sent to the files, or in the event of a serious accident are discussed with the investigator for the purpose of indicating to him other points to be developed. From time to time such extra help in this line as the needs require is employed.

A claim agent should reserve to himself the settlement of all claims and the handling of all court cases. There should rarely ever be a case tried when he is not present and actively assisting the attorneys both as to having the witnesses present, and especially in calling the attention of the attorneys to salient points which can and should be developed from the witness while on the stand. I believe it to be an important part of the claim agent's duties to assist his attorneys in the trial of cases, for the reason that he is in closer touch with the witness and the facts of the case than the attorney, who frequently meets the witness for the first time at the court house when the case is called for trial.

The operation of a claim department brings it in touch not only with the public, but with every other department of the corporation, and to make it successful it must have the active co-operation of all. It should have the co-operation of the rank and file of the employees, in order that it may not in any wise become embarrassed in obtaining the facts surrounding each and every accident, which often are peculiarly within the knowledge of the employee who was operating the car or machine. To obtain this co-operation the claim agent should occasionally meet the men in a body at their quarters and discuss with them the accident problem in its various phases, going into detail as to cause and how accidents could have possibly been avoided, and the amount of money expended in adjustment, inviting the men to express their ideas on the subject.

The investigation of accidents brings the claim department into active touch with the public, and experience has taught me that the investigation should be made as soon as possible after the accident, while the facts are yet fresh in the minds of the witnesses, thus forestalling any effort on the part of would-be unscrupulous friends or representatives to pervert the facts. The investigation takes both tact and knowledge on the part of the investigator. It should be the policy where liability is apparent to settle the claim, if it can be settled on a reasonable basis, and thus keep the matter out of court. The company of which I have spoken has been very successful in this direction.

When we conclude that a claim is fraudulent, we should

exert all our energies to uncover it, and decline a compromise for any amount, preferring to expend the money in exposing the fraud. We believe it the duty of the claim department to discourage by every means possible the filing of claims and suits with the mere hope of extorting a sum of money by compromise.

From personal observation I know that a large percentage of the money paid by the street car companies in Texas is to satisfy judgments founded upon fraudulent claims in the entirety, or with elements of sham so prominent that the claim agent often wonders if there is any justice in our system of jurisprudence for the corporation. Especially do I call attention to this matter for two reasons: First, to arouse to more effective methods and co-operation than at present prevail among the various companies for the combating of this growing evil; second, that the managing officers of the various companies may more fully appreciate the work of their claim departments in exposing some of these frauds and not pull the purse strings too tightly when necessary to spend money to accomplish results.

## SCOPE OF LEGAL AND CLAIM DEPARTMENTS AND THEIR RELATION TO EACH OTHER\*

BY H. S. COOPER, MANAGER, GALVESTON ELECTRIC COMPANY, GALVESTON, TEX.

In this paper when speaking of "accidents" and the damage—and injury—claims that arise from them, it is not intended to limit the meaning of the word "accidents" to the actual bodily accidents arising from the operation of the cars or other portions of the active property, but the word will include, as it should in its broadest sense, any and every occurrence connected directly or indirectly with the operation of the property and from which can arise any claim for compensation for damage or injury.

Any department to which is given the duty of minimizing the losses arising from these "accidents" is the "claim department." The purpose of this paper is to show that such a department should not be a portion of the "legal" department or under its authority or in any way dominated by it, but that the claim department should be an independent one, separate and distinct from all other departments and having full autonomy, authority and power with regard to its specialty—the lessening, to as near the vanishing point as is humanly possible, of the losses arising, directly or indirectly, from accidents.

While it must have the same co-relation with, and must co-operate with, the legal department and all the other departments in the same manner as they do with it and with one another, it must, from the very nature of its specialty, have more authority, more power and more independence than any other. You will easily see the correctness of this claim if you will consider that its specialty covers a phase of the company's business which, if not properly and adequately handled, may eat up—and often does eat up—anywhere from 3 per cent to 25 per cent of the company's gross receipts—which may mean anywhere from 10 per cent to 100+ per cent of the net receipts. Its specialty covers every portion of the property of the company, the intangible as well as the tangible; it covers every department, for in every department—in the legal department and even in the claim department itself—lurks the possibility of damage claims. Every bit of the property of the company, from the bottom of its pole-holes to the top of its smokestack, and every employee, official and officer is a potential agent in the causing of accident-damage losses. In its preventive capacity the claim department must have full authority over all the property and all the personnel of the company in order to prevent "accidents," and in its curative capacity it must have full authority over all the employees, officials and officers of the company, whether as individuals or departments; to call on them for active and passive aid, advice, work or assistance, to help it in the minimizing of the effects of those accidents.

Please realize this point fully: Neither accidents nor their financial and other results are within the power of the company to absolutely prevent or control.

\*Abstract of paper read before Southwestern Electrical & Gas Association, Dallas, Tex., May 20 to 22, 1909.

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The accident-damage business is, at the present time, an unknown and seemingly uncontrollable portion of the company's losses; it is an "X"—the unknown quantity of the company's business that, improperly handled, may result in deficits and receiverships. Its effects are more apparent and are generally greater in that portion of the company's operation which brings it directly in contact with its patrons and the general public, but the potentiality of immense accident losses is latent in every piece of the company's property and in every person connected with it, and the department to which is given the responsibility of controlling these losses must have entire, full and complete jurisdiction and authority over all these possible causes if it is expected to produce the results desired.

The jurisdiction and authority mean that so far as the minimizing of accidents and their results are concerned, the claim department must have complete charge of and full responsibility for this purpose and that, if to this end it appears to encroach on the prestige or authority of any other department, it must, to an extent commensurate with the importance of its specialty, be allowed to do so. It is better to err a shade on the side of caution and of the lessening of accidents and their results than to have them and their results not lessened, simply to save the absolute authority of a department or an official.

While the legal department is interested in the lessening of accident losses, as is every other department of the company, and while it is directly interested in that end to a greater degree than many of the other departments, on account of its personal partaking of some of the active portions of that lessening, it is not as interested in the prevention of accidents as are any and all of the other departments, its main interest and action being in the lessening of losses from the legal results of accidents which have happened. As a "legal department"—outside of the actual conduct of trials—its connection with the matter of accident losses is entirely advisory, and advisory only in regard to purely legal points. Even as regards the trials, it is only directly concerned with the purely legal conduct of the case, for all other matters in regard to and all other aspects of the case have been and will be the proper and exclusive work of the claim department. The legal department is, from the peculiarities of its specialty, engaged in its portion of share of diminishing the accident losses in a totally different manner and from a totally different viewpoint than the claim department, and, indeed, any other department of the company.

In very large corporations the accident-loss business is of such magnitude that the "legal department" attached to, or including, or included in their "claim department" is engaged absolutely and entirely in this one specialty, and is therefore a part and parcel of the whole claim department. In the smaller corporations their accident loss is so actually small in dollars and cents as compared to any of their larger brethren that it can be, and is, handled without any claim department.

Between these, and large in numbers—and in accident losses—lie those corporations which maintain a "legal department" for general legal advice, opinion and action, and, at the same time, maintain an actual "claim agent" who, either by himself or with assistants, constitutes a "claim department." In this class the claim department has only one thing to do, and that is to endeavor to lessen accidents and the losses resulting from them.

On the other hand, the legal department has many other things to do for the company. It has to advise the company on other matters, on franchises, rights of way, ordinances, legislation, and many other matters requiring legal advice. It has to draw up papers on subjects entirely foreign to the accident business, and it sometimes has to try cases or causes having nothing to do with accident losses.

There is another important phase of the subject that militates against the legal department as being or dominating the claim department. This lies in the fact that the claim department is dependent for its existence, and for the continued employment of the persons comprising it, on its success in and with the one thing—the diminishing of accidents and the losses resulting.

In the legal department, while its employment by the company may depend entirely on its results or its portion

of the results obtained in the lessening of accident losses, it is a fact that this is seldom the case.

There is one further and most important difference between the two departments that cannot be passed by, as its influence in damage-suit litigation is one that not only can be, but is, inimical to the interests of the company. The claim department is never hampered in its duty by a departmental code of "ethics" and "courtesy" between it and any of its opponents in the damage-suit industry. Its "ethics" are that its first and only duty is to its sole employer and that "courtesy" to a person who—in 99 cases out of 100—is trying to rob the company, is a little bit far-fetched.

On the other hand, there is scarcely one of us who, in our various experiences with legal departments, has not had to deplore the effects of legal "ethics" and "courtesy" as they are generally practiced. At the most they are relics of medieval days when the profession was—or was believed to be—a profession of honor—at any rate before the day of the damage-suit lawyer and the ambulance chaser.

This sharp line of demarcation between the two departments does not prevent their perfect co-operation in a common cause or does it engender antagonisms between them or make opportunities for misunderstandings or ill-feeling, all of which operate to the disadvantage of the company.

Both sides must see to it that not only must the integrity of their own department be preserved, but also that they are not the first to make a precedent in the destruction of the integrity of the other. This can only be done by the fullest co-operation between them, by placing personal feelings, beliefs and biases entirely to one side and looking only to the best interests of the one whom both serve—the company. The claim department must be extraordinarily careful not to trespass on any legal territory; in anything that is purely legal, or that has a semblance of so being, it is its duty to bring the matter to the attention of the legal department, to settle jointly its status and, if it is a purely legal matter, to leave its decision to the legal department and accept that decision as one final and without appeal for the moment. At the same time, it is the strict duty of the claim department, if it does not concur in the decision, to enter protest, give its reasons therefor and make a record of the whole matter. This is to be done, not that it may at some future time "throw it up" to the legal department as an "I told you so," but strictly for the reason that, if the decision or action of the legal department has been a mistake, a record may be at hand to prevent its repetition.

On the other hand, the legal department must keep "hands off" the claim department in all matters not having a legal bearing. No matter what the temptation to settle, compromise, appeal or take any action—even a legal one—that will have an important bearing on the case, that temptation must be combatted and the matter fully and freely discussed with the claim department and, in all matters not legal, the decision of the claim department must be respected and the responsibility left to it.

If this cannot be done in any case; if both sides are fixed in their belief, and there is a "dead-lock," the claim department must do nothing that the other side can take exception to, and especially must the legal department refrain from using the prestige of its power and influence in other directions to override the rights of the claim department. This should be particularly the case in any action tending toward the settlement, compromise or other ending of a claim. Very few, if any, damage-claims are settled on points of law, and very few damage-suits are won, lost, settled, compromised or dismissed on purely legal grounds. In nearly every case, settlement or compromise of either claim or suit is more a question of unlegal facts, opinions and judgment than it is of law; and, from its more intimate acquaintance with all the facts in the case, and its fuller knowledge of the results of making such a settlement, the opinion and judgment of the claim department will be more accurate and should be relied upon and deferred to.

When it comes to any question of the final lessening of accident losses, the opinion and judgment of the claim department are those of an expert specialist, and when we desire specific results in regard to any certain important matter we take as final the opinion and work of an expert specialist.



was installed on a reversible engine which drives a blooming mill in one of the steel works.

A 1000-kw low-pressure turbine was installed on a mining property in Gary, W. Va., for the United States Coal & Coke Company, which was then operating compound engines and complete expansion steam turbines. This unit was very satisfactory and had as low a water rate as 18.5 lb. per kw-hour for the combined units.

The primary question of whether or not the installation of a low-pressure turbine is warranted in any plant can be answered only after a careful analysis of the character and conditions of the operation of that particular plant. There can be no question about the increased efficiency obtainable and the consequent increase of capacity or decrease of power cost. In plants, such as rolling mills, where the engines are intermittent in their operation and conditions are such that but little economy can be effected by operating them condensing, there is no doubt that the low-pressure steam turbine has found a very valuable field. In power plants, however, where the engines may be operated condensing, while the low-pressure turbine will undoubtedly show added efficiency, the probable remaining useful life of the engine to which it is to be tied, as also the future increased demand for power and the value of a spare unit must all be weighed.

In general, it is safe to say that in large plants, comprising two or more modern engines, the low-pressure steam turbine has a proper place, whereas in small plants having only one engine, and this, perhaps, in the last stages of decrepitude, it would generally be better policy to install a complete high-pressure condensing turbine of the full power required, and to hold the engine solely as a spare.

Unless a vacuum at least equivalent to 26 in. referred to a 30-in. barometer can be economically maintained, the installation of an exhaust turbine can scarcely be justified. Nor is it fair to compare what can be done by installing a low-pressure turbine to operate with very good vacuum with what is being done by an engine with a very poor vacuum. To obtain the same degree of vacuum when condensing a given weight of steam under the similar conditions will cost just the same, whether such steam be exhausted directly from a reciprocating engine or a high-pressure turbine, or passed through a low-pressure turbine.

The accompanying diagram shows four curves giving the steam consumption per brake hp-hour for four combinations of units. The load is expressed in percentages of the maximum capacity of a compound Corliss engine having a cylinder ratio of 4 to 1 and operating condensing with 190 lb. absolute steam pressure and 28-in. vacuum referred to 30-in. barometer. The maximum capacity of the assumed engine under these conditions is 4250 hp. Curve *a* shows the steam consumption of this engine under various loads from 25 per cent up to its maximum capacity of 100 per cent.

Curve *b* refers to the combination of this engine, operating with a constant back pressure of 18 lb. absolute and a low-pressure steam turbine. Curve *c* refers to the combination of this engine, operating with varying back pressure and a low-pressure turbine. Curve *d* refers to a high-pressure condensing steam turbine of a capacity approximately equivalent to the combined engine and low-pressure turbine, and operated with dry saturated steam at 190 lb. absolute, and a 28-in. vacuum referred to a 30-in. barometer.

The diagram does not indicate the efficiency obtainable by the addition to the steam-engine plant of a high-pressure condensing turbine having a capacity equivalent to the low-pressure turbine, which might be installed in connection with the engines. Such combination of condensing engine and high-pressure condensing turbine would naturally be considerably lower in efficiency than either the combination of engine with low-pressure turbine or of the larger high-pressure condensing turbine, and unless plant conditions warrant the installation of the large high-pressure condensing turbine, or are such that consideration other than efficiency make it preferable to install a small high-pressure condensing turbine as a separate unit from the engine, there is no question but that in first cost, as well as efficiency, the low-pressure steam turbine to run in combination with the engine would offer, by far, the most attractive proposition.

## ABSTRACT OF QUESTION BOX OF SOUTHWESTERN ELECTRICAL & GAS ASSOCIATION

### CAR SHEDS

*What are the most necessary tools and apparatus for the maintenance of equipment (electrical and mechanical) of street railways operating from 30 to 100 cars on regular schedule?*

We find that the following tools are all that are absolutely necessary in our shops, operating between 50 and 100 cars: 1 lathe, 1 emery wheel, 1 radial drill press, 1 large grindstone, 1 100-ton wheel press, 1 electric blower for forges, the necessary hand tools. In our carpenter shop we have 1 rip saw, 1 band saw, 1 planer. All these tools are run with two 10-hp, one 7-hp and one 2-hp motors connected to the trolley circuit.

T. C. BROWN.

One lathe, one wheel boring machine, one wheel press, one planer, one or two chain hoists, one good blacksmith equipment, one power emery wheel and one drill.

W. L. WESTON.

The most necessary tools are 20-in. x 10-in. lathe, 20-in. drill press, wheel boring mill, grinder and compressed air apparatus; also chain hoists of sufficient capacity to handle the loads.

J. E. GALLAHER.

One medium size lathe, one large lathe or wheel boring mill, one hydraulic wheel press, one medium size drill press, one small planer, one power emery stand with coarse and fine stone.

T. N. HARTIN.

### ROLLING STOCK

*In a street railway having very few spare cars, which is best and in the end most economical, night or day inspection? "Inspection" to mean also a certain small amount of maintenance, renewals and repairs.*

Day inspection gives the best results from every standpoint, where you have sufficient cars for leave-ins. In addition to this, of course, cars should be given all possible inspection at night.

T. C. BROWN.

Night inspection is preferable because with few cars you cannot spare a sufficient number to make day inspection complete.

THEO. TAYLOR.

Car inspection of system having very few spare cars should always be made at night, as in the end it is the most economical and avoids unnecessary labor in switching regular cars to the barn in daytime and substituting spare cars in their place.

T. N. HARTIN.

I would consider night inspection satisfactory in this case if followed up closely with a thorough day inspection at 30-day intervals at least.

J. E. GALLAHER.

Night inspection is the only practicable scheme, for you have too few extra cars for day inspection, and in order to make day inspection complete cars will have to be pulled in and others sent out continually, which results in extra labor and a great deal of "dead" mileage.

W. L. WESTON.

*Is it good practice to depend on car circuit-breakers, doing away wholly with the fuses?*

Yes, if you keep your circuit-breakers properly adjusted.

T. C. BROWN.

Is satisfactory if breakers are kept in good repair and set properly for amperage.

H. L. HARDING.

Circuit-breakers properly adjusted and maintained should obviate the necessity of a fuse.

J. E. GALLAHER.

Fuse boxes have been found to be more or less dangerous, and should be wholly done away with on small cars. The automatic circuit-breaker will work very satisfactorily alone.

T. N. HARTIN.

Fuses are of value in addition to circuit-breakers in case the latter stick or are otherwise in bad order.

THEO. TAYLOR.

*Which are preferable, solid rolled steel or steel-tired car wheels?*

Solid rolled steel wheel.

H. L. HARDING.

Solid rolled steel wheels are best. The first cost is less, the maintenance is less. They are safer than the steel-tired wheels, for in the latter the spokes are very likely to break.

THEO. TAYLOR.

Solid rolled steel wheels are the most economical and are safer.

T. N. HARTIN.

On roads of high speed, heavy service and frequent stops I would consider the solid rolled steel wheel preferable, on

account of low maintenance cost and a higher factor of safety.

J. E. GALLAHER.

Solid rolled wheels are preferable because the first cost is less and maintenance is less. In small companies it is not an easy job to shrink the new tires on in your own shop, and in many places it is difficult to have it done in a regular machine shop.

W. L. WESTON.

Have never used steel-tired wheels, but solid rolled steel wheels are satisfactory in every way.

G. H. CLIFFORD.

*Should circuit-breakers on double-end cars be connected in series or multiple, and why?*

Circuit-breakers on double-end cars should be connected in multiple. In other words, no current should go through the circuit-breaker on rear end.

T. C. BROWN.

Should be in multiple; if connected in series, rear breaker could open on overload and would be dangerous in case of an accident.

H. L. HARDING.

Automatic circuit-breakers should be wired in multiple, as this places the circuit-breaker and the controller on the same end with the motorman.

T. N. HARTIN.

Circuit-breakers should be connected in multiple, thus avoiding rear breaker going out, causing trouble and delay if connected in series.

J. E. GALLAHER.

Circuit-breakers on double-end cars are safer if connected in multiple, because the circuit-breaker and controller are then on the same end with the motorman, which gives him absolute control over the car.

THEO. TAYLOR.

*Does it pay to refill old-style ribbon rheostat boxes after they have become burnt out or short-circuited?*

Yes.

T. C. BROWN.

Yes, as often only one section burns out.

H. L. HARDING.

It is cheaper to refill the old-style ribbon rheostats than to buy new ones, as the refilled ones are practically as good as new and the cost is much less.

THEO. TAYLOR.

Cannot see any economy in refilling old-style ribbon rheostats.

J. E. GALLAHER.

We refill old-style ribbon rheostats and think it economical.

T. N. HARTIN.

*What results have you obtained with ball-bearing trolley bases? Does the saving in trolley-wheel wear justify equipping all cars with ball-bearing bases?*

We have obtained very poor results so far with the ball-bearing trolley bases. We are now testing two different makes of recent design, but so far we do not think anything better than the U. S. No. 6 on slow-speed city cars.

T. C. BROWN.

Have never used the ball-bearing trolley stand.

J. E. GALLAHER.

Ball-bearing trolley bases are a great saving on the interurban high-speed cars. On the slow-speed city cars they do not save the trolley wheel a great deal.

THEO. TAYLOR.

*Have air brakes ever been applied to single-truck cars?*

While I do not know whether air brakes have ever been successfully applied to single-truck cars, I do know that several cities have equipped a single car as an experiment, and all were found to be very unsuccessful, and the air was replaced by the hand brakes. In fact, considering the weight of single-truck cars and the comparatively small power required on a hand brake to secure the maximum braking effect on the car, there could hardly be any substantial argument for equipping a single-truck car with air. I think a very important fact in connection with the stopping of a car, and one which is frequently overlooked, is the question of how well the braking effect is applied by the operator, rather than how quickly or how powerfully applied, in order to obtain the best resultant braking effect to the car.

T. C. RANDALL.

Yes.

H. L. HARDING.

*Is there any benefit to be obtained by slotting commutators? If so, what?*

Stops flat spots on commutator. Prevents flashing of motor.

H. L. HARDING.

Yes, because the copper softens with the continual heating and cooling and wears faster than the mica. This causes the mica to protrude above the commutator bars, and the brushes on that account do not get a good contact. It is not necessary, however, to slot new commutators, but it will

prove very beneficial, as stated above, after commutators have been in use about three years.

THEO. TAYLOR.

We have obtained good results from slotting commutators after the copper has become worn, for the mica protrudes above the commutator bars.

T. N. HARTIN.

For all motors showing excessive brush and commutator wear I would unhesitatingly advise the slotting of commutators, giving brushes an all copper contact, thus reducing sparking and short-circuiting to a minimum, and increasing the life of brush and commutator and lessening the number of controller burnouts, all for the good of a low maintenance and a decided benefit to the claim department.

J. E. GALLAHER.

*What should be the power consumption in watt-hours per ton-mile for city and interurban cars?*

The power consumption of cars in watt-hours per ton-mile depends upon the schedule speed and the number of stops made per mile. For interurban cars, making a schedule speed of 35 m.p.h. and making stops every  $2\frac{1}{2}$  miles, it would take about 90 watts per ton-mile. For the average city cars it would take about 125 watts per ton-mile.

E. E. NELSON.

ROADBED, OVERHEAD AND MAINTENANCE OF WAY

*What has been the experience, if any, in wheel flanges getting chipped in going through hardened center special work?*

We have a great many chipped flanges, but have no positive evidence as to the amount caused by special work.

J. J. KING.

More than 50 per cent of our car wheels are removed on account of chipped flanges. The writer thinks that this is caused by hard stones, pieces of iron, etc., getting in the grooves of the grooved rail. Where cars run at the proper speed through hard center special work, don't think it will chip flanges to any great extent.

T. C. BROWN.

In any special work where the "floor" of the special work is raised, so that the wheel crosses or runs on the special work on its flange, there will always be chipping of wheel flanges, even when a car is run at very slow speed across the special work, this being especially the case on new wheels or where the flange is sharp and thin and the "floor" of the special work is of hardened material. From a long experience in matters of this kind, the writer would suggest that in all cases the special work be so arranged that the wheel, in crossing, rides on its tread, for, after the special work has been in use for some time and the floor has been gradually worn away by the cutting of the flange of the wheel, any wheel with the flange a little worn will have to cross it on its tread, and the slight advantage thought to be gained when the special work is new and the floor uncut does not compensate for the chipping of the flanges of the wheels.

H. S. COOPER.

There has been a tendency of late for makers of special work to leave a square shoulder on the hard center plate, which results in the flange striking abruptly against it, where, if the hard center was tapered on a gradual slope to bottom of flangeway in the special work, the flange would ride on the center without chipping, but with present construction we are having some trouble.

G. H. CLIFFORD.

We are having some trouble with wheel flanges on hardened center special work, brought about, I think, on account of flangeway or groove not being deep enough to give the necessary clearance for the flange, causing the flange to take all of the load of the car, producing chipping.

J. E. GALLAHER.

*Which is the most desirable construction for a diamond point turnout, and why—an open point switch or the reverse? That is, in entering the turnout, should the switch-tongue be on the right or left-hand rail?*

Practically no difference if spring is used. If motorman is to throw tongue, whichever side is most convenient to him, taking into consideration car construction.

J. J. KING.

Have switch tongue on right-hand rail in order that the force which changes the direction of the car comes on the inside of flange, rather than on the tread side. The inside contour of the flange is more uniform for all wheels after they have been in service than that of the tread side, and as the diameter of the tread of the wheel is less on the outside than at the gage line and the right-hand wheel riding

on the smaller diameter, there will be less liability of broken flanges or riding of switch point.

T. C. RANDALL.

*Does it pay to use treated ties in street railway construction? Should untreated ties be put into track before they have been thoroughly seasoned?*

Treatment of ties has been found a profitable investment by most all users. Experience has taught many that ties, whether treated or untreated, should not be put into the track before seasoning.

H. H. GERHARD.

It does pay to use properly treated ties. Untreated ties should not be used till thoroughly seasoned.

J. J. KING.

If properly treated, yes. In regard to the second question the answer is, in all cases, decidedly no.

H. S. COOPER.

It pays to use treated ties for street railway construction, as they last three to four times as long as untreated timber of the same species, with an additional cost not exceeding from 20 to 25 cents per tie.

J. C. MILLER.

Treated ties undoubtedly last much longer than untreated ones, and I believe the increased cost is more than made up for in the lengthened life of the tie.

Unseasoned untreated ties should never be put in track.

W. L. WESTON.

*Of the two ties do you prefer a post oak or all-heart pine tie?*

Many railway engineers throughout the United States have stated that heart timber is superior to other kinds.

H. H. GERHARD.

All heart in this climate, though there is not much difference.

J. J. KING.

At the same price I prefer the heart pine tie, and believe that if of first-class long-leaf timber it will last much longer than the post oak. The heart pine, if sawed, will give a better rest for the rail, and being more uniform in size than the hewn tie, can be more easily put into the road-bed.

W. L. WESTON.

*What type of trolley wire hanger (the bell or cap and cone) is the most economical?*

Either bell or round top is more economical in maintenance than cap and cone.

The writer is not in favor of using any type of self-insulated trolley wire hanger, either as a matter of economy, insulation or maintenance. He has devised a trolley wire suspension that obviates the defects of both the bell and cap and cone hanger.

H. S. COOPER.

The bell, or what is known as the type N hanger, is more desirable and economical.

G. H. CLIFFORD.

*Is it advisable to use an iron protector at the ground line in connection with iron poles, this protector consisting of an iron tube or pipe slipped over the pole and extending about 6 in. above and 2 ft. below the ground line?*

It is, if it is hot-swaged onto pole and sealed to prevent water entering joint.

J. J. KING.

#### TRANSPORTATION

*Outside of large cities, in towns of, say, 25,000 to 100,000 population, operating from 30 to 100 cars on regular schedule, is it wise to employ experienced trainmen from other roads?*

It is just as wise to employ experienced trainmen, especially motormen, to operate your cars as it is to employ experienced engineers to operate your power plant. The San Antonio Traction Company pays a premium on experienced men.

T. C. BROWN.

We do not consider it wise for the small lines to employ experienced trainmen from other roads, and in Houston we deviate from the policy after considerable consideration, as we discovered that the experienced men were teaching our local and "raw" men many old "tricks of the trade," which they had picked up during their previous experience. We also found it harder to change the habits of the experienced man and teach him the operation as we desired it than it was to teach an entirely "green" man according to our own ideas.

H. L. HARDING.

Would by all means prefer an experienced man, particularly on the front end, to an inexperienced man, assuming, of course, that he has satisfactory references from past employers. The value lies right in the word "experience," for however complete may be instruction and competent the man may be, nothing but continuous operation can give a man knowledge of the thousand and one situa-

tions that arise in the operation of a car, and the ability to handle same coolly, quickly and successfully. As a new man works the extra list he is getting this experience slowly, as he probably does not work every day, or as much as a regular man. While it is true that an experienced man may have learned certain habits that are not as you desire, and which to remedy or break may cause the instructing and inspecting force some trouble, nevertheless the real magnitude of these habits are infinitesimal as compared with the gain in the ability of the man to keep out of the way of vehicles, pedestrians and other cars, and the ability to get fares and handle a crowd safely on the rear end, all of which are practically the same proposition in any city, as a single slip upon any of the above may mean a serious accident and consequent expense.

Take the experienced man if you can get him, and if he has a good record.

T. C. RANDALL.

I usually employ inexperienced trainmen, for the reason that acceptable experienced men are hard to obtain. When the latter are available they are given the preference.

C. H. BOWEN.

I prefer experienced trainmen if satisfied as to their habits, etc., for the reason that it costs the company money in many ways to break in new men.

G. H. CLIFFORD.

*Can trailers be operated more satisfactorily than single units to take care of rush hour business?*

This is altogether controlled by local conditions. On cars that pass the barn, or near the barn, probably so. Where trailers have to be taken a long distance to attach to regular cars and only run one or more trips, it will cost more to put them on and pull them off than to run trippers.

T. C. BROWN.

Single units are more satisfactory in handling crowds during the rush hours than the trailer equipment used in this country. The expense is somewhat greater, but considering the increased liability of accident and the slower time made by trailer equipment, the small additional expense is not objectionable.

C. H. BOWEN.

Trailers for city service can only be used satisfactorily during rush hours on a double track, as on the single track they drag too much and good meetings at turnouts are impossible.

W. L. WESTON.

*What progress have you made during the past year in reducing the number of car failures or "pull-ins"?*

We have almost eliminated pull-ins during the past year by better inspection in the barn and having a good trouble man out with the cars from the time they leave the barn till they go in.

T. C. BROWN.

A thorough inspection of cars and minor repairs such as can be made at night. This inspection to cover particularly brakes, trucks, cables and motors. By adopting this plan and carrying it out carefully, trouble can be avoided by repairing immediately before any particular part of the equipment gets badly run down.

T. N. HARTIN.

The number of pull-ins or car failures has been reduced about 50 per cent in the last 12 months.

J. E. GALLAHER.

#### AMUSEMENT PARKS

*What is the best way to handle an amusement park—to lease it or run it yourself?*

I think, in general, the most successful method of handling a street railway park, particularly in towns having a population of less than about 150,000, is for the railway company to handle it itself and to operate it with a view of stimulating traffic on the cars, rather than making a large profit from the park itself.

The real value of a park to a street railway company is to educate the public to ride, not particularly on holidays or other big days, when it becomes a burden and sometimes impossible to perfectly and efficiently handle the crowd, but to build up the riding on the ordinary weekday, and to make this increased business somewhat uniform, so that the extra service required to handle it can be more nearly foretold in advance, and consequently operated more efficiently, straight through from car to power station.

The objection to leasing a park to outside parties to run is that the lessee is looking for a profit for himself, as is the owner of each concession. The result is that the park is filled up with frivolous and fake forms of concessions,

## THE ACCOUNTING DEPARTMENT\*

BY W. B. WRIGHT, AUDITOR, INDIANAPOLIS & CINCINNATI  
TRACTION COMPANY

most of which cost 10 cents or more each admission, and the attraction or show is all over in a minute. The average person consequently gets very little amusement for an afternoon or evening without an expenditure of about 75 cents or \$1 in addition to his car fare, and rarely a single one of these concessions tends to make "repeaters" of the public.

In towns of up to at least 150,000 population, unless they have a very large and daily changing population, if the public is not educated to "repeat" the population of the town is not sufficient to support the ordinary so-called "White City" or "Electric Park," with its large investment, and from the viewpoint of the street railway company, the volume of the park traffic is irregular, uncertain and frequently amounts to nothing during the ordinary weekday (the day on which a company is best able to handle the business advantageously), and the business runs out early in the season, all of which tends to give the park a black eye for future years.

My experience and observations of the park business in the various cities of the country have been that the best results are obtained by the railway company running the park itself, starting the park off right at the beginning and giving the public a good, clean amusement with variations that will entertain them while they are at the park, with good street car service to and from the park. All of which, outside of the car fare, will cost them practically nothing. The company should figure the real profit from the increased number of passengers carried.

T. C. RANDALL.

### MANAGEMENT, AUDITING

*What results have come from selling six street car tickets for 25 cents? Have the Texas companies that have tried this plan been satisfied with the results?*

So far as the experience of the writer is concerned, the selling of any street car tickets for a cut rate is very seldom remunerative to the street car company. In the first place, it opens up another chance for the conductor to steal from the company, in that it allows him to buy six tickets for 25 cents and turn in tickets for 5-cent cash fares, thus making 20 per cent profit on his investment and robbing the company of that much money. In the second place, it must be remembered that in nearly all street railway companies the margin of profit lies between the fourth and fifth cent, and that any cut in the price of tickets, reducing them below 5 cents, cuts not only the gross receipts, but makes a direct cut into the net. The use of any ticket involves the expense of the ticket itself, counting and accounting for the tickets, and, on account of the tickets lost, mislaid or held, leaves a constant and constantly increasing liability, the uncertainty of which becomes quite annoying to the accounting department after a while. In a town of about 30,000 people with which the writer is acquainted, the debit side of the ticket account showed in five years nearly \$2,800, and in his present property, at Galveston, tickets were offered and compelled to be accepted five years after their issue and purchase. On the whole, unless there are very urgent reasons for so doing, in fact, unless it is impossible to get out of it, the writer would certainly advise that no tickets, and especially no cut-rate tickets, be issued by a street railway company as long as the straight 5-cent fare, or, at any rate, as long as a straight cash fare can be maintained.

H. S. COOPER.

*Do you require conductors to register transfers collected? If so, do you require conductors to pay for transfers short or defective?*

Yes. No.

T. C. BROWN.

We require conductors to register cash on one side of double register and on the other side to register transfers and tickets, but do not require conductors to pay for transfers short or defective, but do keep an account of each conductor to ascertain the number of errors made, so that he may be disciplined accordingly.

G. H. CLIFFORD.

*Do you consider it good policy to have transfers registered if conductors are not accountable for the number registered?*

Yes.

T. C. BROWN.

Yes, for the reason that trainmen could not be checked successfully without the use of the double register.

C. H. BOWEN.

Yes.

G. H. CLIFFORD.

In reviewing the subject it seems to the writer that it cannot be suitably handled as a whole in one paper, but that it should be presented in a series of possibly three studies something as follows:

The accounting department. Its organization and routine.

The accounting department. Its relation to other departments—especially discussing the methods of quick and accurate interchange of information and data covering both current business and periodical report work.

The accounting department. Its chief—his status in the general organization, his authority, and its limitations.

The first two subjects suggest in themselves a style of treatment, but the last one brings before us a phase of the matter which is seldom handled in a concrete way outside the gatherings of accounting men. I believe it one of the very important subjects for the consideration of the general body; this on account of the increased responsibility imposed upon the chief accounting officer by the laws empowering control through national and State commissions; also on account of the tendency to add to his duties as a reviewing authority duties which partake largely of the nature of those of the operating official, notably his participation in the work of the traffic department, and his control of the receipt, care and issue of supplies and stores. On some lines this latter duty includes the employment and discipline of employees engaged in handling this class of property.

I will attempt to discuss briefly the first proposition and to describe the schedule of duties as made in the accounting department of the company with which I am connected. I shall hope to hear the other propositions presented at later meetings.

### ORGANIZATION OF ACCOUNTING DEPARTMENT

The organization of our accounting departments cannot be based on the required duties alone, nor can it be based entirely on the force of people who are to perform them, but will follow a line, the resultant of a combination of these elements. Ordinarily the required duties will indicate an outline for the organization of the working force, but the "personal equation"—the aptitude, education and experience of the individual workers—will vary this widely from time to time as the working force changes, even where the list of duties remains practically constant.

The changing conditions of our individual properties incident to growth, consolidation, etc., adds to our problem another element which must by no means be overlooked, since the relatively small property of to-day, with few accounting people, each performing many duties, is likely to become the large system of to-morrow, where single duties are performed by many people.

The solution of our problem, then, calls for a grouping of duties, so correlated with the individualism of our working force that we can increase or diminish our list of duties both as to number and volume, and augment or diminish our working force—either or all—without serious friction, loss of the effective working time of our employees or the impairment of our records.

Webster quotes Coleridge as defining "organization" in the following question, "What is organization but the connection of parts in and for a whole so that each part is, at once, end and means?" or, to drop the interrogative style and state the proposition positively, organization is the combining of parts in and for a whole, so that each part is both end and means.

Following this line of thought, but keeping always in mind the quality of the human material with which we are to work (and this quality is usually limited by the element of salary appropriation), the work and the workers should be so progressively grouped that the finished product of one group becomes the raw material of the next. As an example take the trip reports, the conductors' finished product. These, forwarded to the accounting department,

\*Abstract of paper read before Central Electric Railway Association, Ft. Wayne, Ind., June 3, 1909.



be the raw material for the checking force; the trip report abstracts, properly footed, balanced and proved, the finished product of the checking force, together with reports of other earnings from their various sources, become the raw material for the chief clerk or other employee charged with compiling and refining the earnings statistics; and the earnings report, the finished product of the chief clerk, becomes the raw material for the clerks in charge of the general books of account. The balance sheets and comparative statements, the finished product

sort of a graphic schedule must be used, and this schedule must, in conforming with the above deductions, possess the following characteristics:

**Comprehensiveness.** It must show the list of duties, by whom performed, time of performance, by whom checked, what proofs of corrections, if any; and if the road is operated by divisions it should show to what divisions the duties apply.

**Flexibility.** As regards grouping of duties and changes in individuals assigned thereto.

**Legibility.** It must be in such shape that it is readily scanned and quickly understood, even by one not conversant with it.

It is the opinion of the writer that neither the ordinary tabulated list, the bracketed table nor the chart based on rectangles or circles showing duties and individuals, with converging or diverging lines showing direction of movement, meets the requirements mentioned. Instead, we have adopted and are using a chart after the style of the sketch shown herewith. A similar chart was published some years ago by a prominent Chicago business magazine, but it did not show the amount of detail that we require.

The chart, for convenience, should be sectionalized, preferably by combining in each section reports and duties incoming, outgoing, etc. Our division is: "Reports incoming, symbol R. I.," "reports outgoing, symbol R. C.," "miscellaneous, symbol M.;" and "pay rolls, symbol P. R."

On the chart, as shown, we have first the list of work; below it is lettering indicating the operating divisions; below these, numbers indicating the duties; below this again, symbol indicating by whom each duty is checked or proved, and below, in serial order, sections indicating times of performance—daily, weekly, monthly and quarterly; the last section also provides for duties recurring at annual intervals only. Each class of employees is indicated by a letter symbol, as A, auditor; C K, checking clerk; S A, station agent, etc. These are alphabetically indexed, as shown at bottom of chart.

The chart is completed by drawing with a hard pencil, in the vertical column representing the required duty, a line from the top of the column to the time of performance, and at the latter place writing, also with hard pencil, the symbol representing the class of employee (and this usually indicates the individual) of whom the duty is required. On the "checked by" line is indicated, also with hard pencil, the symbol for class of employee checking or proving the work. These items are inserted with hard pencil so that they may be readily erased and changed with the changing necessities of the department work.

After the chart is completed as above, a schedule or table of individual work is prepared, grouping under the title of each individual or class of employees all the duties required of that individual or class. This is in effect a classified list, typewritten, with sufficient carbon duplicates to meet the requirements of the case, and shows, in addition to individual or class as above, the symbol for the duty, as "R I—1," the name of duty, as "forwarding conductors' trip reports and cash," and the time, as "daily-train No. 38." A complete list is kept by the chief accounting officer, and copies are sent his superiors. The carbon copies are cut in sections, giving each affected employee the section indicating his duties, this completing the scheme, except that at the foot of the chart should be made a list of notations showing how each duty or report capable of proof is verified, as, for instance, annual statement proves against ledger account.

This type of chart may be known to many of you, but I have never found it in use in any of the offices whose accounts and systems I have been called to handle. This may be because the chart looks somewhat intricate and would appear to be difficult to construct, but it is not.

ADVANTAGES OF GRAPHIC CHART

There are three things that strike the writer as of great importance in the charting of any office routine, and especially that of the accounting department.

First.—The individual schedules made up from the chart detailing the work of each member of the force and giving definite times for the completion of each duty, largely prevent the attempt so commonly made by clerical people to shift their burden in part to other shoulders, especially if the owners of those other shoulders be willing, and the

Duty Chart, Accounting Department.

Reports Incoming, Symbol "R.I."													Reports Outgoing, Symbol "R.O."															
List of Work	Conductors Trip Reports & Cash in Steel Boxes						Register Readings						Trial Balance, Gen. Ledger	Monthly Comparative Statement	Agents Commission Statement	Remittance for Inter-Line Account	Annual Statements											
	Indianapolis	Indianapolis	Rushville	Connersville	Shelbyville	Greensburg	Indianapolis	Indianapolis	Rushville	Connersville	Shelbyville	Greensburg																
Divisions	C	S	C	C	S	S	C	S	C	C	S	S	C	S	C	S	C	S	C	S	C	S	C	S	C	S		
Duty No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	1	2	3	4	5	6
Checked by		C	S	C	K								C	U	C	C	C			BK	EA		EA	A	A	B	B	B
Daily	P	P	C	S	A	SA	Not-Making						TD	TD	TD	SA												
Weekly	Mon.															SA												
	Tues.																											
	Wed.																											
	Thurs.																											
	Fri.															SA												
	Sat.																											
	Sun.																											
Monthly	1																											
	2															SPA												
	3																											
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January 1																												
April 1																												
July 1																												
October 1																												

- INDEX.—  
 Auditor ----- A  
 Book-keepers ----- BK  
 Cashier ----- C  
 Cashier Asst. to ----- AC  
 Dispatcher ----- TD  
 Express Accountant ----- EA  
 Purchasing Agt. Secy. to ----- SPA  
 Porter ----- P  
 Station Agent ----- SA  
 Ticket Accountant ----- TA

- NOTE.—  
 (1) Balances against 43 B & within itself.  
 (2) Abstracted from # 203  
 (3) No list made, mailed monthly to issuing authority.  
 (4) Balances against Ledger a/c.  
 (5) Special as President requires, etc.

Electric Ry. Journal

Chart of Duties of Employees in Auditor's Office, Indianapolis & Cincinnati Traction Company

of the latter, become again in part the raw material for the executive, whose finished product is a system with each department attuned to a high degree of productive efficiency, and each grand division of his forces properly aligned under the general scheme with every other grand division, the net result being an easily handled, well-balanced, forceful, result-producing organization.

To produce in the accounting department definite results at definite periods (daily, weekly, monthly or yearly), some

localizing of responsibility in this manner is usually followed by a very decided increase in output per clerical unit.

Second.—In case of long absence or disability of the department head, there is at hand a means of ready reference and positive information for the guidance of the official detailed to supply his place. If the sections of the chart are covered with a thin sheet of glass the duties may be checked off as completed by dotting the glass lightly with ink over the indicated squares, thus giving a correct and complete record of the work day by day—a record quickly available for the acting department head, the executive, or other interested parties whose work may depend in a greater or less degree on the completion of the work of the department under consideration.

Third (and not of least importance).—The executive whose chief accounting officer has successfully charted his office routine, proving his work by actual results, may rest assured that that accounting officer knows thoroughly the work of his department, where and by whom it is being done, for a very perfect knowledge of the work in complete detail is necessary to the successful construction of a working chart of this kind.

This method of recording routine is adapted not only to the accounting department, but lends itself readily as well to any place where like duties re-occur at approximately fixed intervals of time, and it was this feature, coupled with the thought that it might possibly be applied in other branches of our work, and thus be of some general interest, that first prompted its presentation.

In conclusion, it may be taken without question that the larger properties are provided with carefully planned schedules, the proposition with them being how best to prepare and present these schedules to those members of their forces affected.

The smaller properties are frequently without these helps, but the writer believes that no property is too small to use some plan for outlining definitely the routine of its accounting force, to bring clearly and at fixed times before the mind of the employee charged with many and frequently differing lines of work the thing which at that fixed time requires immediate attention, and which in the stress of the day's routine and under the distracting influence of widely dissimilar duties, unless so reminded, is certain at some time to be forgotten, with results sometimes disastrous to himself and always annoying to his superiors.

It would seem, therefore, that a closely organized working force, with a definite schedule of duties, the latter so built as to admit of quick and easy change, is a desideratum, even a necessity, to economical and effective accounting work.

## THE PIECE WORK SYSTEM\*

BY J. A. GOHEN

Piece work if properly conducted makes better and more diligent workmen than day work. All the average day worker seems to consider is that the company has agreed to pay him so much per hour for so many hours per day whether he does or does not give them a commensurate return for the money they pay him. It is no concern of his if the company has lost by such an agreement. He has no incentive to work harder for the company or to increase his efficiency, for he believes, and often rightly, that extra effort will bring him no additional recompense. There are, of course, exceptions. Some men are honest, careful of the company's material and tools, ever watchful of its interests and put in all their time in an earnest endeavor to help the company, but being classed the same in mechanical ability, they receive the same rate of pay as the other men under the day-work system. The diligent, capable man after a time observes that he is doing more work, or better work, than his fellow-workman, and not getting one penny more. The result is that there being no incentive to continue to work for the company's interest, he becomes careless and improvident and is sooner or later dragged down to the level of his inferior companions.

\*Abstract of a paper read before the Central Electric Railway Association, Ft. Wayne, Ind., June 3, 1909.

Under the piece-work system he becomes a copartner of his employer and is remunerated for any or all increased efforts on his part. There is an incentive to make more money by diligence and increased effort. By so doing the workman makes more money for his employer, and, therefore, is more valuable. The careless, indifferent workman on the day-work plan, if placed on piece work, soon finds the diligent, energetic man distancing him in earnings and realizing the situation, immediately tries to be his equal; the result is that two indifferent workmen under the day-work plan have been converted into two capable and valuable men under piece work.

About a year ago the Cleveland, Cincinnati, Chicago & St. Louis Railroad instituted piece work at its Cincinnati terminal for cleaning, icing and watering coaches. The writer happened to be there one morning talking to the foreman. Directly opposite his office was a storeroom for the commissary department of the dining-car service, with a driveway just about wide enough to admit a horse and wagon backed up to the storeroom. A man who iced the coaches had passed through this driveway to the ice house with a wheelbarrow for ice. While getting his supply a wagon backed in to the storeroom with supplies. When the man came back he found his way blocked. He quickly gathered two boards which he had placed conveniently for the purpose, and passing around the storeroom, used the boards for inclines to cross a number of intervening tracks to get to the coaches. If he had worked on a day rate he would probably have waited at that passageway until the wagon was unloaded if it took half an hour and let the ice melt in the sun, claiming it would be impossible to cross the tracks with a load of ice. But he was not getting pay for loafing under the piece-work system. Can any deduction be drawn from this incident? The saving of the ice from melting is but illustrative of greater savings under a piece-work system.

B. D. Lockwood, mechanical engineer of the Cleveland, Cincinnati, Chicago & St. Louis Railroad, when asked how piece work affected the output of the company's shops, replied:

"Under day work we did not get more than 35 per cent of the efficiency of all machines and we now get 65 per cent under piece work. Allowing for increased repairs incidental to piece work, we think it will net us 60 per cent of the possible maximum efficiency. It does not require any more fuel to develop power to operate machinery at a maximum than a minimum efficiency, for provision must be made for the maximum output at all times. Therefore there is a saving in fuel when 60 per cent or 65 per cent efficiency is obtained from machinery instead of 35 per cent. A large plant will not require so many duplicate lathes and planers when the output of each one is nearly doubled. Under piece work fixed charges, such as interest on investment, taxes and insurance are the same as under day work. Doubling the efficiency of the machinery with little, if any, increase in expense will certainly help to pay your fixed charges. A peculiar feature developed at the Beech Grove shops of the Big Four after the introduction of piece work. Previous to this time no complaint was ever registered by any of the machine hands in regard to a surplus of material in either iron or brass castings that had to be turned, slotted or planed, but it was only a short time until the lathe men complained of this excess in packing-ring cylinders, driving boxes and all other castings, both iron and brass. Now the pattern shop is unusually busy in reducing the superficial area of all such patterns. This will result in quite a saving in the cost of rough castings; also a reduction in the amount of scrap borings and turnings."

Should any electric railway company determine to introduce piece work it should be fair and just with the employees. Try to divide the additional profit which must surely ensue from a practical and well defined system of co-partnership of capital and labor. Do not be precipitate in formulating a schedule of prices. Do not get them so high that they will have to be generally reduced nor so low that the workman will not be amply repaid for any increase in his diligence and ingenuity. Above all things after a schedule of prices that is fair to both sides has been established do not place any limit on the earnings of any workman. Let him earn all he can if there is work to keep him busy. The more he earns, the more

the company will make from his efforts. It may develop that some of the workmen could earn nearly twice as much as others if allowed to do so. Do not jump to the conclusion that such men are making too much money. They have more brain and more muscle than the other men. Remember that the company's savings are in direct proportion to the increased earnings of the men.

If the introduction of piece work is contemplated quietly and without the knowledge of the workman, who is on day work, keep a correct record of the time it takes him to do a specified job. Do this a number of times, then strike a general average and find what this particular job is costing. If a number of men are on the same kind of work, find the average cost of all the output.

After the average cost under day work has been ascertained deduct 40 per cent of the time required under day work and add 40 per cent to the price per hour paid for the labor. For example, if it has taken 10 hours to do a specified job at 25 cents per hour, that job costs \$2.50. Deducting 40 per cent of the time required under day work gives six hours as the time required under piece work. Add 40 per cent to the rate of 25 cents per hour, making the rate 35 cents per hour.

Six hours at 35 cents equals \$2.15, and 10 hours at 35 cents equals \$3.50. The result is that the job is done for \$2.15 which formerly cost on day work \$2.50, and the workman gets \$3.50 for 10 hours instead of \$2.50. These prices are so nearly just that as good work can be expected and exacted under a piece-work system as under day work, and the workmen will soon appreciate it. If they are made to work unnecessarily hard to earn such an increase they will soon learn to slight the work, and trouble will follow.

Start right with the confidence of the men as to the company's honesty of purpose in improving their interests, as well as the company's, and piece work will undoubtedly prove practical and profitable. It will build up a force of intelligent, diligent and independent workmen.

### MUNICIPAL ELECTRIC RAILWAY SYSTEM OF DURBAN, SOUTH AFRICA

Some interesting facts concerning the municipal electric railway at Durban, Natal, South Africa, are contained in a recent report to the Department of Labor and Commerce at Washington, D. C., by Edwin S. Cunningham, Consul at Durban. The municipality of Durban acquired the street railway system in 1901 and immediately extended it to 30 miles of track and converted the horse-car system to an electric railway. No power station was built, however, current being supplied by the municipal electric lighting plant, which represents a total investment of \$1,356,626. The street railway operates 64 cars, mostly double deck, six of which were bought in the United States. All except 11 of the cars are equipped with motors purchased from the General Electric Company, Schenectady, N. Y. The total investment in the railway system is \$1,996,369.

The cars are operated from a common center and the lines are divided into 2-mile fare zones, the first zone being 2 miles from the common center. The second zone usually is somewhat short of 2 miles, but the fare is the same for each zone; that is, 4 cents cash or 3 cents by ticket. During the year ended June 30, 1908, 12,688,800 passengers were carried, or 9.77 per car-mile, and they paid an average fare of 3.42 cents each. The gross receipts of the company for the year ended June 30, 1908, were \$437,369, of which \$256,682, or 58.68 per cent, was paid for operating expenses; \$80,686 for interest on bonded debt; \$12,847 was added to the sinking fund; \$53,344 was charged to the depreciation account and \$2,710 to accident insurance and other funds, leaving a balance of \$31,127. Motormen and conductors are paid a flat wage of \$17.50 per week.

### ORGANIZATION OF THE PACIFIC CLAIM AGENTS' ASSOCIATION

A large and enthusiastic meeting of the claim agents of the electric and steam railroad companies of the Pacific Coast States was held at the Oregon Hotel, Portland, Ore., May 22, and resulted in the organization of the Pacific Claim Agents' Association. The representatives of electric railway companies in attendance included Thomas A. Cole, Los Angeles Railway and Los Angeles & Redondo Railway Company, Los Angeles, Cal.; E. H. Odell, Tacoma Railway & Power Company, Tacoma, Wash.; Geo. Carson, Seattle Electric Company, Seattle, Wash.; H. L. Bleecker, Washington Water Power Company, Spokane, Wash.; J. H. Handlon, United Railroads of San Francisco, Cal.; Geo. D. O'Conner, Walla Walla Valley Traction Company, Walla Walla, Wash.; H. G. Fleischhauer, Vancouver Traction Company, Vancouver, Wash.; A. E. Beck, British Columbia Electric Railway Company, Vancouver, B. C.; T. G. Newman, Bellingham, Wash.; J. L. Lambirth, Portland & Eugene Electric Company, Portland, Ore.; F. I. Buller, C. J. Franklin, O. B. Coldwell, F. F. Barbour, R. E. Edwards and B. F. Boynton, Portland Railway, Light & Power Company, Portland, Ore. In addition, the Northern Pacific, Southern Pacific, Oregon Railway & Navigation Company and other steam railroad companies were represented. Letters expressing interest in the meeting were received from most of the other principal roads on the Pacific Coast.

The officers elected for the ensuing year are as follows: President, B. F. Boynton, Portland Railway, Light & Power Company, Portland, Ore.; first vice-president, A. M. Lee, Northern Pacific Railway, Seattle, Wash.; second vice-president, J. N. Hone, Spokane Inland Empire Company, Spokane, Wash.; third vice-president, T. A. Cole, Los Angeles Railway and Los Angeles & Redondo Railway Company, Los Angeles, Cal.; secretary and treasurer, Mrs. I. P. Newel, Portland Railway, Light & Power Company, Portland, Ore. The executive committee consists of Chairman G. N. Smith, O., R. & N. and S. P. Co., Portland, Ore.; J. H. Handlon, United Railroads of San Francisco, Cal.; John Ferrin, Oakland Traction Company, Oakland, Cal.; A. E. Beck, British Columbia Electric Railway Company, Ltd., Vancouver, B. C.; Geo. Carson, Seattle Electric Company, Seattle, Wash., and H. L. Bleecker, Washington Water Power Company, Spokane, Wash.

On the arrival of the delegates at the Oregon Hotel they were given an informal address of welcome by F. I. Fuller, vice-president of the Portland Railway, Light & Power Company. They then proceeded to the convention hall, where they were formally welcomed by F. F. Barbour, assistant to the president. The organization went into session at 10 a. m., and completed its labors at about 10 p. m. of the same day.

The following morning, Sunday, the visitors were taken in the observation car of the Portland Railway, Light & Power Company, and were shown the city, including the famous Portland Heights trip. Through the kindness of Mr Hutchings, who is building the floats for the Rose Festival, the visitors were permitted to enter the buildings and the floats were lighted up for their entertainment. In the afternoon the visitors inspected the Cazadero power plant, and had dinner at the Hotel Estacata.

There are 54,540 stockholders of the Pennsylvania Railroad Company, of whom 47.96 per cent are women. Nearly 20 per cent of the stock is held abroad.

## CHICAGO TRACTION DEVELOPMENT

At a joint meeting of the electrical section of the Western Society of Engineers and the Chicago section of the American Institute of Electrical Engineers, held on May 28, B. J. Arnold, Harvey B. Fleming and George Weston, of the Board of Supervising Engineers of Chicago Traction, presented the latest developments in the great work of rehabilitating the surface railways of Chicago. W. L. Abbott, chief engineer of the Commonwealth Edison Company, and W. B. Jackson, consulting engineer, presided jointly.

Mr. Arnold first outlined the steps that led to the ordinances of 1907, by which the roads are being rebuilt under the guidance of the Board of Supervising Engineers. Previous to the ratification of the ordinances by the voters of Chicago a valuation board under Mr. Arnold had appraised the physical properties of the Chicago City Railway Company and the Chicago Union Traction Company at \$52,000,000, with pavement, and \$47,000,000 without pavement. As a result of a controversy between the two railways on one side and the city on the other as to the propriety of including the value of the pavement, the total value of the two properties later was assumed as \$50,000,000, and on this basis the ordinance provisions were founded.

By the acceptance of the ordinances of 1907 the two railroad companies agreed to rehabilitate their properties and to furnish the money therefor. To date the rehabilitation work for the two properties has cost about \$30,000,000, and the final amount probably will total \$40,000,000, but this figure cannot definitely be stated until a decision is made as to whether large new generating stations shall be built.

According to the ordinances, the city may, on six months' notice, purchase the properties at the valuation, plus the rehabilitation costs as certified to by the Board of Supervising Engineers. A renewal and depreciation fund of 8 per cent of the gross receipts of each month is set aside to guarantee the up-keep of the property to 85 per cent condition. The ordinance provides that out of gross receipts shall come the operating expenses, the renewal fund of 8 per cent and 5 per cent interest on the capital invested at the time of signing the ordinance, and then the balance shall be divided, 55 per cent to the city and 45 per cent to the company. This feature of dividing the profits required that some one should assume the supervision of the rehabilitation work and the books of the railways, and therefore the Board of Supervising Engineers was created. This board has a staff of auditors who have laid down a system of bookkeeping for the roads and a staff of engineers and inspectors who carefully supervise the construction work as carried on. Through these two independent organizations the city is assured of accuracy in the performance of the work.

Harvey B. Fleming, chief engineer, Chicago City Railway Company, presented a paper on "Street Railway Car House Design," which will be found elsewhere. Mr. Fleming is the member of the Board of Supervising Engineers representing the Chicago City Railway. John Z. Murphy, chief engineer, Chicago Railways Company, and member of the Board of Supervising Engineers, was not present, but Mr. Abbott spoke in tribute to the excellent record which Mr. Murphy had made in handling the present reconstruction, and also complimented him for his resourcefulness in keeping the equipment of the underlying companies in good condition prior to the acceptance of the ordinance, when

financial affairs were very unsettled and when, as Mr. Abbott stated, any other man would have called upon the receivers for considerable more help.

George Weston, assistant chief engineer, Board of Supervising Engineers, presented a brief outline of the rehabilitation ordinance requirements and outlined the organization of the Board of Supervising Engineers. Among other things, Mr. Weston stated that there were 137 employees on the staff of the board, which had in charge work distributed over 651 miles of city track in Chicago, 213 miles of which were being rehabilitated. Sixty-five miles of new extensions are being constructed, and to date 132 special track work layouts have been installed at different locations, not including nearly 100 crossovers. All curves are built for complete clearance of the large pay-as-you-enter cars.

The discussion of the subject of the evening was opened by B. I. Budd, general manager, Metropolitan West Side Elevated Railroad, who, when called upon, asked whether the forthcoming large increase in the number of cars operated would not bring about additional congestion in the loop district. He had noted that as more cars were added to the various routes, additional time was lost at the downtown terminals, and therefore he inquired whether the track capacity downtown had not nearly been reached, and what plans had been made to relieve the congestion caused by the operation of the large amount of new equipment prior to the building of subways.

Mr. Arnold replied that, according to the plans of the board, when all the tracks in the downtown district were reconstructed the congestion would be relieved by through routing a large number of the cars that now turn on loops, downtown. The board held that an equal number of cars from each company should be shuttled from one end of the city to the other, and thus the carrying capacity of the tracks increased. Single cars were now operated in place of two-car trains. This relieved congestion. Also the improvement in the motor equipment of the cars and the power distribution had brought about an increase of 11 per cent in the speed. When political and financial affairs were adjusted it was hoped that subways would be built, and even then the transportation companies of the city would need all the space below, on and above the downtown streets.

When questioned, Mr. Arnold stated that during the past two years the partnership ordinances had resulted in the companies paying the city about \$3,000,000. This was approximately 8 per cent of the gross receipts. Before the ordinances were passed representatives of the city argued that the ordinances should require that the companies pay 10 per cent of their gross receipts to the city, but Mr. Arnold had maintained that under such conditions the railroads would not be able to give the best service, and so the ordinance provided that 55 per cent of the net receipts should go to the city and 45 per cent to the companies. Mr. Arnold also stated that in valuation work there was an undecided question of what should be done with promotion and development expenses. While not making a definite statement, he held the opinion tentatively that such expenses which had to do with the creation of the property should be put into a special account and charged off within a fixed period of years, so that the capital would not have to carry the load. This was a question, however, that must be settled shortly, because of the valuation work at hand in New York, Detroit, San Francisco and elsewhere.

## STREET RAILWAY CAR HOUSE DESIGN AND OPERATION\*

BY H. B. FLEMING, CHIEF ENGINEER, CHICAGO CITY RAILWAY

I only hope at the present time to call your attention to certain phases of the subject of street railway car house design and operation which are new, and which I think will be of interest to you. In case any of you desire to read up on this question, I would call your attention to the report of the committee on operating and storage car house design, published in the *ELECTRIC RAILWAY JOURNAL* Oct. 17, 1908, which report very fully covers the principal problems entering into the design of car houses.

### LOCATION

In selecting a location for a car house the points to be considered are:

- (1) Provision for future requirements.
- (2) Convenience and economy of operation; i. e., minimizing of dead mileage and maintenance.
- (3) Fire risk—location with reference to other buildings.
- (4) Economy of construction.
- (5) Facilities for drainage and sewerage, especially if pits are used.
- (6) Room for proper layout of tracks and extensions.

### DESIGN

The Board of Supervising Engineers in considering the question of car house design reached the following conclusions:

- (1) All car houses that are to be permanent should be divided into bays or sections so as to reduce the loss in case of fire to a minimum.
- (2) New car houses to be built should also be divided into bays or sections and should be of fireproof construction.
- (3) Where any old car houses are to be remodeled in such a manner as to become permanent structures, involving the expenditure of considerable money, that such buildings should be fireproof.
- (4) Where it is necessary to remodel old car houses in order to accommodate the large modern cars temporarily, and which would probably be abandoned in the near future, that such modifications should be made with as little expense as would make them reasonably safe for the storage of property contained in them, and that they should be abandoned and new fireproof car houses built at the proper time at the same or more desirable locations.
- (5) Wherever conditions will permit, the car houses to be of the double-ended type.

The latest approved design of car houses conforms with the above general requirements, and I wish to call your attention to their various features.

### ACCOMMODATIONS FOR MEN

Ample accommodations have been provided for the office of the division superintendents, clerks and trainmen, and in addition, a club room, coat room and reading room is furnished for the use of the employees assigned to duty at the division of which the car house in question is the headquarters. The club room is furnished with pool and billiard tables, chess and card tables, and a small amount of gymnasium apparatus and a stage. These rooms are open to employees at all times, and they are given the privilege of holding various entertainments in them. A small library is kept in sectional book cases along the walls of the reading room, and on the tables are current issues of daily papers and some of the technical journals.

Special attention has been paid to providing toilet facilities for all of the car house employees, and in addition, the repairmen are provided with locker rooms and lunch rooms.

### CAR STORAGE SECTIONS

Each bay or section is independent of all the others, and all openings between sections are provided with double automatic steel fire doors. Each bay is approximately 490 ft. long and 38 ft. wide, and contains three tracks, with a capacity of 30 standard double-truck cars.

Each track is divided into three sections; the middle section having a pit to permit of ready inspection and repair of the trucks, motors and car equipment suspended underneath the body.

The fire-walls of each bay are of brick, 12 in. thick, spanned by reinforced-concrete girders spaced 16 ft. centers and 18 ft. in the clear, and covered with a reinforced-concrete slab 4½ in. thick, cast in one piece over the entire roof. The middle 8-ft. section of the roof of each bay, except at the end panels, is covered with fireproof skylights for lighting and ventilation. The ends of each bay are provided with galvanized steel rolling doors.

The tracks in the bays are connected with the main line in the street by curves at each end, or, in other words, the car house is of the double-ended type, so that the cars can come in at one end, be washed and fumigated, passed over the pits, inspected and repaired, and thence moved on to the other end of the car house ready to go in service again, without any switching or reverse movement after the process is once started.

### REPAIR SECTION

Every car house is provided with one section which is known as the repair section, where special provisions have been made and special machinery installed for the economical handling and repairing of cars.

By the use of overhead traveling cranes we are enabled to shift our standard double-truck car bodies from one pair of trucks to another pair in less than three minutes. These cranes are also very useful in the truck repair section. In addition to the above, each repair section is provided with the following tools:

- 1 motor-driven lathe.
- 1 motor-driven drill.
- 1 motor-driven emery stone with 48-in. grindstone.
- 1 portable beam for swinging armatures into lathe with triplex chain block.
- Assortment of drills.
- Assortment of wrenches.
- 1 mandrel and 40-in. forge.
- 2 vises.
- 1 carpenter bench.
- 1 pipefitter's bench.
- 1 6-ft. face plate.
- Assortment of sledgehammers and hand hammers, cutting chisels, drifts and jacks.

Only certain classes of work are handled in the car houses. Whenever cars require general overhauling or repairing they are sent to the main shops.

### LIGHTING AND WIRING

All light and power wires are installed in conduit and according to the requirements of the National Board of Fire Underwriters. The general lighting is accomplished by means of arc lamps, five in series on a 500-volt circuit. The lights are staggered in the various bays so as to provide general lighting between the rows of cars. Lighting in the pits is obtained by the use of incandescent lamps on the 500-volt circuit, special arrangements having been made for pit lighting in order to reduce the load to a minimum and yet provide the lights needed by the inspectors and repairmen.

The power supply for the building is controlled from what is known as the switch room. The power supplies for each bay and for the trolley wire leading from the bay to the street are also controlled from this switch room so that in case of fire in any one section the power can be cut off without interfering with the supply in the other sections, which would prevent the removal of cars from the danger zone.

This switch room has direct connection with the street so that it would not be necessary for the operator to go through a burning section to pull the desired switch.

The buildings are heated by direct radiation and in most of the buildings the vacuum system has been installed. In the original installation it was considered necessary to provide overhead coils in the vicinity of the skylights, but experience has proved that the bays can be properly heated by locating the coils only in the pits and on the sidewalls in the immediate vicinity of the end doors. The stacks in connection with the heating plants are of the reinforced concrete type.

\*Abstract of paper presented at a joint meeting of Western Society of Engineers and the Chicago Section A. I. E. E., Chicago, May 28, 1908.

Each division car house is provided with quarters for the following utilities:

- Wreck and trouble wagons.
- Track department section house and tool room.
- Dry sand storage.
- Salt storage.
- Storage of summer and winter equipment, such as storm windows, screens, etc.
- Stock room containing material and supplies required for the car-house maintenance work.
- Advertising room.

#### INSURANCE

In the design briefly described above special attention has been given to protection against loss by fire and the results obtained have been very satisfactory, as you will note from the following:

#### COMPARISON STATEMENT—FIRE INSURANCE

	Premium	Rate
Total insurance (1906) .. \$6,441,869	\$64,418.60	\$1.00
Total insurance (1906) .. 7,432,413	61,024.40	.82
Total insurance (1907) .. 9,660,000	65,688.00	.68
Total insurance (1908) .. 9,775,000	58,650.00	.60
Total insurance (1909) .. 10,300,000	51,500.00	.50
Increased insurance (1909), \$525,000; decreased premium, \$7,150.		

### CAMPAIGN AGAINST ACCIDENTS IN CHICAGO

Under the personal direction of its president, John M. Roach, the Chicago Railways Company has started an educational campaign for the purpose of decreasing accidents on its lines. The campaign will be carried on principally by means of a series of "caution bulletins" which are to be posted conspicuously in each end of all of the cars operated by the company. These bulletins will be directed to the public and will state briefly how dangerous accidents may occur and how they may be avoided. Several of the bulletins will be illustrated by large drawings calling attention to the accidents that are most common to passengers in getting on and off cars. The first bulletin posted was devoted to a few of the many "don'ts" with which it is especially desired that the patrons of the railway should become familiar. The text of this bulletin was as follows:

#### HELP US TO AVOID ACCIDENTS

Don't cross tracks without looking both ways for approaching cars.

Don't get caught in the narrow space between two tracks when cars are passing.

Don't fail when leaving a car to look up and down the street for an approaching automobile or other vehicle which may run you down.

Don't jump on or off a car while it is in motion.

Don't ride on car steps.

Don't get off facing rear of car.

Don't cross opposite track after leaving a car without looking for a car or vehicle which may be approaching from another direction.

Don't run after a car and jump on it while it is going at full speed.

Don't let your children play near street-car tracks.

The second bulletin is reproduced in the accompanying engraving.

The educational campaign will also reach the operating department of the company. It is proposed to educate the employees who have charge of the operation of cars so that at all times they will carefully look after the interests of passengers boarding or alighting from cars. This campaign will include lectures by the representatives of the various departments into which the railway organization is divided. As soon as the company's new car barn and depot at the "Limits" on the north side is completed, lectures on accidents will be given periodically for the benefit of the motormen and the conductors.

The campaign as outlined by the company is similar to that begun by some of the large city railway systems in the East, but the plan will be enlarged upon and it is expected later to use large display advertisements in the daily papers to keep the subject of accidents and the way to prevent them constantly before the public. On May 26, 1909, the following bulletin on accidents was sent to every motorman and conductor in the company's employ:

#### ACCIDENTS

A vigorous campaign against accidents has been started by the Chicago Railways Company. One feature will be the education of the public—men and women who ride on cars, who cross the streets without keeping a sharp lookout, and parents who carelessly permit their children to make a playground of the streets. But while many accidents are unquestionably due to the carelessness of the public, trainmen also must do their part in the campaign. Theirs is a great responsibility.

Constant care, concentration of your mind on your work, a sense of your responsibility to the company and, above all, a high regard for human life and limb and a strong feeling of humanity are essential on your part. We believe unquestionably our trainmen are humane men. They are undoubtedly deeply distressed whenever they are responsible for a dangerous accident. But being sorry is useless when it is all over. It will not restore a human life or mend broken bones.

#### TO MOTORMEN

The motorman's mind must be constantly concentrated on the movement of his car and his surroundings. You perhaps are a motorman on one of the big cars on Madison Street or Clark, or Van Buren, or Blue Island Avenue or some other line, or you may be taking the car through the down-town district. Don't let the monotony of the position

**NEVER TRY TO BOARD OR LEAVE A CAR  
WHILE IT IS IN MOTION.**



**You may be in a hurry, but a little caution  
is better than a dangerous accident.**

**Don't risk your life or limbs.**

**HELP US TO AVOID ACCIDENTS.**

CAUTION BULLETIN No. 2.

**CHICAGO RAILWAYS CO.**

#### Caution Bulletin Placed in All Cars

make your mind a semi-blank. Keep your wits about you. Think of nothing but your car, the team on the track ahead of you or the one about to pull in at the next street crossing. Watch out for that woman who apparently is about to run across the track, or that little boy who is playing heedlessly in the street. You may have a wife or children of your own and they may be exposed some day to the same danger. Above all, strictly obey the rule against talking to passengers. You can't talk and keep your mind on your work at the same time. That's one of the frequent causes of accidents.

Ring your gong when passing a standing car or one that is slowing up to make a stop for the discharge of passengers. Ring the gong at all street intersections and keep a sharp lookout for pedestrians and vehicles. Run slowly in dangerous places.

Reduce your speed in time to prevent a rear-end collision with a wagon or another car on the track ahead. Never move your car without a signal from your conductor.

Don't run your cars at too great speed past vehicles which are in motion and which may deviate in their course when the car is about to pass just enough to catch a passenger who may be standing on the footboard.

#### TO CONDUCTORS

People have no business jumping on or leaving a car while it is in motion, but you must make every effort to prevent their doing so before you give the signal to go ahead. It takes but an instant to look along the side of the car just before you give the go-ahead signal to see if some belated woman with parcels, or perhaps a cripple, is hurrying to the entrance. Never let a passenger jump from the rear end of the car while it is in motion if you possibly can avoid it. Don't be too quick with your bell. It is desirable to expedite the business of the company, but not to the danger of passengers entrusted to your charge.

On the other hand, it may be that you don't always give the signal to stop quick enough. As a result the motor-man may run past the stopping place. In this case don't let the passenger jump off until the next corner is reached. Impress upon him that it is dangerous. With the new pay-as-you-enter cars the rear-end or platform accidents should be entirely eliminated. Children never should be permitted to ride on the rear platform; neither should a person under the influence of liquor.

With the new, up-to-date equipment on most of the lines of the Chicago Railways Company there is no reason why the accident percentage should be greatly reduced. On a system with the finest cars that can be obtained, the best motors, controllers, air-brakes, sanders, etc., all of which are kept in first-class condition, with good power, good roadbed and track and splendid overhead construction which does away with practically all the petty annoyances that the trainmen at one time had to put up with, our conductors and motormen should be in a frame of mind that calls for the steadfast application of their work that ought to insure the operation of cars with but few accidents. Avoid any appearance even of carelessness, recklessness or inattention to your duty.

It has been announced that hereafter all trainmen shall be at least 30 years old before they are placed in charge of a car on this company's lines.

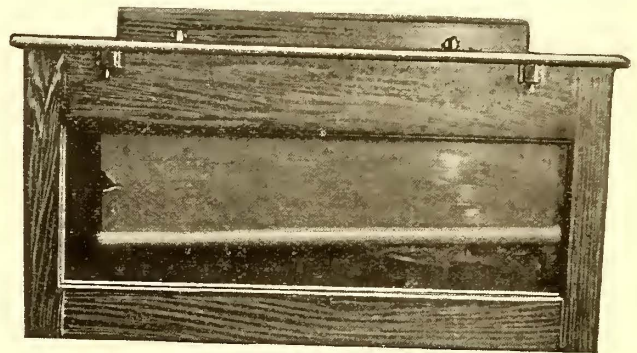
Edward Hungerford has contributed to the June *Outing* an article entitled "The Fellows Out Upon the Line," which has for its subject trainmen, engineers, firemen, track walkers and others who are directly concerned with the operation of trains. While it is distinctly a popular story, the article contains a number of features of general interest, and is remarkably well illustrated, the photographs having been taken by D. F. Urquhart, Jr. Mr. Hungerford says that one man in every 12 is on the payroll of a railroad, and that 96 per cent of these men are engaged in maintaining and operating the lines. He has divided his article under the following heads: "What is Required of Railroad Men?" "How Promotion Comes," "The Brakeman and the Trainman," "The Conductor," "Other Men of the Passenger Crew," "Service in the Railroad Outposts and the Station Agent," and has told under each of these headings what the duties of the men holding the posts are, and how the maintenance of schedules and avoidance of accidents are dependent upon the care which they exercise in performing their various functions.

The libel suit brought by John E. Carroll, of Philadelphia, against F. R. Low, senior editor of *Power*, was tried before a Philadelphia grand jury on May 13 and the editor was acquitted, the judge instructing the jury to find for the defendant. Carroll, it will be remembered, is the inventor of the CO<sub>2</sub> motor, which was described in *Power* for September, 1907, as being a "mechanical fake." Carroll himself is to be tried on several counts for obtaining money under false pretenses.

## BOSTON ELEVATED RAILWAY COMPANY TRACK MAINTENANCE

Track maintenance of the surface lines of the Boston Elevated Railway Company is carried on by the road department under the general direction of a superintendent of tracks reporting to the vice-president. Plans for other than routine work in the department are prepared under the direction of the civil engineer, bureau of surface lines, and executed under the supervision of the superintendent of tracks. The number of men employed from time to time in the track department varies greatly. On large construction jobs it is sometimes necessary to employ 1000 to 1500 men. The nucleus of the track maintenance work, however, is a force of regular men attached to each of the company's surface line divisions, with the exception of the district in the business center of Boston. This district, officially known as Division 8, is maintained by the force with headquarters at the track department yards at Dorchester Avenue, South Boston. The size of the track maintenance forces varies according to the mileage and conditions in the different divisions, a fair average being 30 men per division, each division crew being under the immediate direction of a division track master responsible to the superintendent of the division, who is, in turn, responsible to the superintendent of tracks.

The work of the track department is confined mainly to the open season between April and December, only the



Case and Roller for Holding Blue Prints

most urgent repairs being made during the winter. The tracks in each division are subject to frequent inspection by the track master, and, at least once each month, the division superintendent, accompanied by the track master, makes an inspection of all track under his supervision and makes written report to the superintendent of tracks.

At the Dorchester Avenue headquarters a large storage space is maintained by the company for rails, ties, plates, sand and other supplies, and a number of the company's stables are also located here. The machine work of the track department is handled by a shop in this yard. The tools are group driven by a 50-hp, 500-volt direct-current motor through line shafting. The principal tools of the shop are a Loring rail bender, separately driven by a 50-hp, 500-volt direct-current motor; a saw sharpener; Newton self-feeding rail saw; two grinder saws; emery wheel and two drill presses. The motors are boxed in to protect them against dust and metal particles, and the wiring is run in iron conduit. The saw sharpener is illustrated in the accompanying photograph. This consists of an emery wheel mounted in bearings on a shelf and belt-driven by the main motor countershaft. The saws used are 32 in. in diameter, and in the sharpener there is room

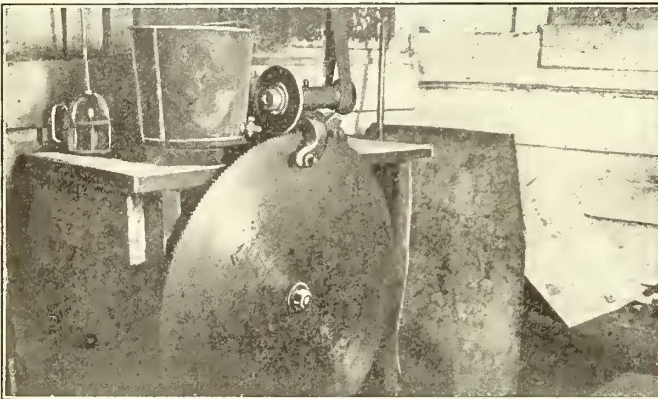
to place the saw close to the bench and out of the way when operating the emery wheel. A special arm and set screw are provided to keep the alignment correct, and at the side of the machine is a hand lever which advances the saw forward one tooth at a time when moved. A pawl is provided to keep the saw from slipping backward. At the side of the tool a pail is set up with a small faucet outlet, from which water is dropped upon the teeth of the saw to maintain the temper of the steel, which otherwise would be lost, due to the heating caused by the process of sharpening.

The rail bender consists of a table across which the rail to be curved is fed by hand, there being two posts against which the rail is set while it receives the thrust of a head driven by gearing from the motor. The travel of the head is regulated and adjusted by a hand wheel and screw mounted centrally in the machine at its end. Rollers are provided on each side of the table to facilitate moving the rail across the face of the machine. From the bender each rail is fed out on a pair of wooden horses fitted with rollers on their tops. After the rails have been

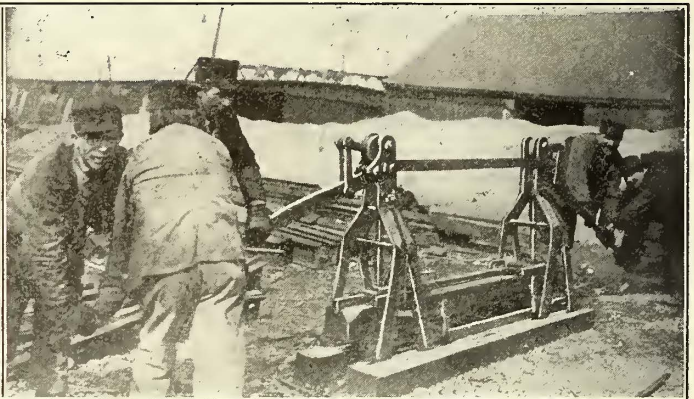
any print desired in front of the observer, and a 32-cp incandescent lamp hung in front of the glass facilitates reading the drawings. By this means the standard drawings are consulted quickly, and at the same time are maintained in first-class condition.

The principal work done in the Dorchester Avenue shops consists of bending rails for new and old track, sawing rails for all purposes, repairing frogs and switches by utilizing short sections of old rail when possible, drilling for bonding, and maintaining ties and bonds. The tie treating plant is located at East Cambridge power station yard.

One of the most convenient tools at the Dorchester Avenue shops is a tie plater, shown in the accompanying photograph. This has a capacity for applying plates to about 220 ties per day, including handling. It consists of a pair of A-frames located above a level bed on which the tie is placed to receive the two plates. A gage of wrought iron is set upon each tie, and the tie is carried on the table, while the tie plates are slipped into position in exactly the right place through a rectangular enclosure



Rail Saw Grinding Machine



Tie Plating Device in Storage Yard

formed they are hauled away by horses to the yard storage, or else transported directly by teams or service cars to the point where they are to be used.

In connection with the rail bending a template rack has been provided in the shop. This rack or cabinet is 30 ft. long, 8 ft. high and 2 ft. deep. It is equipped with sliding doors and  $\frac{3}{4}$ -in. pine pins 12 in. long and located  $2\frac{1}{2}$  in. apart vertically. The templates used are each 15 ft. long, and are made of white pine varnished. They are carried in the rack on five pins each. At the end of the rack is a list of curve radii corresponding to the templates stored in the rack, and in addition each template is marked with its radius, one curve being formed on each side of the template. The templates range in radius from 25 ft. to 1200 ft., larger or intermediate curves being measured by chords struck on the rail as it goes through the bender. The sizes are more numerous and closer together in the smaller ranges. The accuracy of the bending and speed of production have been increased by the use of the templates.

Another convenience at the shop is a blue print roller rack. This is about 4 ft. long, 2 ft. high and 6 in. deep, with a glass front and hinged door. Inside are two 2-in. rollers held 14 in. apart on centers. One roller is held by a spring and finger from slipping when set in any position, and the case is used for the display of the transition curve prints made by the engineering department which are used in the regular practice of the shop. By means of a handle at the side the rollers may be turned to bring

at each end of the template. Pressure is then applied through a plate and lever rod at each end of the tie by the use of two levers about 6 ft. long, which are hand operated and which give the necessary pressure by a combined link and eccentric motion. The tie plates are firmly forced into the tie by this means, without hammering. The machine is operated by five men, one setting the gage on the tie and placing the tie plate in the gage, making the connections fast, etc., and the others working in pairs on the lever arms at the end of the machine. Two rollers are provided on the machine to facilitate moving the ties in and out of position, and these rollers are each equipped with a spring to force them upward when the pressure on the plates has been taken off.

The work at the Dorchester Avenue yard is under the supervision of a yard master, the force consisting of nine men in the shop and about eight men handling material in the yard. In general, in the track shop one man is assigned to the rail bender, one to the drill, one to the rail saw, and the others are employed as helpers. Two Wellington sand driers are in operation on the premises.

Bond maintenance is handled by the track force in each division under the instructions of the company's electrical engineer. When a track is repaired this force rebonds if a joint is broken, and on all new work follow the special instructions of the engineers.

The company has done a small amount of thermit joint welding during the past year, and an experimental wagon has been fitted up with motor-driven compressor, torch



and standard welding supplies required. By another year the company will have had a wider experience with this method of putting in joints.

### THE PHILADELPHIA STRIKE

On Saturday, May 29, 2100 of the 6500 surface car men of the Philadelphia Rapid Transit Company went on strike in an attempt to force the acceptance of the following demands: Grievances to be adjusted between company officials and its employees, or by arbitration in important cases; privilege of purchasing uniforms anywhere; not less than nine hours or more than 10 hours within 12 consecutive hours to constitute a day's work, with time and a half for periods of more than 10 hours; regular wages, 25 cents an hour.

In reply to these demands the company stated that it could not afford to submit the management of its affairs to committees of employees, or, rather, of the union, and stated that it would treat with its employees only as individuals. The rule with regard to purchasing uniforms was necessary for the protection of the men themselves, as inferior goods were furnished by outside clothiers selling on credit at extortionate prices. The conditions involved in the practical operation of street railways in Philadelphia made it impossible to arrange the working time as desired by the carmen. As to the demand for 25 cents an hour, the management pointed out that the directors had voluntarily arranged to increase wages from 21 cents an hour to 22 cents an hour, beginning July 1. It could not go beyond this figure in view of financial conditions.

Of the 2100 men who went out on Saturday not more than one-third were members of the union. Many of the others who joined them were intimidated or feared violence and abuse. A great many of the older employees remained loyal to the company. Although the demands of the platform men were voiced as early as last December, the Philadelphia Rapid Transit Company did not anticipate that the threatened strike would assume serious proportions. No special efforts, therefore, were made to secure the services of strike breakers in advance. When the strike was declared, however, the employment bureau in Philadelphia was immediately thrown open and another bureau established in New York City. In Philadelphia ex-employees and other men are also being engaged at the rate of 180 to 200 a day, and several hundred experienced men from New York and vicinity have also been hired. The employees thus secured are not professional strike breakers, but are chiefly unemployed men who have applied for permanent positions with the company. That the great majority of them are experienced in the operation of cars is very evident to observers.

Several hundred men are quartered at the Lancaster Avenue and Forty-third Street car house, where a complete commissariat has been provided. The company has agreed to care for any man who is injured in the performance of his duty by strikers or others.

Owing to the ease in getting new men so rapidly and the number of loyal men, it was possible to operate 50 per cent of all cars on Saturday, 40 per cent on Sunday, 40 per cent on Monday and 60 per cent on Tuesday. It will be understood, of course, that the schedule demands for Saturday, Sunday and Monday were extraordinarily heavy on account of holiday business; in fact, the strike had been timed to come at the period most embarrassing to the railway management. Nevertheless, fully 516 cars were in

service on Tuesday at 8:30 a. m. By 12:30 p. m. of the same day 615 cars were on the lines, and in the evening a total of 707. As on the previous nights, no attempt was made to operate cars after 8 p. m.

Despite the fact that the people of Philadelphia and the railway company are engaged in a controversy about the abolition of the six-for-a-quarter fare tickets, the strikers did not meet with much material encouragement from the public. It was apparent that the people were willing to ride wherever cars were placed in service. About the only visual evidence of a strike was an occasional "I walk" sign carried in the caps of boys or by striking employees in uniform. Many of the latter are selling newspapers and others are collecting money by playing street organs. During the first three days of the strike a large number of trucks were impressed to carry people for 5 or 10 cents each, but by Tuesday they were doing very little business. Most of the suburban traffic temporarily lost by the electric railway is being diverted to the steam railway lines, especially in the travel to Willow Grove.

The strikers have been cautioned by their leaders not to

## Phila. Rapid Transit Co.

2d Vice President & General Manager's Office.

8th & Dauphin Streets.

Philadelphia, May 31st, 1909.

### SPECIAL NOTICE TO MOTORMEN AND CONDUCTORS.

**Any Motorman or Conductor in the employment of this Company who has been or may be injured as the result of any violence attendant upon the present strike, and who has notified the Company within 24 hours after being injured, will be cared for by the Company as long as he remains incapacitated.**

CHAS. O. KRUGER,

2d Vice Pres't & General Manager.

Poster Placed in the Car Houses of the Philadelphia Rapid Transit Company

participate in any form of disorder. There have been a few slight disturbances here and there, incited by strike sympathizers, but in general the city is remarkably quiet. This must be ascribed largely to the prompt action of Mayor Reyburn in furnishing policemen for all cars and ordering that all saloons should be closed between the hours of 6 p. m. and 6 a. m. It has not been necessary to swear in any railway employees as deputies. By Tuesday conditions had become so much better that the saloons were permitted to remain open until 8 p. m.

Despite the most strenuous efforts on the part of the strikers, not a single employee of any other department of the railway company has left the service. Leaders of other unions have arranged for a parade on Thursday, June 4, mass meetings and the like, but there is little prospect that these will have any effect, as the company is securing all the men it wants, is enjoying sufficient police protection and is getting all the traffic it can handle. The leader of the strikers is C. O. Pratt, who in the past has incited strikes in Knoxville, Chicago, Dayton, San Francisco and other cities.

## REPORT OF PENNSYLVANIA RAILROAD COMMISSION

The Pennsylvania State Railroad Commission has issued its annual report for the year ended Dec. 31, 1908. The commission states that it is co-operating with the Interstate Commerce Commission in an endeavor to secure the adoption of forms of accounts and reports for carriers subject to the jurisdiction of the commission which can be readily adapted to the needs of both commissions. The Pennsylvania commission expresses the opinion that the adoption of the uniform system of accounts would carry with it great benefits to the public, whose money is invested in the securities of these corporations. It is expected that the Interstate system can be used by the Pennsylvania commission "without substantial change, and with only such modifications as may be found necessary to confine the reports to the actual mileage and operations of common carriers in this State."

The street railway situation in Philadelphia and Pittsburg received considerable attention from the commission.

The number and variety of complaints as to the sanitary condition of the street railway cars, especially those used in interurban service, have induced the commission to propose joint consideration and action with the State Department of Health.

The commission adds that such orders and recommendations as it has already made affecting the operation of street railways have been complied with promptly, and have seemed to meet the approval of the public.

A number of recommendations are made by the commission. Among them is one that, in the interest of public policy, a law be enacted providing punishment for all who trespass upon the private right-of-way of any steam or electric railway in the State. The commission recommends that it be given additional power over the issue of securities by corporations under its jurisdiction. The report says on this subject: "How best to regulate this without appearing to place unnecessary obstacles in the way of new undertakings for the development of our rich resources and at the same time furnishing a reasonable measure of protection to the public against such increases of capital of our public service corporations as are improperly conceived has been carefully considered by this commission."

During the year 203 persons were killed on street railways, of whom 32 were trespassers. The number of injured was 4907, of whom 105 were trespassers.

## FRENCH TRAMWAY STATISTICS

The report of the Minister of Public Works of France, covering the statistics of French railways for the calendar year of 1905, has just been published. In this report the tramways are divided into two classes, namely, Class I, which included those conducting a passenger, baggage and package business, and Class II, those which conduct a passenger business only.

The following statistics are presented:

	Class I	Class II
Number of lines.....	33	76
Length of line in operation in km	803	1,844
Number of passengers.....	214,587,056	657,117,421
Receipts, in francs.....	28,735,816	78,498,611
Number of employees.....	6,240	23,348
Number of cars.....	1,885	4,865

As regards motive power, 19 roads in Class I are equipped with electric power, 10 use steam locomotives, 2 employ horses, 1 is equipped with compressed air and storage battery cars, and one with steam and electricity.

## CLOSED TYPE FEED-WATER HEATER

The Goubert Manufacturing Company, New York, has recently introduced its "Multipass" closed type feed-water heater made in sizes from 50 hp to 5000 hp. This apparatus is guaranteed to heat feed water from ordinary temperature to within 10 deg. of the temperature of the exhaust steam. As shown in the illustration, the heater consists essentially of two cast-iron water chambers connected by a cluster of small straight brass tubes, which in turn are inclosed within a cylindrical cast-iron shell extending from one water chamber to the other. The ends of the tubes are rolled into steel tube plates in the same manner as boiler tubes are rolled into the manifold. The cast-iron shell surrounding the tubes merely provides an

envelope for the exhaust steam and is of larger diameter than the water chambers, to form an annular belt from which the steam may enter among the tubes from all directions.

The exhaust steam enters the shell by the upper opening shown at the right, and what does not condense passes out the lower opening. That which is condensed on the tubes flows to the bottom of the shell and passes out through a drip pipe. It is a peculiarity of this construction that oil or grease in the steam is removed as in an oil separator and passes off with the drip, leaving the remainder of the exhaust steam in the best possible condition for heating systems and other purposes where live steam is sometimes used. In



Closed Feed-Water Heater

some closed heaters the steam is made to circulate inside the tubes, while the water is in the shell. In either case the water is forced by the pump through the apparatus as though it were but a part of the feed pipe. In the steam tube type, however, the mud and sediment tend to settle at the bottom among the tubes where they are difficult to remove, while scale that may form on the tubes is also difficult to get at. One great advantage of having the water within the tubes, as in this heater, is that the scale may be removed without taking down the heater, for by removing the top chamber the tube interiors can be examined and cleaned out with little difficulty. Any sediment which falls, either during cleaning or operation, goes down into the bottom of the lower water chamber from which it may be drawn out through the bottom blow-off openings. The greatest advantage claimed for the water-tube construction, however, is the multipass feature. There

are baffles so placed in the upper and lower chambers that the feed water entering at the bottom must travel back and forth through several sets of tubes and be subjected to the heat of the steam several times before it can reach the outlet at the top. In a 700-hp heater, for instance (handling 21,000 gal. of water an hour), there are 100 tubes each 1 in. in diameter and over 7 ft. long. The feed water must travel five times the length of these tubes in the path of the steam, which gives opportunity for absorbing the largest practicable amount of heat.

It is evident that the shell and brass tubes of a feed-water heater will expand to different lengths under the possible difference of about 150 deg. in temperature, and if the construction between the shell and upper water chambers were rigid the tubes would start from their fastenings, leak and render the apparatus useless. For this reason the Goubert heater is provided with an expansion joint between the upper chamber and the shell. The upper chamber is supported entirely by the tubes and left free to move up and down. The expansion joint is fitted with a flexible ring gasket composed of layers of soft copper and special packing with wire interwoven. The inner edge is clamped between the shell and an annular ring. The only purpose of this gasket is to prevent steam from escaping into the room, and as it is subjected to no other pressure than atmospheric, the gasket will last for years. Its renewal amounts to nothing more than the replacing of a cylinder-head or steam-pipe gasket. The vertical heater construction described is preferable, but for installations where there is not sufficient head room, as in the cellars of city buildings, a horizontal heater can be used.

**A NEW ADJUSTABLE BRAKE**

The accompanying illustrations show additional details of the Ackley adjustable brake which was briefly described in the *ELECTRIC RAILWAY JOURNAL* of Jan. 2, 1909. This brake is the invention of G. S. Ackley, president of the National Brake Company, of Buffalo, N. Y., and is of particular advantage for use on cars where, owing to the limited space, it is difficult or almost impossible to install any

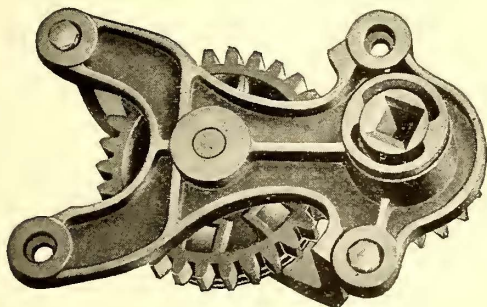


Fig. 1—Main Base Casting

other gear brake. In the Ackley brake the drum is supported by a yoke which is bolted to a separate casting under the platform. Fig. 1 shows the top part of the brake as it fits under the floor, the brake staff being inserted in the hollow pinion at the right. A 3/4-in. hole is bored in the platform allowing the sleeve, which is a part of the frame base, to extend through the platform so that its top is almost flush with the surface of the floor. The pinion is journaled on this part of the frame. The bottom of the brake staff can be squared to fit the pinion without lathework or milling.

Fig. 2 illustrates the base and yoke. As this yoke can be attached at different angles the brake may be installed under the platform in any position desired or that the peculiar construction of the car demands. The entire brake can be dismantled by removing the two yoke bolts. Fig. 3

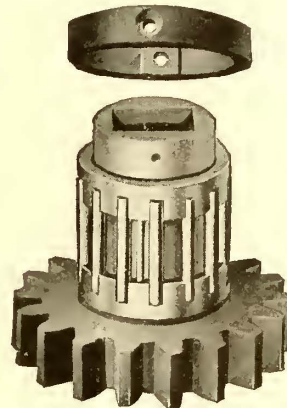


Fig. 4—Roller Bearing and Pinion

shows the shape of the winding drum with its roller bearing in position. The large part of this drum is designed to gather up the slack brake chain quickly and the smaller part to give power when applying the brake shoes. A variation of 2 1/2 in. in the amount of slack chain wound on the large part of the drum can be obtained by removing one of the two bolts by which the chain is secured to the drum. Fig. 4 shows the pinion with its roller bearing which turns in the sleeve of the frame base, as mentioned before, thus leaving no chance for binding in the gears. This brake is made in three different gear ratios. The 18 x 30 and 14 x 34 are designed for single-truck and medium-weight double-truck cars, and the 12 x 36 for heavy double-truck cars. These different gear combinations are all interchangeable in the same frame.

**WEARING PLATES FOR TROLLEY FROGS**

The Electric Service Supplies Company, Philadelphia and Chicago, has recently patented and is now manufacturing a form of wearing plate designed to be used in connection with overhead trolley wire frogs and crossings for the purpose of increasing the life of frogs. These plates are made of sheet steel and in various shapes to fit the pans of different designs of frogs and crossings. They are provided with lips which are turned over the edges of the pan so as to hold them in place. They protect and save the trolley frogs at those points which are subject to the greatest wear, due either to the pressure of the trolley

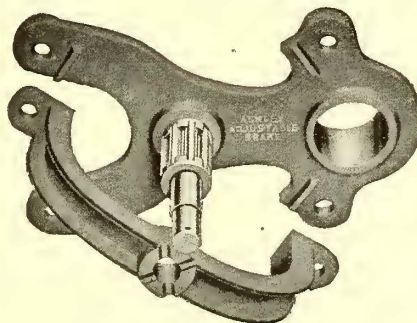


Fig. 2—Base and Yoke

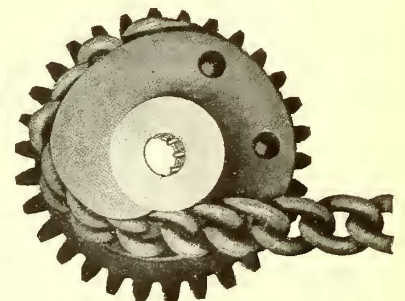


Fig. 3—Winding Drum

wheel or to arcing. They do not affect the trolley wheel guides in any way, so that the efficiency of the frog is not impaired. They are readily attached, and can be easily replaced when worn out, giving the frog a much longer life.

Work on the Pennsylvania Railroad tunnels and terminal station in New York City is progressing so rapidly that it is said trains will be running under Manhattan Island early in 1910. The area of the new terminal station is 28 acres, and it will contain 21,500 linear ft. of platforms between the 21 tracks.

## LONDON LETTER

*(From Our Regular Correspondent.)*

The annual Budget presented by Lloyd George, Chancellor of the Exchequer, seems to have had a rather depressing influence upon the motor omnibus enterprise, as it proposes a very substantial tariff on petrol and to tax vehicles, though large rebates will be given to wagons used for commercial purposes. On the other hand, the underground railways conclude that with greater expenses before the motor buses a larger portion of the traffic will be secured by them. The underground railways of London, especially the lines of the Underground Electric Railways, are enjoying increased traffic, and the debenture stocks and preference shares of the company are almost unobtainable at anything like remunerative prices. Even the receipts of the lines of the Metropolitan District Railway, which has been part of the Underground Electric Railways since the property was electrified, are increasing week by week, and the ordinary shares of the company, which have not paid dividends for years, are being purchased by the public for investment. This progress is attributed to the methods of A. H. Stanley, general manager of the company. Trains are run more frequently and much more quickly, and an express service has been established, a thing that has been considered impossible heretofore. One has only to go into a tube to note the improvements that have been made. The dismal dark stations of the past are giving place to airy, well-lighted stations and convenient connections have been arranged where changes have to be made. The District Railway has the distinction of running trains of 10 50-ft. coaches, the longest electric train in the world. Now that steam and smoke have been eliminated advantage is being taken of the valuable sites which the company owns at Cannon Street and the Mansion House stations and at St. James's Park. At the last place an extension is being built to the general offices of the company.

So successful has the Bakerloo tube railway been that determined efforts are being made to pass the North West London Railway bill, which is a modification of a bill already granted. If enacted the measure will result in the construction of an extension of the Bakerloo tube from Edgware Road to Cricklewood and the northwestern suburbs. This extension is being promoted by the British Electric Traction Company, which owns the existing North West London Railway bill, though the railway would be operated by arrangement by the Bakerloo Railway. It would also involve the abandonment of the North West London Railway from Edgware Road southward to Victoria and also the abandonment of the small stretch of line from Edgware Road to Paddington, for which the Bakerloo Railway owns rights. Paddington was the original destination of this railway. Curiously enough, there is opposition to the construction of the new portion northward and to the abandonment of the portion to Paddington, as the Great Western Railway would undoubtedly have liked to see the Bakerloo tube extended to underneath its station.

John A. F. Aspinwall, the new president of the Institution of Mechanical Engineers, read at his inaugural address a paper on the electrification of railways in May. This paper was abstracted in a recent issue. It is gratifying to hear Mr. Aspinwall state that the electric line opened by his company from Liverpool to Southport has been an undoubted commercial success. The company has saved the immense amount of money which it would have had to expend on the enlargement of its station and has gained considerable new traffic. Generally his paper read to the effect that the "battle of the systems" had been responsible for a great deal of the delay, that at present no great benefit would be derived from the general electrification of main railways, but that many of the suburban railways in the vicinity of large cities might undoubtedly be electrified to great advantage.

The City of York has not yet settled its tramway problem, though in a recent poll there was a majority in favor of municipalization. More recently the tramways committee decided to recommend the City Council to accept the tender of Dick, Kerr & Company for the reconstruction of the permanent way and equipment, including cars, but at the meeting of the City Council to consider this recommendation action was postponed until the June meeting of the Council, as labor representatives have objected to the work being done by an outside contractor. It is to be hoped that the Council will carry the recommendation of the committee, as experience has shown that cities cannot do their own construction work as economically and expeditiously as private contractors who are specialists in their respective lines.

An effort was made recently in Manchester to secure halfpenny tram fares, but the tramway committee has decided against any such innovation, Mr. McElroy, the gen-

eral manager of the tramways, stating that any attempt to introduce halfpenny passengers at the expense of the penny passengers would end in financial disaster, and that the risk of turning the surplus into a deficit by any such means is too great. It is suggested that letter boxes should be put on the last cars to Manchester from outlying districts where there is no late postal collection, but no action has yet been taken. A car thus equipped runs every night from Fleetwood to Blackpool, the letter box being fastened on the back of the car. The postman meets the car at Blackpool and collects the letters and they are distributed in Manchester and elsewhere the following morning. In the ordinary course letters posted at night in the districts served by the postal car would not be collected for distribution until the following morning.

The formal inauguration of the new electric tramway service at Rawtenstall took place during May. The construction cost was more than £120,000. The line will shortly be extended to Bacup at an additional cost of about £25,000.

The King and Queen are to visit Lancashire in July, and as a review is to be held at Worsley on that occasion, the possibility of utilizing tramcars for mobilization of the territorial troops has been the subject of a conference in Manchester between officers of the territorial force and representatives of the tramway undertakings in the district. Between 12,000 and 13,000 troops will assemble, and of these about 3000 will be transported by tramcar from the various East Lancashire towns.

The London County Council has issued about £2,250,000 of new 3½ per cent stock at 102, the issue being greatly oversubscribed. The money will be used for extending the electric tramways, work on which is steadily proceeding.

"Studs" is a familiar term to the Londoner and the word has really become a political war cry between the Moderates and the Progressives and will undoubtedly be used a great deal in the next London County Council election. The work of pulling up the studs of the surface contact system, the abandonment of which was noted in my last letter, has begun and it will not be long before all tangible reminders of the unfortunate experiment will no longer be visible. The London County Council is being savagely attacked for its action in connection with this matter, it being pointed out that Mr. Mordey, the electrical expert retained to report on the system, reported in favor of certain modifications.

Mr. A. L. C. Fell, of the County Tramways, recently gave evidence before a select committee investigating the Daylight Saving bill. Mr. Fell's contention is that the bill would increase the number of passengers because people would have longer evenings to spend in recreation. He contended that 25 per cent of the total number of cars lying idle in the depots would be employed for 123 hours and that this would mean from £6,000 to £7,000 per annum. The bill would also tend to decrease working expenses by reducing the charges for light in cars and workshops.

The work of adapting cars for use in connection with the proposed through service between Leeds and Bradford is approaching completion. It will be remembered that in order to overcome the difficulty presented by different gages of the Leeds and Bradford lines a movable axle was invented, and it was recently stated at a meeting of the tramways and electricity committee of the Leeds Corporation that the two corporations now own a sufficient number of cars fitted with these movable axles to provide for a 10-minute service.

At a recent meeting of the Birmingham Tramways committee a deputation from the Trades Council urged the advisability of the committee building its own car bodies, as is done in other large towns instanced by the deputation. The matter was referred to the consideration of a sub-committee. As a result of the report the committee decided that it could not adopt the suggestion.

The Halifax Corporation Tramways committee has decided to try for three months the system of issuing return tickets for short-distance journeys on the tramways. By this system a passenger will be able to make a short journey of about half a mile, and the purchase of a penny ticket will also cover the return journey.

The Chorley & District Tramways, Ltd., is being formed to construct and equip tramways connecting Chorley with Preston, Bolton, and Horwich, thus serving a population of over 490,000 people. The share capital is £300,000, divided into 50,000 7 per cent cumulative preference shares of £4 each at par, 3000 preferred ordinary shares of £10 each, 7000 ordinary shares of £10 each and first-mortgage 5 per cent debenture stock £160,000.

As the result of prolonged discussion on the electrification of the existing horse tramways the corporation of Oxford has resolved to adopt instead of an underground system of electric traction, as provided by the Act of 1907, a combined system of conduit and overhead traction.

A. C. S.

# News of Electric Railways

## Cleveland Traction Situation

Public sentiment in Cleveland has crystallized into an intense desire to have the traction muddle settled. People understand that they are gaining nothing by a continuation of the eight years' controversy over rates, franchise features and city control. Tracks have become dangerous on many lines, cars are worn and rickety, and so few are they in number that the schedules are nothing like sufficient to give the service that is needed by the city. Consequently, the business men, the industrial workers and the people at large have united in a demand that an end be put to further parley and a settlement be reached at once. This demand took the shape of a request that Judge Robert W. Tayler of the United States District Court formulate his ideas of a settlement for the guidance of the negotiators in terminating the series of public meetings in which they have engaged and making an agreement. Judge Tayler, realizing that the people of the city are in earnest in demanding that something be done, yielded, and on May 27 issued a statement of his ideas, in which he said:

"I am of the opinion that every necessary requirement of the situation can be met with a maximum rate of fare of seven tickets for 25 cents, 1 cent for transfer with no rebate and 5 cents for single cash fare, the 5-cent single fare to cover also the cost of transfer. I do not think this rate of fare will ever be put into effect under the present or any conditions now foreseeable. If, in order to finance the necessities of the company it should become necessary to raise the maximum rate of fare, I am sure the Council, in the interest of the community, will very promptly pass an ordinance, which, while not giving an additional cent to the stockholders of the company, would minister to the advantage of the community.

"With the provisions of the Baker draft of ordinance providing for a dividend fund, the initial rate of fare ought to be 3 cents single fare and 1 cent for transfer with no rebate.

"The valuation of the property ought to be determined in one of two ways: either (1) by taking the Johnson-Goff valuation of last year; or (2) by an expert impartial arbitration.

"I am not, however, the advocate of any unjust or burdensome valuation. If it clearly appears that the valuation put upon the property by Mr. Johnson and Mr. Goff is excessive, then there ought to be a revaluation by impartial arbitrators, although I hesitate to take the chance of having the arbitration result in an increase of the valuation.

"If it be said that the valuation may be arrived at in some other way, I answer that that has been tried. Four months or more were devoted to it last year. It was agreed to then. What right have we to hope for a better fate as a result of new negotiations? The effect of fixing a valuation upon which an ordinance is passed is to substantially appropriate the property of the Cleveland Railway to a public use; that is, to permanently devote it to the use of the community at a fixed rental.

"The Baker ordinance provides that if the franchise is not renewed within 10 years after its date the company may charge the maximum rate of fare and distribute among its stockholders the surplus thus produced. It also relieves the company from special supervision by the Council. I disagree with both Mr. Johnson and Mr. Andrews on this point. In my opinion, when, after 10 years, a new franchise not having been granted, the company charges the maximum rate of fare, the surplus that would thus certainly be created ought to be used to wipe out capital value; so that, when the Council does renew the franchise, as it doubtless would before the expiration of the final 15 years, the cost of service will be then reduced according as the interest charge is reduced by the reduction of capital value. I think, also, that there ought to be, during the entire life of the franchise, a supervision by the city of accounting and operation.

"The right of Council to nominate a purchaser is one of the most valuable provisions to be incorporated in the franchise, since it gives opportunity to the city, without jeopardizing the investment, to obtain better terms if they can be obtained. The right ought not to be exercised earlier than 10 years from the granting of the franchise. Whatever ordinance is passed must be submitted to the people at a referendum election."

President Andrews of the Cleveland Railway was in New York at the time Judge Tayler's statement was issued. Although expressing the fear that the initial fare is too low and that the maximum is not high enough to attract the money that will be needed to rehabilitate the system, he

said that he is willing to accept Judge Tayler's suggestions without qualifications of any kind. Mayor Johnson, also in New York, received the text of the statement in full by wire, but refused to commit himself, stating that he would not talk except in a public meeting before the City Council. In almost all respects except as to the time suggested for the city or its nominee to exercise the option of taking over the property, and perhaps limitations in the manner of control the city shall exercise over the operation, the terms suggested coincide with the views the Mayor has been expressing all along.

At a meeting of the Council committee of the whole on May 24 the subject of placing certain points before Judge Tayler for decision was discussed. President Andrews of the Cleveland Railway presented another resolution of the board of directors, proposing that all disputed points be laid before Judge Tayler and that both sides agree in advance to abide by his decision. The points regarded as open by the company were as follows: Form of ordinance, valuation, maximum rate of fare, initial rate of fare, right of the city to name a purchaser, and when; liability of the city for bonds, if the city purchases the property; allowance for operating expense, including maintenance and renewal reserve and accident reserve; character and extent of the city's supervision and regulation. A resolution was adopted by Council that the initial and maximum fares should not be presented to Judge Tayler for consideration. President Andrews said he did not see how any headway could be gained by presenting questions to Judge Tayler if the main contention was omitted.

At the regular meeting of the City Council on the same evening a franchise providing for a grant to Herman J. Schmidt on Payne Avenue was presented. The bids of the Cleveland Railway were referred to the street railway committee. Although Schmidt made a bid for Clark Avenue, also, only Payne Avenue was included in the ordinance. This indicates that all the rights that Schmidt will need for some time to come will be treated as extensions from Payne Avenue. Such extensions do not require consents of owners of abutting property. However, all franchise grants must be submitted to a referendum vote, and this is the great stumbling block in the way of further experiment. The Schmidt ordinance contains no safeguards, such as were included in the original 3-cent grants. It merely gives him the right to build and operate a line on Payne Avenue, without requirements for transfers and practically without other restrictions. Mayor Johnson explained that this was done to avoid legal entanglements, and that all conditions would be entered in the final contract or whatever arrangement he sees fit to make with Mr. Schmidt. The question of Schmidt's ability financially did not enter into the matter.

On the evening of May 29 the Cleveland Chamber of Commerce, with one dissenting vote (that of City Solicitor Baker), adopted a resolution requesting Judge R. W. Tayler to write a complete franchise ordinance, embodying his views both as to the main points and the details.

Judge Tayler's statement was introduced at the meeting of the Council on June 1. Mayor Johnson insisted that it might be easy to settle the street railway matter under the plan proposed by the judge, if only disputed points are submitted to arbitration. Mr. Andrews asked that all points in the valuation be taken up by the arbitrators if anything is submitted to arbitration. Judge Tayler indicated that he meant that the valuations made by Mr. Goff and Mayor Johnson a year ago be accepted or that the whole matter be reconsidered. He favors a settlement on the basis of the valuations already made, however.

On the evening of June 1 the Council refused to accept Judge Tayler's maximum fare plan. Judge Tayler then said he would assume no further responsibility in the matter.

## Transit Affairs in New York

As soon as it had been informed that Governor Hughes had affixed his signature to the Travis-Robinson bill, designed to amend the Rapid Transit law so as to permit of the construction of rapid transit lines by private capital, the Public Service Commission sent letters to the Interborough Rapid Transit Company, the Brooklyn Union Elevated Railroad, the Amsterdam Corporation, the Bradley-Gaffney-Steers Company and the Continuous Transit Company, all of which have recently made propositions to the commission for consideration. The communication to the Interborough Rapid Transit Company explained in detail

the reason the recent propositions submitted by the company could not be accepted by the commission, with the exception of the plan to lengthen the platforms of the present subway stations, which is now being gone over by the chief engineer of the commission. It further called the attention of the company to the action of the Governor and asked that any propositions that the company may have to offer and that the commission can consider under the amended law be submitted immediately. It also invited a proposition for the utilization of the Steinway tunnel to Long Island City. The letter to the Brooklyn Union Elevated Railroad asked that company to submit any plans it may have in mind, including those relating to Manhattan. The Amsterdam Corporation was asked to submit any plans for the interterminal belt line that may be considered under the law. The Bradley-Gaffney-Steers Company was asked to submit a formal bid in accordance with its recent communication. The Continuous Transit Securities Company was asked to forward any proposals it wished to have the commission consider that will come under the amended law.

All of the companies to which the Public Service Commission addressed communications replied to the commission within a few days of the receipt of the letter. The Interborough Rapid Transit Company proposed a modified plan calling for the construction of a \$100,000,000 subway to connect Brooklyn, Manhattan and the Bronx. E. W. Winter, president of the Brooklyn Rapid Transit Company, which controls the Brooklyn Union Elevated Railroad, called on Chairman Willcox, of the commission, in person and discussed transit development in Brooklyn. While nothing official has been announced regarding this conference, it is understood that Mr. Winter for his company will submit plans calling for the expenditure of \$20,000,000, especially as Mr. Winter outlined improvements recently in the Brooklyn which his company contemplates, as noted in the *ELECTRIC RAILWAY JOURNAL* of May 8, 1909, page 885. The Bradley-Gaffney-Steers Company asked that it be permitted to delay for a few days in order that some changes in its plans might be perfected. The company at first intended to build a subway in Lexington Avenue which would connect with the Brooklyn loop subway and go south only as far as the Brooklyn Bridge. The commission has asked the company informally, however, that it conform as closely as possible to the route laid down by the commission in the Broadway-Lexington Avenue subway. In accordance with this request, the company has decided to make its southern terminus the Battery. William J. Wilgus, president of the Amsterdam Corporation, which planned both freight and passenger elevated and subway lines, said that his company had already anticipated the signing of the bill, and that Edward M. Shepard, counsel for the company, had written to Chairman Willcox, stating that the company was anxious to proceed and suggesting several points for mutual discussion. Max E. Schmidt, president of the Continuous Transit Securities Company, said that his company would renew its proposition for a moving platform under Broadway from Fourteenth Street to Forty-second Street within a few days.

The special committee of the Board of Estimate appointed to consider the proposed extension of the Hudson & Manhattan Railroad from Thirty-fourth Street and Sixth Avenue to the Grand Central Station, which has already been approved by the Public Service Commission, decided on May 27 to send the matter back to the commission for further consideration. Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, said he desired to have the Hudson & Manhattan Railroad specify the exact location of its stations on Forty-second Street so there might be no possibility of interference with future extensions of the present subway.

The receivers of the Metropolitan Street Railway have been granted an extension of time by the Public Service Commission in which to equip their cars with fenders or wheel guards of approved design. The time originally set was Aug. 15. Now it has been made July 15 for 500 closed cars and Oct. 15 for all cars. The receivers desired the extension so that they might complete comparative tests of different types of wheel guards and fenders.

F. W. Whitridge, receiver of the Third Avenue Railroad, has sent letters to Comptroller Metz and to Corporation Counsel Pendleton protesting against the proposed sale of the properties of the Third Avenue Railroad, on June 5 for non-payment of special franchise taxes. Mr. Whitridge rehearsed his negotiations with the city authorities, in the course of which he offered to settle the unpaid special franchise taxes for the lump sum of \$1,000,000, the representative of the Corporation Counsel estimating the amount at \$1,250,000. Just now negotiations are suspended pending the decision of the Court of Appeals on the Jamaica Water Company case, and Mr. Whitridge thinks it both improper and futile to attempt to hold the tax sale under the existing conditions.

## Circular on Selection and Training of Employees

The committee on training of transportation employees of the American Street & Interurban Railway Transportation & Traffic Association has sent to the general managers of member companies Data Sheet No. 39 on the selection and training of employees. The committee's recommendations are given covering various points and the companies are asked to fill in the blanks giving their practice and to state in particular cases why they have adopted a standard which differs from that of the committee. The committee's recommendations follow:

### SELECTION OF THE EMPLOYEE.

Age limit of conductors—21 to 40 years. Why different?  
 Age limit of motormen—21 to 40 years. Why different?  
 Weight limit of conductors—minimum, 130 lb.; maximum, 200 lb. Why different?  
 Weight limit of motormen—minimum, 150 lb. Why different?  
 Height limit of conductors—minimum, 5 ft. 6 in. Why different?  
 Height limit of motormen—minimum, 5 ft. 6 in. Why different?  
 Do you prefer men having previous electric railway experience, or men without experience? Men with previous experience be employed, provided that such experience is in the same class of service as that applied for, and that previous record is entirely satisfactory. Why different?  
 Do you prefer country or city bred men? Country bred men, especially for interurban service. Why different?  
 On interurban service do you favor employing men of steam railroad experience? Men without steam railroad experience. Why different?  
 Do you employ other than Americans? If so, what nationalities? No distinction other than all employees be American citizens, excepting as to negroes, Chinese and Japanese, the employment of whom is not recommended. Why different?  
 What information required from applicant, and how verified? Use of standard forms as submitted in report, particular attention being called to the form of release and the furnishing of photographs. Why different?  
 Do you have vision, color, hearing and physical tests? Standard forms as submitted be used in these examinations. Why different?

### TRAINING OF THE EMPLOYEE.

(a) After applicant has been accepted, what is the next step, if he is to be a motorman?  
 (b) If he is to be a conductor?  
 (c) Do you give motormen shop experience?  
 (d) If so, how much?  
 (e) Do you allow compensation while in shop?  
 (f) Do you have training school with dummy car?  
 The committee recommends that after acceptance the applicant be given a talk by the head of the transportation department or delegated official on the duties of the position that he is about to assume. It recommends that before permitting applicant to go out on the road it is advisable to give him a certain knowledge of the handling of control and other apparatus, either by means of a service car in the barn or shop, or on an instruction car fitted up for that purpose. Why different?  
 Do you require a certain length of time to be spent by the student on the car, or is it left to the discretion of the instructor? It is recommended that the length of time with the instructor should be left to the discretion of the instructor and the ability of the applicant to pass subsequent examination. Why different?  
 (a) Do you give new employees an examination? (b) Is it oral or written? The committee recommends examination to be both written and oral. The written to cover all essential points on rules of operation, and that this be retained as part of the employee's record. Why different?  
 Where joint city and interurban service is operated, do you work extra men on both city and interurban lines? Service should be separately operated. Why different?  
 In city service, after trainmen have been taught their duties and turned in, do you employ traveling instructors to follow up new men? It is recommended by the committee that traveling instructors be employed to follow up new men. Why different?  
 What educational work are you carrying on among men already in the service? The committee deems it advisable and to the interest of the companies' service to take up educational work for the men, through meetings with the men, conducted by the transportation department, at which talks should be given by the master mechanic, claim agent, auditor and others, on the different subjects pertaining to their respective departments, in which the transportation department has to co-operate or execute. The committee feels that one of the greatest means of reaching and maintaining high efficiency among employees is through "follow-up" work along educational lines, and that the mental and moral development of the man should go hand in hand with his training as a transportation employee. Why different?  
 What method of discipline do you recommend? The committee, after careful consideration of the various methods of discipline and with knowledge gained through actual operation of the merit and demerit system, recommends it as being the best form of administering discipline, on account of its taking notice of minor infractions of rules which otherwise would not be made subjects of discipline, and also because of the fact that it makes possible commendation of good work on the part of the employees; it affords as well a complete and accurate record of the employee's work in every particular and is of great value in determining standards of efficiency. Why different?

## Niagara Gorge Railroad Resumes Service

The Niagara Gorge Railroad at Niagara Falls, which was submerged with ice to a depth varying from a few feet at the Whirlpool to 25 and 30 ft. at the lower end of the Gorge near Lewiston, the result of an unprecedented ice jam last month, was restored to a condition permitting service to be resumed on May 23 on the outer track. Work is rapidly progressing on the clearing and restoration of the inner track, but ice has still to be cleared from a section of the inner track about 2 miles long near "Giant Rock" in the central portion of the route. It is expected, however, that this section will be complete by June 15, and the full service will then be restored. Meantime sufficient space for passing sidings has been cleared in this portion.

Cars of the Niagara Gorge Railroad were forced to stop running at 4 o'clock p. m. on April 8, the day on which the

ice jam started, owing to the encroachments of the ice upon the tracks, and cars were not run from that time until May 23, except between Niagara Falls and the Whirlpool at the entrance to the lower gorge. The jam rose rapidly on April 8 and April 9, and remained practically stationary until April 16. Then it commenced to subside, and men were placed at work to restore the road. On April 18, however, a second rise in the ice jam commenced, which lasted a number of days, and reached a greater height than the first, 60 ft. being the height in some places below Lewiston Suspension Bridge and 30 ft. to 40 ft. on the roadbed near Lewiston. After the accumulated jam at the mouth of the Niagara had been dynamited by the New York State authorities the flood and ice began to recede again, and on April 22 a force of 100 men was set to work to clear the roadbed of the wall of ice piled upon it and the force was gradually increased by Bert T. Jones, general manager, until 315 men were employed, all that could be worked to advantage. Results were attained rapidly, considering the thousands of tons of ice upon the roadbed and the large quantities of loose rock and earth scoured out of the cliff back of and above the tracks by the movement of the ice and deposited on top of the ice wall and lodged over the roadbed and tracks.

When the ice had been removed it was found that comparatively little damage had been done to the tracks, guard rail and roadbed. As explained by George A. Ricker, chief engineer of the company, this was due to the fact that the road was built almost entirely upon solid rock, the rails being held in place by the weight of the ice wall packed over the roadbed and protected from the rush of the current. The track required only the lining up and rebalasting of such portions as had not been seriously disturbed and the laying of new rail in the few places, mostly adjacent to culverts, where the roadbed had been twisted out of place by the action of the ice.

Precaution has been taken when the danger from overflow of ice seemed imminent to cut the feed cables into sections and haul them up on the bank out of reach of the jam, so that in the reconstruction of the line there was not a great deal of expense for material for overhead work except for poles. The principal portion of the expense of restoration was for labor in removing the ice. The management estimates the total expense at about \$18,000. The road was able to take care of the large crowds at the Falls from Canada to celebrate the Queen's Birthday, or "Victoria Day," May 24, the day following the reopening, notwithstanding that only one track was in service. Herbert P. Bissell and Bert L. Jones celebrated a formal reopening of the line on May 27 by a trip of inspection over the road, accompanied by a party of newspaper men as invited guests in the company's private car "Ondiara."

#### Decision in Des Moines Franchise Case

The Supreme Court of the United States has handed down an important decision as the result of an injunction secured by the Des Moines (Ia.) City Railway to restrain the city from enforcing a resolution adopted by the Council of Des Moines, which directed the company to do certain work. Questions were raised by the City of Des Moines regarding the right of the Des Moines City Railway and the Inter-Urban Railway to maintain and operate their lines, and as it was deemed essential to determine the questions involved as speedily as possible, the City Council ordered the companies to remove certain specified tracks and to restore the street. The Circuit Court of Iowa granted an injunction to the company against the enforcement of the resolution, and the case was appealed to the United States Supreme Court. The opinion of that court as delivered by Justice Holmes, says in part:

"This is a bill brought in the Circuit Court by an Iowa corporation against a city of Iowa. The ground of jurisdiction is that a resolution of the City Council of that city is a law impairing the obligation of contracts within the meaning of the Constitution of the United States, and if carried out will take the property of the corporation without due process of law, contrary to the Fourteenth Amendment. The Circuit Court granted an injunction against the enforcement of the resolution, and the defendant appealed to this court.

"The plaintiff, the appellee, sets up, under a certain ordinance, a right unlimited as to time to construct, maintain and operate an electric street railway in and over the streets, alleys and bridges of Des Moines. The resolution of the city alleged to impair these rights.

"We are of opinion that this is not a law impairing the rights alleged by the appellee, and therefore that the jurisdiction of the Circuit Court cannot be maintained. Leaving on one side all questions as to what can be done by resolution as distinguished from ordinance under Iowa

laws, we read this resolution as simply a denial of the appellee's claim and a direction to the city solicitor to resort to the Courts if the appellee shall not accept the city's views. The resolution begins with a recital that questions as to the railway company's rights have been raised, and ends with a direction to the city solicitor to take action to enforce the city's position. The only action to be expected from a city solicitor is a suit in court. We cannot take it to have been within the meaning of the direction to him that he should take a posse and begin to pull up the tracks. The order addressed to the companies to remove their tracks was simply to put them in the position of disobedience, as ground for a suit, if the city was right."

#### Program for Meeting of Central Electric Accounting Conference

The following call has been issued for the next meeting of the Central Electric Accounting Conference:

"The ninth meeting of the Central Electric Accounting Conference will be held in Columbus, Ohio, Saturday, June 19, 1909, at 12:30 p. m., in the general offices of the Scioto Valley Traction Company, corner of Third and Rich Streets.

"The following subjects have been listed for discussion and all members are requested to come to the meeting prepared to discuss them:

"1. Difficulties experienced in handling the classification of operating expenses prescribed by the Interstate Commerce Commission.

"2. Traffic statistics—their preparation and use.

"3. Pay rolls, time keeping, and the best methods of paying employees.

"An address will be delivered by P. V. Burlington, secretary and auditor of the Columbus Railway & Light Company, on an appropriate subject.

"Robert N. Wallis, president of the American Street & Interurban Railway Accountants' Association, has signified his intention of attending this meeting, and all members are urged to be present in order to meet Mr. Wallis personally and to show their appreciation of the interest he has taken in the conference.

"It was found necessary to change the date of this meeting from June 12 to June 19 on account of the inability of a number of members to attend on June 12, the date originally set.

"All officials of electric railway lines, both city and interurban, are invited to be present at this meeting, as it is thought that the meeting will prove of interest to all present.

"Please notify the secretary of your intention to be present at this meeting, so that before the date of the meeting he will know how many members will be present.

"M. W. GLOVER, President.

"C. B. BAKER, Secretary."

#### Association Meetings

Pennsylvania Engineers, Harrisburg, Pa., June 9, 10 and 11.  
Canadian Electrical Association, Quebec, Que., June 16, 17 and 18.

American Railway Master Mechanics' Association, Atlantic City, N. J., June 16, 17 and 18.

Master Car Builders' Association, Atlantic City, N. J., June 21, 22 and 23.

Street Railway Association, State of New York, Lake George, N. Y., June 29 and 30.

American Institute of Electrical Engineers, Thousand Islands, June 28, 29 and 30.

Colorado Light, Power & Railway Association, Denver, Col., during the week of Oct. 11-16.

American Street & Interurban Railway Association and affiliated associations, Denver, Col., week commencing Oct. 18.

**Lunch Room for San Antonio Employees.**—J. J. King, general superintendent of the San Antonio (Tex.) Traction Company, has fitted up a dining-room for employees by the company at its barn and has readjusted the shifts of the men so that they have an increase in time for meals.

**Catalog of Wheeler Gift.**—The illustrated two-volume catalog of the Wheeler Gift of books, etc., to the American Institute of Electrical Engineers, edited by William D. Weaver, which is the most complete list of electrical books ever prepared, is completed. Information of the method of securing copies can be obtained from the secretary of the Institute.

**Special Train to Car Builders' and Master Mechanics' Convention.**—To accommodate delegates to the annual

convention of the Master Car Builders' Association, and the American Master Mechanics' Association at Atlantic City, the Central Railroad of New Jersey will run a special train leaving New York (West Twenty-third Street) at 3.20 p. m., Tuesday, June 15. Those desiring to travel on this train should notify Wm. McIntosh, S. M. P., Central Railroad of New Jersey, at Jersey City.

**New Line Opened Between Hartford and Middletown, Conn.**—The Connecticut Company opened its line between Hartford and Middletown, Conn., on May 25. The road is 16 miles long and the running time between the two cities is 1 hr. 15 min. The fare between the cities is 25 cents, and the fare zones are as follows: Middletown to Cromwell, Cromwell to Rocky Hill, Rocky Hill to Griswoldville, Griswoldville to Wethersfield, and from Wethersfield to Hartford.

**Street Railway Conditions Here and Abroad.**—G. J. Clark, of the Toronto (Ont.) Railway, was the guest of the Progressive Club, of Toronto, on a recent occasion when it considered civic and political questions. Mr. Clark took for his subject "Public Franchises." He contrasted returns to the city of Toronto under the contract between it and the company with the results attained in England under municipal ownership, and showed clearly how Toronto benefited by its contract with the city without the risks which follow an adventure into municipal ownership. He said that serving the public is precarious at the best, so many variable factors enter into the problem, and that in order to secure capital for investment the guarantee is essential that the property after development will not be confiscated, either directly or indirectly.

**Fire Insurance Rates Discussed in Boston.**—After one of the most spirited meetings in its annals the New England Insurance Exchange recently declined to adopt by a tie vote, 64 to 64, the resolutions submitted requesting it to relinquish jurisdiction over the rates and rules governing electric traction, lighting and gas properties in favor of a central rating committee. The attendance was the largest on record. Every member present, including President Rice, voted. A copy of the resolutions being offered in this and other exchanges on the subject of fire-insurance rates was published on page 827 of the *ELECTRIC RAILWAY JOURNAL* for May 1. In the case of the New England exchange, the majority report was presented by George Neiley, of the Royal Insurance Company, and the minority by Frank H. Battilana, of the Pennsylvania Insurance Company.

**Public Utilities Commission in Canada.**—The Province of Quebec has passed an Act authorizing the appointment of a Public Utilities Commission to have a surveillance of all public utilities. The bill defines a "public utility company" as "persons or organizations whose business is subject to provisional authority, with their lessees, receivers, etc., who possess, exploit, administer or control a system, plant, or appliances for transmission of telegraphic or telephonic messages or for transport of passengers or freight on a railway or tramway, or for production, transmission, delivery or sale of heat, light, or motive power, directly or indirectly, to or for the public." In matters of fact the commission will be absolute, while on questions of law or of jurisdiction there may be an appeal to the Court of King's Bench. The commission will be composed of three members appointed for a term of 10 years. It will have power to regulate all questions relating to the expropriation of private property by public utilities companies, including the power to fix the compensation. It will have authority to grant a public utility company the right to build within a municipality and will control all matters relating to extensions by companies, and all questions arising between a public utility company and a municipality in regard to furnishing heat, light, etc., to the citizens, including the fixing of rates.

**Hearing on Boston & Western Electric Railroad.**—The Massachusetts Railroad Commission gave a hearing recently at Boston on the petition of the Boston & Western Electric Railroad for a certificate of exigency to build a high-speed double-track interurban electric railway between Waltham and Marlboro. Samuel L. Powers represented the company, and Henry Durkee, Springfield, testified as its engineer. The line will cost about \$1,522,000, including a power plant investment of \$116,110, the total single-track mileage being 40 miles. With the exception of three grade crossings located where a combined abolition of steam railroad, electric railway and highway crossings will be necessary, the line will cross no steam railroad at the same level. The main line will be almost entirely on a private right-of-way. W. N. Buffum, Boston, counsel for the opposing interests, requested the board to refuse to give the company a hearing at this time, arguing that the dismissal of two previous petitions within the past year

constituted a refusal to grant the certificate of exigency. One petition was dismissed at the request of the company on account of a change in the directorate, the commission stating that this action was taken without prejudice in the case. The second petition was dismissed by the commission on account of an informality in the company's advertisement of its articles of association. Chairman Hall asked the counsel for the opposition if the spirit of the law forbidding a company to reappear within a year after the refusal of the board to grant a certificate did not require that the board should first investigate the whole proposition from the standpoint of whether additional transportation facilities are needed; and ruled that the commission had not refused to grant the certificate and that the company is properly before the commission. The next hearing will be held in June, unless the opposition stops the proceedings temporarily through the courts.

#### LEGISLATION AFFECTING ELECTRIC RAILWAYS

**Connecticut.**—The House has passed the following bill: "Section 1. Whenever the Railroad Commissioners deem it necessary, in the interests of the public, that any or all of the cars operated by any street railway upon any highway in this State shall be equipped with air brakes or other sufficient brakes, said Railroad Commissioners may order the company operating such cars to equip such cars with brakes, operated by air or otherwise, of such kind and in such manner as said Railroad Commissioners may deem necessary and proper, first giving such company reasonable notice to appear and be heard, and may, after similar notice, alter, modify or revoke any such order. Sec. 2. Any company operating such car or cars which shall neglect or refuse to comply with any order relating to brakes made pursuant to the provisions of section 1 of this act shall forfeit to the State \$25 for each day of such neglect or refusal." The House has reconsidered the bill providing for seats for motormen and has passed the measure and referred it to the Senate.

**New York.**—The Travis-Robinson rapid transit bill, which provides for the construction of subways in New York by private capital, public funds, or by assessment on the property benefited, was transmitted to Governor Hughes with the approval of Mayor McClellan of New York on May 11. The Governor immediately announced that a public hearing on the measure would be held by him at Albany on May 22. Many advocates of the bill appeared at the hearing to favor the measure, and on May 26 the Governor signed it. Governor Hughes vetoed the Stillwell bill designed to permit the Public Service Commission of the First District to make contracts for the construction, equipment, maintenance and operation of a subway extension. The bill conflicts with the Travis-Robinson bill which the Governor signed, as both measures provide for the amendment of the same section of the rapid transit law. In a memorandum filed with the Stillwell bill the Governor said: "The Travis-Robinson bill is a comprehensive measure designed to meet in a just way and with proper safeguards of the public interests the necessities of New York with regard to rapid transit development. Nothing should be done to introduce uncertainty or confusion. If the present bill were signed first the subsequent signing of the Travis-Robinson bill would supersede it. If the Travis-Robinson bill were signed first, the signing of this bill would override important provisions of the former. From any point of view this bill is inadvisable and cannot be approved." On May 27 Lieutenant-Governor Horace White and Speaker James W. Wadsworth, Jr., appointed the four joint legislative committees which are to investigate the question of direct primaries, the Ivens New York city charter, the capacity of the members of the Public Service Commissions and the question of employers' liability and the reasons for the condition of the unemployed in this State. The members of the committee to report on the advisability of extending the authority of the Public Service Commissions are Senators Meade, Rochester; Davenport, Oneida; McCarren, Brooklyn; Assemblymen Merritt, St. Lawrence; Yale, Putnam; Ward, New York; Walters, Onondaga, Caughlan, New York. Senator Meade has been made chairman of the committee. Despite the fact that Governor Hughes cut out of the legislative contingent fund the appropriation of \$50,000 for the expenses of these committees, the Republican legislative leaders determined to go ahead to pay the money for the expenses of these committees, using an available \$65,000 legislative contingent fund which the Governor did approve. During the first week of the legislative session next January the legislative leaders plan to pass a bill appropriating \$50,000 to meet the expenses of these committees, and if Governor Hughes vetoes the bill again it is their purpose to pass it over the Governor's veto. To do this will require a two-thirds vote in each house. This means Democratic support will be necessary.



# Financial and Corporate

## New York Stock and Money Market

June 1, 1909.

The stock market opened up buoyant and more active to-day, after the three days of holiday. The most notable feature was the strength of the common and the preferred issues of the United States Steel Corporation, which made new high records. Traction stocks have not been active and their prices have shown only fractional gains.

The money market continues to be remarkably easy. The banks are overstocked with cash and rates remain extremely low. Quotations to-day were: Call, 1½ to 2 per cent; 90 days, 2½ to 2¾ per cent.

### Other Markets

Both Philadelphia Rapid Transit and Philadelphia Union Traction stocks have sold off a few points and to-day were at the low points for the week. The former sold down to 30½ and the latter to 54. There was some recovery for each at the close.

In Boston, the only sales recorded were a few shares of Massachusetts Electric, both preferred and common, and some lots of Boston Elevated.

Kansas City Railway & Light has been the only traction issue that has been in evidence, to any extent, in the Chicago market during the past week. The issues of the Chicago Railways have been dull, only broken lots appearing.

United Railways bonds continue to be active in the Baltimore market. The "incomes" have been especially in demand. Prices remain about the same: "incomes" 57¼, funding 5s 80, and 4s 87½.

At the auction of securities in New York last week the following tractions were sold: \$5,000 West Penn Railways Company first mortgage 5s, at 99½; \$4,000 Third Avenue Railroad first mortgage 5s, at 109½, and 140 shares Orange County (N. Y.) Traction Company preferred, \$25 par, at \$1.50 per share.

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

	May 24.	June 1.
American Railways Company.....	45¾	45¾
Aurora, Elgin & Chicago Railroad (common).....	a38	*38
Aurora, Elgin & Chicago Railroad (preferred).....	a87½	*87½
Boston Elevated Railway.....	128½	130
Boston & Suburban Electric Companies.....	*15½	*15½
Boston & Suburban Electric Companies (preferred).....	71	*71
Boston & Worcester Electric Companies (common).....	11	*11
Boston & Wooster Electric Companies (preferred).....	a56	*56
Brooklyn Rapid Transit Company.....	79	79½
Brooklyn Rapid Transit Company, 1st ref. conv. 4s.....	88½	88
Capital Traction Company, Washington.....	*135½	a135¾
Chicago City Railway.....	a190	*190
Chicago & Oak Park Elevated Railroad (common).....	*4	3
Chicago & Oak Park Elevated Railroad (preferred).....	*15	14
Chicago Railways, ptcptg. ctf. 1.....	a110	*110
Chicago Railways, ptcptg. ctf. 2.....	a38	*38½
Chicago Railways, ptcptg. ctf. 3.....	a28	*28
Chicago Railways, ptcptg. ctf. 4s.....	a10	10¼
Cleveland Electric Railway.....	*78	*78
Consolidated Traction Company of New Jersey.....	a79	a79
Consolidated Trac. Co. of N. J., 5 per cent bonds.....	a107	a107
Detroit United Railway.....	a58½	a58
General Electric Company.....	161	161¼
Georgia Railway & Electric Company (common).....	85½	86
Georgia Railway & Electric Company (preferred).....	*85	*85
Interborough-Metropolitan Company (common).....	16	16½
Interborough-Metropolitan Company (preferred).....	44½	46
Interborough-Metropolitan Company (4½s).....	44½	44½
Kansas City Railway & Light Company (common).....	a49	78½
Kansas City Railway & Light Company (preferred).....	a86½	50¼
Manhattan Railway.....	a148	85¾
Massachusetts Electric Companies (common).....	a14	*147
Massachusetts Electric Companies (preferred).....	a71	*69½
Metropolitan West Side, Chicago (common).....	a18	*18
Metropolitan West Side, Chicago (preferred).....	a53	*53
Metropolitan Street Railway.....	*110	*28
Milwaukee Electric Railway & Light (preferred).....	*110	*110
North American Company.....	82½	81¾
Northwestern Elevated Railroad (common).....	a24	*24
Northwestern Elevated Railroad (preferred).....	a71	69½
Philadelphia Company, Pittsburg (common).....	42¾	41½
Philadelphia Company, Pittsburg (preferred).....	44	43½
Philadelphia Rapid Transit Company.....	33¾	32
Philadelphia Traction Co.....	a93	a93
Public Service Corporation, 5 per cent col. notes.....	a100¾	a100¾
Public Service Corporation, ctf. s.....	a89½	a89
Seattle Electric Company (common).....	*97½	108
Seattle Electric Company (preferred).....	99¾	100
South Side Elevated Railroad, Chicago.....	a60	*58
Toledo Railways & Light Company.....	11¾	10
Third Avenue Railroad, New York.....	28½	30
Twin City Rapid Transit, Minneapolis (common).....	a105¾	*104½
Union Traction Company, Philadelphia.....	57	55½
United Railways & Electric Company, Baltimore.....	12¾	*12¾
United Railways Inv. Co., San Francisco (com.).....	a38½	a38
United Railways Inv. Co., San Francisco (pfd.).....	a55	a55
Washington Railway & Electric Company (common).....	43	a43
Washington Railway & Electric Company (preferred).....	*90¾	a90½
West End Street Railway, Boston (common).....	*92¼	92
West End Street Railway, Boston (preferred).....	*110	105½
Westinghouse Electric & Manufacturing Company.....	84	84
Westinghouse Elec. & Mfg. Company (1st pref.).....	121	121

\*Last sale.

## Quarterly Report of Subsidiary Lines in Brooklyn Rapid Transit System

A report of subsidiary companies of the Brooklyn Rapid Transit system for the quarter ended March 31, 1909, has been issued by the New York Public Service Commission, First District. The returns of all the companies combined show total gross earnings in the quarter of \$4,451,869, an increase of \$213,197 over the corresponding quarter of the previous year, and total operating expenses of \$3,151,537, an increase of \$68,133. The operating ratio, all companies, was 70.8 per cent. The returns of the principal companies in the system were as follows:

	Brooklyn Heights Railroad.	Brooklyn, Queens County & Suburban Railroad.	Brooklyn Union Elevated Railroad.	Nassau Electric Railroad.
Quarter ending March 31, 1909.				
Gross earnings from operation.....	\$1,612,089.53	\$279,916.20	\$1,611,888.91	\$887,307.10
Operating expenses (excluding all taxes).....	1,106,583.93	221,578.99	1,052,294.39	695,454.32
Net earnings from operation.....	\$505,505.60	\$58,337.21	\$559,594.52	\$191,852.78
Income from other sources than operation.....	16,155.29	13,296.74	35,684.07	36,993.51
Gross income from all sources.....	\$521,660.89	\$71,633.95	\$595,278.59	\$228,846.29
Deductions from income as follows:				
Interest on funded and floating debt.....	\$144,662.62	\$104,083.50	\$425,824.68	\$214,593.26
Taxes { On property used in operation of road.....	88,031.30	12,705.40	91,296.86	33,065.17
On earnings and capital stock.....	21,682.46	2,932.13	16,475.73	14,493.00
Other than above.....	3,804.99	990.00	.....	1,830.00
Rentals.....	387,125.00	.....	.....	.....
Special appropriations.....	9,344.16	.....	.....	10,078.74
Total deductions.....	\$654,650.53	\$120,711.03	\$533,597.27	\$274,060.17
Net income from all sources (surplus).....	*\$132,989.64	*\$49,077.08	\$61,681.32	*\$45,213.88
Net income for previous quarters of fiscal year.....	90,118.45	21,177.55	424,138.33	154,139.61
Surplus for nine months ended March 31, 1909.....	*\$42,871.19	*\$27,899.53	\$485,819.65	\$108,925.73
Increases or decreases over the corresponding period of 1908:				
Gross earnings from operation.....	\$26,738.45	*\$119,233.65	\$100,260.91	\$199,783.10
Operating expenses (excluding all taxes).....	12,482.86	*32,685.01	*51,244.32	163,897.87
Net earnings from operation.....	\$14,255.59	*\$86,548.64	\$151,505.23	\$35,885.23
Income from other sources than operation.....	*5,005.65	7,240.59	156.36	744.91
Gross income from all sources.....	\$9,249.94	*\$79,308.06	\$151,661.59	\$36,630.14
Deductions from income as follows:				
Interest on funded and floating debt.....	\$12,321.85	\$6,555.90	\$7,987.45	\$3,034.16
Taxes { On property used in operation of road.....	26,306.76	1,599.59	51,556.89	3,655.34
On earnings and capital stock.....	217.14	*1,119.93	1,004.17	2,005.47
Other than above.....	39.99	115.02	.....	*4.98
Rentals.....	*750.66	.....	.....	.....
Special appropriations.....	9,960.69	*93.61	*6,922.69	8,482.39
Total.....	\$48,095.77	\$7,056.93	\$53,625.82	\$17,172.38
Net income from all sources (surplus).....	*\$38,845.83	*\$86,364.98	\$98,035.77	\$19,457.76
Net income for previous quarters of fiscal year.....	3,900.04	107,433.81	*308,234.66	72,738.81
Surplus for nine months since July 1st.....	*\$34,945.79	*\$193,798.79	*\$210,198.89	\$92,196.57

\* Indicates deficits, losses or decreases.

## Quarterly Report of Interborough Rapid Transit Company

A report of the Interborough Rapid Transit Company of New York for the quarter ended March 31, 1909, has been made public by the Public Service Commission, First District. It shows that, as compared with the corresponding

quarter of the previous year earnings from operation of the subway division gained 16 per cent, while the Manhattan Railway (elevated) division gained but 0.8 per cent. The operating ratio on the subway division in the quarter ended March 31, 1909, was 35.7 per cent and on the elevated division 43.6 per cent. The comparative figures follow:

MANHATTAN RAILWAY DIVISION,		Increase over	
Item.	January- March, 1909.	January- March, 1908.	quarter in 1908.
Earnings from operation.....	\$3,521,230.87	\$3,492,308.11	\$28,922.76
Operating expenses.....	1,536,728.94	1,579,435.82	*42,706.88
Net earnings.....	\$1,984,501.93	\$1,912,872.29	\$71,629.64
Other income.....	139,663.34	118,210.13	21,453.21
Gross income.....	\$2,124,165.27	\$2,031,082.42	\$93,082.85
Deduct—			
On property used in operation.....	\$36,000.00	\$30,000.00	\$6,000.00
On earnings and capital stock.....	50,108.94	49,605.18	503.76
Other than above.....	300,000.00	265,000.00	35,000.00
Rentals.....	1,456,293.02	1,500,833.37	*44,540.35
Net income.....	\$282,763.31	\$185,643.87	\$97,119.44
SUBWAY DIVISION.			
Earnings from operation.....	\$3,321,525.15	\$2,862,124.16	\$459,400.99
Operating expenses.....	1,186,884.98	1,126,495.03	60,389.95
Net earnings.....	\$2,134,640.17	\$1,735,629.13	\$399,011.04
Other income.....	222,606.59	200,130.95	22,475.64
Gross income.....	\$2,357,246.76	\$1,935,760.08	\$421,486.68
Deductions—			
Interest on funded debt.....	\$498,812.50	\$275,000.00	\$223,812.50
Taxes on property used in operation.....	18,000.00	15,000.00	3,000.00
Rentals.....	†545,957.46	†502,769.74	43,187.72
Amortization of debt discount and expense.....	3,036.21	.....	3,036.21
Net income.....	\$1,291,440.59	\$1,142,990.34	\$148,450.25

\* Decrease.

† Rental due City of New York measured by interest and sinking fund on city bonds for construction of Rapid Transit Railway.

#### Annual Report of the Honolulu Rapid Transit & Land Company

Earnings of the Honolulu Rapid Transit & Land Company for the year ended Dec. 31, 1908, compare as follows with the previous year:

	1908.	1907.	Increase.
Gross earnings.....	\$382,130	\$367,134	\$14,996
Operating expenses.....	211,976	201,228	10,748
Net earnings.....	\$170,154	\$165,906	\$4,248
Other income.....	7,797	7,475	322
Balance.....	\$177,951	\$173,381	\$4,570
Taxes, interest and sinking fund, etc.	72,727	78,161	*5,434
Balance.....	\$105,224	\$95,220	\$10,004
Depreciation.....	22,731	22,807	*76
Net divisible income.....	\$82,493	\$72,413	\$10,080

\*Decrease.

Of the operating expenses in the last year \$27,464 was expended for maintenance of equipment and ways and structures, as compared with \$25,142 in 1907.

From the net divisible income of \$82,493 shown as the result of the year's operations dividends of \$21,000, or 6 per cent, were paid on the preferred stock and \$32,000, or 4 per cent, on the common stock, a total of \$53,000.

L. T. Peck, the president, states in his report to shareholders: "Deterioration is showing in our rails, especially on curves, and renewals in future will be an expense of some moment. The same may be said of our poles and wires."

Mention is made by C. G. Ballentyne, the manager, of the increasing requirements on account of depreciation, as follows: "On account of depreciation due to wear and tear and climatic effects, it will be necessary from year to year to increase our expenditure in regard to the maintenance and renewals of all parts of the plant, but with the favorable outlook for increased passenger and freight traffic, I have no hesitation in saying the percentage of increase in the earnings will be much greater than that of the expense account."

**Boston & Northern Street Railway, Boston, Mass.**—The Boston & Northern Street Railway has petitioned the Railroad Commissioners for authority to issue \$536,000 additional bonds as voted by the directors of the company. The commission has previously approved an issue of \$15,000,000 first mortgage refunding 50-year 4 per cent gold bonds dated July 1, 1904, to be issued from time to time, of which the present issue is a part. Of the \$15,000,000 bonds, \$10,770,000 have already been issued.

**Chattanooga (Tenn.) Railways Company.**—The Chattanooga Railways Company and the Chattanooga Electric Company have applied to the City Council of Chattanooga for permission to consolidate. The Chattanooga Railways Company is capitalized at \$3,000,000, \$1,000,000 of which is 5 per cent preferred stock and the remainder common stock. The Chattanooga Electric Company is capitalized at \$1,500,000, of which \$500,000 is preferred stock. It is said that the proposed new company will be capitalized at \$5,000,000, of which \$2,000,000 will be preferred stock and the remainder common stock. The consolidation will be financed through E. W. Clark & Company, Philadelphia, Pa., and Hodenpyl, Walbridge & Company, New York, N. Y.

**Columbia Power, Light & Railways Company, Bloomsburg, Pa.**—The Columbia Power, Light & Railways Company, which has taken over the railway, lighting and gas properties in Danville, Bloomsburg and Berwick, organized on May 25 at Bloomsburg, as follows: E. R. Sponsler, Harrisburg, president; Myron I. Low, Bloomsburg, vice-president; A. W. Duy, Bloomsburg, secretary; M. Milleisen, Bloomsburg, treasurer. The directors of the company are: E. R. Sponsler, M. I. Low, A. W. Duy, W. C. Billman, Reading; William M. Pyle, Wilmington, Del.; W. F. Lowry, Berwick; C. M. Creveling, B. F. Myers, Harrisburg; R. H. Koch, Pottsville; R. S. Ammerman, Danville; M. F. D. Scanlon, Philadelphia, and P. R. Bevan, Wilkes-Barre.

**Lehigh Valley Transit Company, Allentown, Pa.**—At a special meeting on May 26 the directors of the Lehigh Valley Traction Company voted to increase the bonded indebtedness of the company from \$7,600,000 to \$9,000,000. Brown Brothers & Company, New York, and E. B. Smith & Company, Philadelphia, have agreed to take the new bond issue of \$1,400,000. After utilizing about \$400,000 to cancel outstanding notes \$1,000,000 will go into physical betterments, chief of which is a belt line for Allentown.

**Lexington & Interurban Railway, Lexington, Ky.**—The Lexington & Interurban Railway has sold part of an authorized issue of \$750,000 of two-year 6 per cent notes, the proceeds of which will be used to finance an extension from Lexington to Nicholasville.

**Metropolitan Street Railway, New York, N. Y.**—The United States Circuit Court of Appeals, Judges Noyes, Hough and Adams sitting, heard argument on May 25 and reserved decision on the appeal from the judgment of the circuit court in favor of the plaintiff in the suit of the receivers of the Metropolitan Street Railway against the Metropolitan Securities Company. The amount of the judgment was \$5,271,000, the total amount sued for as the balance of \$8,000,000 of three-year 5 per cent improvement notes turned over to the Metropolitan Securities Company by the Metropolitan Street Railway. Judge Ward in giving the judgment of the lower court held that the contract providing for the transfer of the \$8,000,000 in improvement notes constituted a real and valid sale. Appeal from this judgment was taken on the ground that there was no actual sale but only an agreement to advance the \$8,000,000 as a loan for which the improvement notes and their collateral were used as security.

**New Orleans Railways & Light Company, New Orleans, La.**—In connection with the plan of the New Orleans Railways & Light Company to create a \$50,000,000 issue of bonds, as noted on page 1002 of the ELECTRIC RAILWAY JOURNAL of May 29, 1909, Hugh McCloskey, president of the company, has sent the following letter to the stockholders of the company, concluding it with a request for proxies: "As you are aware, the New Orleans Railway & Light Company has outstanding \$30,000,000 of 4½ per cent bonds. This amount has either been directly issued or is held for the purpose of providing for payment of underlying bonds. As a result, when permanent work is to be done the earnings which could be credited to the stockholders are utilized for this permanent work, which will enure to the benefit of the system for many years to come. To finance the corporation so that the stockholders will derive some benefit in the way of dividends without waiting indefinitely is one of the objects which actuates your board of directors in submitting the enclosed proposition to you. It is also necessary to provide some means of retiring the present outstanding issue of 6 per cent notes, which mature in May, 1912, and as the present mortgage resting on your property is a closed instrument, and no other securities may be issued thereunder to cover purposes above named, it seems desirable to adopt some method for future financing. If the proposition is accepted, the financial arrangements will be such as to place the corporation in a position to keep pace with the growth of the city and to make such permanent and additional improvements as will enure to the benefit of the stockholders and all other parties in interest, and it will also place the company in such a posi-

tion as hereafter to be unhampered for the necessary capital to carry on the purposes of its creation."

**Old Colony Street Railway, Boston, Mass.**—The Old Colony Street Railway has petitioned the Railroad Commissioners for the approval of an issue of bonds not to exceed \$275,000. This is part of an issue of \$10,000,000 first mortgage refunding 50-year 4 per cent bonds authorized by the commission on May 10, 1904, of which there are now outstanding \$7,712,000.

**Philadelphia, Bristol & Trenton Street Railway, Philadelphia, Pa.**—Judge Stout has entered a decree of foreclosure of the property and franchises of the Philadelphia, Bristol & Trenton Street Railway. The proceeding under which the decree was made is upon the mortgage of the Union Trust Company, of Maryland, to secure an issue of bonds amounting to \$650,000, the company having twice defaulted in the payment of interest. The Bristol Trust Company was appointed receiver pending foreclosure proceedings. The property will be sold at public sale probably within the next 30 days. The upset price has been fixed at \$200,000.

**Rhode Island Company, Providence, R. I.**—The plea of the Rhode Island Company, which is controlled by the New York, New Haven & Hartford Railroad through its ownership of the securities of the Providence Securities Company, to the bill in equity filed against it by the Government, was overruled by Judges Colt, Putnam and Lowell in the United States Circuit Court recently. The plea contended that three judges did not constitute a lawful Circuit Court of the United States. The court allowed the filing of a bill of exceptions to its ruling and also the filing of a demurrer.

**Schuylkill & Dauphin Traction Company, Pottsville, Pa.**—The Schuylkill & Dauphin Traction Company reports earnings as follows for the year ended April 30, 1909: Gross receipts, \$27,876; operating expenses, \$15,943; net earnings, \$11,933; fixed charges, \$9,606; surplus, \$2,326. The increase in earnings over the corresponding years was 35.6 per cent.

**United Railways Investment Company, San Francisco, Cal.**—The purchase of the property of the Stanislaus Electric Power Company, at the recent foreclosure sale, by the United Railways Investment Company has been ratified, and the new company will at once take over the property. This is the conclusion of negotiations which have been pending for 15 months, and which have been frequently outlined in these columns. The new contract contemplates the issuance of first mortgage bonds on the property, which will take precedence over the original bonds; but it is held that the additional market for power and the improvements that will be made will advance rather than diminish the securities of the present bond issue. For the equities in the preferred and common stock of the power company the underwriters will receive \$900,000 of preferred and \$900,000 of common stock of the United Railways Investment Company. From the proceeds of the sale of the bonds it is contemplated that the fourth 10,000-hp unit will be installed at the Stanislaus power station; the storage dam at Relief Creek will be completed; the steam plant of 500 kw now under construction by the San Francisco Railway & Power Company at the North Beach power station will be purchased and the installation of an additional steam turbine plant of 9000 kw in the same station will be made. In addition, there will be the acquisition and construction of the necessary distributing lines, including the construction of two 100,000-volt, steel tower, transmission lines from Stanislaus to San Francisco. It is estimated that there can be developed by the Stanislaus property 60,000 hp. The contract made between the Stanislaus Power Company and the United Railroad Company provides for a rate of about \$30 per hp, and the railroad company expects to use about 25,000 hp.

**United Traction Company, Albany, N. Y.**—The United Traction Company reports earnings as follows for the quarter ended March 31, 1909, as compared with the similar period for 1908: Gross receipts for 1909, \$454,260, as compared with \$453,702 for 1908; operating expenses for 1909, \$295,210, as compared with \$323,799 for 1908; net earnings for 1909, \$159,049, as compared with \$129,903 for 1908; taxes accrued for 1909, \$33,000, as compared with \$24,631 for 1908; operating income for 1909, \$126,049, as compared with \$105,272 for 1908; other income for 1909, \$44,282, as compared with \$30,990 for 1908; net income for 1909, \$170,331, as compared with \$145,262 for 1908; total deductions for 1909, \$83,521, as compared with \$74,999 for 1908; surplus for 1909, \$86,809, as compared with \$70,262 for 1908.

**Washington, Frederick & Gettysburg Railway, Frederick, Md.**—The Washington, Frederick & Gettysburg Railway has elected officers as follows: Dr. Franklin Buchanan Smith, president; Alexander Ramsberg and Charles Wertheimer, vice-presidents; Charles C. Waters, secretary; Oscar T. Coblenz, treasurer. The company is now operating temporarily by steam between Frederick and Thurmont.

## Traffic and Transportation

### International Railway Freight Interchange at Lockport

The Public Service Commission of the Second District of New York gave a further hearing on May 28 at the offices of the commission in the Chambers of Commerce Building, Buffalo, in the matter of interchange of freight and joint rates between the International Railway and Erie Railroad and the New York Central & Hudson River Railroad at Lockport, N. Y., and the tributary industrial district, and Chairman Stevens and Commissioner Olmstead took additional evidence in the complaint of the Niagara Sprayer Company and the Merritt Manufacturing Company relative to refusal of the International Railway and the Erie Railroad and the New York Central & Hudson River Railroad to provide facilities for such interchange.

The examination of Martin J. Sheehan, superintendent of the Niagara Falls, Lockport and Olcott divisions of the International Railway, was continued. He testified as to various details of the freight business between North Tonawanda, Lockport and Olcott Beach, stating that under the arrangement between the International Railway and the Erie Railroad the lines of the International Railway between these points were integral parts of the Erie Railroad, so far as freight is concerned. The International Railway is under contract with the Erie Railroad to handle all freight originating at or destined to the various points on its line between North Tonawanda, Lockport and Olcott Beach and in the Lockport manufacturing district. For this service it receives a pro rata freight revenue and terminal switching charges and the privilege of using the tracks of the Erie Railroad between Buffalo and Lockport for its trolley passenger service. For this freight business the Erie Railroad furnishes all freight cars, and Mr. Sheehan contended that if the compulsory interchange arrangement asked for by complainants should be established it would be a detriment to his company because it would curtail the exclusive arrangement of the International Railway with the Erie Railroad, releasing the latter from its obligation to furnish all freight cars needed and would necessitate the building of a large number of freight cars of different classes by the International Railway to provide for business originating on its line or subject the company to a per diem charge for the use of cars of other roads, for which there would be no adequate return in revenues. He stated that the number of freight cars handled averages 30 or 40 per day, running as high as 130 to 150 per day during the height of the fruit shipping season from the Olcott district. Mr. Sheehan further testified that the cost of installing interchange tracks and providing interchange facilities with the New York Central & Hudson River Railroad at Lockport, Brest and other junction points would be large and not warranted by benefits which complainants claimed would be gained. The Erie Railroad and New York Central & Hudson River Railroad also introduced evidence to the same effect.

Thomas J. McGrath, president of the Lockport Board of Trade, testified regarding the large number of manufacturing concerns located in the industrial district of Lockport, served by only one railway, which he believed would be benefited by a system of interchange between the International Railway, the Erie Railroad and the New York Central & Hudson River Railroad, as asked for by the complainants, and intimated that if the cost of the interchange terminal and facilities to the railways was the only bar to the arrangement the Board of Trade or the City of Lockport might provide such interchange terminals without cost to the railroads. Upon the conclusion of the testimony the complainants were given until June 20 to file their briefs with the commission, the briefs to be accompanied by a map showing the routes of the International Railway and the New York Central & Hudson River Railroad in Lockport. Respondents are to file briefs by July 1 and complainants are to file a reply brief on or before July 10, when the case will be considered as finally submitted for the decision of the commission.

### Vestibule Order in Connecticut

As a result of a public hearing held in Hartford on April 20, 1909, on the subject of vestibules for cars operated over electric railways, the Railroad Commission of Connecticut has issued an order to the electric railways in the State which it concludes as follows:

"We take occasion to state the position which this board takes at this time on the whole question of vestibuling

cars and to modify or revoke our numerous previous orders relating to vestibuling cars and to substitute therefor an order on vestibuling which is applicable to all street railways operating cars in this State and to cover their operation at all seasons of the year.

"We find that by the operation of orders previously issued and by the acts of the street railways in providing their equipment, there are now in use in this State 950 closed cars of which 923 are provided with vestibules, but 185 of said cars are provided with what is known as the semi or bulkhead vestibule only.

"The two chief uses of the vestibule are the protection of the operators of the cars from cold and from storms. The operators, themselves, make a third claim, namely: protection from dust, cinders and other objects in the open air.

"We find that the open car is provided as additional equipment by the railways to meet the demands of its patrons and should be used only in the warm season of the year and on pleasant days in that season. We think that the traveling public demands that cars operated at such times should be in reality as open as it is possible to have them. We believe that the motorman operating the car can protect himself or be protected by the various simple devices now in use (such as glasses, storm coats, etc.) from the occasional short storms that occur in the summer months; that in severe or prolonged storms in said seasons the closed cars should be substituted for the open cars.

"Much testimony was heard tending to show the danger incident to operating cars in storms and the need of the operator having an unobstructed view. The testimony of witnesses and our inquiries fail to show any State where by statute or orders of Railroad Commissioners open cars used in summer months are required to be vestibuled.

"Therefore we deem it necessary in the interest of the public and of the employees concerned, and do order and direct each and every company operating a street railway within the limits of Connecticut fully to enclose the platforms of all so-called closed cars to be used in the transportation of passengers, with complete vestibules. And that all cars used by said street railway companies for the transportation of passengers between Nov. 1 (beginning in 1909) and April 1, inclusive, of each year be thus fully vestibuled, excepting from the provisions of this order cars used in an emergency or on such warm clear days in April and November as are suitable for the use of open cars."

**Will Dim Lights in Twin Cities.**—The Twin City Rapid Transit Company has decided to dim the headlights of its cars operated in Minneapolis and St. Paul. Owners of horses and of automobiles complained to the company about the intensity of the lights, and Horace Lowry, superintendent of the Minneapolis division of the company, who is president of the Minneapolis Automobile Club, agreed that the lights were a source of annoyance and possible danger.

**Record of Arrivals and Departures Over the Fort Wayne & Wabash Valley Traction Company's Lines.**—Frank Hardy, superintendent of transportation of the Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind., reports that during the last year 90 per cent of the cars arrived and left terminal points on time. Within five minutes of schedule time is considered to be on time, but if a car is more than five minutes late the crew is required to make a report, giving the cause of the delay.

**Employees at Evansville, Ind., Ask Arbitration.**—On page 1003 of the ELECTRIC RAILWAY JOURNAL of May 29, 1909, mention was made of the request of the employees of the Evansville & Southern Indiana Railway for a change from the present rate of wages, 17, 18 and 19 cents an hour, according to the length of service, to 19 and 20 cents an hour for two grades of employees. The men met on May 26, and have proposed to the company that it agree to leave the settlement of the terms of service with a board of arbitration of five members, two of whom shall be selected by the company, two by the Central Labor Union and the fifth member jointly by the others.

**Hearing on Application to Abandon Road.**—The application of the Bennington & North Adams Street Railway, Hoosick Falls, N. Y., to abandon its line in Hoosick Falls because it does not pay was opposed before the Public Service Commission of the Second District of New York at the hearing on May 2, by the citizens of the village, who objected to the abandonment of the line. The company's representatives said the gross revenue in Hoosick Falls did not average \$4 a day. The company agreed to modify its application so that only that part of the road in Hoosick

Falls which lies beyond the Boston & Main Railroad should be abandoned. The commission reserved its decision.

**Opinion of Attorney-General of California Regarding Electric Railways.**—The statement was made recently in a San Francisco paper that the Attorney-General of the State had expressed the opinion that interurban electric railways in California come within the jurisdiction of the Board of Railroad Commissioners. W. D. Wagner, who was asked by the ELECTRIC RAILWAY JOURNAL to confirm the statement, has replied as follows: "The Attorney-General's opinion was a verbal one, given at a meeting of the Board of Railroad Commissioners. It was the Attorney-General's opinion, verbally expressed, that interurban electric railways are within the jurisdiction of the Railroad Commission of this State."

**Summer Schedules on the Oneida Railway and the Utica & Mohawk Valley Railway.**—The Oneida Railway and the Utica & Mohawk Valley Railway have made a number of changes in their schedules. Between 8:05 a. m. and 7:05 p. m. there is a limited car each way every hour between Utica and Syracuse except at 12:05 p. m. An extra limited car also leaves each terminal at 10:15 p. m. to accommodate people from the Oneida Lake resorts. The limited cars formerly ran every two hours between 7:05 a. m. and 5:05 p. m. The time of the local Utica-Syracuse service has not been changed. There is an hourly service from 5:30 a. m. until 9:30 p. m., all cars leaving the terminals on the half hour. There is also a local from each terminal at 11:30 p. m. The Utica & Mohawk Valley Railway now maintains half-hourly service between Rome and Little Falls from 5:30 a. m. until midnight on Mondays, Tuesdays, Wednesdays, Thursdays, Fridays and Sundays. When additional cars are required on Sundays, however, they will be run. On Saturdays a 20-minute service is established at noon and maintained until midnight.

**More Washington, Baltimore & Annapolis Circulars.**—The Washington, Baltimore & Annapolis Electric Railway, Washington, D. C., has issued a new circular descriptive of the principal cities reached by the line and of the road itself. The principal points of interest in Washington, Baltimore and Annapolis and typical scenes along the line are illustrated. Two maps show the connections between the Washington, Baltimore & Annapolis Electric Railway and other lines in Washington and Baltimore. Places of interest in Washington and Baltimore are tabulated. The rates of fare for one way and the round trip between Baltimore and Washington, Baltimore and Annapolis, and Washington and Annapolis are given, as are also the rates for the tri-city trip, including Washington, Annapolis and Baltimore. The rates for twilight and other special excursions for parties are tabulated separately. The company has also issued a circular giving the program for the commencement exercises at the United States Naval Academy at Annapolis, which will be held the first week in June. In this publication there is a description of the facilities which the company proposes to offer during commencement week, and a statement of the requirements for securing admission to the different functions at Annapolis during the ceremonies.

**Terms of Service at Scranton to be Arbitrated.**—In accordance with a 10-year agreement which went into effect in the spring of 1906 between the Scranton (Pa.) Railway and its employees, the company has decided to submit to arbitration the request of its employees for a flat rate of 25 cents an hour for trainmen and an increase in wages of 25 per cent for all other employees. During the 10-year period covered by the agreement there can be neither strikes nor lock-outs, but it was provided that on April 1, 1909, and on April 1, 1912, the question of wages should be taken up for adjustment. The company is at present paying its car men 20 cents an hour for the first year of service, 21 cents for the second year and 22 cents for the third year and thereafter. The agreement between the company and the men provides that if terms cannot be arranged between themselves, matters in dispute shall be settled by a board of arbitration consisting of five members, two appointed by the company, two by the employees and the fourth so selected to select the fifth man. The company selected D. B. Atherton and H. E. Paine as its representatives on the board of arbitration, and the employees selected William Corless and P. E. Kilcullen to represent them. These gentlemen conferred recently and decided to extend an invitation to Judge George B. Gray of the United States Circuit Court of Appeals for the Third Judicial District to act as referee of the board, and Judge Gray has accepted. The hearings will be held in the Federal Building, Scranton, beginning on June 7. Judge Gray was president of the Anthracite Strike Commission and has been requested on several occasions to name an umpire when the Miners' Conciliation Board has been deadlocked.

## Personal Mention

**Mr. H. C. Hoagland** has resigned as chief electrical and mechanical engineer of the Illinois Traction System, Decatur, Ill., to become vice-president of and general manager of the Missouri Central Railway, Columbia, Mo.

**Mr. F. J. Gerdon** has resigned as superintendent of transportation of the Utica & Mohawk Valley Railway, Utica, N. Y., and **Mr. T. C. Cherry**, formerly with the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., has been appointed to succeed him, with the title of superintendent.

**Mr. J. C. Larason** has been appointed passenger agent of the Columbus, Delaware & Marion Railroad, Columbus, Ohio, to succeed **Mr. W. T. Henderson**, resigned. **Mr. Larason** was formerly ticket agent and cashier of the Ohio Electric Railway at Springfield, Ohio.

**Col. Edwin W. Hine** has been elected a member of the board of directors of the Public Service Corporation of New Jersey, and has also been selected as a member of the executive committee of the company to succeed the late **Mark T. Cox**. **Colonel Hine** has been secretary of the corporation for more than a year and is a member of the works committee.

**Mr. Louis Ducor**, engineer of the contracting firm of Messrs. Geros & Loucheur, Paris, is in this country on a tour of inspection to study American developments in high-tension power transmission and single-phase and high-tension direct-current railroads. **Mr. Ducor** will remain here about 10 weeks, and will visit some of the far Western cities before his return.

**Mr. Edgar S. Fassett**, general manager of the United Traction Company, Albany, N. Y., and general manager of the Hudson Valley Railway, both of which are controlled by Delaware & Hudson Company interests, has resigned as general manager of the Hudson Valley Railway, and will be succeeded by **Mr. A. E. Reynolds**, with headquarters at Glens Falls, N. Y. **Mr. Fassett**, however, will continue as a director of the Hudson Valley Railway.

**Mr. J. S. Shedd**, superintendent of the Birmingham Division of the Pittsburg (Pa.) Railways Company, has been appointed general agent of the company in charge of the employment bureau. **Mr. Shedd** has had many years' experience in railway work. He was formerly identified with several Western railroads and later was claim agent of the Monongahela lines of the Pittsburgh Railways Company. At one time he was assistant superintendent of the Consolidated Traction Company, Pittsburgh.

**Mr. E. Dana Durand**, who is to succeed **Mr. S. N. B. North** as director of the United States census, was the author of Part I of the report on street and electric railways in the census of 1902, relating to the economic, financial and social features. Part II of that report, relating to the history and engineering features of street and electric railways, was written by **Mr. T. Commerford Martin**. Before he became associated with the census bureau **Mr. Durand** was connected with Harvard University in the capacity of professor of economics.

**Mr. John De Lowry**, superintendent of the Highland Division of the Pittsburgh (Pa.) Railways Company, has been appointed superintendent of the Birmingham Division of the company with jurisdiction over the Charleroi and Washington lines, succeeding **Mr. J. S. Shedd**, who has been appointed general agent of the company in charge of the employment bureau. **Mr. C. C. King**, superintendent of the Second Avenue Division of the company, has been appointed superintendent of the Highland Division of the company to succeed **Mr. De Lowry**, and **Mr. W. H. Boyce**, assistant superintendent of the Second Avenue Division of the company, has been appointed superintendent of the Second Avenue Division.

**Mr. E. Stuart McLean** has been appointed to the newly created office of chief inspector of the Boston & Worcester Street Railway, Boston, Mass., and will take over practically all the duties of the position of assistant superintendent which was abolished following the resignation of **Mr. M. E. Nash**, which was noted in the *ELECTRIC RAILWAY JOURNAL* of May 22, 1909, page 963. **Mr. McLean** has had a varied railroad experience. He served as a motorman and a conductor on the Milford & Uxbridge Street Railway for about four years, and spent some time in the freight and express service of the company. He has been connected with the Boston & Worcester Street Railway for about six years. Entering the employ of the company as a motorman he was promoted to night foreman and then to foreman of the car house, in which position he served about four years. As chief inspector of the company **Mr. McLean** will be located at the general offices of the company in Framingham Junction.

**Mr. Edward F. Reeves** has been appointed chief of the employment bureau of the transportation department of the Brooklyn Rapid Transit Company. **Mr. Reeves** was born in Toronto, Ontario, in 1860. He entered the employ of the New York Central & Hudson River Railroad in 1885 and served with that company until 1895. His first position with the New York Central & Hudson River Railroad was as freight clerk at Albion, N. Y., where he remained until 1889, when he was appointed freight agent of the company at Medina. He served at Medina until 1890, and was then appointed freight and ticket agent of the company at Albion, which position he retained until 1893. **Mr. Reeves** was next appointed freight clerk and joint transfer agent of the New York Central & Hudson River Railroad at East Buffalo and remained with the company in that capacity until 1895, when he resigned to enter the employ of the Brooklyn Rapid Transit Company as master of the Fifty-eighth Street depot. This position **Mr. Reeves** retained until 1898 when he was appointed superintendent of terminals of the Brooklyn Bridge by the Brooklyn Rapid Transit Company. In 1902 **Mr. Reeves** was appointed superintendent of the Bridge Division of the Brooklyn Rapid Transit Company and continued in that capacity until quite recently when he was appointed to his present position.

**Mr. Edward J. Bock**, whose appointment as superintendent of the Chicago & Milwaukee Electric Railroad with headquarters at Highwood, Ill., was noted in the *ELECTRIC RAILWAY JOURNAL* of May 29, 1909, page 1004, was born in Holland on Jan. 1, 1876, and came to the United States when a small boy. After graduating from grammar school **Mr. Bock** spent several years in the northern part of Canada as a miner, at times being employed by the Canadian Pacific Railway in various subordinate positions. In February, 1897, he accepted a position with the Metropolitan West Side Elevated Railway, Chicago, as a trainman, and was promoted from time to time until he was made master of the Garfield Park Division of the company. Subsequently, **Mr. Bock** was appointed to the position of dispatcher of the Metropolitan West Side Elevated Railway, succeeding **Mr. M. J. Feron**, who was made the general superintendent, and **Mr. Bock** was given full charge of the Garfield Park Division of the company. On account of the close connection between the Metropolitan West Side Elevated Railway and the Aurora, Elgin & Chicago Railway, **Mr. Bock** became well acquainted with interurban electric railway operation. **Mr. Bock** was transferred from the Garfield Park Division to the Logan Square and Humboldt Divisions of the Metropolitan West Side Elevated Railway on May 1, 1908, and retained the position with these divisions of the road until he resigned recently to become superintendent of the Chicago & Milwaukee Electric Railroad.

### OBITUARY

**John W. Carter**, formerly general superintendent of the Kansas City Railway & Light Company, Kansas City, Mo., is dead. **Mr. Carter** retired from the Kansas City Railway & Light Company in June, 1908, and after retirement devoted his time to agriculture.

**Mark Walton Watson**, president of the Standard Underground Cable Company, Pittsburgh, Pa., died at Philadelphia on June 1, aged 81 years. **Mr. Watson** was prominent in financial and business circles in Pittsburgh, and at the time of his death was president of the Exchange National Bank and the Monongahela Water Company, and was a director in several other companies.

**Daniel E. Walsh**, who was president of the People's Railway and the Tower Grove & Lafayette Railway, St. Louis, Mo., is dead. **Mr. Walsh** was active in street railway affairs in St. Louis before the organization of the St. Louis Transit Company and the United Railways, St. Louis, but retired from business about 10 years ago. **Mr. Walsh** was born in St. Louis in 1844, and was educated in the city schools there and at St. Louis University. He was a bachelor. In recent years **Mr. Walsh** was active in the affairs of the University and the Missouri Athletic clubs.

**Edward A. Newman**, secretary, treasurer and general manager of the Portland (Me.) Railroad, died at his home in Portland on May 21. **Mr. Newman** was born in Westbrook, Me., and was educated in the public schools of his native town and at Westbrook Seminary. For a time after graduating from Westbrook Seminary **Mr. Newman** was employed in the office of **Mr. J. Winslow Jones** in Portland, but in June, 1875, he was elected treasurer of the Portland Railroad and has held that office ever since. In 1885 **Mr. Newman** was appointed general manager of the company in addition to treasurer. Subsequently he was elected secretary of the company. **Mr. Newman** was also general manager and a director of the Biddeford & Saco Railroad.

# Construction News

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

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

## RECENT INCORPORATIONS

**Missouri Inland & Southern Railway, Licking, Mo.**—Chartered to build an electric railway from Rolla to Licking, 40 miles. Capital stock, \$400,000. Directors: Albert Campbell and C. H. Evers, Spokane, Wash.; A. E. Young, E. C. Comstock, A. H. Bradford and D. M. Meaders, Licking, Mo. [E. R. J., March 15, '09.]

**\*Third Avenue Bridge Company, New York, N. Y.**—Incorporated to construct a street railway about 2 miles in length over the Queensboro Bridge, extending from Third Avenue and Fifty-seventh Street, Manhattan, to the Queens terminus of the bridge at Jackson Avenue, Long Island City. Capital stock, \$20,000. Incorporators: Alfred D. Sage, Walter J. Quinn, John E. Quinn, William P. Seaver, James F. Feeley, Raymond O'Neill and Edwin Goodwin, New York; Walter C. Burrows, Brooklyn, and Louis Kayer, Mount Vernon.

**\*Shawnee Electric Railway, Shawnee, Okla.**—Chartered to build an electric railway from Shawnee to Muskogee, a distance of 120 miles; also to build a railway from Shawnee to Oklahoma City, 40 miles. Incorporators: C. T. Edwards, A. Hargraves, C. E. Eastwood and W. S. Pendleton, Shawnee.

**\*Eugene-Pacific Western Railroad, Eugene, Ore.**—Incorporated to build an electric railway from Eugene to Florence. This company will take over the franchises and privileges obtained by the Eugene & Pacific Electric Railway recently organized for the purpose of building an electric railway to the coast. Capital stock, \$300,000. Incorporators: F. J. Bergot, F. A. Anderson and Joseph Fellman, Eugene, Ore.

**\*Irwin-Herminie Traction Company, Irwin, Pa.**—Application has been made by this company for a charter to build an electric railway from Herminie to Irwin, 4 miles. Applicants for the charter are C. H. Bolton, I. H. Taylor, C. A. Thompson, Thomas P. Herron and John L. Pearce.

**Hinton Street Car & Transportation Company, Hinton, W. Va.**—Incorporated to build an electric railway from Hinton via Union, Avis and Red Sulphur Springs to the mouth of the East River. Capital stock, \$50,000. Incorporators: James T. McCreery and W. H. Sawyers. [E. R. J., March 6, '09.]

## FRANCHISES

**Birmingham, Ala.**—Application has been made to the City Council for a franchise for the Birmingham & Edgewood Electric Railway to build an electric railway from the southern terminus of the South Highlands line along the Twentieth Street road to the city limits. The object of the proposed railway is to connect Birmingham with Shades' Valley. [E. R. J., May 29, '09.]

**Fresno, Cal.**—The Board of Supervisors has granted to F. S. Granger, vice-president of the Fresno, Hanford & Summit Lake Interurban Railway, a franchise for an electric railway over certain streets in Fresno County. [E. R. J., May 8, '09.]

**\*Los Angeles, Cal.**—The Board of Supervisors has granted a franchise to M. J. Nolan to construct and operate an electric street railway on the extension of Washington Street, from the west city boundary to Rimpau Street.

**San Mateo, Cal.**—J. Barneson, who is said to represent the United Railroads, San Francisco, has petitioned the City Trustees for a franchise for an electric railway which will traverse B Street, south to Ninth Avenue, thence west to Palm, south to Sixteenth Avenue.

**Washington, D. C.**—President Taft sent to Congress on May 29 two short messages transmitting ordinances recently approved by the executive council of the island of Porto Rico. One granted an extension of time to the Ponce Railway & Light Company in which to complete certain extensions, and the other granted to the San Juan Light & Transit Company the right to operate an electric railway between San Juan and Rio Piedras, and to supply electric light to the public.

**College Park, Ga.**—A franchise has been granted to the Fairburn & Atlanta Railway & Electric Company by the City Council. It is the plan of the company to construct an electric railway from Fairburn through Stonewall and Red Oak to College Park, 11 miles. [E. R. J., Jan. 2, '09.]

**\*Covington, Ga.**—The City Council has granted to the Oxford & Covington Street Railway a 5-year franchise for an electric railway in Covington.

**Joliet, Ill.**—The City Council has granted the Joliet & Southern Traction Company an extension of two years to its franchise. By this new ordinance, the company has until April 23, 1911, to complete its interurban system.

**New Orleans, La.**—Announcement is made by the New Orleans Railway & Light Company that application will be made at the next meeting of the City Council for a franchise providing for the extension of the Clio Street line from Napoleon Avenue to the Protection Levee, a distance of about 3 miles.

**Wellesley, Mass.**—The Natick & Cochituate Street Railway has applied to the Selectmen for an extension of its franchise, in which to make certain improvements in its tracks.

**\*Houghton, Mich.**—C. D. Hanchette has petitioned for a franchise for a right-of-way through certain streets of Portage for an electric railway connecting Houghton and South Range.

**Hibbing, Minn.**—The Northern Traction Company has requested of the City Council a six months' extension of its franchise. The company proposes to build an electric railway to connect Hibbing, Chisholm, Buhl, Mt. Iron, Virginia and Eveleth. Grading has been done for a distance of about 3 miles and some track has been laid.

**Columbia, Mo.**—The City Council has granted a 20-year franchise to the Mexico, Santa Fe & Perry Traction Company for the entrance of an interurban electric railway from Mexico to Columbia, a distance of 60 miles. The franchise provides that the railway must be completed in two years. S. L. Robinson, Mexico, president. [E. R. J., May 15, '09]

**West Orange, N. J.**—The Town Council has granted to the Orange Mountain Traction Company a 50-year franchise to extend its tracks from its present terminus at Northfield and Benvenue Avenues, along Northfield Avenue to Walker Road.

**Dayton, Ohio.**—The Oakwood Street Railway has applied to the City Council for an extension of its franchise, which will allow the company to build from its present terminus on Salem Avenue to a point about 1 mile north on Salem pike.

**Defiance, Ohio.**—The Ohio Electric Railway, Cincinnati, has asked for a year's extension of time in which to begin the electrification of the steam line which it now operates between Lima and Defiance.

**\*Okmulgee, Okla.**—At a special meeting recently held in Okmulgee it was voted to grant an electric railway franchise to the Okmulgee Interurban Railway. J. B. Jones, Muskogee, is identified with the company.

**Portland, Ore.**—The City Council has granted the United Railways an extension of its franchise, for completing its track to Mount Calvary Cemetery and Hillsboro, until one year from July 1, 1909.

**Allentown, Pa.**—The City Council has defeated the ordinance presented by the Inter-County Electric Railway, Tipton, for an electric railway franchise over certain streets in Allentown. [E. R. J., May 8, '09.]

**Knoxville, Tenn.**—Charles Dawes, representing the Knoxville-Interurban Railway, has applied to the City Council for an electric railway franchise. [E. R. J., May 1, '09.]

**Grand Rapids, Wis.**—The Common Council has granted the Grand Rapids Street Railroad a franchise to build an electric railway in Grand Rapids. The company plans to construct an electric railway between Grand Rapids and Nekoosa, 7 miles. Neal Brown, Wausau, president. [E. R. J., May 15, '09.]

## TRACK AND ROADWAY

**\*Searcy, Ark.**—Louis Lorch, Searcy, is reported to be promoting a plan to build an electric railway from Searcy to Higginson, 4 miles, with a branch 2 miles long in Searcy to Searchlight Park. W. M. Wheeler, Little Rock, Ark., is also reported interested. The company will be known as the Searchlight Power & Electric Company and will be incorporated within the next few weeks. It is planned to build a power station at Searcy.

**\*Goat River Power & Light Company, Creston, B. C.**—W. F. Teetzel, general manager of this company, advises that construction work will be started within a year on a new 10-mile electric railway to extend from Creston to the Goat River. The line as proposed is more for the development of a large fruit district than for passenger traffic. The company proposes to build a power station on the Goat River Canyon. Power will be furnished for lighting and for other general purposes. Capital stock, authorized, \$1,000,000; issued, \$300,000. Officers: R. S. Lennie, Nelson,

B. C., president; W. K. Essling, Rossland, B. C., vice-president; J. D. Anderson, Trail, B. C., secretary-treasurer; W. F. Teetzel, Nelson, B. C., general manager.

**British Columbia Electric Railway, Vancouver, B. C.**—This company has appropriated \$2,500,000 for new equipment and extensions to its lines on the southern mainland. It is stated that most of this amount will be used in constructing new lines in the vicinity of Vancouver. The work is expected to be done during the next 12 months.

**Shore Line Electric Railway, New Haven, Conn.**—The Board of Railroad Commissioners has issued a finding approving the layout and method of construction of a proposed street railway line by this company from Saybrook to Madison, passing through the towns of Westbrook and Clinton.

**Savannah (Ga.) Electric Company.**—This company advises that it expects to rebuild 5 miles of city track.

**Chicago, Wheaton & Western Railway, Chicago, Ill.**—This company has filed for record at Syracuse a mortgage to the Central Trust Company of Illinois, as trustee, to secure an issue of \$500,000 of 40-year 5 per cent gold bonds. The company proposes to build an electric railway from Wheaton to Geneva by way of West Chicago. [E. R. J., May 22, '09.]

\***Freeport, Ill.**—It is stated that W. T. Rawleigh is interested in a proposition to build an electric railway from Freeport, Ill., to Madison, Wis., via Cedarville, Rock Grove, Oakley and Brodhead.

**Decatur, Sullivan & Mattoon Transit Company, Mattoon, Ill.**—This company has filed a deed making the Windsor Trust Company, New York, N. Y., trustee in an authorized bond issue of \$2,500,000. The company contemplates building an electric railway from Decatur to Mattoon, Ill., a distance of 48 miles. [E. R. J., June 20, '08.]

**Tri-City & Northeastern Interurban Railway, Port Byron, Ill.**—Preparations are being made by this company for making new surveys through Rapid City and Cordova. The work will be done under the direction of Wallace Treckler, chief engineer. [E. R. J., April 3, '09.]

**Illinois Traction System, Springfield, Ill.**—H. E. Chubbuck, general manager, is said to have announced plans for the construction of an electric belt railway entering Springfield. The line will be built at a cost of \$200,000. F. B. Martin, Decatur, will be in charge of the work. The line will be used exclusively for freight traffic and is expected to be ready for operation within five months.

\***Kansas City, Kan.**—It is reported that Martin J. Reitz is promoting a cross-town street railway to run irregularly from Thirteenth Street and Minnesota Avenue to Eighteenth Street and Muncie Boulevard in West Armourdale.

**Central Kentucky Traction Company, Frankfort, Ky.**—This company has awarded the contract for the construction of the proposed extension from Lexington to Nicholasville, 12 miles, to David Pepper, Jr., of Philadelphia. Swethurst & Allen, Philadelphia, will do the work. J. B. Crawford, Lexington, general manager.

**Louisville (Ky.) Railway.**—This company expects to let contracts within the next few days for the rebuilding of 8 miles of city track.

**Boston & Northern Street Railway, Boston, Mass.**—This company is said to have announced that it will expend \$120,000 for improvements to its street railway and additional equipment for its power plant.

**Oak Bluffs (Mass.) Street Railway.**—This company expects to install during the summer a turn-out and will use a complete equipment of split switches, frogs and ground stands for a standard-gage, 45-lb. T-rail roadbed.

**Guadalajara, Jalisco, Mex.**—It is stated that the Southern Pacific Company has in contemplation an electric railway which will connect Guaymas with Aurora, San Jose de Guayma and Empalme. The proposed line would go westward to the Gulf beach beyond Aurora and the Hacienda Aranjuez to Empalme. It would be a scenic route about 16 miles in length.

**Montana Rapid Transit Company, Helena, Mont.**—F. W. Bibb, Helena, writes that this company plans to start construction work soon on a new 72-mile electric railway which is to connect Helena and Butte. The following towns are located along the route: East Helena, Montana City, Clancy, Alhambra, Jefferson, Beavertown, Amazon, Boulder, High Ore, Basin, Bernice, Calvin, Lowland, Woodville and Meaderville. Spurs will be constructed from East Helena to Lakeview, an amusement resort, also from Jefferson to Wickes, via Corbin. The company has secured the grade of the old Northern Pacific Railroad out of Helena and also the abandoned grade of the Great Northern Rail-

road from Weeks tunnel to Boulder. No contracts for material have been awarded as yet. The company has contracted with the United Missouri River Power Company for the necessary power to operate its lines. Officers: Jos. K. Toole, president; H. G. Pickett, vice-president; E. C. Day, secretary and treasurer. [E. R. J., April 17, '09.]

**Babylon (N. Y.) Railroad.**—The Public Service Commission of the Second District has authorized this company to extend its railway from its present terminus in Babylon to Amityville, a distance of about 5.81 miles.

**Oneida (N. Y.) Railway.**—This company has applied to the Public Service Commission of the Second District for permission to build an extension from Sherrill to Kenwood.

**Geneva, Waterloo, Seneca Falls & Cayuga Lake Traction Company, Seneca Falls, N. Y.**—The Public Service Commission of the Second District has granted the application of this company for permission to construct an extension of its railway from Seneca Falls across Cayuga Lake to Auburn. The order requires that the detailed plans for the crossing of Cayuga Lake be filed and approved by the commission before actual construction is started. The commission has also granted the company permission to change its name to the Geneva & Auburn Railway.

**Northern Ohio Traction & Light Company, Akron, Ohio.**—It is stated that this company is considering the advisability of building an electric railway between Akron and Massillon, over a right-of-way that was purchased and partly graded several years ago.

**Cincinnati, Lawrenceburg & Aurora Electric Street Railroad, Cincinnati, Ohio.**—It is stated that this company plans to extend its railway to Rising Sun. The company is planning to extend its line to Scottsburg also, with a view of connecting with the Indianapolis & Louisville Traction Company, affording direct connection to Indianapolis and Louisville.

**Cleveland, Barberton, Coshocton & Zanesville Railway, Cleveland, Ohio.**—The directors of the chamber of commerce and J. J. Breiting, Cleveland, president of this company, recently held a special conference and discussed plans for the proposed railway entering Zanesville and also securing rights-of-way in the city. Mr. Breiting stated that matters had so far progressed that the company was about ready to take up the work of a franchise with the City Council. The route entering the city has not yet been decided upon definitely. It is stated that construction work will be started at Coshocton by June 15. A power plant will be built at Otsego. [E. R. J., April 10, '09.]

**Toledo, Fostoria & Findlay Railway, Fostoria, Ohio.**—This company expects to place contracts during the next two weeks for special work to be used in connection with the Tiffin, Fostoria & Eastern Electric Railway so as to establish a union freight station.

**People's Railway, New Hamburg, Ont.**—Official announcement is made that this company expects to begin the construction of its proposed electric railway within the next few weeks. This line will connect Stratford, Woodstock, New Hamburg, Berlin, Guelph and intervening towns. It will be about 88 miles in length. The company intends to use 2800 ties to the mile and the track will be laid with 70-lb. steel rails with continuous rail joints and electrically welded bonds. Catenary construction will be installed. Power will be purchased from the Hydro-Electric Power Commission. A. N. Warfield, New Hamburg, construction engineer. [E. R. J., April 10, '09.]

**Wasco County Electric & Power Company, Portland, Ore.**—At the annual meeting of the stockholders of this company, held at Condon on May 13, a new board of directors and the following officers were elected: George S. Carpenter, president; H. I. Keeney, first vice-president; George Ainslie, second vice-president; Mark W. Gill, third vice-president; F. T. Hurlburt, treasurer; C. W. Lord, secretary; C. S. Greaves, assistant secretary; W. H. Hurlburt, general manager; H. C. Smith, superintendent. The electric railway to be built by this company will enter the Deschutes and John Day valleys and will be built south from Condon to Antelope Madras and Bend. Branches will be built to Howard and Dayville. [E. R. J., Nov. 7, '08.]

**Southern Cambria Railway, Johnstown, Pa.**—This company is said to have approved the plans prepared by the Tennis Construction Company for a viaduct entrance into South Fork and has authorized the building committee to contract with various bidders in order that work may begin in the immediate future. The viaduct will be 525 ft. long.

**York (Pa.) Railways.**—It is said that this company is planning to expend \$100,000 for extensions and various other improvements if it can obtain certain concessions from the city.

**San Antonio (Tex.) Traction Company.**—This company expects to build at once a 3-mile extension to its street railway.

**Pacific Traction Company, Tacoma, Wash.**—This company has awarded a contract to Dibble & Hawthorne, Tacoma, for double tracking and relaying the tracks on paved streets in this city.

**Vancouver (Wash.) Traction Company.**—It is stated that this company has plans under consideration for extending its railway from Vancouver east to Camas, a distance of about 12 miles.

**Grand Rapids (Wis.) Street Railroad.**—This company is said to have placed a contract with the Knox Construction Company, Chicago, Ill., for the construction of its proposed electric railway, which is to connect Grand Rapids, Port Edwards and Nekoosa, 7 miles. [E. R. J., May 15, '09.]

#### SHOPS AND BUILDINGS

**San Francisco, Vallejo & Napa Valley Railroad, Napa, Cal.**—It is stated that this company will, during the summer, erect a new passenger and freight depot at Maine Street, Vallejo. The structure will cost, it is estimated, \$20,000.

**Chicago & Milwaukee Electric Railroad, Chicago, Ill.**—It is stated that this company will soon award contracts for a new freight depot to be erected at First Street and National Avenue, Milwaukee.

**Nevada Interurban Railway, Reno, Nev.**—This company is engaged in erecting a new car house at a point midway between Reno and Moana Springs.

#### POWER HOUSES AND SUBSTATIONS

**British Columbia Electric Railway, Vancouver, B. C.**—This company has awarded a contract to Naylor Brothers, Huddersfield, Eng., for the enlargement of its hydraulic tunnel connecting Lakes Coquitlam and Buntzen. The capacity of the tunnel will be trebled by the improvement which is undertaken in connection with the construction of the new dam at the mouth of Lake Coquitlam, for which permission was recently given by the provincial authorities of British Columbia.

**Southern Pacific Railroad, Los Angeles, Cal.**—Construction is now under way on the power station of this company at Fruitvale which is to furnish power for the electrification of lines in Oakland, Alameda and Berkeley. The dimensions of the building are 228 ft. x 138 ft. and it will be three stories high. The exterior walls of the building, up to the height of the first-story windows, will be constructed of concrete finished on the exterior in cement stucco. The walls above this concrete work will be constructed of dark-red brick.

**United Railroads, San Francisco, Cal.**—This company expects to purchase about 20,000-kw motor generator sets for substations.

**Pueblo & Suburban Traction & Lighting Company, Pueblo, Col.**—John F. Vail, general manager, writes that this company is planning to increase the boiler capacity of its power plant by the installation of 1000 hp in boilers.

**Savannah (Ga.) Electric Company.**—This company has purchased recently a 1000-kw Allis-Chalmers steam turbine.

**Louisville (Ky.) Railway.**—This company plans to build a new boiler house which will necessitate the purchase of 2000 hp in boilers.

**Old Colony Street Railway, Boston, Mass.**—This company has plans under way to increase the efficiency of its service by providing for a secondary high-tension circuit all the way from the main power station in Quincy to Fall River. The secondary system will extend over the present course, the same poles and route to be used, passing through Brockton and Bridgewater to Taunton and Fall River, through the same transforming stations.

**Grand Forks (N. D.) Street Railway.**—This company advises that it is considering the purchase of the following second-hand power-plant equipment: 1 100-kw belted railway generator, 550-600 volts; 1 250-kw, 550-volt generator direct connected to a compound condensing engine; boilers, condensers, heaters, switchboard, etc., complete.

**Morris County Traction Company, Morristown, N. J.**—It is announced that this company will soon let contracts for additional power-plant equipment.

**Rochester Railway & Light Company, Rochester, N. Y.**—This company is said to contemplate installing a 1500-kw transformer in its substation at Mill Street and Commercial Street.

**Kenosha (Wis.) Electric Railway.**—It is stated that this company has secured a site for a new power station which it proposes to build at an estimated cost of about \$75,000.

## Manufactures & Supplies

#### ROLLING STOCK

**San Antonio (Tex.) Traction Company** is having 10 cars built by the American Car Company.

**Rockford & Interurban Railway, Rockford, Ill.**, is in the market for four city cars for fall delivery.

**Sapulpa (Okla.) Interurban Railway** has ordered four cars from the St. Louis Car Company, St. Louis.

**Dallas (Tex.) Electric Corporation**, it is reported, will purchase two pay-as-you-enter cars through Stone & Webster.

**Houston (Tex.) Electric Company** has purchased one Warner non-parallel axle truck from the St. Louis Car Company.

**Indiana Union Traction Company, Anderson, Ind.**, has purchased one 18-ft. motor car from the Dorner Railway Equipment Company, Chicago.

**Beaumont (Tex.) Traction Company**, which recently ordered five cars from the St. Louis Car Company, has just received these cars and placed them in service.

**Portsmouth (N. H.) Electric Railway** expects to purchase 20 fare registers within a month. The style of register to be bought has not been decided on.

**Savannah (Ga.) Electric Company** expects to build two single-truck, closed cars in its own shops. The company has purchased two GE-67 four-motor equipments.

**Springfield (Mass.) Street Railway** has not definitely decided on rolling stock to be purchased this season, as mentioned in the *ELECTRIC RAILWAY JOURNAL* of May 22, 1909.

**Grand Valley Railway, Brantford, Ont.**, has decided not to purchase any new cars until next spring. Mention of the contemplated purchase of cars was made in the *ELECTRIC RAILWAY JOURNAL* of May 15, 1909.

**Sheffield Car Company, Three Rivers, Mich.**, has placed an order with the Taylor Electric Truck Company for 12 trucks. These trucks will be used for gasoline inspection cars which the company is building.

**Southern Wisconsin Railway, Madison, Wis.**, has ordered one car from the American Car Company. This is a sample car for which the company was reported in the *ELECTRIC RAILWAY JOURNAL* of March 6, 1909, to be in the market.

**Chicago (Ill.) Railways Company** will receive this week the first shipment of three all-steel cars from the Pressed Steel Car Company. The balance of the order for 50 all-steel cars which was placed last year will be received and placed in operation during the next 60 days.

**Hattiesburg (Miss.) Traction Company** has purchased four 20 rebuilt Pullman cars from the Dorner Railway Equipment Company. These cars are mounted on Brill 21-E trucks and are equipped with Westinghouse motors. Mention of the contemplated purchase of six cars was made in the *ELECTRIC RAILWAY JOURNAL* of Feb. 20, 1909.

**Grand Forks (N. D.) Street Railway**, mentioned in the *ELECTRIC RAILWAY JOURNAL* of May 8, 1909, as having ordered three cars from the American Car Company, advises that these cars will be mounted on single trucks, will be 20 ft. 8 in. in body length, will have a seating capacity of 32, and will be equipped with Smith heaters and two GE-57 motors.

**Interborough Rapid Transit Company, New York, N. Y.**, has placed the order for 40 trailer cars for elevated service, dividing it equally between the St. Louis Car Company and the Wason Manufacturing Company. The contract for the motor cars was let as follows: Jewett Car Company, Newark, Ohio, 20 cars; Barney & Smith Car Company, Dayton, Ohio, 40 cars.

**St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.**, reported in the *ELECTRIC RAILWAY JOURNAL* of April 24, 1909, as having purchased five cars from the St. Louis Car Company, advises that these cars will have 28-ft. 8-in. bodies, will be equipped with Brill No. 22 special maximum traction trucks and GE-210 motors and will be built under the license of the Pay-As-You-Enter Car Corporation.

**Washington Water Power Company, Spokane, Wash.**, has placed an order with The J. G. Brill Company for 15 new double-truck cars for city service. The cars will be double end and equipped with four GE-80 motors each, contactor control, Hunter illuminated signs, Midvale steel wheels, Symington center and side bearings, Symington journal boxes, International registers, Brooklyn Heights headlights and Consolidated heaters.

**Portland Railway, Light & Power Company, Portland, Ore.**, has drawn the following specifications for the 40 pay-as-you-enter cars bought from the American Car Com-



pany, other than those mentioned in the *ELECTRIC RAILWAY JOURNAL* of May 22, 1909:  
 Width over sills...7 ft. 2 in. Headlights .. Crouse-Hinds  
 Over posts at belt...8 ft. 2 in. Motors .....2 GE  
 Height from top of rail to Push-button signal.L. M. E.  
 sills.....2 ft. 7 3/16 in. Telephone Manufacturing  
 Interior trim.....Cherry Company  
 Axles.....Jones & Laughlin Sanders .....De Witt  
 Couplers..Van Dorn or Safety treads.....Universal  
 Tomlinson Trucks .....Eureka  
 Curtain fix....Curtain S. Co. Varnish ..... Murphy  
 Destination signs...Hunter Wheels ..... Griffin

**Grand Rapids (Mich.) Railway** has drawn up the details of the 12 pay-as-you-enter cars, reported in the *ELECTRIC RAILWAY JOURNAL* of April 10, 1909, as being built by the American Car Company, as follows:

Seating capacity .....36 Axles ..... Brill  
 Weight, body.....28,000 lb. Curtain fix....Curtain S. Co.  
 Length of body.....30 ft. Curtain material...Pantasote  
 Over vestibule...46 ft. 4 in. Fare boxes ..... Brill  
 Width over sills..8 ft. 5 1/2 in. Gears and pinions.....GE  
 Over posts at belt..8 ft. 9 in. Gongs ..... Dedenda  
 Sill to trolley base....9 ft. Hand brakes ..... Brill  
 Height from top of rail to Heating system.Peter Smith  
 sills.....3 ft. 1 1/4 in. Headlights .. Crouse-Hinds  
 Body ..... wood Motors .....GE-210  
 Interior trim, Cherry and ash Seats ..... Hale & Kilburn  
 Underframe ..... wood Safety treads.....Universal  
 Air brakes.....GE Trucks..Brill Special No. 22

**Tri-City Railway, Davenport, Ia.**, which was reported in the *ELECTRIC RAILWAY JOURNAL* of May 22, 1909, to have ordered 10 cars, has placed the order with the Cincinnati Car Company, Cincinnati, Ohio. The specifications which will be followed are:

Length of body...21 ft. 6 in. Fenders ..... Consolidated  
 Length over all.....33 ft. Gongs ..... Dedenda  
 Width over all.....8 ft. 6 in. Hand brakes .....Peacock  
 Sill to trolley base..7 ft. 8 in. Heating system.Consolidated  
 Height from top of rail Motors .....2 GE-80  
 to sills.....2 ft. 4 7/8 in. Paint ..... Willey  
 Body ..... ash Registers ..... International  
 Interior trim.bird's-eye maple Roofs ..... Monitor  
 Underframe...wood & metal Sanders ..... Dumpit  
 Couplers ..... Hovey Seats ..... Hale & Kilburn  
 Curtain fixtures.... National Step treads ...Carborundum  
 Curtain material...Pantasote Trolley base....U. S. No. 6  
 Destination signs.... Hunter Varnish ...Murphy—Chicago  
 The motors and registers will be installed by the railway company.

**TRADE NOTES**

**Aluminum Company of America, Pittsburgh, Pa.**, has removed it Washington, D. C., office from 2204 Q Street to the Metropolitan Bank Building.

**Perry Ventilator Corporation, New Bedford, Mass.**, has received an order for equipping with its ventilators the 13 cars being built for the Rochester, Syracuse & Eastern Railway by the G. C. Kuhlman Car Company.

**Francis X. Pund**, vice-president of the D. T. Williams Valve Company, Cincinnati, Ohio, after a brief illness, died on May 8. In 1904, Mr. Pund with David T. Williams, formerly general manager of the Lunkenheimer Company, founded the D. T. Williams Valve Company. Mr. Pund is succeeded by Charles K. Thomas, formerly sales agent for the company.

**Ohmer Fare Register Company, Dayton, Ohio**, announces that the Detroit (Mich.) United Railway, which has 350 of its cars equipped with the Ohmer registers, has just given the Ohmer Fare Register Company another contract for equipping 241 cars, including equipment for the city lines at Ann Arbor, Pontiac, Port Huron, Mt. Clemens, and four additional interurban lines controlled by the Detroit United Railway. The Ohmer Fare Register Company has secured during the past few days contracts for installing the Ohmer system on six other properties.

**Dayton Manufacturing Company, Dayton, Ohio**, has secured the services of Franklyn M. Nicholl, who will aid the company in the promotion of sales of its curtain specialties for steam and electric railway cars. Mr. Nicholl is well known both as a railway man and as a salesman of railway supplies. For a number of years he was associated with the Rochester Railway Company, but later resigned his position to accept a place in the sales department of a truck manufacturer. During the past two years he has represented the O. M. Edwards Company as salesman in the central States.

**Allis-Chalmers Company, Milwaukee, Wis.**, advises that the aggregate horse-power of its recent orders for electrical apparatus, mentioned in the *ELECTRIC RAILWAY JOURNAL*

of May 29, 1909, page 1068, was 161,985 hp instead of 61,985 hp, as printed. The company reports that since Jan. 1, 1909, it has received orders for nearly 1000 air-brake equipments. These include straight air, straight-air emergency, combined straight and automatic air equipments and automatic air-brake equipments. Among the companies buying are the following: Tampa & Sulphur Springs Traction Company, Tampa, Fla.; Third Avenue Railroad, New York; Tarrytown & White Plains Railway, White Plains, N. Y.; Yonkers (N. Y.) Railway; Omaha & Council Bluffs Street Railway, Omaha, Neb.; Conestoga Traction Company, Lancaster, Pa.; Ogden Rapid Transit Company, Ogden, Utah; Atlantic Shore Line Railway, Kennebunk, Me.; General Construction Company, Omaha, Neb.; Sandusky, Norwalk & Mansfield Railway, Norwalk, Ohio; Shelbourne Falls & Colrain Street Railway, Shelbourne Falls, Mass.; Chester (Pa.) Traction Company; Lebanon Valley Street Railway, Lebanon, Pa.; Rochester (N. Y.) Railway; Eastern Wisconsin Railway & Light Company, Fond du Lac, Wis.; Transit Supply Company, Minneapolis, Minn.; Chicago (Ill.) City Railway.

**Western Electric Company, Chicago, Ill.**, in April made a slightly better showing than in March, which was the best month in the fiscal year to that time. Sales in April, 1909, were nearly 50 per cent ahead of the sales for April, 1908. The company has expanded steadily during the last 10 years, the high record being reached in 1906, when sales ran up to \$69,245,331, an increase of more than \$25,000,000 over the preceding year. At the present time the Western Electric Company is operating at the annual rate of 65 per cent of the record of 1906 and about 85 per cent of the record of 1907, which was the second best year in the company's history with sales totalling \$52,724,168. Demand for electrical supplies and electrical machinery is fully up to that of March and the business in small and moderate-size motors and generators is the best in the company's history. This is partly explainable by the fact that manufacturers have found it more economical, especially in cities where current is cheap and easily available, to give up the use of steam power and run their plants by many small motors, which are easily moved about from place to place and consume current only when in active operation.

**ADVERTISING LITERATURE**

**F. Bissell Company, Toledo, Ohio**, has issued a pamphlet describing electric sign receptacles.

**British Thomson-Houston Company, Ltd., Rugby, England**, is mailing a slip illustrating its B.-T.-H. motor-starting rheostats.

**Detroit Sanitary Rag Company, Detroit, Mich.**, is sending out a folder describing the advantages of its sanitary wiping rags.

**Lord Electric Company, 213 West Fortieth Street, New York**, has published Bulletin G on Earll trolley retrievers and catchers.

**National Brake Company, Buffalo, N. Y.**, has issued a leaflet illustrating the Ackley brake and calling attention to its many new features.

**Frank Ridlon Company, Boston, Mass.**, has printed a new catalog illustrating principally its shop specialties for armature, field, commutator and bearing work.

**Joseph Dixon Company, Newark, N. J.**, has printed a booklet on belt dressing which includes data for calculating the speed of pulleys and the horse-power of belting.

**Elmer P. Morris Company, New York, N. Y.**, is mailing a wall map showing the western hemisphere, the Panama Canal district and numerous examples of its overhead line specialties.

**Electric Storage Battery Company, Philadelphia, Pa.**, has issued a bulletin entitled "The Use of the Chloride Accumulator in Connection with Electrically Operated Drawbridges."

**General Electric Company, Schenectady, N. Y.**, announces Booklet No. 3779, containing a list of this company's snap switches. It has also issued Bulletins Nos. 4659 and 4660, respectively, describing Type I a.c. switchboard instruments and tungsten economy diffusers.

**Wason Manufacturing Company, Springfield, Mass.**, has prepared a splendid publication of over 100 pages on its products. The text is given in English, German, French and Spanish. The greater part of the book illustrates passenger and freight cars built for steam or electric service, each car being accompanied by full data. Illustrated references are also made to trucks and to various general constructional details. Cable codes and indexes are included to add to the value of the publication as an order guide.

TABLE OF MONTHLY EARNINGS

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

COMPANY	Period	Gross Income	Operating Expenses	Gross Income Less Operating Expenses	Deductions From Income	Net Income	COMPANY	Period	Gross Income	Operating Expenses	Gross Income Less Operating Expenses	Deductions From Income	Net Income
AKRON, O. Northern Ohio Tr. & Light Co.	1m., Apr. '09 1 " " '08	151,906 129,804	89,586 32,252	62,320 47,552	43,779 44,029	18,541 3,523	MEMPHIS, TENN. Memphis St. Ry. Co.	1m., Mar. '09 1 " " '08 3 " " '08	133,151 128,857 379,712	*84,512 *83,705 *240,331	48,639 45,152 133,382	35,489 34,836 106,340	13,150 10,316 27,042
BELLINGHAM, WASH., Whatcom Co. Ry. & Lt. Co.	1m., Mar. '09 1 " " '08 12 " " '08	32,172 28,561 369,849	18,063 15,973 214,970	14,109 12,588 154,879	8,100 8,017 101,554	5,919 4,571 53,325	MILWAUKEE, WIS. Milwaukee Elec. Ry. & Lt. Co.	1m., Apr. '09 1 " " '08 4 " " '08	339,718 309,848 1,341,187	167,001 157,762 688,407	172,717 152,085 652,780	103,841 93,024 411,807	68,876 59,061 240,972
BIRMINGHAM, ALA. Birmingham Ry., Lt. & Power Co.	1m., Mar. '09 1 " " '08 3 " " '09 3 " " '08	181,818 177,003 551,015 522,091	*114,204 112,680 *342,287 *348,338	67,614 64,317 209,328 173,753	44,787 42,803 134,350 130,168	22,827 21,454 74,972 43,586	Milwaukee Lt. Ht. & Trac. Co.	1m., Apr. '09 1 " " '08 4 " " '09 4 " " '08	105,596 100,492 412,597 194,183	28,552 27,312 117,296 115,757	77,045 73,181 295,301 278,426	60,730 15,507 241,078 51,573	16,315 15,507 54,223 51,573
CHARLESTON, S. C. Charleston Con. Ry. Gas & Elec. Co.	1m., Apr. '09 1 " " '08 2 " " '09 2 " " '08	59,976 177,003 120,370 122,564	36,250 39,528 75,886 80,263	23,726 21,450 44,484 42,283	13,917 13,817 27,833 27,633	9,810 7,634 16,651 14,650	MINNEAPOLIS, MINN. Twin City Rapid Transit Co.	1m., Apr. '09 1 " " '08 4 " " '08	537,049 493,497 2,087,748	261,714 246,325 1,100,631	275,335 247,172 987,117	149,367 126,075 477,256	134,968 121,097 439,861
CHICAGO, ILL. Amora, Elgin & Chicago R. R. Co.	1m., Apr. '09 1 " " '08 10 " " '09 10 " " '08	106,412 97,934 1,183,401 1,156,407	64,183 57,378 653,439 641,509	42,230 40,556 529,962 514,858	28,553 28,330 280,245 278,979	13,677 12,225 249,717 235,978	MONTREAL, CAN. Montreal St. Ry.	1m., Apr. '09 1 " " '08 7 " " '08 7 " " '08	294,374 280,736 2,107,716 2,027,873	173,552 170,141 1,339,935 1,316,007	120,822 110,595 767,781 711,866	37,625 37,495 218,866 224,109	83,199 73,099 548,915 487,757
CLEVELAND, O. Cleveland, Painesville & Eastern R. R. Co.	1m., Apr. '09 1 " " '08 4 " " '09 4 " " '08	21,807 20,834 77,020 77,189	*12,559 *11,713 *44,398 *43,670	9,248 9,121 33,222 33,519	8,383 7,974 32,840 31,828	866 1,148 382 1,691	NORFOLK, VA. Norfolk & Portsmouth Trac. Co.	1m., Mar. '09 1 " " '08 3 " " '08 3 " " '08	156,394 138,792 468,558 415,452	93,720 88,061 269,744 274,961	62,674 50,731 198,814 140,491	..... ..... ..... .....	..... ..... ..... .....
Lake Shore Elec. Ry. Co.	1m., Apr. '09 1 " " '08	78,574 73,200	*45,651 *45,280	32,923 27,920	34,353 31,135	†1,430 †1,215	OAKLAND, CAL. Oakland Traction Co.	1m., Mar. '09 1 " " '08 3 " " '09 3 " " '08	233,992 232,494 653,675 668,170	116,302 108,036 277,590 337,844	117,690 123,858 326,085 330,326	45,367 45,872 136,101 137,534	72,323 77,986 189,984 192,792
DALLAS, TEX. Dallas Electric Corporation.	1m., Mar. '09 1 " " '08 12 " " '08	102,667 87,997 1,208,226	62,996 61,758 787,935	39,671 26,239 421,192	28,918 29,327 345,748	10,753 7,388 75,444	San Francisco, Oakland & San Jose Cons. Ry.	1m., Mar. '09 1 " " '08 3 " " '09 3 " " '08	75,166 74,598 213,949 213,031	34,749 38,228 102,037 110,402	40,417 36,370 111,912 102,569	23,142 20,852 69,426 62,556	17,275 15,518 42,486 40,013
DETROIT, MICH. Detroit United Ry. Co.	1m., Apr. '09 1 " " '08 4 " " '09 4 " " '08	619,724 551,161 2,322,392 2,069,47	374,292 *350,426 1,438,353 *1,360,240	245,502 206,735 883,949 709,231	*154,155 134,249 *614,404 540,132	91,347 66,486 269,545 169,099	PADUCAH, KY. Paducah Traction & Light Co.	1m., Mar. '09 1 " " '08 12 " " '09 12 " " '08	17,641 18,304 224,435 230,597	10,855 8,976 133,677 147,056	6,785 9,328 90,758 89,540	7,064 7,938 82,601 82,886	†729 2,290 8,158 6,654
EL PASO, TEX. El Paso Elec. Co.	1m., Mar. '09 1 " " '08 12 " " '08	45,602 43,041 542,404	29,005 32,567 377,054	16,597 11,074 104,750	7,911 7,070 89,108	8,686 4,004 75,552	PENSACOLA, FLA. Pensacola Electric Co.	1m., Mar. '09 1 " " '08 12 " " '09 12 " " '08	19,013 19,205 214,323 228,927	11,549 13,320 138,077 152,131	7,464 5,886 75,646 76,796	4,339 4,165 51,808 48,745	3,125 1,721 23,837 28,051
FAIRMONT, W. VA. Fairmont & Clarksburg Tr. Co.	1m., Mar. '09 1 " " '08 3 " " '09 3 " " '08	33,085 27,816 93,153 85,980	13,189 11,088 37,934 30,090	19,896 16,129 55,219 49,884	..... ..... ..... .....	..... ..... ..... .....	PHILADELPHIA, PA. American Rys. Co.	1m., Apr. '09 1 " " '08 10 " " '09 10 " " '08	222,076 213,955 2,330,260 2,394,999	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....
FT. WAYNE, IND. Ft. Wayne & Wabash Valley Tr. Co.	1m., Mar. '09 1 " " '08 3 " " '08	105,812 97,760 314,721	64,721 58,250 187,284	41,091 39,504 127,437	..... ..... .....	..... ..... .....	PLYMOUTH, MASS. Brockton & Plymouth St. Ry. Co.	1m., Mar. '09 1 " " '08 12 " " '09 12 " " '08	7,580 7,254 123,479 121,037	6,393 6,293 86,112 86,324	1,186 961 37,367 34,714	1,980 2,382 25,925 27,370	†794 †1,421 11,442 7,343
FORT WORTH, TEX. Northern Texas Elec. Co.	1m., Mar. '09 1 " " '08 12 " " '09 12 " " '08	109,013 91,051 1,124,025 1,064,116	60,357 48,403 657,058 592,853	48,656 41,248 466,967 471,263	17,173 14,269 198,310 103,030	31,482 28,979 268,657 308,233	PORTLAND, ORE. Portland Ry., Lt. & Pwr. Co.	1m., Apr. '09 1 " " '08 4 " " '09 4 " " '08	377,488 341,493 1,442,446 1,350,758	170,838 177,669 699,812 699,383	206,650 163,824 742,634 651,375	*123,611 *114,521 *484,134 *468,113	83,039 48,303 258,500 182,262
GALVESTON, TEX. Galveston-Houston Elec. Co.	1m., Mar. '09 1 " " '08 12 " " '09 12 " " '08	95,611 83,539 1,119,176 1,063,113	59,076 51,033 640,063 628,093	36,535 32,505 470,113 433,021	21,578 20,476 249,067 232,631	14,957 12,029 221,046 202,390	ST. JOSEPH, MO. St. Joseph Ry., Lt., Heat & Pwr. Co.	1m., Apr. '09 1 " " '08 4 " " '09 4 " " '08	72,440 64,699 300,637 268,265	41,782 36,651 162,649 146,157	30,658 28,048 137,988 122,108	*20,819 20,341 *83,332 81,463	9,839 7,707 54,656 40,645
HOUGHTON, MICH. Houghton County Tr. Co.	1m., Mar. '09 1 " " '08 12 " " '09 12 " " '08	25,457 19,773 280,676 254,141	14,900 12,259 150,311 144,295	10,551 7,514 124,365 109,840	5,797 4,807 61,618 57,396	4,754 2,708 62,744 52,450	ST. LOUIS, MO. United Railways Co. of St. Louis.	1m., Apr. '09 1 " " '08 4 " " '09 4 " " '08	911,654 865,691 3,452,002 3,327,451	*569,702 *570,663 *2,333,337 *2,293,096	331,952 295,028 1,218,665 1,123,755	233,527 232,274 939,517 932,437	108,425 62,754 279,148 191,318
JACKSONVILLE, FLA. Jacksonville Elec. Co.	1m., Mar. '09 1 " " '08 12 " " '09 12 " " '08	41,047 36,965 445,411 397,658	23,591 21,983 259,254 237,307	17,457 14,982 186,157 160,351	9,558 9,184 112,155 92,936	7,899 5,798 74,002 67,414	SAVANNAH, GA. Savannah Elec. Co.	1m., Mar. '09 1 " " '08 12 " " '09 12 " " '08	46,814 4,161 600,274 604,044	29,215 3,162 369,179 409,143	17,599 12,999 231,095 194,901	101,071 85,249 1,132,906 976,643	87 †4,095 23,317 †5,196
KANSAS CITY, MO. Kansas City Ry. & Lt. Co.	1m., Mar. '09 1 " " '08 10 " " '09 10 " " '08	548,061 488,741 5,397,181 5,127,918	303,888 267,037 3,054,437 2,658,672	244,174 221,704 2,342,744 2,469,246	154,370 153,824 1,544,973 1,532,896	89,803 67,880 797,772 936,351	SEATTLE, WASH. Seattle Elec. Co.	1m., Mar. '09 1 " " '08 12 " " '09 12 " " '08	420,416 354,887 4,655,154 4,285,313	262,079 214,536 2,738,293 2,559,755	158,338 140,351 1,916,861 1,725,558	101,071 85,249 1,132,906 976,643	57,266 55,101 783,954 748,915
KNOXVILLE, TENN. Knoxville Ry. & Lt. Co.	1m., Mar. '09 1 " " '08 3 " " '09 3 " " '08	47,131 46,522 139,215 128,017	*24,158 *23,251 *71,426 *73,348	22,972 23,270 67,787 54,672	11,483 11,623 34,450 34,469	11,489 11,647 33,337 20,203	TACOMA, WASH. Puget Sound Elec. Ry. Co.	1m., Mar. '09 1 " " '08 12 " " '09 12 " " '08	146,287 127,448 1,729,026 1,689,304	103,166 83,035 1,150,308 1,047,239	43,120 44,413 578,719 642,065	45,911 42,154 523,431 476,916	†2,790 2,259 55,288 165,150
LEXINGTON, KY. Lexington & Interurban Rys.	1m., Mar. '09 1 " " '08 3 " " '09 3 " " '08	40,957 43,985 119,725 120,954	34,703 31,380 94,774 87,975	6,254 12,605 24,951 32,980	..... ..... ..... .....	..... ..... ..... .....	TAMPA, FLA. Tampa Elec. Co.	1m., Mar. '09 1 " " '08 12 " " '09 12 " " '08	48,176 43,121 508,206 531,949	27,702 29,234 365,701 380,420	20,475 13,887 202,505 151,528	4,609 2,236 47,078 17,438	155 15,651 155,427 134,090
LITTLE ROCK, ARK. Little Rock Ry. & Elec. Co.	1m., Mar. '09 1 " " '08 3 " " '09 3 " " '08	56,589 56,552 171,031 163,509	*27,549 *28,220 *82,189 *81,439	29,040 28,326 88,842 82,070	11,023 8,191 32,784 27,500	18,017 20,136 56,058 54,570	TOLEDO, O. Toledo Rys. & Light Co.	1m., Apr. '09 1 " " '08 4 " " '09 4 " " '08	215,553 202,342 873,085 832,327	122,473 109,216 494,498 465,486	93,080 93,126 378,587 366,841	70,915 70,792 283,781 276,655	22,165 22,424 94,806 90,186