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NEW YORK, SATURDAY, FEBRUARY 4, 1911.

CONTENTS.

The Mid-Year Meeting

Two mid-year meetings of the American Association have now been held. Both have been as well attended as the annual meetings of the parent association and the plan of holding these mid-year meetings may now be considered as firmly established. The practice of holding a number of meetings of committees of the parent association and of some of the affiliated associations during the same week naturally brings to New York at this time many railway men, who thus combine attendance at the mid-year meeting with their committee work. The reports of these meetings, published in our issue of last week and of this week, show that a great many important topics will be taken up this year and that considerable progress on their consideration has already been made by many of the committees. The statement of the secretary and treasurer also shows that the membership of the association, both active and associate, is increasing, in spite of the fact that it is yet early in the year and the new committees on both classes of membership have not yet had an opportunity of doing very much active work.

We do not recall that in any other year recently the committee work of the different associations has been as far advanced as is the case this year. This is gratifying, but, of course, must be followed up by active work during the next six months if the results desired are to be obtained. The Engineering Association has asked this year that all of the committee reports should be completed and in the hands of the secretary one month earlier than formerly, and it would be well for the other associations to require an earlier delivery of reports to the secretary so that all members will have a chance to read them carefully before going to the convention. The plan adopted by the Transportation & Traffic Association to request the chairman of each committee to arrange for the discussion of the report of his committee by two individuals outside of the committee should also stimulate the discussion of these reports and is worthy of consideration by the other associations. Six committees met on Wednesday and meetings of 20 committees were held on Thursday. These were followed on Friday by the regular mid-year meeting of the American Association at which the four addresses previously announced in this paper were presented. Two of these, that by Mr. McCarter on "Return on Investments" and that by Mr. Davis on "The Adjustment of American Street Railway Rates to the Expansion of City Areas," are published elsewhere in this issue. We feel confident that all of those who attended the meetings on Friday felt repaid for their trip to New York, and it is significant that the attendance at the meetings was considerably larger than at the first mid-year meeting of the association, held last year. The day concluded with a banquet at which the speeches were in accord with the best traditions of the association.

A Reduction in Costs of Injuries and Damages

Earnest efforts to reduce accidents on the Cleveland, Southwestern & Columbus Railway have been a prominent feature of the operations of this system for several years. In the calendar year 1910 these efforts, as shown by the last annual report, had an appreciable result upon the total payments for claims due to accidents. With gross revenues from operation of $1,015,627 the company charged in its operating expenses the sum of $35,442 on this account. This is substantially 3½ per cent of the gross revenue. Although the company paid during the year a total of $16,646 for claims, this amount does not represent the expense incident to claims arising from accidents which took place during the period. The actual settlements for accidents which occurred last year and the estimated expenses which will accrue from the unsettled claims due to accidents in the year amount to $15,000, or about 1½ per cent of the gross revenue. As the company charged its operating expenses with approximately 3½ per cent of the gross revenue, it completed the year with a credit in the accident fund of $18,796. E. F. Schneider, the present general manager of the company, has maintained a successful campaign for the protection of life, limb and property, and the results which have been accomplished are indicative of the possible opportunities for improvement in operating methods and the training of employees which may well be grasped and made productive by other electric railway companies.

Specialized Maintenance of Electric Heaters

The committee on equipment of the American Electric Railway Engineering Association is to take up as one of its subjects for the 1911 convention report a study of car heating apparatus and its relation to car construction and operating speed. Of course, no report on this subject could be complete unless it included a consideration of the maintenance features of the several types of heating equipments. The usual car stove or hot-water equipment is simple in construction, and it is not likely to receive any abuse that would escape attention. The maintenance of electric heaters presents a more special problem. Nothing looks simpler than the groups of coils which make up an electric heater, but there is nothing easier than to misconnect those very coils in such a way that grounds and open circuits will make the heaters useless. The trouble then is not in the heaters, but in the haphazard ways of maintaining them. The fact that each heater is designed to take so many amperes per point means nothing to some shopman who either will insert the first spare coil that happens to fit into the heater frame or else reports a nonchalant "O. K." on a device which cannot "come back," like a neglected motor or controller. An obvious, yet uncommon, method of eliminating these abuses is to have one or two men specialize in heater maintenance. On one large system where this is done, the specialists are supplied with wiring diagrams of all types of heaters in service and with a voltmeter and ammeter for testing and calibrating the coils. By this means assurance is obtained that the heaters actually do heat the cars. At the same time a considerable reduction is effected in the total amount of current taken by the equipments. This experience shows clearly how easy it would be to draw false conclusions in making comparisons between the upkeep and operating costs of the different car-heating systems which are available for electric railway conditions at the present time.

THE BOSTON ELECTRIFICATION REPORTS

Few, if any, investigations in the reports by State commissions have been awaited this year with greater interest from the engineering point of view than that recently concluded in Massachusetts by the joint board of metropolitan improvements. This board was appointed last year to report among other things on the desirability of the enactment of a law requiring the steam railroads entering Boston to equip their lines electrically and was composed of the membership of the four commissions most fully acquainted with the general situation, namely, the Railroad Commission, the Transit Commission, the Park Commission and the Harbor and Land Commission. The area to which the study was to be confined was within the Metropolitan District, a somewhat arbitrary district included within a maximum radius of about 15 miles from the Boston City Hall.

As readers of this paper know, the companies concerned reported that the cost of the conversion would be about $40,000,000, and in reports published in the issue of this paper for Nov. 19, 1910, unanimously protested against being required to adopt electricity at the present time on the double ground of expense and the absence of standardization in electrical systems. Interest in the report is enhanced by the fact that the joint board in its report submitted to the Legislature on Monday of this week was divided on the main question. A majority of nine upheld the contention of the steam railroads. Of the minority, five believe electrification is feasible, both financially and from an engineering standpoint, for at least portions of the systems at the present time, while the remaining two considered the majority report too conservative, but were not prepared to recommend immediate electrification without further study of the subject.

The conclusions of the majority of the joint board are, briefly, that while electrification is desirable for the public and possesses many advantages over steam for the railroad companies, it is not necessary on the ground of public safety, as was the case in New York. If capital should be expended for electrical equipment it would mean the postponement of improvements in other directions. Moreover, the local situation in Boston is such that it is doubtful whether the companies could recoup themselves for the added expenditures by an increase of the fares of those passengers who would most greatly benefit by the change, namely, the suburban passengers. The minority reports in favor of more prompt action are based upon the apparent success of electrification elsewhere, the public announcements of officers of the New York, New Haven & Hartford Railroad of their intention to equip portions of both the Boston & Maine and New Haven systems with electricity for a considerable distance near Boston, and the studies of the Boston & Albany Railroad for the electrification of certain portions of that line.

It is interesting to note in this connection that the members of the joint board favoring electrification are in the main the members of State tribunals which have had long-continued jurisdiction over railroads and electric railway properties. It is also notable that the entire board is united on the inevitable introduction of electricity on the system of railroads within the Metropolitan District within a comparatively small number of years. The only question which divides the committee is how soon the application should be made and whether for the pres-

ent at least the change should be left to the initiative of the companies themselves. Even the minority report of five does not declare in favor of setting a date for the electrification of all the roads within the district, but those signing the report do not believe that the matter should be left exclusively in the hands of the several railroad companies.

There is no doubt, as the minority report says, that similar legislation, such as that relating to automatic car couplers and prohibiting car stoves, has been found in the public interest and has accomplished good results. It is the tendency in all large corporations, especially those whose stock is very widely distributed, as with most steam railroad companies, for the management to assume a very conservative attitude regarding the expenditure of large sums of money for improvements from which an immediate monetary return is not evident. This is perhaps only natural. Where a board of directors consists in large part of the actual owners of a property, the management can easily learn the wishes of those whose final interests are involved in any important decision. Hence such a management can take risks which would seem injudicious for the management of a large corporation in which the stock ownership is largely distributed and the board of directors often represents directly only a minority ownership in the property. We believe that this is one of the important reasons why there has not been a greater development in the electrification of steam railroads, and that in many cases steam railroad managers would long ago have introduced electric traction if it were merely a question of personal risk. Undoubtedly, in such cases, the spur of legislative requirement will often be welcomed as giving a good excuse for making an improvement which, purely on its merits, had been long justified in the minds of the management.

While this generally may be true, we hardly believe that it applies in the Boston case. The company most concerned in the proposed electrification in Boston is the New York, New Haven & Hartford Railroad. This road, for itself and for the Boston & Maine Railroad, which it controls through stock ownership, would be called upon to expend for the electrical equipment of its passenger service about $33,000,000, or approximately 80 per cent of the total amount required to electrify all the steam railroads entering Boston. But it is well known that the New Haven road has already shown its keen appreciation of the merits of electric traction. No part of its New York electric zone was equipped because of legislative requirement, since the New Haven road could have fulfilled the demands of the New York State law by turning over its trains at Woodlawn to the New York Central Railroad and having them hauled from there to Forty-second Street by New York Central electric locomotives. In addition, the company is now equipping its Harlem River division line with electricity, has announced its intention of voluntarily extending its main line electric system to New Haven, is electrically equipping the Hoosac Tunnel, and has offered to equip electrically the Boston, Revere Beach & Lynn Railroad if it is authorized by the Massachusetts Legislature to acquire that property. It is also well known that the construction of a railroad tunnel between the North Station and the South Station in Boston is being very seriously considered. If this tunnel should be constructed, it would necessarily have to be equipped with electric power, and this fact would have a very important bearing upon the type of electric system and the general plan of electrification to be used at each terminal of the line. With these undertakings in mind or in serious contemplation, and until more definite knowledge can be secured from them in regard to their engineering features and financial results than is now available, it is not surprising that the New Haven road should not wish to be committed to electrify all, or even any considerable part, of its Boston Metropolitan railroad system by a certain date.

In spite of these facts, it is significant that the report of Mr. McHenry, submitted last November by Mr. Mellen as the New Haven's answer to the joint board, by no means excludes the idea that the company would consider favorably the installation of electric power on some of its Boston lines. The statement is made in this report that: "In general it would seem altogether more practicable at first to restrict the substitution of electricity for steam to a few of the more important routes, subsequently extending the system as rapidly as consistent with the financial conditions and the public needs."

For these reasons, although we believe that the abolition of the steam locomotive in all large cities is inevitable and that it will come soon, we feel that it would be premature at the present time to set any definite date at which the electrification of the Boston lines should be begun.

INTER-DEPARTMENT CHARGES

In deciding to take up the subject of inter-department charges the joint committee on shop accounting appointed for the year 1911 by the Accountants' and Engineering Associations is likely to render very good service in a virgin field of electric railway economics. There exists in many minds the strange impression that it is as needless to keep inter-department accounts on a money basis as it would be for a man to transfer his cash from one pocket to another. This feeling is well reflected in the franking privilege accorded by the United States post office to other departments of the government. It is safe to say that if the beneficiaries of this system were obliged to use a special stamp which indicated the value of the service rendered there would be a most desirable decrease in free mail—especially in the output of those legislators who are fond of asserting that the post office deficit is due to the low rate for second-class matter.

This "It's all in the family" sentiment is equally strong in the administration of many electric railway properties. On the one hand, the power station engineer lies awake nights speculating whether the directors will let him install that economizer, carbon dioxide recorder or other refinement which he hopes will add another 5 per cent or 10 per cent to the output of the plant; on the other hand, the transportation department may be wasting so much current by burning car house and passenger station lamps for 24 hours in the day that the increase in generating efficiency would be wholly absorbed without any resulting benefit to the company. The ratio of kw-hours to car miles should be carefully compared, not by lump totals, as is often done, but by checking up each feeder division and even each line at periodical intervals. Even the temporary installation of wattmeters in shops and car houses would have a most salutary effect in bringing both the department heads and their subordinates to realize that electricity is a very palpable thing when viewed from the standpoint of the consumption of fuel. Unscientific car operation is responsible for a much greater waste of electric energy than wasteful illumination, but

its meaning in dollars and cents can be judged only by some form of checking instrument placed directly on the cars.

There are losses in inter-department relations in other things than power. For instance, the track department will have one or more men spend a great deal of valuable time taking to the blacksmith shop of the car maintenance department a large number of tools which could be renewed at a nearby smithy for a lower total cost. The overhead line and power departments also are sinners in this respect because they realize that their maintenance accounts will look far more modest when an accommodating master mechanic helps them out than when they have to pay cold cash to an outsider for services rendered. The value of accurate accounting of inter-department charges becomes evident when, for example, a new and well-equipped repair shop is built to replace one or more old or widely scattered shops. Before the shop is built the head of the mechanical department is able to prove to his own satisfaction and the satisfaction of the directors who are asked to appropriate the money that a large saving in maintenance costs can be effected. Strange to say this saving seldom materializes and the shop expenses may even increase. The output of the shop grows, but without a system of cost accounting by which each department can be charged with the full cost of the additional work which is being done for it by reason of the enlarged facilities available, the shop department is obliged to bear the whole burden of operating and overhead charges. The cost of doing miscellaneous small repair work should rightly be charged against the proper department just as accurately and in as much detail as the cost of manufacturing repair parts in large quantities on stockroom orders.

In general, where competitive repair or manufacture is concerned, it is but proper that while one department of a railway should enjoy another department's facilities the charge for the service should include something more than the bare labor and material expenses. This is one subject which the joint committee on shop accounting has selected to consider as part of its work for the coming year, that is, to determine just what overhead charges should be considered in order to place inter-department work on a businesslike basis, and in the accomplishment of this object it will do a great deal of good.

THE ANNALS OF ELECTRIC RAILWAY TRANSPORTATION

In the issue of the Electric Railway Journal of Jan. 21, 1911, page 126, we published a brief descriptive reference to each article contained in the "Annals of the American Academy of Political and Social Science" for January, 1911. The subject of this publication, "Electric Railway Transportation," was treated in 17 articles contributed by various engineers, railway officials and others interested. The topics of the individual papers were divided between traffic and financial problems, on the one hand, and public regulation of electric railways, on the other. These problems are not easily or wholly inseparable one from the other and, as might be expected in view of the conditions now existing, several of the articles which treat of the traffic and financial problems of the industry relate also to the allied subject of regulation.

Of the articles which suggest this dual nature of the problems the first is by Bion J. Arnold. While this was written in connection with the study of the Pittsburgh traffic situation in which Mr. Arnold has been engaged, it is applicable in principle to conditions that prevail in other large cities. Mr. Arnold's discussion is more suggestive than conclusive on some points, but his summary is a concrete presentation of several leading issues. For instance, there are references to fares, taxes and depreciation. His conclusion, that the result of experiments with 3-cent fares has been to prove that cheap fares and good service cannot be secured at the same time, is one which accords with the prevailing judgment of those who have investigated the subject. The public of this country is far less tolerant of poor service than of high rates, and its attitude in this respect toward railway service is not different from its attitude toward hotel and restaurant service.

Mr. Arnold states that the fact is becoming apparent that there is very little surplus left for taxes, particularly for the payment of a franchise tax. We have expressed frequently our opinion that the large percentages of gross earnings which companies are required to pay in taxes and public benefits of similar nature are demonstrable and that their reduction is a simple method of lessening the burden. Although Mr. Arnold points out that the problem of what should be done with past obligations due to accumulated depreciation is receiving much consideration, he does not offer a solution. That this problem should receive the serious consideration of the industry is clear. Observance of the lessons of the past should make future practices more wholesome.

The paper of Thomas Conway, Jr., on the decreasing financial returns upon urban properties is an even more comprehensive review of present-day conditions than the title indicates. It not only presents the surface point of view of the companies, but it goes further and teaches the duty which rests upon the officials of properties to take the public into their confidence. It is but fair to accept the conclusion which this study emphasizes, which is that the company can secure justice only if the public possesses a full understanding of the difficulties and limitations of the industry. This is a truth upon which the most progressive managers found their policies.

With the conclusion of Professor Conway that the problem is a serious one only in the case of urban properties we may be permitted to differ. Interurban passenger rates are sometimes limited by local franchise conditions and are frequently determined by the rates of existing competitive steam railroads, whose rates are limited in many States by legislative action.

The article by William B. Jackson is a recognition of the need of provision for the loss due to depreciation. It calls attention to the fact that in connection with revision of rates a full understanding of the elements which make up the cost of furnishing the service is necessary. It deals less with the practical methods of determining the life of varying elements of property than with the necessity of making provision for this loss. Integrity of both capital and operating accounts is involved in the consideration of this subject. Since the topic is not one of purely academic interest the discussion should help to a clearer understanding of the situation.

It is a valuable addition to the literature upon the economic waste of strikes which Daniel T. Pierce contributes in his review of the developments which culminated in the strike of 1910 on the lines of the Philadelphia Rapid Transit Company. Mr. Pierce has sought deeper than the direct issues involved for the general reasons which could permit so serious a strike to occur as that which caused the loss of property and wages aggregating many hundreds of thousands of dollars in Phila-

delphia. His answer is that a fairly permanent body of employees should be maintained. This it has been the effort of managers to do, but it is still an unsolved problem.

It is an indication of a controlling tendency of the times that the article by Frank R. Ford on the subject of valuation states that the importance of an accurate appraisal is now universally recognized and that intelligent regulation depends upon the possession of accurate information concerning the value of the property under investigation. The article includes studies made by Mr. Ford in connection with prominent valuations which have been reported in detail in the issues of the ELECTRIC RAILWAY JOURNAL. To discuss both tangible and intangible elements, as Mr. Ford does, is to demonstrate the mistaken policy of the public in calling one element of property physical property and the other element franchises. Now, it has been perfectly clear in the past to all who are at all familiar with the subject that there are actual elements of property which represent proper investments and are properly capitalized, but, strangely enough, it has remained for this latter-day period of regulation to witness the development of scientific analyses of values other than those of a purely physical nature.

One of the strongest and most important features of the discussion in which William Osgood Morgan calls the indeterminate permit a satisfactory franchise is his denunciation of the limited-term franchise. Mr. Morgan says the theory of the contract on which the limited franchise is based is in itself wrong. It allows the municipality to treat a grant of franchises in its streets as an asset to be bargained for. The strongest argument against the limited-term franchise from a business point of view lies in the fact that, as a rule, it has not made any proper provision for the protection of the capital invested in the property. No contract that fails to safeguard the capital investment can be justified by public policy.

This short review of the controversial elements does not touch many interesting subjects that are treated. For the publicity given to its problems by the academy the industry should be grateful.

INSULATION OF HIGH-VOLTAGE LINES

Two very important papers read at the last meeting of the American Institute of Electrical Engineers deal with the theory and practice of extremely high-tension lines, especially with reference to the properties of air as an insulator. Very fortunately in most railway work comparatively moderate voltages, say, 25,000 volts to 40,000 volts, suffice, so that for the present at least the railway engineer does not find himself confronted with the failure of air as an insulator and can confine his attention chiefly to the much simpler problem of securing adequate insulation at the supports. The introduction of the suspension insulator has greatly simplified the securing of adequate insulation at high voltage, and, in fact, this system of support has mechanical advantages which render it useful at voltages below those which give it its chief electrical importance. A line carried on suspension insulators has a certain flexibility about it which is in itself highly advantageous. A broken wire is unlikely to pull over poles or towers when carried on suspension insulators, but simply can be allowed to run through them and relieve the strain.

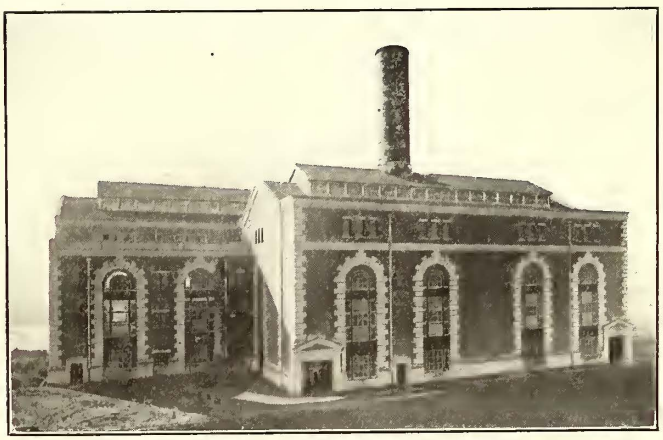
Up to 50,000 volts or 60,000 volts the losses on a transmission line due to coronal discharge, resulting from the weakening of the air as an insulator, are comparatively slight with the ordinary sizes of wire used, say, No. 1 or larger. The coronal effect shows far below this, chiefly at points and irregularities in the wire, but the losses themselves are not great. On the other hand, the actual power losses found on the transmission lines of the Central Colorado Power Company at voltages in the vicinity of 100,000 are liable, according to the paper by Mr. West read at the last Institute meeting, to rise to formidable magnitudes. In these tests the turning point of the curve showing the relation between voltage and loss was between 75,000 volts and 80,000 volts. Beyond this point the line losses increased with great rapidity, particularly under no-load conditions, when the voltage toward the end of the 180-mile line tested rose considerably. Most of the line in this case was of No. 1 wire, 289 mils in diameter, a size anything but well suited for the extreme voltages tried, inasmuch as with wire of so small radius the coronal discharge which indicates the breaking down of air as an insulator begins much lower than would be the case with a No. 000 or a No. 0000 wire. Once the coronal discharge is well established the striking distance over which the spark will leap between the points increases very rapidly. In the test in question the striking distance at 75,000 volts on the station instruments was 5 in., while at 100,000 volts it had risen to 1 ft. The same rise in voltage under no-load conditions increased the kilowatts lost on the line in the ratio of something like 5:1.

The figures given in Mr. West's paper were of a very striking character and worth careful investigation by anyone who contemplates dealing with exceptionally high voltages. The facts indicated seem to be about as follows: Up to 50,000 volts or 60,000 volts the line losses even on so long a line as 180 miles are not at all serious, even when the wire is as small as No. 1. There would be still less loss were the diameters of the wires greater by reason of a larger capacity of plant. With wires of this size, even when strung about 10 ft. between centers, as they were in this case, the critical point in the voltage is reached at about 75,000 volts and beyond this point the losses, especially at no-load, go up very rapidly. In working near 100,000 volts the energy losses in the unloaded line are serious and increase rapidly on account of rise in voltage toward the end of the line. They are large enough, in fact, at moderate loads to be a very serious matter were power being delivered from a steam-driven station. Such high-tension line losses become of less and less importance as the amount of energy transmitted grows larger so as to demand conductors of greater diameter and to give a heavy distributed load along the system. The difficulty would be most severely felt on extensive distributing networks covering large areas of territory at high voltage with relatively small conductors. It probably exists on such systems to a much greater extent than is generally supposed, but the added load due to high-voltage line losses would usually be, so to speak, lost in the shuffle and would not be recognized as such unless it rose to a considerable amount.

In railway power service over any distance at present attempted the difficulty is not likely to be a serious one, but it should nevertheless be borne in mind in laying out some of the projects which are being considered, especially in those in which the use of steam as a motive power is being considered, because the energy losses in such installations have to be paid for directly in a sense not true in a hydroelectric plant.

SOUTHERN PACIFIC ELECTRIFICATION AT OAKLAND, FRUITVALE POWER AND SUBSTATION

As is well known, the Southern Pacific Company is engaged in the electrification on the 1200-volt system of its Oakland, Alameda and Berkeley suburban lines. In connection with this work a power-generating station has been installed at Fruitvale, Alameda County, Cal., with present capacity for the lines whose electrification has been authorized and with an ultimate capacity designed to furnish power to all of the future extensions to this system as far as the San Francisco Bay district is concerned. A contract has also been made for the supply of a small block of power (about one-tenth the ultimate capacity of the station) with the Great Western Power Company.



Southern Pacific Power Station—Power House from North

The general fuel conditions on the West Coast are so different from those of any other section of the country that Eastern engineers will find in this statement an explanation of why many of the usual refinements to produce economic operation have been suppressed. They will understand readily that the fixed charges on the apparatus necessary to secure these elaborate refinements would wipe out the small difference in fuel consumption produced by them under West Coast conditions. It is not considered at all likely that the present supply of fuel oil will be diminished in the next 10 or 15 years; hence all estimates as to relative economies in the station apparatus were based on this assumption. Provision has been made, however, in the design of the building for the installation of coal-handling apparatus whenever the market conditions shall make the change desirable.

The general scheme of the power house installation may be stated very briefly as follows:

First—A 13,200-volt, 25-cycle, three-phase generating system for distribution to substations at various points along the line and also, eventually, for the supply of a high-tension transformer house which will be located adjacent to the east end of the building whenever the extensions to the suburban system shall require an extra high voltage transmission.

Second—Within the generating station and entirely independent of all of the large unit generating apparatus is installed a 110-250-volt, three-wire, direct-current system to which are connected all of the generating excitation circuits, the station lighting circuits, the crane and all the station auxiliary circuits. Since this system is reinforced by a storage battery a continuous supply of power for the station auxiliaries and lights is insured, independent of any accident to the main generators.

Third—A 1200-volt direct-current substation, with its conversion and control apparatus, is located within the main station, to supply power to the trolley lines that are within economic reach of this point.

GENERAL ARRANGEMENT OF POWER STATION

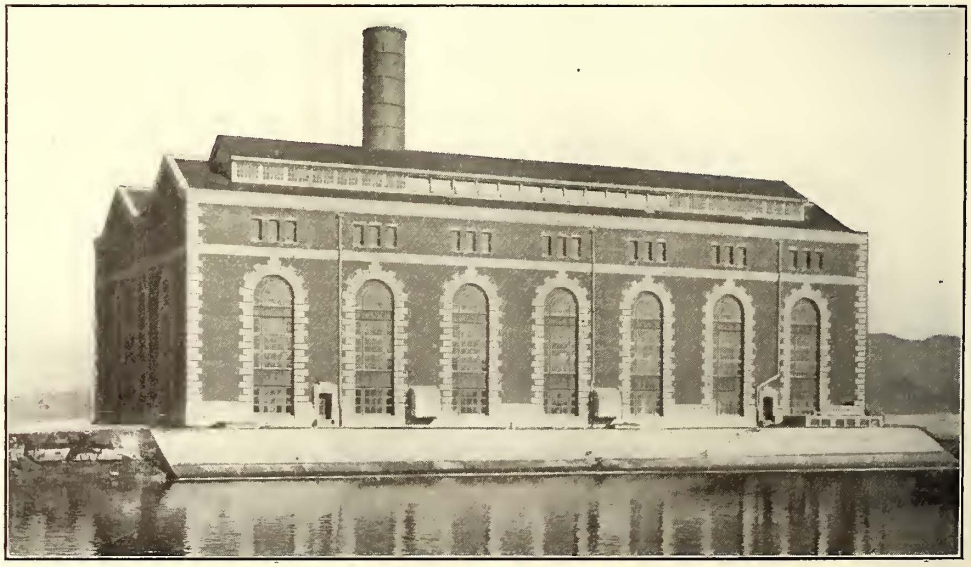
The power station is situated upon the San Antonio Estuary, a part of the bay of San Francisco, about 3 miles distant from the business center of Oakland.

The main station is designed for four units of approximately 5000 kw capacity, normal rating. The ratio of the rated horsepower of the boilers to that of the turbo-generators is approximately one-half. The station is equipped for oil fuel with provision for conversion to coal firing later, if necessary. Extension of the turbine and boiler rooms can be made by uniformly lengthening the building. Salt water for condensing purposes is obtained by gravity from the estuary. The maximum temperature of the circulating water is 65 deg. Fahr., and the minimum is about 55 deg. Fahr. A substation is combined with the main steam station. The foundations of the building and the circulating tunnels are of reinforced concrete; no piling is used. Provision has been made in the ends of the tunnels toward the extension end of the building for the introduction of gates so that the tunnels and building can be extended without closing down the condensing system. The superstructure is a steel frame covered with concrete up to 7 ft. above the ground and from there with red brick trimmed with sand-lime brick. The main roof is covered with terra cotta tile supported on an angle-iron frame. The flat roofs are concrete with mastic finish.

A permanent track permits the use of the 60-ton crane when handling material on cars. On account of the temperate climate no provision has been made for heating the building.

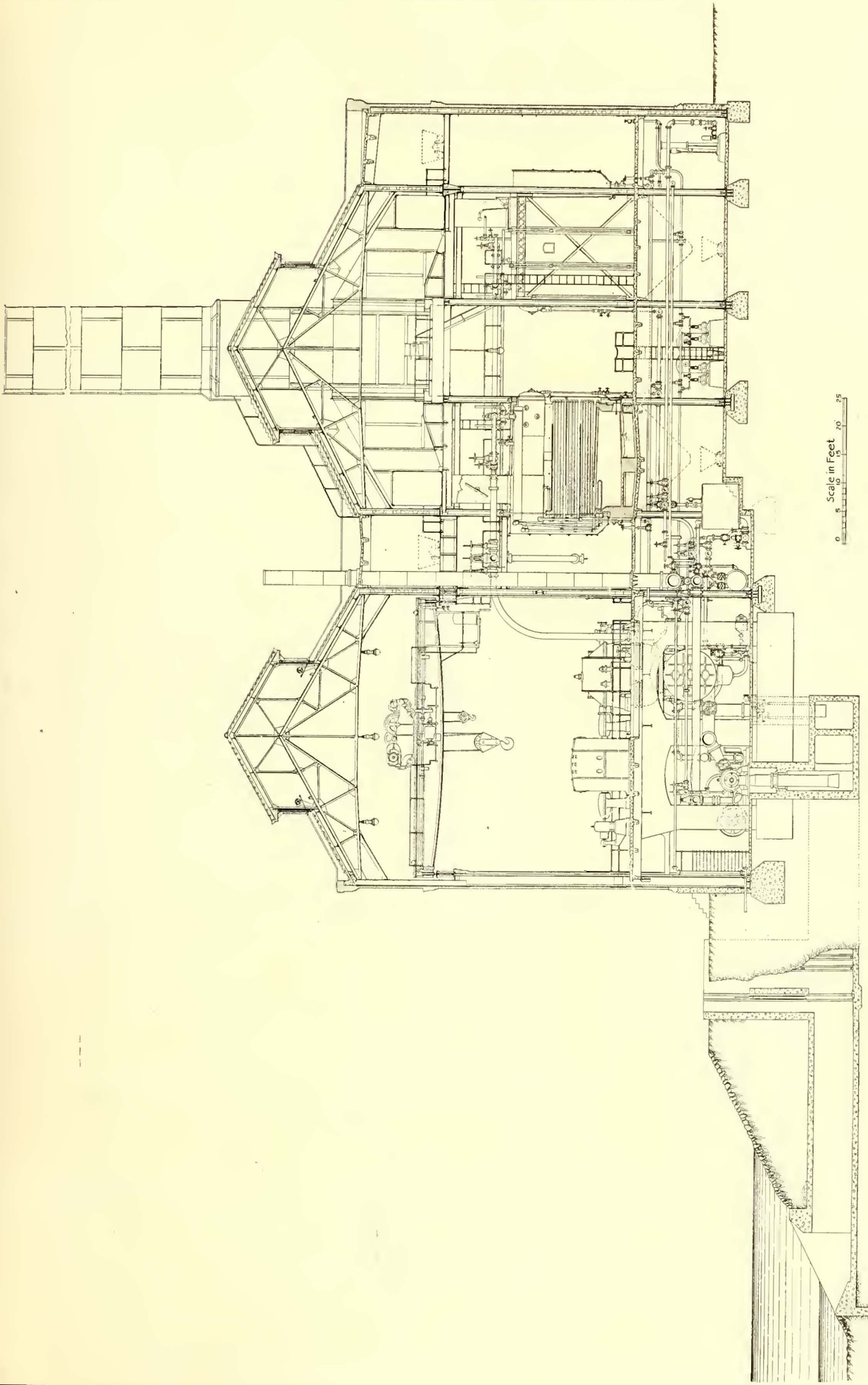
TURBO-GENERATORS

Two Westinghouse double-flow turbo-generators of 5000 kw rated capacity, guaranteed for twice their rated load for one minute, and for 7500 kw for two hours, supply three-phase, 25-cycle alternating current at 13,200 volts, when operating at 1500 r.p.m. The steam consumption at rated load was guaranteed not to exceed 15.9 lb. per kw-hour with superheated steam and 18.2 lb. with saturated steam; 1.10 load is guaranteed when operating non-condensing. The turbines are designed to operate with steam at 175 lb. gage pressure with 150 deg. Fahr. superheat at the throttle valve. The turbines can be started, synchronized or stopped from the switchboard.

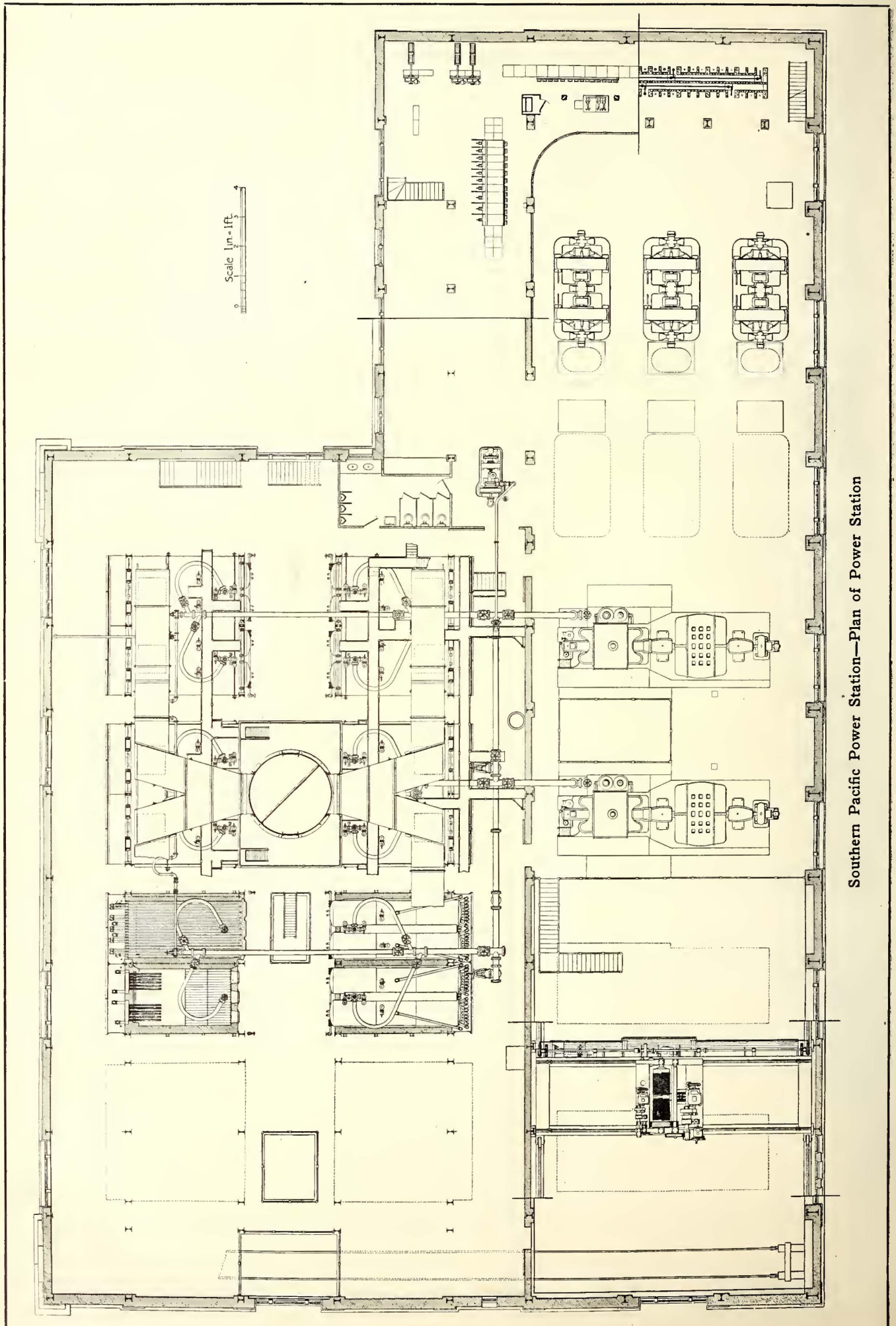


Southern Pacific Power Station—Power House from South

The air for ventilating the generators is taken from the



Southern Pacific Power Station—Section of Station Through Boiler Room and Engine Room



Southern Pacific Power Station—Plan of Power Station

outside of the station through screened galvanized iron ducts, but in foggy or damp weather the air can be taken from the turbine room basement, to avoid drawing moisture through the machines. Each turbine is provided with a 125-kw, 250-volt exciter mounted on an extension of the main shaft. Each exciter has sufficient capacity to excite at least two turbines under any probable conditions of overload.

In addition to the automatic oiling system of the turbo-generators there is an auxiliary oiling system with an independent steam pump, gravity tank, Turner oil filter and oil stations at which oil cans may be filled.

SURFACE CONDENSERS

Two Henry R. Worthington surface condenser units are connected to the underside of each turbine and are designed to maintain 28 in. of vacuum, referred to barometer at 30 in. Each condenser has 12,000 sq. ft. of cooling surface. The tubes are not tinned. Should the need of tinned tubes arise, they will be installed when defective tubes have to be replaced.

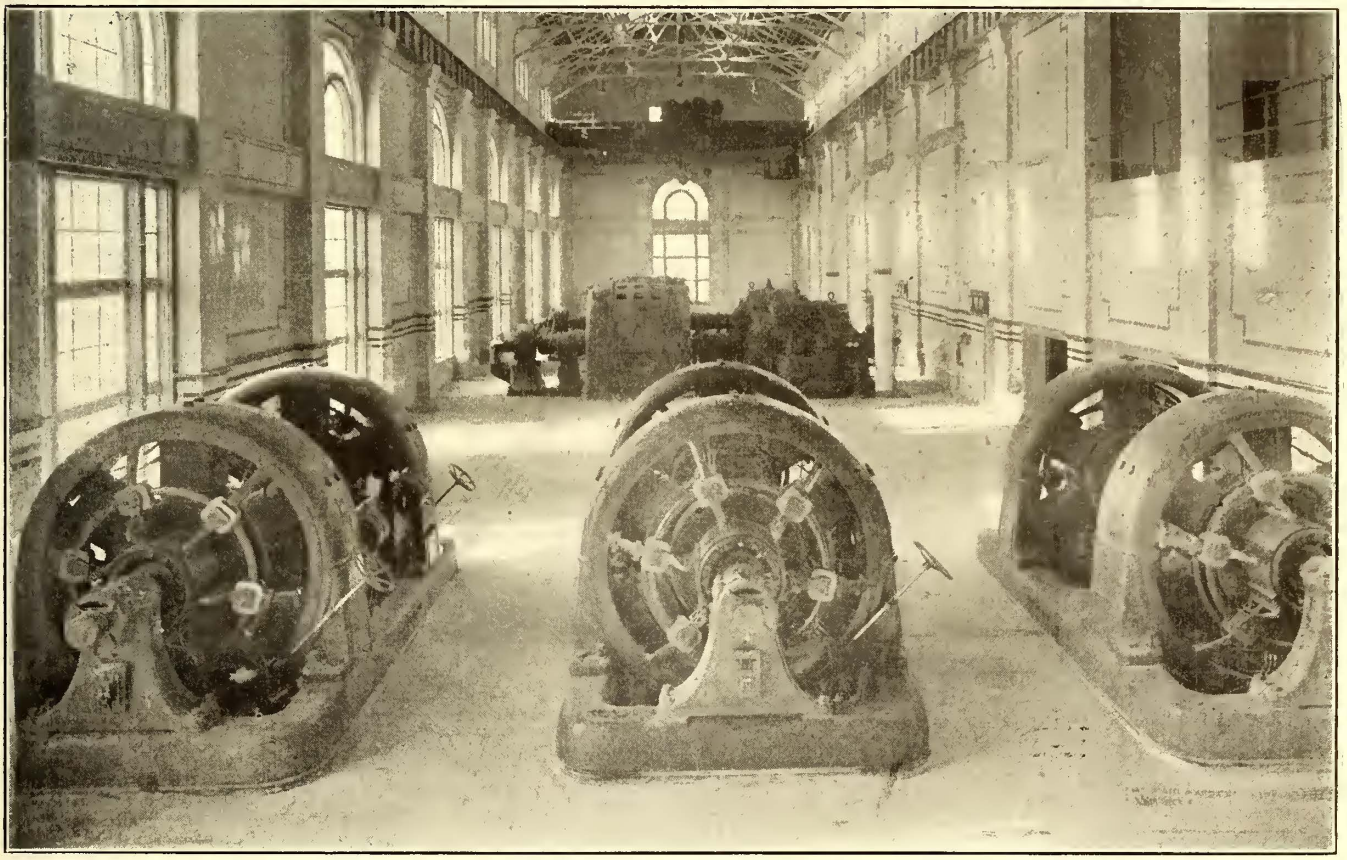
machinery if required. The boilers have been designed so that in case it should be found desirable to burn coal, stokers or grates can be installed at both ends of the boilers. The building and steel work are designed so that automatic coal and ash-handling apparatus can be installed. The present boiler room is designed for an installation of 16 boilers.

The original installation contains 12 645-hp Parker boilers, which are so-called self-cleaning because they deposit the scale in a pocket in the drum instead of in the tubes. Check valves in the headers and drums prevent the reversal of the flow.

Three burners are located in front of every boiler. The superheater is placed in the rear of the furnace. It maintains an even superheat. Walkways are installed over and between the boilers.

STACK

The stack is of unlined steel and is arranged for natural draft under oil firing. It is 125 ft. high above the boiler room



Southern Pacific Power Station—Generator Room, Looking West

The two circulating pumps are the H. R. Worthington high-speed turbine type, each with a capacity of 10,000 gal. per minute, under a maximum suction lift of 16 ft. They are driven by Terry steam turbines direct-connected to the pumps.

The hot well pumps are motor-driven and of the H. R. Worthington turbine type. The dry vacuum pumps are the Laidlaw-Dunn-Gordon type.

The only provision for priming the circulating system is by means of a steam ejector mounted on the condenser at the top of the circulating water system. Provision is made at the top of the circulating system for removing pocketed air by the insertion of piping, which acts upon the principle of the injector.

An electric high-water alarm is mounted on the hot well of each condenser and, as an additional precaution against the flooding of the condensers, a red lamp is installed on each pump, to indicate stoppage of the hot well pump.

BOILERS

California crude oil is used at present for fuel. The boiler room has a basement containing space for future coal-handling

floor and is 14½ ft. in diameter. To secure maximum boiler room floor space the stack is supported upon a concrete deck above the top of the boilers, as shown on page 198. It is no larger than is necessary to obtain economical results in burning oil.

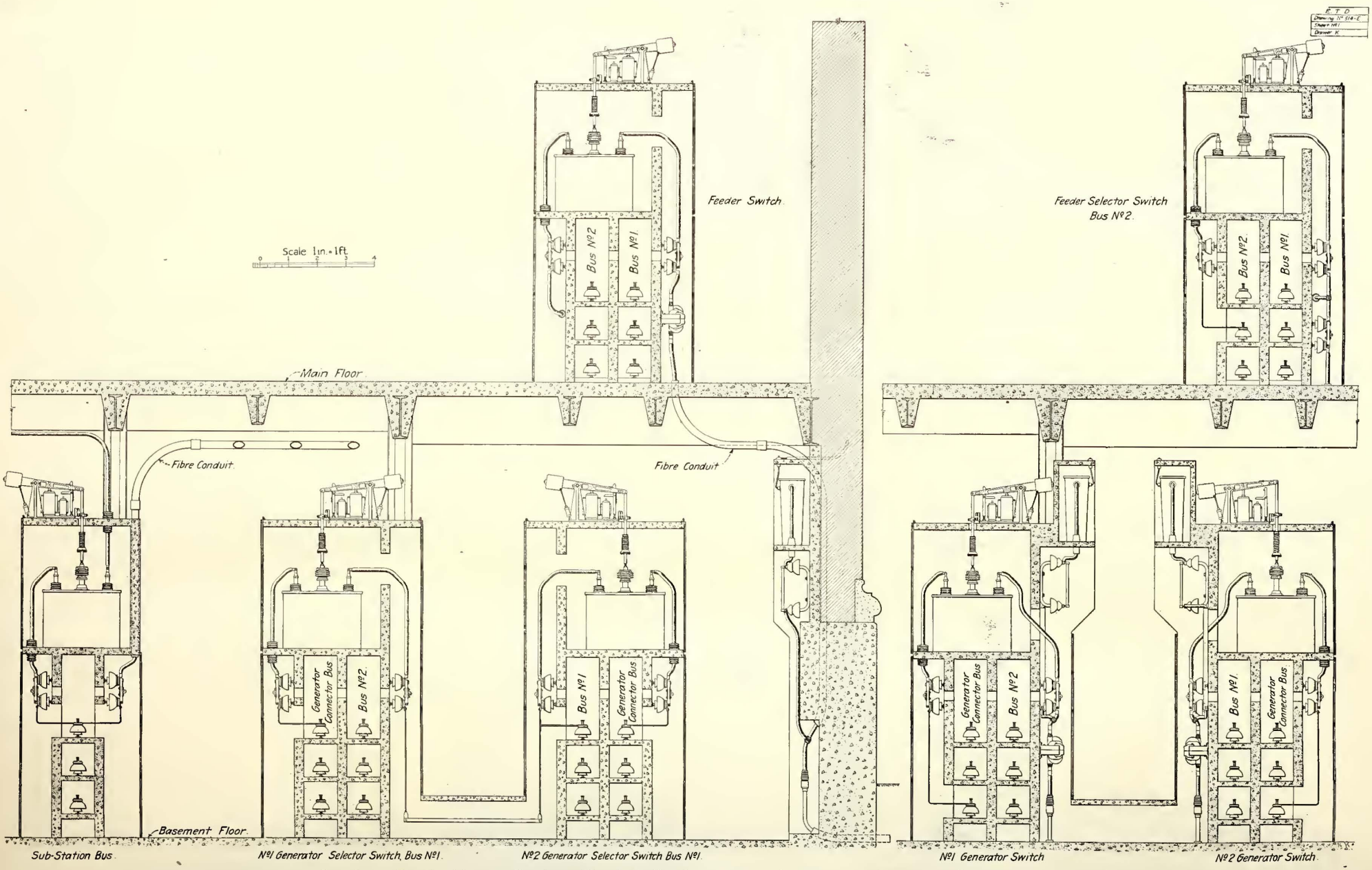
Provision has been made for the possible future use of coal as fuel by reserving sufficient storage space, and by designing the structural steel of the building and the flues to provide for the installation of a mechanical draft system. The dampers are regulated by hand, with provision for automatic control if found desirable.

OTHER EQUIPMENT

A 60-ton Shaw electric traveling crane with a 15-ton auxiliary hoist is installed.

A 1000-gal. fire pump and auxiliary, with hose racks at different points in the building, provides adequate fire protection. The piping is designed so that in emergency the fire pump can be used as a boiler feed pump.

One Alberger high-speed turbine-driven centrifugal pump and one Worthington reciprocating double-acting pump supply

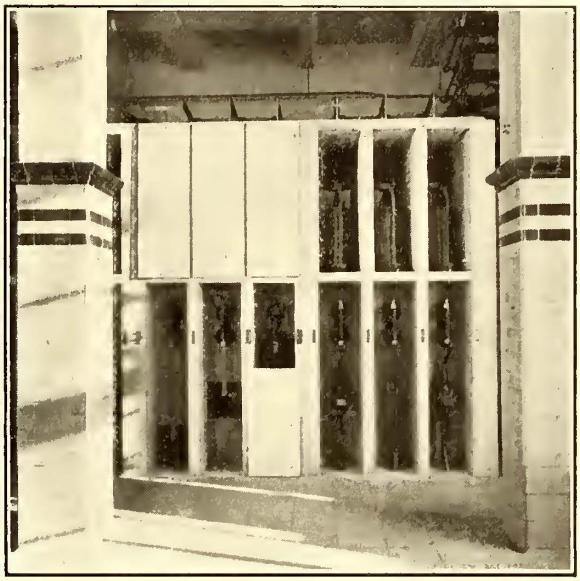


Southern Pacific Power Station—Vertical Sections Through the 13,200-Volt Bus Structures

the boilers with feed water, which is heated by the exhaust steam from the auxiliaries in a Wainwright type closed feed-water heater.

A small intercommunicating telephone system with extensions is installed. It is connected with the main operating telephone lines of the Southern Pacific Company.

Southern Pacific Power Station—Switchboard from South End of Gallery



Southern Pacific Power Station—Oil Switches and Bus Structure

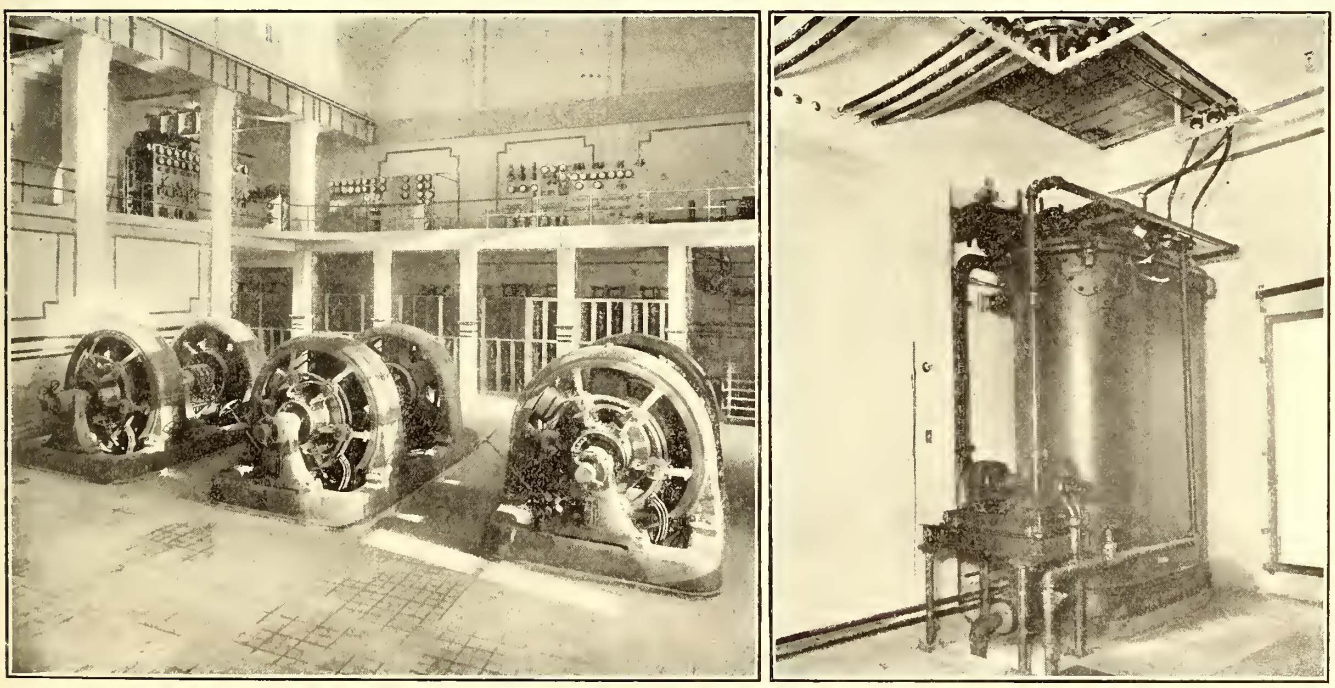
On the main floor is a machine shop with the necessary tools for making repairs.

PIPING

The piping systems were installed by the Pittsburgh Valve Foundry & Construction Company. The steam piping is stalled by the Magnesia Asbestos Company, is 85 per cent magnesia. A Westinghouse motor-driven air compressor is located in the substation basement.

FUEL OIL AND WATER SUPPLY

A six weeks' supply of fuel oil can be carried in the fuel oil storage tank, which is of 55,000 bbl. capacity and into which eight cars can be unloaded simultaneously. The oil is pumped directly from the cars into the storage tank by two direct-acting steam pumps located in the boiler room basement and drains by gravity from the tank (through a steam oil heater in cold weather) to the fuel oil pumps which provide pressure



Southern Pacific Power Station—Rotary Converter Equipment and the Switchboard Gallery as Seen from the Main Floor—Transformer with Oil-Circulating Pump

wrought iron with Van Stone type flanges; the joints are made with corrugated steel gaskets and Smooth-on. The high-pressure steam valves are of the outside screw type with bodies of cast steel. The high-pressure and low-pressure water valves are cast iron with bronze stems. No expansion joints are used in the piping systems. Provision for expansion has been made by the use of long turns and bends. The pipe covering, in-

of about 80 lb. at the burners. A duplicate pipe line is installed from the tanks to the pumps.

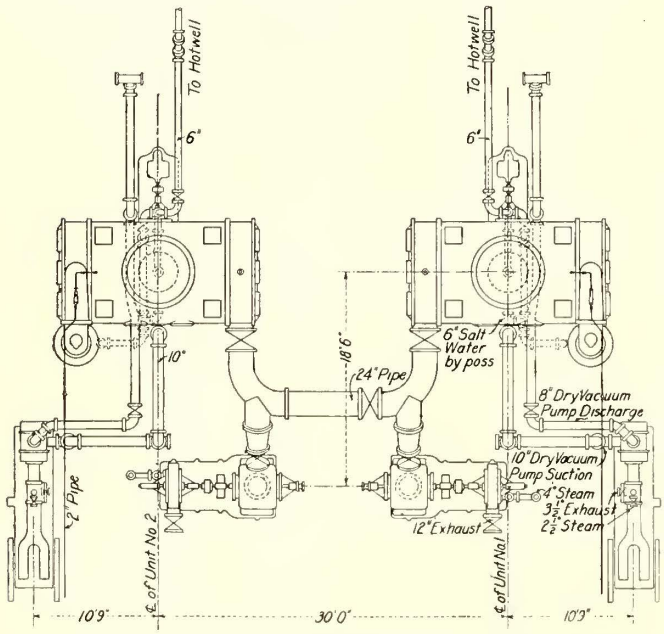
A steam line for smothering fire encircles the top of the tank, and for safety in case of fire the tank is placed within an earthen dike that incloses a space equal to the volume of the tank.

Beside the usual connection to the city water supply there

are installed in the basement two vertical direct-acting deep-well plunger pumps, each having a capacity of 130 gal. per minute when delivering the water to a tank on the roof.

EXCITATION

Beside the 125-kw exciters mounted on the extension of the turbo-generator shafts, a 125-kw General Electric steam-turbine-driven exciter is installed. On the excitation system is in-



Southern Pacific Power Station—Plan of Condensing Apparatus

stalled a 136-cell storage battery with a one hour capacity of 280 amp. It is charged from either of the two 250-volt buses by means of a motor-driven, 90-volt shunt booster. At present 15 plates are installed in a 27-plate lead-lined tank with provision for an increase to 23 plates, or an ultimate capacity of 440 amp for one hour. Sixteen of the cells are end cells and are controlled by means of an electrically operated end-cell switch. The battery and the end-cell switch were furnished by the Electric Storage Battery Company.

13,200-VOLT WIRING

In general, all 13,200-volt wiring in the building is run in Orangeburg fiber conduit, embedded in concrete. The generator leads and the outgoing feeders are No. 0000 single conductor cable with lead-covered varnished cambric insulation, terminating in Davis station terminals. The main generator leads are carried in conduit along the basement wall to the main generator switches.

There are two sets of 13,200-volt buses, so that by means of its main generator switch and its two selector switches any generator may be connected to either bus. The generator connector buses and main generator buses are located on the main floor. The half-tone on page 201 and the wiring diagram herewith show the arrangement of buses and the scheme of the 13,200-volt wiring. The station is designed so that any generator or any outgoing feeder may be connected to either or both buses.

The local substation bus is located in the basement near the main generator buses. By means of two selector switches it may be connected to either main feeder bus. The outgoing 13,200-volt distribution system consists of four feeders, two of which run north through Oakland to the West Oakland substation and the other two south through Alameda to the same substation. The north, or "First Street," feeders run in conduit from the feeder bus to an outlet tower near the power station and from there run overhead. The south, or "Estuary," feeders run to an underground switching chamber, thence by submarine cables under the estuary to a switching tower on the Alameda side, and from there overhead.

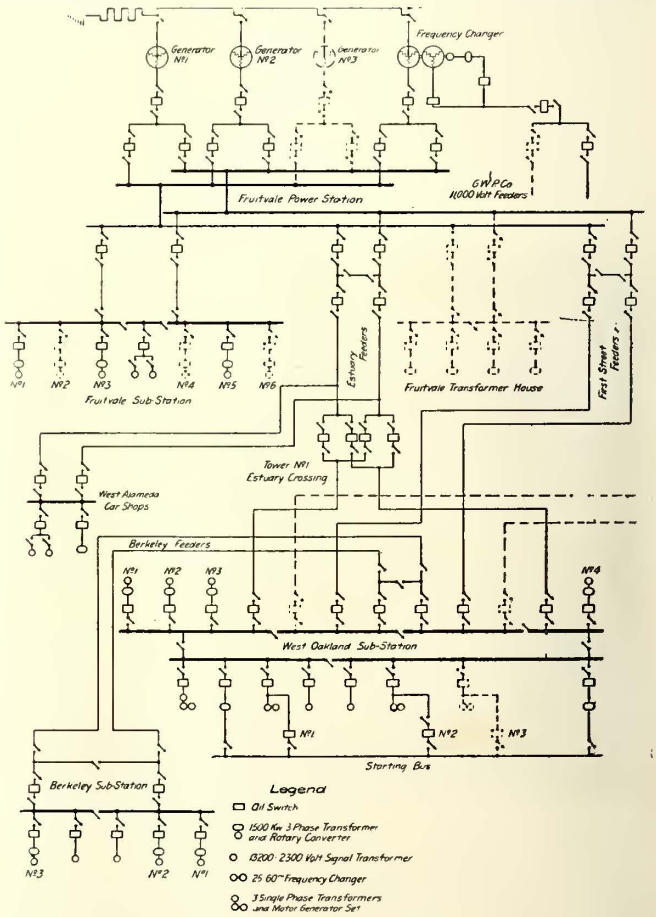
Provision has been made for a future high-tension transformer house located at the east end of the power station.

All 13,200-volt circuits are controlled by electrically operated Kelman oil switches. The generators, generator selector switches and feeder selector switches are non-automatic, while the outgoing feeder and rotary converter feeder switches are automatic.

The generators are star-connected with the neutrals brought out for grounding. Only one generator at a time will be connected to the neutral bus, which is connected to ground through 13 ohms resistance. As shown in the line engraving on this page every generator neutral is connected to a single-pole, double-throw switch. The practice will be to run with all neutral switches in the down position, except the one on the grounded generator, which will be in the up position. When it is desired to shift the neutral connection the switch on the generator to be grounded is thrown up, after which the switch on the generator to be disconnected from ground is thrown to the down position. The system will be un-grounded only during the time it takes to throw a switch from the "up" to the "down" position.

SUBSTATION

The local substation is placed in an extension of the turbine room. The present installation consists of three General Electric 1500-kw, 1200-volt rotary units and transformers. Space is left for three additional units. A rotary unit is two 750-kw, 600-volt rotaries, connected permanently in series on the d.c. end, mounted on a common base and with shafts carried in a common center bearing but free to revolve independently of



Southern Pacific Power Station—Diagram of 13,200-Volt Connectors

each other. Power is supplied by one General Electric 1500-kw, three-six-phase transformer with a double secondary winding per unit.

The transformers are the forced-oil, water-cooled type, 13,200 volts to 440 volts. They are located in a fireproof room in the basement. Removal of a reinforced concrete hatch above any transformer permits the crane to reach that transformer.

The rotaries are started from the a.c. end from one-third

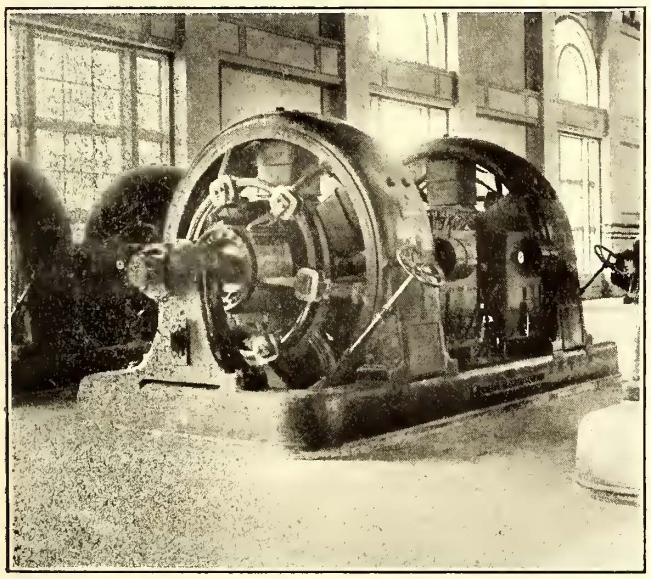
and two-third voltage taps on the transformers, through t.p. d.t. General Electric K-3 oil switches. The 440-volt switches are the t.p. s.t. General Electric K-2 oil switches. The operating handles of these switches, together with the field break-up switches, negative and equalizer switches and polarity indicators, are mounted on slate panels, mounted on the rotary bases as shown in the engraving on this page.

The cast-iron rotary bases are mounted on oak insulating frames and, to limit insulation strains and to protect operators, the bases are connected through a resistance of 10 ohms to the 600-volt interconnection between the two halves of the unit. Additional protection is afforded the operator by the installation of tile insulated floor in the substation.

SWITCHBOARD

The switchboard is located on a gallery at the east end of the turbine room extension. The power station board is of standard construction designed in three sections, i.e., benchboard, generator and feeder instrument boards and exciter and auxiliary d.c. boards. The generator rheostats and speed-changing devices are motor-operated from the benchboard. A totalizing panel is provided for metering the total output of the generating station by means of curve-drawing watt, volt and frequency meters.

The substation 1200-volt board is installed at right angles to and near the power station board. Double-panel construction is used, with the front and the rear panels 4 ft. apart. All switches and circuit-breakers are the remote-control, hand-operated type. The front panels contain the instruments and switch-operating levers. The switches and circuit-breakers are mounted on the rear panels. Spare rotary and spare feeder breakers are provided, with their switches connected to the spare breaker buses mechanically interlocked so that only one rotary or feeder at a time can be connected to its respective spare breaker bus. While the angle-iron frames of the front and rear panels are insulated from ground and from each other, the station will be operated with the front frame



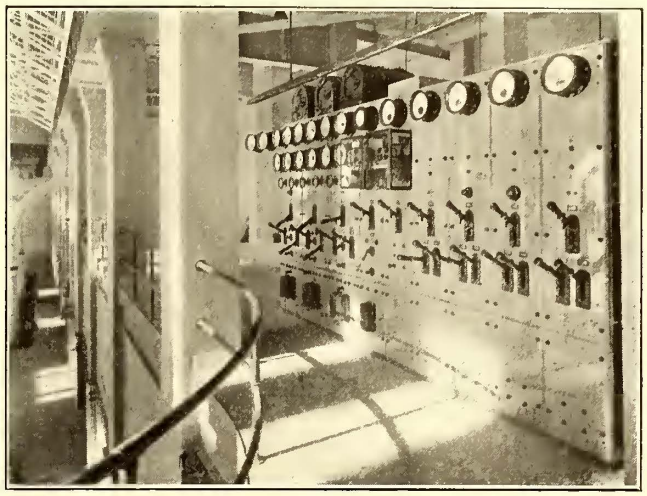
Southern Pacific Power Station—Rotary Unit Showing Starting Panel

grounded and the rear frame insulated. Soapstone slabs placed across the top brace the front and the rear panels.

The 1200-volt bus is carried in a fireproof compartment above the soapstone slabs. The rotary rheostats are mounted on the soapstone slabs above the panels. A Thomson watt-hour meter and a Westinghouse graphic recording wattmeter are installed to measure the total output of the substation. The entire switchboard was furnished by the Westinghouse Electric & Manufacturing Company.

Two 30-kw, 13,200-2300-volt Allis-Chalmers transformers furnish 25-cycle current for the operation of the local block signal system.

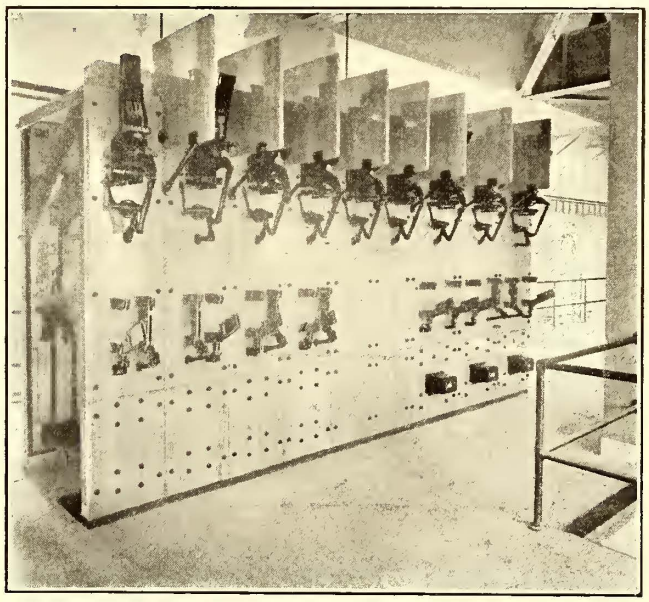
The station is lighted from the 250-volt excitation bus, across which a balancer set is connected to produce a three-wire system. For emergency use taps brought out from the middle cells of the storage battery are connected to a 9-point end-cell switch. The turbine and the boiler rooms are lighted by General Electric 6.5 amp luminous arc lamps suspended from the steel work. For other lighting around the generating station building individual 16-cp lamps are generally installed.



Southern Pacific Power Station—Front of 1200-Volt Board

AUXILIARY POWER SUPPLY

The Great Western Power Company has installed temporarily on the No. 4 turbo-generator foundation a General Electric 2500-kw frequency changer consisting of an 11,000-volt, 60-cycle synchronous motor, direct-connected to a 13,200-volt, 25-cycle generator. Its oil switches and switchboard for



Southern Pacific Power Station—Rear of the 1200-Volt Switchboard

its 25-cycle end and for its exciter will occupy temporarily the space intended for No. 4 generator panels. A zero center scale curve-drawing wattmeter is installed to show the output from, or the input to, the 25-cycle end.

ENGINEERING

All of this installation has been carried out under the general direction of E. E. Calvin, vice-president and general manager Southern Pacific Company.

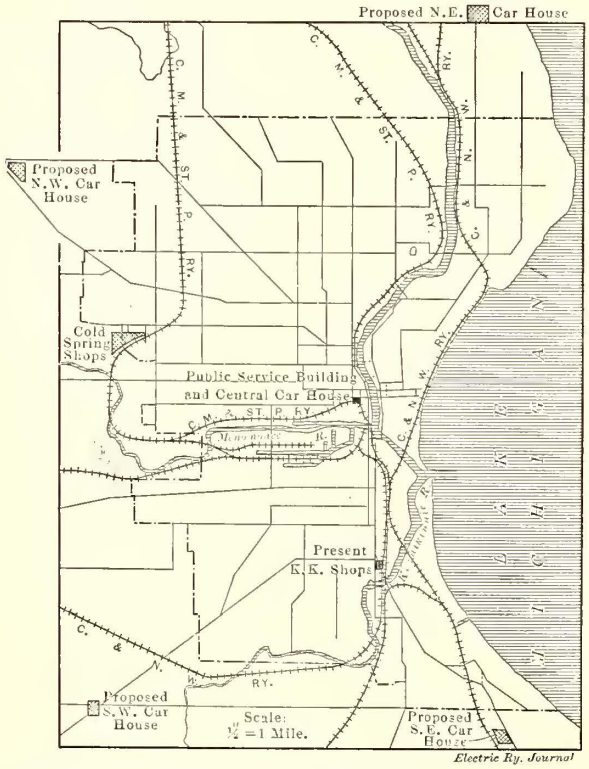
The construction details are under the direction of J. Q. Barlow, assistant chief engineer, who has for his representative in the field R. T. Guppy, engineer of suburban lines, and for his architect D. J. Patterson, who is responsible for the extremely

artistic superstructure, which is built of ordinary and inexpensive materials. The entire work, other than the superstructure, was designed, planned and specified under the direction of A. H. Babcock, electrical engineer of the Harriman lines, who accords to W. C. Miller, engineer of power stations, who supervised the entire mechanical and steam installation, assisted by J. C. Lathrop, who designed the steel building frame, and to H. Y. Hall, assistant electrical engineer, who designed and planned the switchboards, the station wiring, the bus structure and all the minor electrical details of the plant, their full share of whatever credit may be earned by the Fruitvale power plant.

NEW COLD SPRINGS CAR SHOPS OF THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

Plans have been perfected and construction work is now well advanced on the large new repair and construction shops of the Milwaukee Electric Railway & Light Company. The old shops in the southern part of the city have long been overcrowded and these new shops will be the first of several groups of new car-maintenance buildings, all planned to improve operating conditions. The accompanying map of Milwaukee shows the location of the present and proposed operating car houses and shops, together with the location of the Milwaukee Public Service Building, which includes trackage for housing a large number of interurban cars. This building is at the center of the congested district of Milwaukee and includes very extensive terminal facilities with arrangements for operating interurban and suburban cars through the building and for housing, inspecting and making light repairs on large or small equipment.

This building with its terminal facilities at the heart of the



New Milwaukee Shops—Map Showing Location of Different Shops and Car Houses in Milwaukee

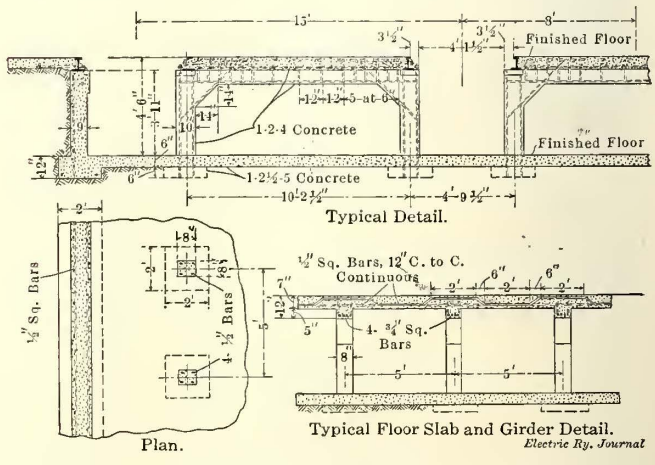
street and interurban railway system is an important part of the ultimate arrangement of buildings for constructing, repairing and housing cars. This general plan, so far as now determined, calls for the housing and storage of city cars in existing or new car houses at the extreme northeast, northwest, southeast and southwest corners of the city and the repairing of those cars at the new shops here described. The location of the new shops is close to the geographical center of the city and within fifteen minutes' running time from the center of the business district. With the operating car houses located in the four quarters of the city near the outer ends of the car lines, the extra equipment required for morning and evening rush hours can be put in and taken out of service with a minimum dead mileage. Housing and storage of the cars away from the center of the city will permit the morning trippers to commence loading shortly after leaving the car houses; likewise, in the afternoon, when the trippers have discharged their loads they will be in the vicinity of the car houses from which they operate. With shops near the center of the railway system a disabled car may quickly be taken to the repair headquarters.

COLD SPRING SHOP PROPERTY

The group of buildings now being erected is designed to be a car repair and construction plant. No facilities will be provided here for car storage. It is intended that the four outlying car houses and the new shops will be complementary and car operation will be planned so that full advantage may be taken of the geographical location of the shops with regard to the locations of the car houses.

The new shop property extends for several thousand feet along the main line of the Chicago, Milwaukee & St. Paul Railroad, a siding of which connects with the loop track which incloses the shop yards. From this loop two material tracks lead to a storage yard of about 10 acres in extent. The Electric Railway & Light Company plans to take advantage of this centrally located property for storing all its construction materials. From there distribution to any part of the city railway system can be made with a minimum mileage.

The general arrangement of the shop buildings is shown on page 206. The property is reached by one double-track street railway line and one single-track line on parallel streets two blocks apart. Both of these lines connect with a double-track trunk line on Vliet Street, one block north of the shops. Double tracks entering the northeast corner of the shop property extend along the east and south sides of the shops. Near the entrance of these tracks a "Y" is formed and an additional track is led along the north side of the shop property to form one side of a loop track which encircles the entire group of shop buildings. Maximum switching facilities are obtained by double-tracking certain portions of the loop and joining two sides of the loop by transfer tables. The arrangement of tracks is such that loaded supply cars may be spotted at any point on the shop tracks without backing. Shop supplies received by steam or electric railway



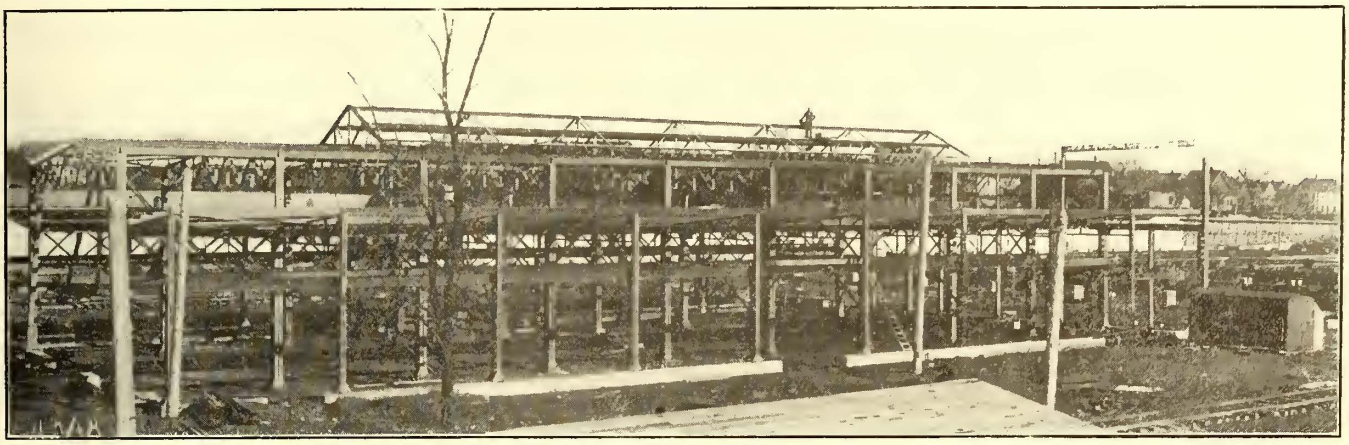
New Milwaukee Shops—Detail of Repair Pits and Intervening Floor Slabs

will be taken onto the transfer tables and delivered direct to the storerooms or any desired part of the shops. Heavy materials received in flat or gondola cars may be run under a yard crane spanning the aisle between the machine and forge shops or may be run directly under cranes in buildings.

REGRADING OF PROPERTY

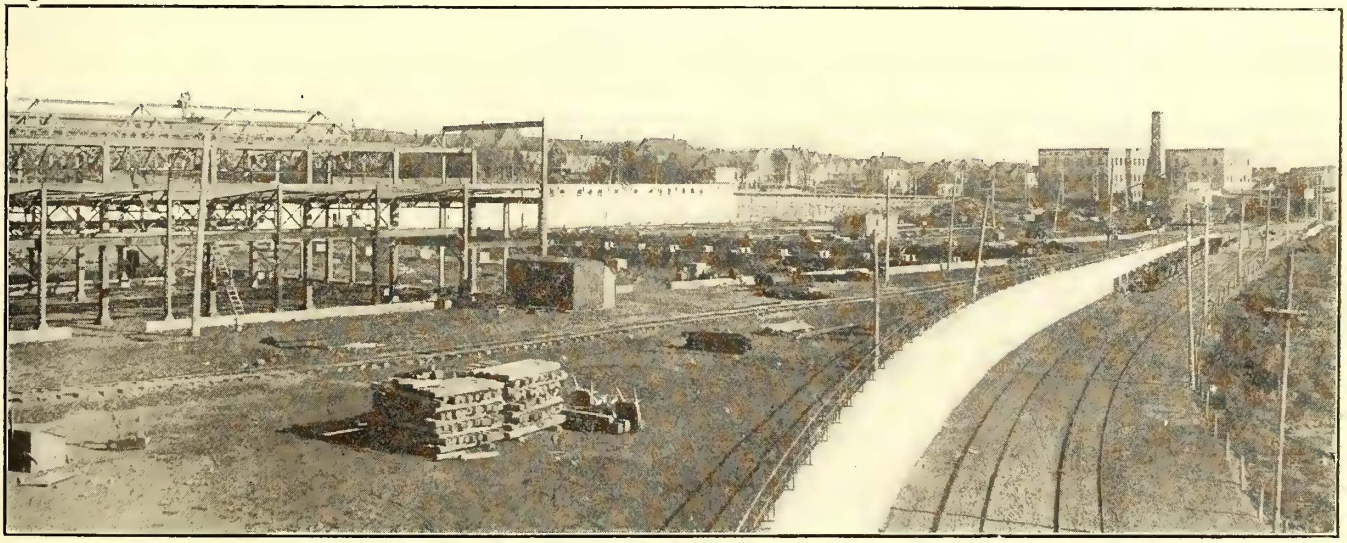
The property on which the new shops are being erected was

formerly used as a brickyard and was for the most part already on the desired level, but in some places grading was necessary. This grading, together with excavation for drains, foundations, retaining walls, pits, etc., necessitated the moving of about 64,000 cu. yd. of earth. This was excavated with steam shovels and the excess earth from the excavations and high places was transferred to the lower end, thus making the shop property practically level except for the slope required for drainage.



New Milwaukee Shops—Recent View of Steel Work for Forge Shop

On its west side and on part of the north side the shop property adjoins city streets and the marked change in grade made necessary the erection of about 2300 lin. ft. of retaining walls at the property lines. The walls vary in height from 7 ft. to 28 ft. and are constructed of reinforced concrete. A typical plan and section of one part of the wall is reproduced. In general all walls less than 20 ft. high are of the cantilever type and higher walls of the counterfort type. Expansion joints are placed every 50 ft. These are made by completely separating the two sections of walls by introducing layers of tar paper. The retaining wall along the north side of the property is surmounted by a 5-ft. concrete fence to protect the street traffic. The wall along the west side of the property averages 25 ft. in height. Of this wall the railway company built 252 ft. and the city 200 ft. The retaining wall on the south side of the property separates the grades of the double tracks leading to the material storage yard from the shop loop track.



New Milwaukee Shops—Part of Shop Site Showing Retaining Walls

In all 5300 cu. yd. of concrete were used in constructing the company's portion of the retaining walls. This concrete was a 1:2½:5 mixture which was assumed to withstand 650 lb. per square inch under compression. The tension stresses in the walls are cared for by Johnson corrugated bars, about 90 lb. of steel being used to the yard of concrete. In the calculations for the walls the reinforcing steel was assumed to have a tensile stress of 16,000 lb. per square inch.

DRAINAGE

A comprehensive drainage system has been installed to care for the surface water and the water collected from the roofs of the buildings. The trunk line of this drainage system is a 20-in. sewer, with a fall of 2.75 per cent, which extends along the south side of the shop property to connect with a large city sewer near by. Curb catch-basins have been placed throughout the yard to collect the surface water. All the roof drains are to be inclosed within the buildings and provision is thus made to assure freedom from freezing. The roof and surface sewers are subdivided into three main lines from which extend branches not less than 6 in. in diameter. Catch-basins have been built under the shop floors at important sewer junctions and these basins are large enough to admit of a man going inside for cleaning them. Three curb catch-basins are installed in each transfer table pit.

The underground piping for the plumbing system is carried to the main outfall sewer and all connections between the main sewer and the water drainage system have been trapped to protect against gases from the plumbing sewer system entering the buildings by way of the water drainage system.

GENERAL ARRANGEMENT

The ground plan here reproduced shows the general arrangement of the new shop buildings. The group includes a machine shop 180 ft. x 124 ft. and a forge, track and special workshop 180 ft. by 93 ft. These two buildings are separated by an open space 31 ft. wide, which will be served by an overhead traveling crane and will afford space for storage of

wheels and heavy materials. Adjoining the machine and the forge shops is the general car repair shop. This building is 310 ft. long x 180 ft. wide. It contains 20 pit tracks. A storehouse 31 ft. wide x 180 ft. long, two stories high, adjoins the general repair shop on the north end. The second floor of this storehouse bridges two yard tracks and has a width of 56 ft. The erecting and paint shop is 218 ft. long x 240 ft. wide and is located directly across a transfer table pit from the general repair shop. The erecting and paint shop incloses 12 tracks and is adjoined on the south by a wood mill 62 ft. wide x 240 ft. long. A two-story storehouse, 240 ft. long x 31 ft. wide on the ground floor and 56 ft. wide on the second floor, adjoins the erecting and paint shop on the north side. The two storehouses are connected above the tracks along the north sides of the buildings and over the north end of the transfer table pit. This connecting inclosure will be used as an office for the superintendent of shops.

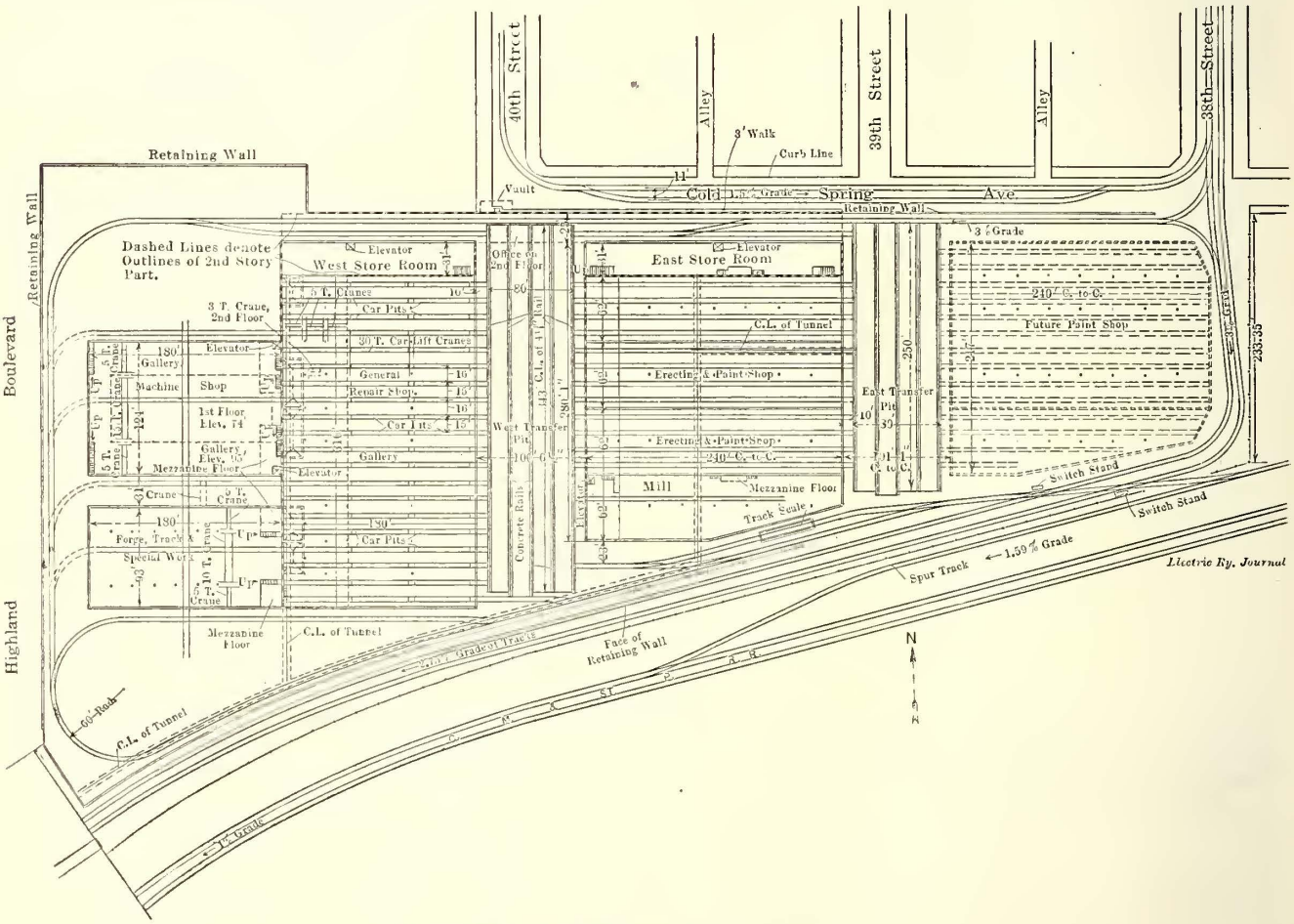
The east end of the erecting and paint shop is served by a transfer table operating in a pit 80 ft. wide x 250 ft. long. On the east side of this transfer table pit space has been reserved for the future erection of a paint shop approximately 200 ft. wide x 240 ft. long.

The areas in square feet for the different buildings and their subdivisions are as follows:

	Sq. Ft.	Sq. Ft.
Blacksmith shop, main floor	16,740	
Mezzanine floors	880	
Blacksmith shop, total		17,620
Machine shop, main floor	22,320	
Second floor	14,392	
Mezzanine floors	1,600	
Machine shop, total		38,312
Repair shop, main floor working space	18,600	
Main floor car pit space	37,200	
Second floor	14,880	
Repair shop, total		70,680
West storeroom, first floor	5,580	
Second floor	10,080	
West storeroom- total		15,660
Office		2,500
East storeroom, first floor	7,440	
Second floor	13,440	
Mezzanine floor	140	
East storeroom, total		21,020
Erecting and paint shop, first floor	52,080	
Second floor	7,440	
Erecting and paint shop, total		59,520
Mill, first floor	12,180	
Mezzanine floor	140	
Mill, total		12,320
Future paint shop		48,592

DESIGN AND CONSTRUCTION

The railway company is acting as the architect and engineer on the entire shop construction work. The only portions of the work being handled by contract are the structural steel,



New Milwaukee Shops—General Plan

masonry, sheet-metal and roofing jobs. The structural steel work for the building frames is being furnished by the Worden-Allen Company, of Milwaukee. The buildings will be of fireproof construction and with the exception of the machine and blacksmith shops and the truck working space in the general repair shop the entire group of buildings will be protected by a system of sprinklers.

The foundations for all the buildings and columns are made of concrete and this is brought up to the floor level. The north walls of the two storerooms rest on the north property retaining wall. In designing the foundations an allowable load of three tons per square foot of soil was used. The structural steel columns are inclosed in 13-in. side walls of Milwaukee brick. Steel roof trusses support a roof made of 2½-in. concrete slabs waterproofed with tar and gravel. All the window frames in the shop buildings are metal and the window sills are

molded concrete. The skylight frames also are of sheet-metal construction. Wired glass will be used throughout.

A detached power house and pumping station is being erected to furnish water, heat and compressed air for all the new shops. The sprinkler system will be fed from an elevated tank located in the turning loop at the southwest corner of the shopyard not far from the power house. All shop service pipes, wires and cables will be installed in a concrete tunnel which has been built to connect the power plant with each shop building. This tunnel is 6 ft. wide, 6 ft. 6 in. high and 1200 ft. long.

TRANSFER TABLES

The two large transfer tables will form a most important part of the shop track arrangement. The west transfer table connects the working tracks in the general repair shop with those in the erecting shop and wood mill. The east transfer table connects the tracks in the erecting shop with the yard space later to be occupied by a paint shop. Both transfer tables connect with the loop tracks extending around the shop property and with the storehouse tracks, which are located at the north end of the principal shop buildings.

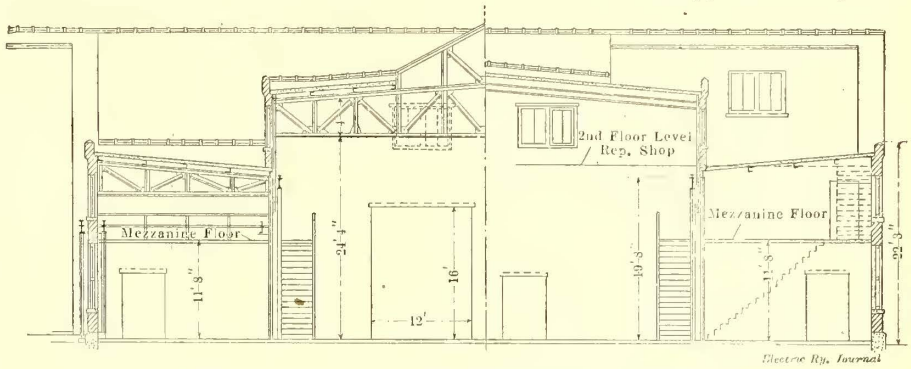
Each transfer table is 80 ft. long and is carried on five rails equally spaced in a pit. Each rail is anchored to a heavy concrete stringer extending 18 in. above the ground, thus allowing for freedom of movement with snow 18 in. deep on a level. The height of the transfer table from the top of the running rails to the top of the track rails on the table is 16½ in. and all portions of the transfer table frame are above the tops of the pit rails. This design makes it possible to construct walkways across the pit and sloping runways are provided at each side of the pit so that shop materials may be trucked across from building to building.

The capacity of each transfer table is 65 tons and the speed of travel 300 ft. per minute loaded. The walls of the buildings facing the transfer pits are approximately 100 ft. apart, thus giving a clear space of 10 ft. at each end of the transfer tables. It was not thought desirable to run the trolley wires from the shop tracks directly to the edge of the pit and therefore they were stopped at the building line and the transfer table trolley wire is extended 10 ft. in each direction beyond the table, being carried on structural steel brackets. Current for propelling the transfer tables is received from an overhead trolley wire supported along the outside of one of the buildings facing the pit. These transfer tables were built by George P. Nichols & Brother, Chicago, and installed by the railway company.

Attention is directed to the general relation of one shop to another and the principal features of design of each shop.

FORGE SHOP

The plan and a sectional elevation of the forge shop are shown. This shop has runways for three cranes and an entrance track for bringing heavy materials through the center bay. The characteristics of the crane in the center bay of the forge shop are as follows: Capacity, 10 tons; span, 48 ft. 4 in.; distance from crane rail to floor, 20 ft.; speed of bridge, 350 ft. to 400 ft. per minute; speed of trolley, 100 ft. to 150 ft. per minute; speed of hoist, 20 ft. to 50 ft. per minute. This crane is operated from a cage. Each of the cranes in the two side bays of the forge shop is of 5 tons capacity. Their characteristics are as follows: Span, 18 ft. 4½ in.; distance from rail to floor, 14 ft. 4 in.; bridge speed, 300 ft. to 350 ft. per minute; trolley speed, 100 ft. to 150 ft. per minute; hoist speed, 20 ft. to 60 ft. per minute. These cranes also are to be operated from cages.



New Milwaukee Shops—Section of Forge Shop

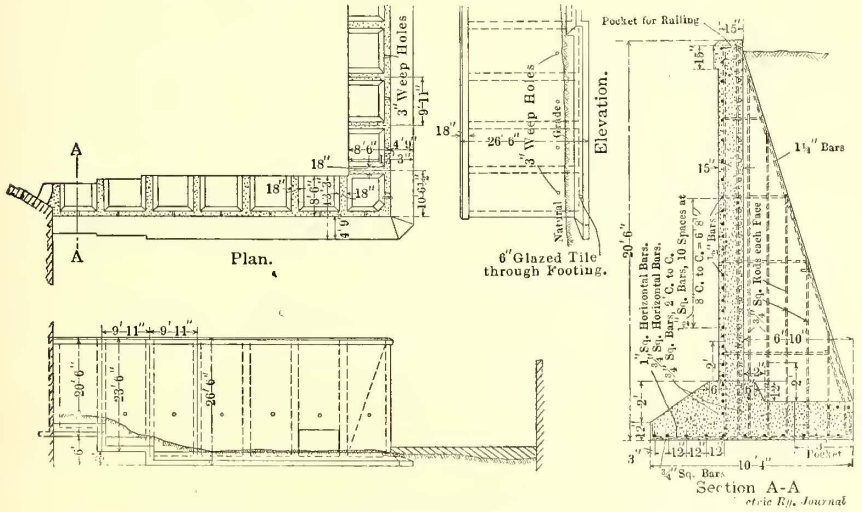
Toilet facilities are provided on two mezzanine floors at the end of the forge shop adjoining the repair shop.

MACHINE SHOP

The machine shop is located 31 ft. distant from the forge shop and also connects at one end with the general repair shop. A sectional view of the machine shop is shown. This building has a gallery floor 21 ft. above the ground floor; also mezzanine floors located 12 ft. above the ground floor. The toilet facilities for both machine and repair shops will be placed on these mezzanine floors, which adjoin the common wall between the two shops.

The machine and repair shops will be connected by four doors on the ground floor and one door on each side of the machine-shop gallery floor. The mezzanine floor in the machine shop will be used for locker and wash rooms. On account of the depression in grade the employees' entrance from Fortieth Street will be on a level with the second floor of the shop buildings. As the men pass through the entrance they will walk through a corridor on the second floor to the locker and wash rooms, from which they can pass down to either the machine shop or the repair shop.

A standard-gage industrial track has been built through both machine and forge shops and is intersected by a lead from the yard loop track which extends through the machine shop into the general repair shop. Practically the entire ground floor of the machine shop will be served by an equipment of three cranes. The crane in the center bay has the following characteristics: Capacity, 15 tons; span, 60 ft.; height from crane rail to floor, 31 ft. 8½ in.; bridge speed, 400 ft. to 450 ft. per minute; trolley speed, 100 ft. to 150 ft. per minute; hoist speed, 20 ft. to 50 ft. per minute; cage operated. The two cranes serving the side bays of the machine shop under the gallery floor have the following characteristics: Capacity, 5 tons; span, 28 ft. 5 in.; height from rail to floor, 14 ft. 4 in.; bridge speed, 300 ft. to 350 ft. per minute; trolley speed, 100 ft. to 150 ft.



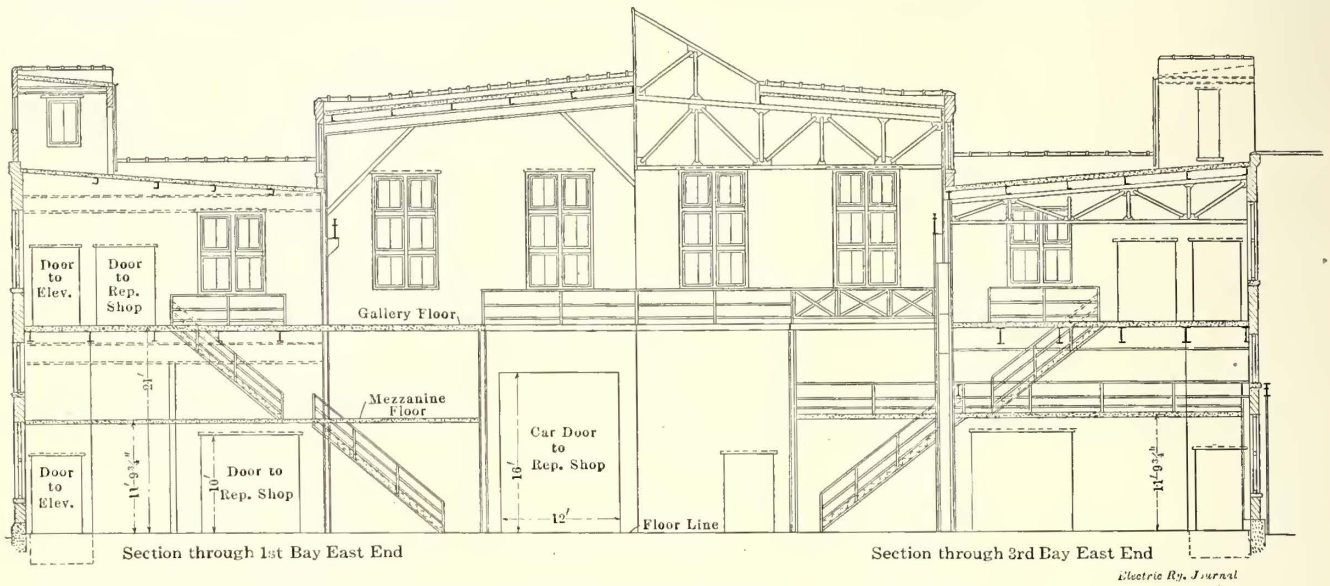
New Milwaukee Shops—Sections of Retaining Walls

per minute; hoist speed, 24 ft. to 60 ft. per minute; cage operated.

GENERAL REPAIR SHOP

The general repair shop incloses 20 tracks with open car pits, each long enough to accommodate two cars. The tracks are spaced alternately on 15-ft. and 16-ft. centers. A cross-section through the pit tracks showing the open construction runways. The span of the car-body cranes will be 56 ft. 11 in.; height from floor to crane rail, 21 ft. 4½ in.; bridge speed, 400 ft. to 450 ft. per minute; trolley speed, 100 ft. to 150 ft. per minute; hoist speed, 20 ft. to 50 ft. per minute. These cranes are all cage operated.

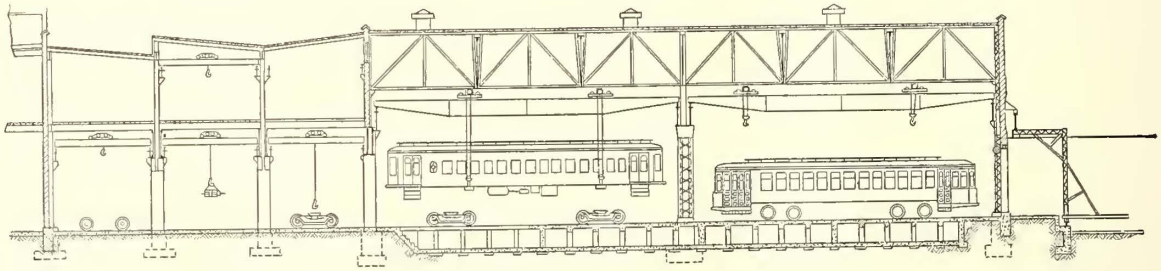
The car-p t section of the general repair shop will occupy about two-thirds of the ground-floor space. The remaining



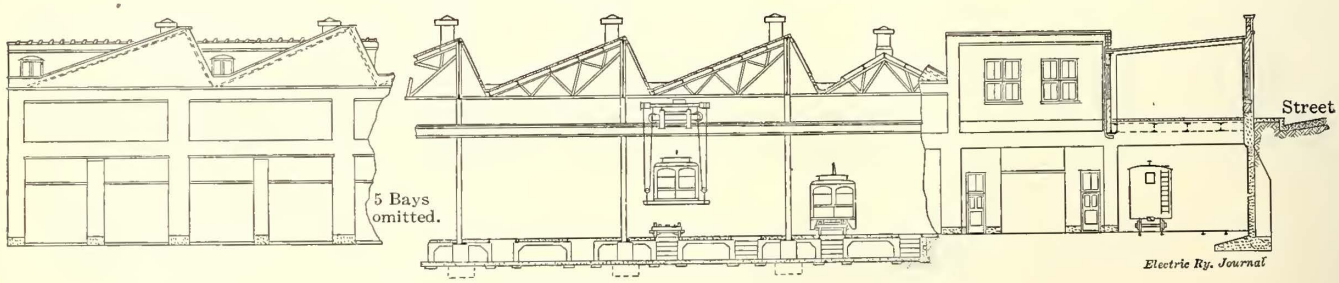
New Milwaukee Shops—Section and Elevation of Machine Shops

adopted is reproduced on page 204. The floor between the car pits has a thickness equal to the height of the pit track rails, 7 in. These rails are carried on reinforced concrete posts spaced on 5-ft. centers. The posts are 8 in. square in section. Each post is surmounted by a cap made of a section of channel iron through which pass the anchor bolts for holding the rails. The design of the floor between the pits is such that it will withstand the load brought on by pulling a heavy interurban truck across it. The space between pits is subdivided into four sec-

one-third of the first floor will be used as truck repair space, each car pit track extending entirely across it and one of these tracks extending into the machine shop and another into the forge shop. Above this track space will be a gallery floor on which the electrical department will be located. Elevators will connect the two floors. The truck repair space on the first floor will be lighted by shafts extending through the gallery floor to the roof, as shown by the dotted lines in the general plan shown on page 206.



New Milwaukee Shops—Longitudinal Section Repair Shop



New Milwaukee Shops—Cross-Section Repair Shop

tions by three concrete diaphragm walls extending across the open space underneath the repair shop floor. Car bodies will be handled by either of two specially designed car-lifting cranes installed to serve all pit tracks. The cranes have the following characteristics: Each has two 15-ton travelers. Each traveler is arranged with two traveling drums and two hooks, each with a capacity to lift seven and one-half tons. The hooks will be spaced 9 ft. apart in a direction parallel with the

The truck section of the repair shop will be served by five 5-ton cranes operating on three runways, each with a span of 17 ft. 8½ in. and with crane rails 16 ft. 3 in. above the floor. The cranes will have a bridge speed of 250 ft. to 300 ft. per minute; a trolley speed of 100 ft. to 150 ft. per minute and a hoist speed of 24 ft. to 60 ft. per minute. They will be controlled by pendent switches. The electrical shop on the second floor will be served by one 3-ton crane with a span of 18 ft. 1 in.

This crane will have a hoist arranged to lift materials from the ground floor to the second floor, but normally will serve the electrical shop. The height from the ground floor to the crane rails on the second floor will be 31 ft.; the bridge speed of the crane, 250 ft. to 300 ft. per minute; trolley speed, 100 ft. to 150 ft. per minute; hoist speed, 50 ft. to 100 ft. per minute.

The erecting and paint shop will have three four-track bays. Runways will be provided for cranes in two of these bays. A portion of this building, 30 ft. wide and 186 ft. long, is to be two stories high. The erecting and paint shop is to be joined on the south by a mill shop and on the north by one of the two storerooms earlier described.

MEETINGS OF THE EXECUTIVE COMMITTEE OF THE TRANSPORTATION & TRAFFIC ASSOCIATION

Meetings of the executive committee of the American Electric Railway Transportation & Traffic Association were held Jan. 26 and 27. Those present were President Henry C. Page, Worcester; First Vice-President John N. Shannahan, Baltimore; Second Vice-President C. E. Learned, Boston; Third Vice-President Dana Stevens, Cincinnati; C. D. Emmons, Fort Wayne; J. V. Sullivan, Chicago, and A. Gaboury, Montreal. At the first meeting President Page stated that the association had been officially represented at recent meetings of State and sectional associations held to discuss transportation and traffic subjects and that R. I. Todd, Indianapolis, and W. H. Collins, Fonda, had represented it respectively at the recent meetings of the Central Electric Railway Association and at the Syracuse meeting of the New York State railways.

BUDGET

The first subject discussed by the committee was the budget for the ensuing year. Mr. Page stated that the association had this year two more committees than last year, namely, the joint committee on signals appointed to act with the Engineering Association and the joint committee on freight and express accounting to act with the Accountants' Association. It was therefore decided to ask for an appropriation of $1,800 during the year, or $300 more than requested last year. President Page thought that the services which the two additional committees could render the association warranted the association in the additional expense.

INTERURBAN RULES

J. W. Brown, Wheaton, Ill., chairman of the committee on interurban rules, then asked whether the executive committee had any special instructions as to the direction in which the association wished the committee to work during the coming year. He said that he had sent inquiries to some 18 managers in different parts of the country, asking which code they preferred, the Denver code, the Atlantic City code or the A. R. A. code. Opinions were about equally divided between the three. After discussion the executive committee voted, upon motion of Mr. Shannahan, that the rules committee should endeavor to draw up the best possible set of rules which would be adopted by a majority of the member companies of the association.

BLOCK SIGNALS

C. D. Emmons, Fort Wayne, a member of the joint committee on block signaling, then reported the action taken by that committee at its meeting on Jan. 25. An account of this meeting was published on page 169 of the issue of this paper of Jan. 28.

TRANSFERS AND TRANSFER INFORMATION

J. V. Sullivan, Chicago, a member of the committee on transfers and transfer information, then asked the executive committee whether it had any further instructions to make to that committee. Secretary Donecker stated that the association had received a suggestion from the Los Angeles Railway Company suggesting as a topic the consideration of the best method of collecting fares on prepayment cars, and if a fare-receiving device was used whether it should be so arranged that the money received for fares could be used by the conductor for making change. A discussion arose in the executive committee as to the committee of the association to which this subject and others relating to the method of collecting fares should be referred. The conclusion was finally reached that the manner of collecting fares was so closely allied to that of issuing and collecting transfers that it would be well to enlarge the scope of the committee on transfers and transfer information to include this subject and to change the name of the committee to the "committee on fares and transfers." This was then done and the subject suggested by the Los Angeles company was referred to the committee on fares and transfers, whose instructions were briefly to investigate all matters relating to the collection of fares, the issue and acceptance of transfers, the registration of the same and the need of fare boxes in connection with the use of prepayment cars. The committee was also instructed to continue the subject referred to last year of whether transfers should be registered and, if so, whether two registers, one for cash fares and one for transfers, should be used.

EXPRESS AND FREIGHT TRAFFIC

H. E. Reynolds, Boston, chairman of the committee on express and freight traffic, then reported that the membership of that committee had not yet been completed and that it had been impossible yet to have a meeting.

SCHEDULES AND TIMETABLES

The committee on schedules and timetables reported that among other subjects in its forthcoming report the committee expected to take up that of defining some of the most common terms used in city and interurban railway operation. It had found that terms used for the same things varied greatly in different parts of the country and it would attempt to begin the standardization of some of the terms used in the construction of schedules and timetables. This was approved by the committee and at Mr. Learned's suggestion all committees were authorized to define the technical terms used in the field in which their committee work was directed if definitions seemed advisable.

CITY RULES

H. W. Fuller, chairman of the committee on city rules, reported as follows: "The committee met at 9:30 a. m. Thursday, Jan. 26, and reviewed the report of the 1909-1910 committee and the action of the association at the 1910 convention. Several letters and suggestions submitted were also considered and a conference was had with the interurban rules committee. The city rules committee is now prepared to submit recommendations covering changes in certain rules (Nos. 2, 10, 21, 29, 116, 122, 209, 210 and 213). The committee plans to hold another meeting and formulate recommendation of rules covering the operation of prepayment cars. The committee also plans to submit all recommended changes and additions to member companies by circular, so that a comprehensive report may be submitted to the next convention."

SUBJECTS

The committee on subjects reported through Mr. Shannahan that it believed that the time of the association at the next convention would be so fully occupied with considering the reports of committees that there would not be time to take up individual papers. Mr. Emmons suggested that instead of outside individual papers the chairman of each committee should arrange to have at least two persons not connected with the committee present oral or written discussions on the report, these discussions to occupy not more than 10 minutes. The suggestion was adopted and the secretary was instructed to advise the chairman of each committee of this action.

NEW MEMBERS

The secretary then presented to the executive committee the names of some 50 associate members of the American Electric Railway Association who had answered the recent circular sent out by the association by expressing their wish to ally themselves with the Transportation & Traffic Association. Upon motion the list was approved.

TRAINING OF TRANSPORTATION EMPLOYEES

The committee on the training of transportation employees reported, through Mr. Nagle, that it had met and discussed the instructions issued to it by the executive committee, namely, to

consider methods of keeping permanent records of employees, the minimum breaking-in periods in both city and interurban operation and the development of uniform records for use during the breaking-in period, and to tabulate the State laws relating to the employment of trainmen. These subjects had been assigned to several members of the committee with the exception of the last, which is to be taken care of by the secretary of the association, who will send a circular letter to two railway companies in each State requesting that copies of any new bills presented to or laws passed by the Legislatures or any order issued by the railroad or other public utility commissions in their respective States be sent to the committee to aid it in its work.

PASSENGER TRAFFIC

L. D. Pellissier, Holyoke, chairman of the committee on passenger traffic, reported that no other members of the committee had been to the meeting in New York and that it was therefore impossible to make a report.

JOINT COMMITTEE ON EXPRESS AND FREIGHT ACCOUNTING

The secretary reported that P. P. Crafts, chairman of this committee, was preparing to call a meeting soon.

MEETING OF THE MANUFACTURERS' EXECUTIVE COMMITTEE

The executive committee of the American Electric Railway Manufacturers' Association held a meeting in the Engineering Societies Building at 10:30 a. m. on Jan. 26 for the consideration of routine business and to dispose of certain details pertaining to the arrangements for the annual dinner. The report of the entertainment committee, which had this latter matter in charge, was received and unanimously approved.

An interesting incident of the meeting was the presentation to the past president, Joseph R. Ellicott, of a set of resolutions, handsomely engrossed, expressive of the appreciation and esteem in which he is held by his fellow members of the executive committee and by the entire membership of the association. The resolutions, which had been suitably framed, were presented by Charles C. Peirce in an appropriate speech.

A special committee to act upon selecting the time and place of the next convention was appointed, consisting of the president, Charles C. Castle; the secretary, George Keegan; the vice-president in charge of the entertainment committee, W. L. Conwell; the vice-president in charge of exhibits, K. D. Hequembourg, and two alternates to be named later. This committee is to confer and co-operate with a similar committee of the American Electric Railway Association with regard to the time and place of holding the next annual convention.

A report was received from the special committee appointed to consider the subject of a permanent office in New York for the Manufacturers' Association. This report was made by the chairman, Mr. Ellicott, and favored the establishment of such an office. After protracted discussion it was decided that the association should have an office where all of its business might be transacted and where the work of the various committees might converge. A resolution was adopted authorizing the president and secretary to engage rooms and establish an office in the downtown district of New York.

MEETING OF ENGINEERING ASSOCIATION COMMITTEE

The special committee appointed to frame rules for the guidance of the standards committee of the Engineering Association held a meeting at the office of the Electric Railway Journal on the afternoon of Jan. 26. Those present were Paul Winsor, Boston Elevated Railway, chairman; C. B. Voynow, Philadelphia Rapid Transit Company; Rodney Hitt, Electric Railway Journal, and H. H. Adams, Metropolitan Street Railway, New York. An informal discussion of the subject assigned took place and the meeting adjourned for two weeks, during which time each member of the committee is to prepare a set of rules as a basis for discussion at the next meeting.

MEETING OF THE EXECUTIVE COMMITTEE OF THE ACCOUNTANTS' ASSOCIATION

At the meeting of the executive committee of the Accountants' Association on Jan. 26 the following were present: W. H. Forse, Jr., Anderson, Ind., president; M. R. Boylan, Newark, N. J.; H. E. Weeks, Davenport, Ia.; C. N. Lahr, Akron, Ohio; F. B. Lasher, New York, N. Y.; C. L. S. Tingley, Philadelphia, Pa.; W. B. Brockway, New York, N. Y.; Henry J. Davies, Cleveland, Ohio; P. S. Young, Newark, N. J.; W. F. Ham, Washington, D. C.; L. T. Hixson, Indianapolis, Ind.; Frank J. Pryor, Jr., Philadelphia, Pa.; H. E. Smith, Montreal, Que., and Robert N. Wallis, Fitchburg, Mass.

The subject of a campaign to increase the number of active members of the association was discussed and various suggestions were considered.

In connection with a discussion of the subject of the "get-together" luncheon, which has been held by members of the association at the recent annual meetings, various plans were considered for getting the members, and particularly the new delegates, better acquainted. It was decided to appoint a "sociability" committee to act in regard to this matter at the next annual meeting.

President Forse called attention to the facts that the association will have five committee reports at the next meeting instead of three as heretofore and that there will be two joint sessions with other affiliated associations instead of one, as was the case last year. The two new committees are the one on car miles and car hours and the joint committee with the Transportation & Traffic Association.

It was decided that the association will publish the standard classification of accounts and the decisions on questions regarding the classification which have been made in conjunction with the Interstate Commerce Commission. The decisions on the cases will be provided with an index or marginal notes. The pamphlet will be placed on sale by the association.

It was decided tentatively to have papers presented at the next annual meeting on the subjects of overhead charges, statistical compilations, accounting for a small property, and fare boxes, with an exhibit of sample fare boxes. A committee of three accountants will be appointed to prepare a list of articles giving data regarding the life of railway physical property.

President Forse has announced the following membership of committees:

Standing committee on classification of accounts—W. F. Ham, Washington, D. C., chairman; H. L. Wilson, Boston, Mass.; W. B. Brockway, New York, N. Y.; W. H. Forse, Jr., Anderson, Ind.; F. E. Smith, Chicago, Ill.

Joint committee on shop accounting with Engineering Association—P. S. Young, Newark, N. J., co-chairman; N. E. Stubbs, Baltimore, Md.; F. B. Lasher, New York, N. Y.; C. E. Thompson, Chicago, Ill.; A. F. Elkins, Columbus, Ohio; representing Engineering Association—A. D. McWhorter, Memphis, Tenn., co-chairman; Chas. Hewitt, Philadelphia, Pa.; H. H. Adams, New York, N. Y.; E. O. Ackerman, Columbus, Ohio; John W. Corning, Boston, Mass.

Joint committee with Transportation & Traffic Association on freight and express accounting—W. Shroyer, Anderson, Ind., co-chairman; E. L. Kasemeier, Springfield, Ohio; J. C. Collins, Rochester, N. Y.; representing Transportation & Traffic Association—P. P. Crafts, Clinton, Ia., co-chairman; W. S. Whitney, Cincinnati, Ohio; Geo. H. Harris, Birmingham, Ala.

Committee on car miles and car hours—S. C. Rogers, Youngstown, Ohio, chairman; C. S. Mitchell, Pittsburgh, Pa.; W. J. Tharp, Little Rock, Ark.

Committee on interline accounting—L. T. Hixon, Indianapolis, Ind., chairman; Irwin Fullerton, Detroit, Mich.; E. L. Schmock, Willoughby, Ohio.

THE ADJUSTMENT OF AMERICAN STREET RAILWAY RATES TO THE EXPANSION OF CITY AREAS*

BY GEORGE H. DAVIS, OF FORD, BACON & DAVIS, CONSULTING ENGINEERS, NEW YORK, N. Y.

The modern city is an organized unit having its residence, financial, commercial and other districts all within its limits of transportation, while the ancient city without transportation was at best a group of communities, each having its centers of interest within walking distance. City areas per capita in typical cases in America are more than twice those of European cities of corresponding size. The factor creating this condition is the flat-rate system of payment for street transportation as opposed to the quantity or distance rate system abroad.

Considering all industries, we now have in America only a few remaining examples of the flat-rate plan of charge which was almost universal in early industrial history. Considering common labor, when the employer bought the services of the laborer at one time for a given amount he claimed his entire time for an indefinite period and possibly the laborer himself. At present a laborer does a certain kind of work during fixed hours under stipulated conditions at a given rate. In professional and higher grade service the flat-rate method of charge appears only in the salary or retainer, while for all special services special fees are paid. Commodities are universally produced and sold at a per unit price. Restaurants, for example, have almost entirely abandoned the flat-rate system of charge known as the "American plan." City supply services such as telephone, telegraph, water, gas, heat and electricity were placed on the flat-rate basis of charge when first established, while at present it has been necessary not only to make a quantity charge for amounts as measured, but to establish other bases of charge, such as time of service and readiness to serve. For some reasons the basis of charge for a product or service should be in general accord with the basis of cost of production. For illustration, if in transportation service items of operating cost and other corporation expenditures on account of conducting the business are proportional to ton miles, then rates should have the same basis. Rates cannot be so arranged as to be absolutely just to each individual patron. It is apparent that not only the statutes of governments but the laws of nature are made for classes and the most that can be hoped is an equitable class rate plan. Rates of charge for products or services are of most vital importance to the business or industry under consideration, and feasibility and adaptability are prominent features to consider.

In analogy to successful rate systems of other industries, a rate plan for street railway service charge would suggest itself in which not only convenience of fare collection is taken into consideration as in

(1) The American flat-rate plan, and as in

(2) The European zone plan, in which quantity of service is considered,

but other factors such as:

(3) Readiness to serve, including a consideration of:
  (a) Availability of routes and transfers.
  (b) Quality and condition of cars and roadway.
  (c) Reliability of service.
  (d) Speeds and headways.
  (e) The guarantee of safe transportation.
  (f) Perpetuity of service.

(4) Time of service, including:
  (a) Rush-hour service.
  (b) Day service.
  (c) Theater and other amusement service.
  (d) All-night service.
  (e) Excursion service.

(5) Risks of the service, including:
  (a) Damage claims.
  (b) Public demands.
  (c) Franchise requirements.
  (d) Labor controversies.
  (e) Changes in the art.

Since 1905, following a 10-year development period, there has been a pronounced reawakening to the advantages of light car equipment in the reduction of operating costs. This came about on account of the marked advantage observed in operating expenditures of companies using only light cars as compared with those operating heavier types. This led to a careful consideration of the subject, resulting in demonstrations both in theory and practice showing the extent to which operating costs are influenced by car weight or load weight carried.

This subject is mentioned here only in connection with weight, miles and rates. In theory it has been shown that by the elimination of weight transported, either in car units or live passenger loads, savings in operating and other items of expenditure can be made amounting to from 5 cents to 10 cents per pound per year, based upon the assumed distance of transportation of a car, for the period amounting to approximately 50,000 miles. The exact savings per pound will depend upon location, climate, grades and other road conditions, as well as efficiency of management and equipment. Among the items of expenditure influenced by weight transported are maintenance of roadway, power plant, cars and equipment, operating costs, as power plant wages, fuel, water and miscellaneous, together with interest, taxes and depreciation on the property affected. Transportation and general expense items are not included. It is assumed that freight transportation rates of steam railroads in the United States are $0.007 for one ton hauled one mile, which if hauled 50,000 miles would amount to $350, equivalent to $0.175 per pound. With an operating ratio of 86 per cent, including the usual operating items, together with interest, taxes and depreciation, the cost to the steam railroads of this transportation would be $0.1505 per pound for 50,000 miles.

Considering the expenditures for 1910 of a typical street railway of the group of smaller cities in the statements of which abstracts are published herewith, the items of operating costs amounted to $240,000; interest, $100,000; taxes, $25,000; depreciation, in addition to 10 per cent of gross earnings for maintenance, $25,000; a total of $390,000. This company operates a light, uniform type of single-truck car, seating 32, and in the period its schedule mileage amounted to 2,000,000 car miles, and on the basis of 50,000 miles per car per year would be equivalent to 40 cars at an average weight of 26,000 lb., including live load. This would amount to 1,040,000 lb. of car unit and load weight used in the service, which is equivalent, with expenditures of $300,000, to $0.375 per pound.

In a group of street railway properties having for 1910 gross earnings of approximately $5,700,000, of the 92.33 per cent of gross earnings expended for all purposes except dividends, including operating expenses, 54.47 per cent; interest, 24.74 per cent; taxes, 7.12 per cent; depreciation, 6 per cent, only 53.08 per cent is affected to any extent whatever by weight of car or live weight transported, and of this the items particularly affected are cost of power, car repairs, track repairs, interest and depreciation, which in the aggregate do not exceed 15.22 per cent of gross earnings.

From a consideration of a large number of typical examples it would appear that the addition or subtraction of passenger weight at the rate of $0.075 per pound per year may not influence the total expenditures to a greater extent than 20 per cent.

The American 5-cent-fare flat-rate plan of charge had its origin from considerations of convenience, and a half century ago in small cities having limited car routes the amount was no doubt equitable, but to meet the conditions existing in large cities where great territories are served it is inadequate.

Passenger weight miles, or passenger miles, since the weight of passengers is approximately uniform, may be considered as the unit of quantity of street railway service, and the European zone system of rates is established on this unit. Since this unit covers only a part of the costs of conducting the business it should not form the entire basis of rates for service.

*Abstract of paper read before the American Electric Railway Association, New York, N. Y., on Jan. 27, 1911.

Regarding the readiness-to-serve rate factor in a rate plan in all large cities from the completion of initial construction to the expiration of the franchise street railway service is constantly available. The extremes of service requirements are shown in the maximum service of a typical company at 6 p. m. and minimum service at 3 a. m. as indicated by cars upon the system, which are in the ratio of 15 to 1.

Public utility businesses are unique among industrial undertakings in that they are required through ordinance contract and public demand to perform continuous service and to all applicants without discrimination. If a car service could be suspended during hours of minimum requirements, expenditures, with the exception of interest, taxes, depreciation and certain general items, would be correspondingly reduced.

In general practice, cars are furnished when the people want to ride and they are not required to ride when it is profitable to furnish cars. The service given is equivalent to that of a private conveyance at or near the door of every house, available every hour for 25 years, 50 years or even in perpetuity. This rate factor, if applied to one-quarter of the car hours furnished to the urban population of the United States reached by street car service as reported in 1907, would amount to an expenditure on the part of the operating companies of between $50,000,000 and $100,000,000, which is of sufficient magnitude to demand recognition in any rate plan.

The time of day or hour of day of service is one of the most important elements of consideration in an equitable rate. In a system furnishing extra cars for daily peak service there is expended in principal items only, including interest, taxes and depreciation on $10,000 investment per car, at least $2,000 per car per year. This would indicate the great injustice in the requirement that transportation be sold in rush hours through tickets at a cheaper rate than the base rate.

In the preceding considerations it has been the aim to suggest matters which would have a bearing on an equitable rate plan, and such a plan would appear to include payment in proportion to the length of ride and according to the time service.

Owing to the rapid growth of cities the majority of companies are facing a definite problem resulting from the constant increase of city areas, the extension of their traffic systems and the expansion of five-cent fare limits to correspond with corporation limits. To obtain information so far as is available covering actual present conditions, inquiries were addressed to a large number of companies in the United States, nearly all having gross annual earnings in excess of $1,000,000. [Tables published herewith, numbered "I" to "XI" inclu-

TABLE I.—AREA OF CITY WITHIN CORPORATE LIMITS.
(SQUARE MILES.)

Co.	1870.	1880.	1890.	1900.	Increase 1910 over 1900 (per cent).	1910.
1	.....	.....	.....	.....	...	.....
2	23.11	27.76	27.76	28.06	47	41.35
3	10.95	13.67	20.16	27.26	46	39.72
4	10.25	14.75	20.50	21.50	12	24.00
5	16.36	18.16	18.16	18.94	23	23.40
6	20.99	31.96	108.44	108.45	...	108.44
7	.....	.....	15.00	28.00	28	33.70
8	2.78	4.28	5.60	16.60	16	19.30
9	18.70	19.00	19.20	19.50	...	19.50
10	.....	.....	8.50	12.20	110	25.60
11	38.00	38.00	38.00	38.00	...	38.00
12	17.50	17.50	12.50	12.50	40	17.50
13	.47	.47	12.04	12.04	300	50.10
14	1.81	1.81	3.96	3.96	...	3.96
15	129.50	129.50	129.50	129.50	...	129.50
16	8.00	8.50	11.45	18.45	–38	11.45

TABLE II.—ESTIMATED AREA OF CITY DEVELOPED AND SERVED.
(SQUARE MILES.)

Co.	1870.	1880.	1890.	1900.	Increase 1910 over 1900 (per cent).	1910
4	6.00	9.00	16.00	21.50	12	24.00
5	7.50	9.50	10.20	11.40	44	16.40
6	.....	.....	37.95	43.38	37	59.52
8	1.67	2.78	4.20	9.96	45	14.48
9	.....	.....	6.73	7.80	70	13.26
12	.....	.....	11.00	12.00	30	15.50
13	.47	.47	12.04	12.04	66	20.00
14	.....	.....	9.00	18.00	40	25.00
16	8.00	8.50	11.45	18.45	*38	11.45

* Decrease.

TABLE III.—POPULATION SERVED INSIDE CORPORATE LIMITS.

Co.	1870.	1880.	1890.	1900.	Increase 1910 over 1900 (per cent).	1910.
2	86,076	156,383	238,617	321,616	63	533,905
3	79,557	116,342	205,876	285,704	66	465,786
4	14,000	83,200	184,000	285,315	30	373,740
5	105,059	136,508	181,830	246,070	41	347,469
6	.....	88,360	297,894	365,783	42	516,152
7	48,244	75,056	105,436	169,164	38	233,650
8	40,226	33,592	64,495	102,320	28	131,105
9	35,092	45,850	72,215	102,026	27	129,867
10	.....	37,000	65,000	89,000	74	155,000
11	26,703	33,340	44,179	62,059	43	88,926
12	.....	.....	31,200	38,415	35	51,521
13	1,000	3,800	26,178	38,415	245	132,685
14	.....	.....	22,535	32,637	11	36,346
15	674,022	847,170	1,046,964	1,293,967	20	1,549,008
16	8,230	13,138	26,874	39,000	18	46,000

TABLE IV.—POPULATION SERVED OUTSIDE CORPORATE LIMITS.

Co.	1870.	1880.	1890.	1900.	Increase 1910 over 1900 (per cent).	1910.
4	0	8,000	10,000	20,000	50	30,000
5	38,780	53,421	74,268	112,983	46	165,417
7	.....	.....	.....	20,000	–95	1,000
8	5,000	10,000	15,000	20,000	...	20,000
9	.....	.....	.....	130,000	–33	87,000
10	.....	5,000	12,000	25,000	20	30,000
12	.....	.....	2,000	3,500	157	9,000
13	.....	.....	42,800	61,585	–72	17,315
14	.....	.....	11,000	17,943	100	35,000
15	263,156	304,372	358,045	400,642	19	444,392
16	.....	300	400	500	...	500

TABLE V.—TOTAL POPULATION SERVED.

Co.	1870.	1880.	1890.	1900.	Increase 1910 over 1900 (per cent).	1910.
2	262,204	355,869	551,959	775,058	31	1,018,463
4	14,000	91,200	194,000	305,315	32	403,740
5	143,839	189,929	256,098	359,053	43	512,886
6	.....	88,360	297,894	365,783	41	516,152
7	.....	.....	.....	171,164	37	234,650
8	47,226	43,592	79,495	122,320	24	151,105
9	.....	.....	.....	232,026	–6	216,867
10	.....	42,000	77,000	114,000	62	185,000
12	.....	.....	33,200	41,915	45	60,521
13	1,000	3,800	68,978	100,000	40	140,000
14	.....	.....	33,535	50,580	42	71,346
15	937,178	1,157,902	1,405,009	1,694,339	18	1,993,400
16	.....	13,438	27,274	39,500	18	46,500

TABLE VI.—MILES OF SINGLE-TRACK EQUIVALENT.

Co.	1870.	1880.	1890.	1900.	Increase 1910 over 1900 (per cent).	1910.
1	.....	.....	256.79	370.16	31	485.22
2	.....	.....	89.00	.....	...	585.00
3	.....	.....	.....	.....	...	208.18
4	25.00	50.00	100.00	116.00	26	136.00
5	.....	.....	.....	.....	...	101.65
6	.....	.....	181.00	230.80	33	306.60
7	.....	.....	*95.19	108.83	28	139.66
8	.....	.....	.....	68.61	62	110.37
9	.....	.....	.....	76.67	13	86.83
10	.....	.....	.....	110.00	70	186.00
11	2.71	6.60	21.40	72.69	78	129.38
12	.....	.....	.....	42.00	38	58.00
13	.....	.....	81.00	94.00	41	133.00
14	.....	1.00	19.00	26.00	60	41.60
15	219.25	361.57	411.20	444.83	41	627.65
16	.....	4.00	22.00	26.00	27	33.00

* 1894.

sive, present part of the information furnished by the 16 companies, which are designated by numbers.—Eds.] These companies represent both geographically and politically nearly all sections of the United States and all conditions of operation. No attempt has been made to average the data, as there is a wide variation of conditions, and a clearer idea can be obtained from a study of the individual cases than through averages.

Of the 21 largest street railway companies in the United States only six are required to make mandatory extensions of tracks, and of these four have neutralizing conditions. Approximately one-half of the companies replying state that their franchise provisions necessitate the extension of their five-cent fare limits to coincide with the extension of city limits. Of the remaining companies, nearly one-half or one-quarter of the total reporting have additional five-cent fare zones beyond the original five-cent zone. The question of extension of fare limits is under litigation in two cases.

It is axiomatic that there is a limited distance to which a five-cent fare can be applied profitably. A city might annex a neighboring city 100 miles distant and through its franchise provisions demand a five-cent fare. The question is one that must be settled in a manner to result in profitable operation. This involves a consideration of rates by city governments at least, possibly by commissions and the courts.

Of the appended tables, Table I shows the areas within the corporate limits of each of the cities for each of the decades from 1870 to 1910, with rates of increase in each decade. Between 1870 and 1880 the increase in city areas varied from 11 per cent to 53 per cent; for the decade ending in 1890 from —30 per cent to +240 per cent; in the next an increase of from 4 per cent to 200 per cent, and in the last from 12 per cent to 300 per cent.

Table II shows the estimated area of the city developed and served. The statement was prepared for the purpose of comparison between the political and actual expansion of cities and shows in conjunction with population tables III, IV and V that the density of traffic has not kept pace with the expansion of city boundaries and distance hauled. There appears to be very little definite information regarding the length of the average passenger ride. Few companies have made a traffic count, but available data, however, would indicate that this is from 2 miles to 4.5 miles, an average of approximately 3 miles.

In general, the tables presented reflect the average conditions of the industry and are self-explanatory. There are, however, four or five typical companies which it may be useful to consider in detail.

Company No. 3, for example, is operating in a city which in 1870 had 10.95 sq. miles within corporate limits. This city has steadily increased its corporate limits by 25 per cent, 48 per cent, 35 per cent, 46 per cent, until at present the area is approximately 40 sq. miles, an increase in 40 years of 300 per cent. The total population served by its railway system, which is apparently entirely included within corporate limits, has increased from nearly 80,000 in 1870 to 465,786 in 1910, 482 per cent. The average revenue per passenger was in 1901 3.38 cents and in 1909 3.25 cents. The length of the longest ride possible for one fare was in 1901 12.30 miles and is in 1910 13.50 miles.

Company No. 4 shows in the period of 40 years an increase in area of from 10.25 sq. miles to 24 sq. miles. The population has increased in the same period from 14,000 to 403,740. Trackage has increased from 25 miles in 1870 to 136 miles in 1910. In the first two decades the trackage increased 100 per cent in each decade, while the population served increased 550 per cent in the first decade and 113 per cent in the second. The seat-mile earnings increased from 0.51 cent in 1900 to 0.64 cent in 1910; the average revenue per passenger has decreased from 3.76 cents in 1900 to 3.12 cents in 1910. The longest ride possible for one fare was 10 miles in 1900; it is 12.14 miles in 1910.

Company No. 8 had a city area in 1870 of 2.78 sq. miles; in 1910 the area of this city is 19.3 sq. miles, showing an increase in each of the four decades of 53 per cent, 30 per cent, 200 per cent and 16 per cent respectively. The population has increased from 40,226 in 1870 to 131,105 in 1910, showing a decrease of 16 per cent in the first decade, an increase of 94 per cent, 59 per cent and 28 per cent in the three following decades. Its seat-mile earnings have increased from 0.68 cent in 1906 to 0.70 cent in 1910. Its average revenue per passenger, including

TABLE VII.—CAR MILES OPERATED.

Co.	1900.	1905.	1908.	1909.	1910.
1	38,353,514	48,273,622	51,857,889	51,127,681	53,362,500
2	.....	33,562,699	30,857,647	34,323,796	37,537,433
3	.....	17,694,708	20,888,366	22,846,879	.....
4	8,395,323	10,521,760	12,144,642	12,887,776	13,812,813
5	.....	.....	14,439,017	15,179,426	†15,377,000
6	13,530,829	15,136,019	21,683,889	22,441,312	24,229,010
7	6,581,897	4,840,080	8,301,504	8,683,104	9,346,183
8	.....	.....	6,284,291	6,423,159	6,895,421
9	3,054,950	3,737,364	3,825,756	3,896,339	4,068,502
10	.....	6,549,802	8,444,508	9,020,897	9,538,867
12	.....	.....	2,587,612	2,464,181	.....
*13	.....	4,794,620	5,574,550	5,672,867	6,194,583
14	1,021,046	1,275,628	1,679,067	1,759,533	2,045,703
15	56,510,922	69,743,770	81,161,348	73,340,404	70,943,404
16	810,458	1,392,930	1,704,819	1,741,709	1,790,722

* Passenger
† Estimated.

TABLE VIII.—CAR HOURS OPERATED.

Co.	1900.	1905.	1908.	1909.	1910.
1	5,529,923	5,842,847	5,313,792	4,998,292	5,109,993
2	.....	3,871,567	3,617,831	4,025,097	4,416,117
3	.....	1,738,872	2,091,713	2,304,493	2,678,391
4	997,783	1,198,319	1,367,793	1,433,060	1,546,513
5	.....	.....	1,702,371	1,796,761	‡1,833,000
6	1,379,140	1,762,704	2,367,510	2,442,391	2,628,627
7	.....	875,158	928,293	976,422	1,059,376
*8	.....	.....	748,083	786,135	853,954
9	401,542	511,185	534,340	528,599	554,210
10	.....	739,127	957,398	996,650	1,044,439
12	.....	.....	292,263	266,300	.....
†13	.....	464,859	595,020	609,001	700,117
14	.....	165,841	201,574	206,272	239,168
15	7,463,564	9,047,716	10,263,770	9,126,695	8,710,076
..	.....	174,974	202,976	209,679	222,727

* Basis changed in 1905.
† Passenger.
‡ Estimated.

TABLE IX.—PASSENGER EARNINGS PER CAR MILE AND PER SEAT MILE—(CENTS)

Co.	Cents per Car Mile.							
	1900.	1904.	1905.	1906.	1907.	1908.	1909.	1910.
1	26.00	24.90	25.70	26.20	26.10	26.40	27.50	27.80
2	.....	26.46	27.25	28.62	28.82	29.10	28.15	28.77
3	.....	20.52	21.52	22.34	22.24	22.46	23.20	.....
4	22.04	25.75	25.38	25.88	26.21	26.54	26.90	27.42
5	.....	.....	.....	.....	.....	27.89	30.21	31.50
*6	24.75	31.11	31.40	31.71	29.82	29.21	30.73	30.75
7	17.85	22.87	25.08	26.38	27.37	27.84	28.29	28.86
8	.....	.....	.....	22.96	24.35	25.88	26.75	26.14
9	19.12	24.50	25.45	25.60	27.30	29.20	29.30	28.70
10	.....	.....	21.40	22.34	21.56	22.32	23.21	23.84
11	.....	.....	.....	.....	.....	23.81	26.22	26.14
12	.....	.....	.....	.....	.....	21.19	21.61	.....
13	.....	19.36	21.76	23.25	25.07	24.90	25.50	26.32
14	10.92	19.28	21.50	22.87	23.20	22.38	23.04	23.29
15	22.98	22.72	23.20	23.12	22.26	22.53	24.96	25.34
16	13.77	21.13	23.69	24.10	24.00	25.04	26.55	27.42

* Figures based on motor car miles.

Co.	Cents per Seat Mile.							
	1900.	1904.	1905.	1906.	1907.	1908.	1909.	1910.
4	.51	.60	.59	.60	.61	.62	.63	.64
8	.....	.....	.....	.68	.67	.69	.70	.70
9	.76	.80	.80	.75	.80	.86	.89	.87
13	.....	.49	.54	.58	.62	.62	.64	.67
16	.68	.63	.62	.72	.81	.79	.81	.81

transfers, has increased from 3.957 cents in 1905 to 4.092 cents in 1910. The longest ride for a single fare has increased from 9.64 miles in 1900 to 16.14 miles in 1910. This company, under its franchise provisions, is required to extend its five-cent fare limits as the city limits are extended, which extension is the subject of continuous controversy.

The most pronounced example of the extension of city limits is shown in company No. 13, operating in a city which in 1870 had an area of 0.47 sq. mile and now has an area of 50.1 sq. miles, while the developed portion of the city amounts to only 20 sq. miles of the 50 sq. miles included within corporate limits. The trackage has increased from 81 miles in 1890 to 133 miles in 1910. The earnings per seat mile have increased from 0.52 cent in 1902 to 0.67 cent in 1910. The average revenue per passenger has decreased from 4.61 cents in 1902 to 4.08 cents in 1910. The longest ride possible for a single fare has increased from 7.3 miles in 1900 to 13.6 miles in 1910. This company operates under a definite franchise provision that the original fare limit or first zone shall remain constant, no matter what

TABLE X.—AVERAGE REVENUE PER PASSENGER, INCLUDING TRANSFER.

Co.	1900.	1904.	1905.	1906.	1907.	1908.	1909.	1910.
*1	3.982	.....	.....	.....	.....	.....	3.105	....
2	.....	4.35	.....	4.33	4.31	4.27	4.31	4.34
3	.....	3.32	3.31	3.25	3.26	3.25	3.25	.....
4	3.76	3.71	3.27	3.22	3.18	3.15	3.17	3.12
5	.....	.....	.....	.....	.....	3.57	3.59	3.62
6	4.06	3.95	3.90	3.97	3.94	3.88	3.83	3.89
7	§3.29	.....	.....	.....	.....	.....	.....	.....
†8	.....	.....	3.957	4.047	4.054	4.068	4.090	4.092
9	4.13	4.15	4.17	4.11	4.10	4.10	4.11	4.10
10	.....	4.23	4.23	4.19	4.11	4.07	4.09	4.09
11	.....	.....	.....	.....	.....	4.98	4.95	4.90
12	.....	4.95	4.95	4.95	4.94	4.94	4.94	4.94
‡13	.....	4.36	4.29	4.21	4.15	4.12	4.09	4.08
‡14	.....	4.25	4.26	4.28	4.28	4.24	4.21	.....
15	4.44	4.07	4.02	3.89	3.68	3.57	3.94	4.15
16	4.85	4.11	4.00	3.88	3.92	3.96	4.05	4.07

* 1909 includes bodily transfers.
† Including passes.
‡ Revenue passenger.
§ No special date.

TABLE XI.—LENGTH OF LONGEST RIDE POSSIBLE FOR ONE FARE (MILES).

Co.	1890.	1900.	1905.	1906.	1907.	1908.	1909.	1910.
1	.....	18.00	.....	.....	.....	.....	.....	20.00
2	.....	14.37	14.37	14.37	14.37	14.37	14.37	14.37
3	.....	.....	12.50	12.50	12.50	13.50	13.50	13.50
4	.....	10.00	.....	.....	.....	.....	.....	12.14
5	.....	.....	.....	.....	.....	.....	.....	14.63
6	6.00	.....	.....	.....	.....	.....	.....	17.70
7	.....	.....	.....	.....	.....	.....	.....	12.59
8	.....	9.64	12.12	12.12	12.12	15.23	15.23	16.14
9	.....	.....	.....	.....	.....	.....	.....	8.30
10	.....	.....	.....	.....	.....	.....	.....	18.00
11	.....	.....	.....	.....	.....	.....	.....	14.00
12	.....	6.50	.....	.....	.....	.....	.....	7.76
*13	.....	7.30	13.60	13.60	13.60	13.60	13.60	13.60
14	.....	.....	.....	.....	.....	.....	.....	9.50
15	.....	.....	.....	.....	.....	.....	.....	19.50
16	.....	6.00	8.79	8.79	8.79	8.79	8.79	8.79

* Not five-cent fare.

extensions are made in the city limits. Owing to the city's great area in proportion to the population the company has three five-cent fare zones. The three zones include from the center of the city an aggregate radial distance of 13 miles. Again the elimination of one after the other of the zones in question is the subject of constant controversy.

Instead of duplicating in America the multiplicity of narrow zones and frequent fare collections existing in cities abroad it would appear practical and expedient that American companies maintain a limited five-cent fare zone of present radius and as the length of haul is extended new zones of narrow limits and smaller fare be established. Those negotiating with municipalities with new operating contracts in view may find it advantageous to incorporate "on-peak" and "off-peak" fare rate provisions.

The steam railroad companies with electrically equipped terminals are now performing, in a sense, a long-distance city transportation service, together with an interurban service. They have based their fare rates on the zone system for all services. In their city and suburban service commutation tickets have been issued, good for given stations in given zones.

Companies are constantly implored for and often driven to concessions. There is, however, at least one general demand upon which there is no possible compromise—the indefinite extension by American street railway companies of their single-fare limits.

MEETING OF THE COMMITTEES OF THE AMERICAN ASSOCIATION

A meeting of the executive committee of the American Electric Railway Association and meetings of a number of the other committees of the association were held on Thursday and Friday, Jan. 26 and 27, at the association headquarters. Those in attendance at the meeting were Arthur W. Brady, president; Thomas N. McCarter, first vice-president; General George H. Harries, second vice-president; W. H. Forse, Jr., president Accountants' Association; W. J. Harvie, president Engineering Association; H. V. Drown, president Claim Agents' Association; H. C. Page, president Transportation & Traffic Association, and H. H. Littell, H. H. Vreeland and James F. Shaw, past presidents.

The meeting was held principally to hear the reports of the committees of the association and to lay out the work for the current year. The reports of these meetings are published below.

The executive committee also considered the question of the location of the 1911 convention. The secretary reported that invitations had been received from Rochester, N. Y.; Toronto, Canada; Washington, D. C.; Minneapolis, Minn.; Atlantic City, N. J.; Niagara Falls, N. Y., and Richmond, Va. A representative of the latter city was present to extend the invitation of Richmond in person. As has been the custom in the past, the executive committee authorized President Brady to appoint a special committee to consider this matter. The membership of this committee will be announced later and it will act with a similar committee which was appointed at the last meeting of the Manufacturers' Association.

The secretary reported that the total active membership of the association was 359 and that the total associate membership was 1153. This is an increase of nine active members and 74 associate members since Sept. 30, 1910, the date of the report of the secretary and treasurer, presented at the last Atlantic City convention.

President Brady then announced the personnel of the committees of the American association to serve during the present year. This list is given elsewhere in this issue.

Another matter considered was that of the standard transfer law recommended by the Transportation & Traffic Association at the 1910 convention. After a thorough discussion the executive committee ordered that this law be printed and copies of it sent to member companies.

Another subject considered was that of insurance, which was taken up with the committee on insurance, as mentioned below. Representatives of several bureaus engaged in fire insurance matters appeared before the committee and the question of acting on the recommendations contained in the 1910 report of the committee on insurance was finally left in the hands of the president and vice-presidents of the American Association.

Brief statements of the action taken by the different committees of the American Association follow.

COMMITTEE ON SUBJECTS

Those in attendance at the meeting of this committee were: Thomas N. McCarter (chairman), H. G. Bradlee, C. L. S. Tingley, W. H. Forse, Jr., W. J. Harvie, H. V. Drown and H. C. Page. The committee outlined a tentative program for the American association and considered similar matters for the various affiliated associations. The details of these programs will be published later.

COMMITTEE ON COMPENSATION FOR CARRYING UNITED STATES MAIL

Those in attendance at the meeting of this committee were: Edgar S. Fassett (chairman), H. A. Nicholl, C. H. Hile, C. L. S. Tingley and J. K. Choate. The committee gave further consideration to the data which had been collected by the committee last year and outlined a plan of work for the coming year which, it is hoped, will result in substantial good to the member companies.

COMMITTEE ON FEDERAL RELATIONS

Those in attendance were General George H. Harries (chairman), F. R. Ford, C. S. Sergeant, F. W. Brooks, R. I. Todd and L. S. Storrs. This committee took up many matters within its jurisdiction but no report was made public.

COMMITTEE ON PUBLIC RELATIONS

The members of this committee in attendance were Charles O. Kruger (chairman), Thomas N. McCarter, General George H. Harries, E. C. Foster, Calvert Townley, D. A. Belden and J. H. Pardee, president Street Railway Association of the State of New York; Charles H. Hile, president New England Street Railway Club, and R. L. Rand, president Alabama Light & Traction Association. This committee considered general publicity matters and decided to compile and distribute in pamphlet form to the member companies a digest of the material gathered by the committee on the subject of laws and regulations affecting electric railways.

COMMITTEE ON DETERMINING THE PROPER BASIS FOR RATES AND FARES

The members of this committee present at the meeting were: Frank R. Ford (chairman), H. J. Davies, H. G. Bradlee and James F. Shaw. This committee met for the first time and outlined a plan to secure data to enable the members to make definite recommendations at the next meeting of the association.

COMMITTEE ON INSURANCE

Those in attendance were: H. J. Davies (chairman), A. H. Ford and F. A. Healy. After a discussion of the recommendations contained in its report to the 1910 convention, the committee met with the executive committee, as mentioned above.

COMMITTEE ON TAXATION MATTERS

Those in attendance were: Calvert Townley (chairman), Guy E. Tripp, C. L. S. Tingley and J. H. Pardee. This was the first meeting of the committee and plans were drawn up for the current year. No report, however, is available for publication at this time.

ELECTRIC RAILWAY DICTIONARY SUPERVISING COMMITTEE

The committee appointed by the American Electric Railway Association to supervise the preparation of the *Electric Railway Dictionary* held a meeting at the office of the ELECTRIC RAILWAY JOURNAL on the afternoon of Jan. 26 to examine the proofs and approve the contents of the book before its publication. The full committee, consisting of H. H. Adams, Metropolitan Street Railway, New York (chairman); Paul Winsor, Boston Elevated Railway, and Richard McCulloch, United Railways of St. Louis, was present. Rodney Hitt, editor of the dictionary, submitted page proofs of the book, which were duly approved by the committee. The book will be sent to press immediately and it is expected that copies will be ready for distribution about March 1.

TITANIUM RAIL ORDER OF THE NEW YORK CENTRAL

The New York Central Lines have ordered 41,500 tons of titanium Bessemer rails for 1911. In addition they have specified the use of 1 per cent of the 10 per cent titanium alloy (or equivalent titanium), which will, therefore, require more than 400 tons of the 10 per cent alloy. The strength of the titanium content may be increased to 15 per cent, thus requiring a proportionately smaller quantity of alloy, but, in any event, this requisition will make the largest single order ever placed for alloy steel rails. This large order is of particular interest in view of earlier rumors that no more titanium rails would be ordered.

THE MEETING OF COMMITTEE ON SHOP ACCOUNTING

The first meeting of the 1911 joint committee on shop accounting was held Thursday, Jan. 26, at the headquarters of the American Electric Railway Association. For this year the membership of the committee was increased from six to ten, and is now made up of members of the Engineering and Accounting Associations as follows: Co-chairman, P. S. Young, comptroller Public Service Railway, Newark, N. J.; co-chairman, A. D. McWhorter, master mechanic, Memphis Street Railway, Memphis, Tenn.; Charles Hewitt, superintendent of motive power, Philadelphia Rapid Transit Company, Philadelphia, Pa.; H. H. Adams, superintendent of rolling stock and shops, Metropolitan Street Railway Company, New York; E. O. Ackerman, engineer maintenance of way, Columbus Railway & Light Company, Columbus, Ohio; John W. Corning, electrical engineer, Boston Elevated Railroad Company, Boston, Mass.; F. B. Lasher, traveling auditor, New York State Railways, New York; N. E. Stubbs, auditor, United Railway & Electric Company, Baltimore, Md.; C. E. Thompson, auditor, Chicago & Milwaukee Electric Railroad, Chicago, Ill.; A. E. Elkins, auditor, Columbus, Delaware & Marion Railway, Columbus, Ohio. The committee members at the meeting were Messrs. Young, Adams, Lasher, McWhorter, Hewitt and Ackerman. W. H. Forse, Jr., president Accountants' Association, was also present.

Mr. Young was re-elected chairman of the joint committee. Mr. Forse said that the Accountants' Association had been asked to take up the study of the life of materials as a subject for the 1911 convention. He would, therefore, appreciate any suggestions from the committee as to how this information could be secured, because the data necessarily would come jointly from the engineers and the accountants.

Upon the suggestion of Mr. Hewitt a sub-committee consisting of Messrs. Hewitt (chairman), Ackerman and Lasher was appointed to report on "What Constitutes Maintenance." This sub-committee will endeavor to draw the line between ordinary replacements and those which constitute a proper addition to capital account.

Mr. Lasher submitted the remarks on shop accounting which were made by Messrs. Joel, Belleville and Ingle at the quarterly meeting of the Street Railway Association of the State of New York Dec. 7, 1910, and published in the ELECTRIC RAILWAY JOURNAL on page 1160, Dec. 10, 1910. These papers were in the nature of comments and elaborations of certain points in the 1910 report of the joint committee on shop accounting. Mr. Lasher thought that they could profitably be considered in connection with any review of this report.

Mr. Adams and Mr. McWhorter further suggested the advisability of elaborating some of the subdivisions of the maintenance accounts, such as those relating to track and line, which were not as extended as those on rolling stock. It was therefore decided to appoint as a sub-committee on the "Review of 1910 Report" Messrs. Adams (chairman), Corning and Stubbs.

There was considerable discussion on the advisability of one department charging more than bare labor and material costs for work done for another department. It was decided that while fixed percentages ought not to be specified for all cases to cover overhead charges it would be desirable at least to determine how many overhead charges should be taken into consideration. This subject was turned over to a sub-committee on "Interdepartment Charges," consisting of Messrs. McWhorter (chairman), Thompson and Elkins. This committee will also endeavor to formulate some suggestions on the elimination of waste in the manufacture and use of materials made at home.

Upon the suggestion of Mr. Adams the committee as a whole decided to make a study of efficiency and incentive systems in the shops, such as premiums, piecework and bonuses. In closing the proceedings Mr. Young suggested that each sub-committee conclude its report with a set of definite recommendations which could be considered at the next meeting of the entire committee, which would probably be held next May.

THE AMERICAN ELECTRIC RAILWAY ASSOCIATION*

BY ARTHUR W. BRADY, PRESIDENT

To-day, for the first time, those interested in electric railway affairs have met under a name sufficiently broad to make it co-extensive with the industry itself. What, in its origin, was the American Street Railway Association, and afterward was the American Street & Interurban Railway Association, has now become the American Electric Railway Association. These changes in name typify the growth and development of the industry to which that name applies. When in 1882 a small group of street railway men met for the purpose of forming what has now become the American Electric Railway Association one of them had the temerity to prophesy that in a few years the horse and the mule would be displaced in street railway operation by electric power. That meeting was held less than a third of a century ago but, nevertheless, that suggestion was received with smiles and its proponent was looked on as an enthusiast whose judgment his dreams and hopes had temporarily obscured. Yet so great have since been the growth and development of electric traction that not only have the horse and the mule been emancipated from street railway service but the very name of the association then formed has finally been changed to indicate the inseparable bond between the organization and the power then ignored and practically unknown. To-day in the membership of the successor to the association then born are included electric railways of all kinds, surface street railways, elevated railways, underground railways, underwater railways, interurban railways and electrified parts of steam railroads.

However great the difference among these various kinds of railroads, they are all alike in one respect—the power which propels their cars and upon which they rely for ability to accomplish their purposes is electricity. It is this which creates in them all a common interest, presenting similar problems, both of internal administration and of external relation, differing in important respects from the problems of other transportation agencies and other public utilities. This common interest not merely justifies but, if the greatest effectiveness is to be obtained, compels consultation and co-operation, opportunity for which the American Electric Railway Association is intended to offer.

To the extent to which that association has already accomplished the purposes for which it was formed I shall merely allude. Many in this room are familiar with the large quantity and the high quality of the work which it has done in the past. As now organized much of its work is done through affiliated associations representing the engineering, the accounting, the transportation and traffic and the claim agents' departments of work and dealing with the many practical questions constantly arising in connection with these important branches of electric railway operation. To this list of affiliated associations should be added as not less important that of the manufacturers to whose kind offices we owe our entertainment to-night. Not the least of the advantages which have arisen from this association are found in the increased spirit of harmony and intelligent co-operation between operators and manufacturers brought about through the existence of the affiliated Manufacturers' Association.

But it is not to the accomplishments of the past that my remarks will be devoted to-night but to the work of the future, for it is on future labors and results that the association must depend for continued growth, prosperity and influence.

Now, the work of our association has a twofold aspect, one, as it were, facing within and the other facing without. Every electric railway company has to deal with the same two classes of questions, one relating to its internal affairs and the other to its external affairs; one involving all of the difficulties connected with the efficient and economical operation and administration of the property, the other having to do with public and governmental relations. The work of the American Electric Railway Association, which is nothing but the combined co-operative work of its several hundred member companies, follows the same line of cleavage, and it is chiefly to the class of questions last stated that my words to-night will be addressed. It is in this direction that some of the most fruitful and necessary work of the immediate future lies.

No thoughtful student of the time can fail to conclude that the present is a period of political ferment and to look with some degree of fear and foreboding for the developments of the future. Doctrines that a few years ago were regarded as radical if not revolutionary are now the shibboleth of great parties or at least of important factions of great parties. In high places the wisdom of our forefathers is questioned. That great instrument, the Constitution of the United States, which for more than a century has attracted the praise of publicists, foreign and domestic, and has given to the American people the strength of a powerful nation without at the same time taking away the blessings of local self-government, is pronounced antiquated and out of date.

Our courts are called on not to interpret it according to its letter and its spirit but to trim it here and add to it there until it corresponds to the twentieth century model which its critics set on the fashion plate before them. Nay, more, the decisions of our courts upon which each one of us must depend for the preservation and safety of every liberty and right that is dear to a freeman are criticised. This criticism is applied not in the spirit and within the limits of fairness and self-restraint wherein an enlightened and self-governed people has a right to discuss every one of its institutions and every act of its servants. On the contrary, they are treated as objects of attack whenever the view of a judge, sworn to administer the law as it is and not as he would have it, differs from the latest theory or "ism" of the critic.

There is no cause for wonder that an important phase of the campaign carried on by the men who profess and preach and endeavor to put into practice the doctrines spoken of has to do with the relations between public service corporations and the public. While these men do not, perhaps, make of electric railways an especial target for their assaults, they are impartial enough not to grant them exemption therefrom and consequently they lay at their doors every one of the sins which they charge against any other class of public utilities. The various directions which these attacks have taken are so well known as to call for little specification here. They may be summed up in the statement that through them a large part of the public has been taught to believe that every public service company is not merely a mine of wealth for its owners but also that that wealth has been filched, or forced, or otherwise improperly taken from the public. The natural effect of this belief is seen in various directions. Unfair demands are made and unfair treatment administered without other justification than the assumption, implied or expressed, that thereby the public will regain some part of its own. Or, perhaps, the basis is the selfish and corrupt desire of some individual or individuals to share in those riches which it is thought the company is improperly enjoying.

Now, it is inevitable that so rapid a development as has taken place in the field of electric railroading could not have been effected without the commission of many and costly blunders. Furthermore, without doubt, instances have existed wherein wrong was done in methods employed or results obtained. Bear in mind, however, in considering all this, the magnitude of electric railway development. In 1882 the man who suggested even the probability of electric traction was laughed at. In 1907, according to the United States Bureau of Census, the net capitalization of the electric railways of the United States, exclusive of partially electrified steam railroads, approximated $3,400,000,000 and the gross annual income of such properties approximated $430,000 000. Of all the marvels of our past most marvelous century none is greater than this, and none of a material kind has done so much in so short a time to increase the convenience, comfort and welfare of the people.

*Abstract of speech delivered at the banquet given by the Manufacturers' Association to the American Electric Railway Association, New York, Jan. 27, 1911.

That so magnificent a development could have taken place so quickly without mistakes, many and grievous, and without cases of actual wrong is contrary to all human experience. But the mistakes were due in the main to the novelty of the art, to the fallibility of human judgment, to the over-sanguineness of promoters and, more often than is credited, to a sense of local pride and public spirit on the part of those who controlled capital. The actual wrongs done were sporadic and exceptional. The fact is that in every respect this development is typical of the development of other great branches of American industry. It all has exhibited that same bold and aggressive spirit and enterprise on the part of men of affairs that was exhibited by those earlier generations which in less than 100 years after the close of the American Revolution pushed the frontier of these United States westward from the Alleghanies across the Mississippi and over the Rocky Mountains to the coast of the Pacific Ocean. If that development is weak and unsound, if it is permeated with fraud and corruption, if the foundations on which it rests are rotten and crumbling, then is the fabric of American industry throughout slight and weak indeed.

Let me allude briefly to two or three of the fallacies with which, through false teachings, some considerable part of the public mind is imbued. One is the theory that a public service industry differs from every other branch of business in that no profits are to be gained therefrom beyond interest on the actual investment and a very low rate of interest at that. No account is to be taken of the hazards incurred by the projectors of these necessary undertakings, of the uncertainty in which at the outset their future is shrouded and often long after enfolded, of the years of constant care and attention required to keep these enterprises alive, much less profitable. Every public utility is treated as though it was an assured success from the beginning. The successful promoter is likely to be called a grafter and the unsuccessful one a fool. The need of continual supplies of fresh capital to keep pace with increased public wants and demands is overlooked or it is assumed that the owners will be driven to supply all capital requirements. But let us listen as closely as we may we find no one to tell us how capital will be lured from fields where it has at least a chance at the fleshpots of Egypt by an offered diet of starvation. Nor can the student of history be found who will point to the instance where capital has been driven from more inviting to less inviting channels of investment.

Coupled with the fallacy just referred to are others, such as the theory that the amount of investment upon which a minimum return shall be allowed is the present physical value or the replacement value of a property; that the value so determined is not merely one of the factors to be considered in determining the reasonableness of a rate or a return but is the sole or principal factor; that all mistakes of past construction and operation, even when based on the best expert advice at the time available, must be borne by the investor alone and no part of it shifted to the shoulders of the public; that losses incurred in the improvement of a property to enable it better to meet public needs and convenience shall likewise be borne by the investor alone; that the shorter the term of a franchise the better, forgetful of the fact that the less the term the greater the rate or the less the service, in order that the investor may protect himself within the period; that heavy burdens imposed in the way of taxes and assessments or by franchise exactions are legitimate and in the public interest.

Now, if these various doctrines are fallacious, if they are unfair and unjust, if they are opposed to the real and permanent interest of the public as they are opposed to our interest, it is our duty to combat and overcome them. The law of self-preservation dictates this, and our responsibility as citizens of a common country confirms the view. In this direction a chief part of the future work of this association must lie. We cannot as individuals gain the desired end. We cannot because the attacks are not merely by individuals or merely upon individuals. The firing is all along the line and every electric railway is a target, even though in many cases the bullets have not been felt or even heard. If doubt exists in your minds read the popular magazines that cover the newsstands everywhere. Read the speeches in Congress and State legislatures, the messages of presidents and governors, the reports of committees and commissions, the platforms of political parties, lectures delivered at Chautauqua and harangues spoken upon the stump. You will find constant demonstration of my assertions. We must meet these attacks. We must meet them unitedly as they are made. We must first of all clear up our own minds. We must see wherein truth lies, for we cannot expect and do not want to displace one delusion by another.

Herein lies the opportunity and herein lie the duty and the work of this organization—that is, that the association shall, through investigation, consultation and co-operation, arrive at the true doctrines and, having found them, play its part in the campaign for a return of safe and sound views.

And what is the truth? We electric railway men believe that we know our business far better than our critics know it. We are certain that we know and appreciate the difficulties of our business much better than our critics do. We daily feel the diminishing gap between our income and our expenses. The public does not. We recognize the seriousness of the problem which constantly increasing rates of expense combined with constantly diminishing or at least non-increasing rates of return offer. The public does not even know that such a problem exists. We do not claim infallibility. We do not assert our freedom from error. We do not doubt that at times our views of questions involving our public relations have been colored by our own apparent interest. We know that at times arrogance has marked the acts of some of us; that the castigation administered to some of us has not in every instance been undeserved. But we do claim that, on the whole, our properties have been wisely and properly administered, with a due regard to the public interest, including fair and even liberal treatment of our patrons. Wiser men might have done better, but nothing in our observation of governmental operation of public utilities or even of the ordinary course of public administration leads us to believe that through government operation or a more thorough-going system of governmental regulation these same properties would have been made nearly as useful, as efficient or as inexpensive to the public as they have been in our hands. Furthermore, we claim that, conceding for the sake of the argument all that our critics allege concerning undue profits and exploitation and even wrong-doing, yet all this has been many times outbalanced by the public benefits which our properties have conferred in increased values, taxes paid, added comfort and convenience, the scattering of congested population, new opportunities for rest and recreation and other ways.

We do not object to proper public regulation. We recognize our position as semi-public agencies which the State has a right to control. We do view with dread the spectre of improper regulation. We strenuously deny the right, the duty and the interest of the State to cross the line which separates regulation from management. We fear the result of direction freed from responsibility for results. We insist that it is our right and the public interest that we be permitted to secure, if possible, sufficient earnings from our properties to pay present owners a return commensurate with that received in the general run of other classes of successful industry, affected by similar hazards, and also sufficient to attract freely the additional supplies of capital which we constantly need. We insist also that losses borne in our efforts to give the public the benefit of the latest advances in the art of transportation are a legitimate part of our capitalizations on which we are entitled to earn a fair return.

Furthermore, the fact has been borne in upon us through repeated observations and experiences that unfair burdens imposed on our properties, whether in the form of unduly limited franchises or in the form of taxes, franchise exactions, or what not, will incapacitate us by just that extent from giving to the public some one or more of the things for which it is constantly asking. These burdens are, therefore, in fact in the long run borne by the public itself.

These are some part of the truths which we of the electric railway world must see infiltrate the public mind. The only agency through which this can be accomplished on a scale sufficiently broad to meet the situation as it exists is the American Electric Railway Association. The newspapers, the technical press, the periodical press and our own association addresses, papers and reports must be relied on to attain this end. But these must be supplemented by the intelligent and informed labors of our members, active and associate, including especially our associate members of the Manufacturers' Association.

Think for a moment of the advantages which surround our industry in the forwarding of such a movement. We are in touch with our patrons. They deal with us daily, perhaps several times a day, not occasionally or at long intervals as in the case of the ordinary patron of a steam railroad. Our managements and often our ownerships are nearer in residence and closer in interest to the public we serve than are those of any steam railroad. The human element enters into all our transactions. The stage has not been reached in electric railway transportation when the service we offer can be had by pushing a button or turning a key. Moreover, the vast public benefits which our industries have conferred and are continuing to confer are in many if not most cases fresh in the public mind, or at least are not so far forgotten as to forbid a renewed recognition of them. Still further, it is not too much to assert that, by reason of the very facts just referred to. in no public service industry have greater efforts been made, or with greater success, or with more general recognition of efforts and success, to treat its patrons fairly and generously, than in ours. These various matters are advantages of the utmost importance in the campaign that is proposed. They will greatly aid in securing the open ears we ask for our arguments. And what of the result? Can there be doubt? The court to which we must appeal, to whose judgment we must finally submit, is the American people. When informed, that tribunal is fair. Thus far our opponents have shouted their arguments into the ears of that court, while our voices have been barely raised above a whisper. Let us lose fear of our shadows, turn the light on and speak forth boldly and truly. That done we can safely rest our cases, relying on the justice of our cause and confident of the fairness of our judges.

DECISION IN UNDERGROUND RAILWAYS ARBITRATION

A decision was rendered in London, Jan. 12, by the Lord Chief Justice and two other judges sitting as a divisional court, in the arbitration case of the British Westinghouse Company against the Underground Electric Railway Company, of London. The case was brought before the court by Alfred Lyttleton, arbitrator, and arose through disputes as to the value of the turbines built by the manufacturers for the Lots Road power station of the railway company some seven or eight years ago. These were the first very large turbines that were designed, and the railway company claimed that they did not work efficiently and substituted other turbines for them.

The first point on which the arbitrator asked the opinion of the court was whether the claimant's contention was correct that the commercial life of the first turbines had expired at the time of the purchase of the later machines; if this was correct the respondents could not claim any further damages from the plaintiffs after the latter machines were installed. The second point was whether the plaintiffs were responsible for the purchase and installation cost of the latter machines. The Chief Justice stated that the question was in some respects a novel one, but that he considered a person relying upon breach of contract must do what was reasonable so as not to make the damages greater than they would otherwise be. It might be true that at the time the first turbines were built the type of turbines installed later by the railway company were not available, but this fact did not show that the early turbines had reached the end of their commercial life at the time they were removed. Hence, both questions were decided in favor of the railway, and the matter was returned to the arbitrator.

MEETING OF COMMITTEE ON EQUIPMENT

The first meeting of the 1911 committee on equipment, American Electric Railway Engineering Association, was held at the New York office of the association Saturday, Jan. 28. The committee members present were M. V. Ayres (chairman), electrical engineer Boston & Worcester Street Railway, Boston, Mass.; H. A. Benedict, mechanical engineer Public Service Railway, Newark, N. J.; A. T. Clark, superintendent of rolling stock and shops United Railways & Electric Company, Baltimore, Md.; F. R. Phillips, superintendent equipment Pittsburgh Railways, Pittsburgh, Pa.; W. Thorn, division engineer of cars Board of Supervising Engineers, Chicago Traction, Chicago, Ill., and F. G. Grimshaw, master mechanic Pennsylvania Railroad, Camden, N. J.

There were also present W. J. Harvie, chief engineer Utica & Mohawk Railway, Syracuse, N. Y., and Norman Litchfield, engineer car equipment Interborough Rapid Transit Company, New York, N. Y., respectively president and secretary of the Engineering Association.

Mr. Ayres outlined the work which had been suggested to the committee by the executive committee as follows: Method of heating cars; design of car body, trucks, motors and equipment parts, having in mind reduction in weight without the sacrifice of strength; unit basis comparison of weights; coupler report of the Central Electric Railway Association, including signal, air and control connections as proposed for general standardization.

The first subject discussed by the committee was the method of heating cars. Mr. Ayres thought that an investigation of this subject naturally should include a discussion of ventilation. There was considerable interchange of opinion of the experiences which the members of the committee had had with various types of stoves and electric heaters, also on the radiation losses of various types of cars having large window areas, single or double sash and steel panels. It was pointed out that the speed at which cars operated was also an important factor in considering the amount of heat necessary to keep the car comfortable. The use of insulators to prevent the rapid dissipation of heat in metal cars was also taken up. An interesting point in connection with heating and ventilating was mentioned by Mr. Thorn, who said that he had found that it took less heat to warm a car when fresh air was drawn in all the time than when the dead air was used again and again. He thought that this surprising result might be ascribed to the fact that fresh air is much richer in oxygen.

Mr. Phillips described some personal experiences with the use of electric blowers over heaters. The sub-committee appointed by Mr. Ayres to report on the subject of electric, hot-water and hot-air heating and on ventilation is composed of Mr. Thorn (chairman), Messrs. Benedict and Clark.

The next subject discussed was the design of car body, truck, motor and other equipment parts, with a view to the reduction of weight; also providing a unit basis for the comparison of car weights. Mr. Ayres pointed out that these subjects would be a continuation of the work done the two preceding years.

Mr. Thorn stated that the Board of Supervising Engineers, Chicago Traction, was studying the merits of plate-girder underframes as compared with truss designs.

One member said that some of the studies which he had made convinced him that the weight of the actual structural members of a car forms a smaller part of the total than is generally supposed. This fact applied to all classes of cars, whether wood, composite or steel.

Mr. Thorn mentioned the savings which were being obtained in the weight of bolsters. A cast-steel bolster weighed about 100 lb. less than the original built-up bolster and a saving of another 100 lb. was possible by building the bolsters of structural steel members.

Mr. Grimshaw mentioned that the Pennsylvania Railroad was now building some steel cars for electric motor and trailer service. These cars were about 9 ft. longer and carried 18 to 20 seats more than the 58-passenger wooden cars. The latter

cars weighed 96,000 lb., whereas the steel motor cars weighed but 100,000 lb. despite their greater capacity. The new cars are similar in design to the present Long Island electric motor cars, which weigh 106,000 lb. each. The saving in weight was due principally to the use of a lighter truck.

Mr. Thorn brought up the question of corrugated bumpers or other construction to prevent colliding cars from climbing over one another. One member believed that the principle of the anti-climber was all right as the underframe of modern cars should be strong enough to stand severe shocks. He indorsed Mr. Grimshaw's suggestion that the subject of lighter trucks should be considered by the committee.

Mr. Thorn mentioned the objections which truck manufacturers had first offered when lighter trucks were suggested by the Chicago engineers. He said that eventually they were convinced that it was not necessary to use the same class of construction for city service as for high-speed suburban and interurban service.

There was a brief discussion on short wheelbase and long wheelbase trucks in relation to motor hanging and car speed. Mr. Phillips mentioned the interesting fact that the temperatures of inside-hung motors are more nearly uniform than of outside-hung motors. When the motors are outside-hung Nos. 2 and 4 are bound to heat faster because they carry 15 per cent to 20 per cent more load. The numbers of the motors as mentioned by Mr. Phillips are based on operation from the No. 1 end of the car.

Mr. Clark stated that while every traction system would doubtless continue to seek the type of car best suited to its needs yet the committee might do much good work if it were to lay down a series of designs each of which could be used as a basis for a given class of service. One member added that it would be very desirable to incorporate in such a report a standard method for figuring the strength of car framing parts; in other words, to present an essay on car design and calculation.

The committee determined that it would be advisable to divide the subject of car weights into three parts, namely, bodies, trucks and equipments. The sub-committee on design of car weights will consist of Mr. Phillips (chairman) and Messrs. Thorn and Homer McNutt, master mechanic San Diego Electric Railways, San Diego, Cal. This sub-committee will also take up the matter of a possible standard data sheet for determining the proper methods of comparison between cars. The design of car trucks with reference to reducing weight was assigned to a sub-committee consisting of Mr. Benedict (chairman) and Messrs. Phillips and Clark. Mr. Ayres personally will take up with the manufacturers the question of weight reduction of electric equipment and air compressors.

Mr. Thorn asked that the manufacturers be requested to prepare a schedule showing the horse-power capacity of the motors which should be used for cars of given weights and speeds.

The fourth subject considered was the standardization report submitted by the Central Electric Railway Association's standardization committee at the Indianapolis meeting of that association, Sept. 22, 1910. This report had been transmitted to the standardization committee of the American Electric Railway Association for its consideration and in turn had been sent for discussion and comment to the committee on equipment of the Electric Railway Engineering Association. Particular attention was devoted to the recommended standards for train couplings, including electric, air and signal connections. It was pointed out by Mr. Ayres that the Central Electric Railway Association standard had in mind very evidently a condition which would permit interoperation with steam railroad rolling stock. It was also found that some of the other standards of the Central Electric Railway Association, such as the brake shoes and axles, differed so little from those of the American Electric Railway Association that it was difficult to understand just why the variations should have been made. A case in point was a variation of ⅛ in. in cast-iron brake shoes.

Mr. Ayres, Mr. Benedict and other members of the committee thought it very desirable that a strong effort should be made to harmonize these conflicts in standards and to point out clearly for what conditions of service each design was recommended. It was considered especially desirable to follow the present procedure in adopting standards whereby the work of the equipment committee must be approved by the standardization committee at the following convention and then submitted to the association as a whole the following year before it is formally adopted as a standard. The subject of train line connections, including interchanging equipments with steam railroads, was assigned to a sub-committee consisting of Mr. Grimshaw, (chairman), J. M. Bosenbury, superintendent of motive power Illinois Traction System, Champaign, Ill., and H. L. Patterson, chief engineer Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.

A motion was made and carried that the chairman of the equipment committee call the attention of the standardization committee of the American Electric Railway Engineering Association to the variations in the standards of the Central Electric Railway and American associations.

COMMITTEES OF THE AMERICAN ELECTRIC RAILWAY ASSOCIATION

At the meeting of the executive committee of the American Electric Railway Association on Jan. 26 President Brady announced the membership of the committees of that association for 1910-1911. The list follows:

COMMITTEE ON SUBJECTS

Thomas N. McCarter, chairman, president Public Service Railway, Newark, N. J.

J. F. Calderwood, vice-president and general manager Brooklyn Rapid Transit Company, Brooklyn, N. Y.

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

C. C. Smith, president Wisconsin Electric Railway, Milwaukee, Wis.

H. G. Bradlee, president Stone & Webster Management Association, Boston, Mass.

C. L. S. Tingley, second vice-president American Railways, Philadelphia, Pa.

W. H. Forse, Jr., president Accountants' Association and secretary and treasurer Indiana Union Traction Company, Anderson, Ind.

W. J. Harvie, president Engineering Association and chief engineer Syracuse Rapid Transit Railway, Syracuse, N. Y.

H. V. Drown, president Claim Agents' Association and general claim agent Public Service Railway, Newark, N. J.

H. C. Page, president Transportation & Traffic Association and general manager Worcester Consolidated Street Railway, Worcester, Mass.

COMMITTEE ON ACTIVE MEMBERSHIP

W. Caryl Ely, chairman, president Ohio Valley Finance Company, Buffalo, N. Y.

H. C. Page, general manager Worcester Consolidated Street Railway, Worcester, Mass.

D. H. Lovell, superintendent West Jersey & Seashore Railroad, Camden, N. J.

J. N. Shannahan, vice-president and general manager Washington, Baltimore & Annapolis Electric Railway Company, Baltimore, Md.

H. W. Plummer, secretary and general manager Asheville Electric Company, Asheville, N. C.

Jos. H. DeGrange, vice-president New Orleans Railway & Light Company, New Orleans, La.

E. B. Stichter, general manager Texas Traction Company, Dallas, Tex.

E. C. Faber, general manager Aurora, Elgin & Chicago Railroad, Wheaton, Ill.

Dana Stevens, vice-president Cincinnati Traction Company, Cincinnati, Ohio.

Jos. S. Wells, general manager Utah Railway & Light Company, Salt Lake City, Utah.

J. D. Fraser, secretary and treasurer, Ottawa Electric Railway, Ottawa, Ont.

Thos. Finigan, purchasing agent United Railroads of San Francisco, San Francisco, Cal.

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D. A. Hegarty, general manager Little Rock Railway & Electric Company, Little Rock, Ark.

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R. H. Sperling, general manager British Columbia Electric Railway, Vancouver, B. C.

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G. H. Clifford, general superintendent Northern Texas Traction Company, Fort Worth, Tex.

Joel Hurt, Equitable Building, Atlanta, Ga.

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J. M. Roach, president Chicago Railways, Chicago, Ill.

J. C. Hutchins, president Detroit United Railway, Detroit, Mich.

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E. C. Foster, Sanderson & Porter, New York.

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A. E. Lang, president Toledo Railways & Light Company, Toledo, Ohio.

T. H. Tutwiler, president Memphis Street Railway, Memphis, Tenn.

John J. Stanley, president Cleveland Railway, Cleveland, Ohio.

Calvert Townley, vice-president Connecticut Company, New Haven, Conn.

D. A. Belden, president New Hampshire Electric Railways, Haverhill, Mass.

Geo. B. Wheeler, president Wisconsin Electrical Association, Eau Claire, Wis.

John H. Pardee, president Street Railway Association of the State of New York, New York, N. Y.

W. B. Tuttle, president Southwestern Electrical & Gas Association, San Antonio, Tex.

Ed. C. Reynolds, president Oklahoma Public Utilities Association, Sapulpa, Okla.

Chas. H. Hile, president New England Street Railway Club, Boston, Mass.

R. J. Irvine, president Missouri Electric, Gas, Street Railway & Water Works Association, Marshall, Mo.

M. T. Flynn, president Kansas Gas, Water, Electric Light & Street Railway Association, Kansas City, Kan.

Duncan McDonald, president Canadian Street Railway Association, Montreal, Que.

L. D. Mathes, president Iowa Street & Interurban Railway Association, Dubuque, Ia.

H. L. Corbett, president Colorado Electric Light, Power & Railway Association, Georgetown, Col.

Geo. Whysall, president Central Electric Railway Association, Marion, Ohio.

B. C. Fowles, president Arkansas Association of Public Utility Operators, Pine Bluff, Ark.

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E. A. Heron, president California Electric Railway Association, Oakland, Cal.

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H. A. Nicholl, general manager Indiana Union Traction Company, Anderson, Ind.

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C. L. S. Tingley, second vice-president American Railways, Philadelphia, Pa.

A. R. Piper, general freight agent Brooklyn Rapid Transit Company, Brooklyn, N. Y.

J. K. Choate, general manager Otsego & Herkimer Railroad, Hartwick, N. Y.

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L. C. Bradley, manager Galveston Electric Company, Galveston, Tex.

J. F. Porter, president Tri-City Railway & Light Company, Davenport, Ia.

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F. W. Brooks, general manager Detroit United Railway, Detroit, Mich.

L. S. Cass, president Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.

R. I. Todd, vice-president and general manager Indianapolis Traction & Terminal Company, Indianapolis, Ind.

L. S. Storrs, president Springfield Street Railway, Springfield, Mass.

Richard McCulloch, vice-president and assistant general manager United Railways of St. Louis, St. Louis, Mo.

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A. S. Richey, professor of electrical engineering Worcester Polytechnic Institute, Worcester, Mass.

W. F. Kelly, second vice-president Oakland Traction Company, Oakland, Cal.

J. F. Calderwood, vice-president and general manager Brooklyn Rapid Transit Company, Brooklyn, N. Y.

D. C. Jackson, professor of electrical engineering Massachusetts Institute of Technology, Boston, Mass.

SUPERVISING COMMITTEE TO CO-OPERATE IN THE PREPARATION OF THE M'GRAW ELECTRIC RAILWAY DICTIONARY

H. H. Adams, chairman, superintendent of rolling stock and shops Metropolitan Street Railway, New York, N. Y.

Paul Winsor, superintendent of motive power and rolling stock Boston Elevated Railway, Boston, Mass.

Richard McCulloch, vice-president and assistant general manager United Railways of St. Louis, St. Louis, Mo.

JUROR TO REPRESENT THE ASSOCIATION IN THE MATTER OF THE J. G. BRILL COMPANY PRIZE

W. A. House, president United Railways & Electric Company, Baltimore, Md.

COMMITTEE ON DETERMINING THE PROPER BASIS FOR RATES AND FARES

Frank R. Ford, chairman, Ford, Bacon & Davis, New York.

C. S. Sergeant, vice-president Boston Elevated Railway, Boston, Mass.

John I. Beggs, president Milwaukee Electric Railway & Light Company, Milwaukee, Wis.

H. J. Davies, secretary Cleveland Railway, Cleveland, Ohio.

Wm. J. Clark, General Electric Company, New York.

H. G. Bradlee, president Stone & Webster Management Association, Boston, Mass.

James F. Shaw, president Citizens' Electric Street Railway, Boston, Mass.

Wm. Northrop, president Virginia Railway & Power Company, Richmond, Va.

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Calvert Townley, chairman, vice-president Connecticut Company, New Haven, Conn.

Guy E. Tripp, vice-president Stone & Webster Management Association, New York.

C. L. S. Tingley, second vice-president American Railways, Philadelphia, Pa.

J. H. Pardee, operating manager J. G. White & Company, New York.

John Blair MacAfee, president Norfolk & Portsmouth Traction Company, Norfolk, Va.

C. L. Henry, president Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.

G. L. Estabrook, secretary and treasurer East St. Louis & Suburban Railway, Philadelphia, Pa.

Albion E. Lang, president Toledo Railways & Light Company, Toledo, Ohio.

A recent report from Henry P. Coffin, United States consul at Rosario, Argentina, states that the Rosario Electric Tramway Company has forwarded to the municipality a petition asking for an extension in its concession for 25 years, up to Sept. 15, 1985. In return the company offers to construct 30 km (18.6 miles) of new line in accordance with the plans of the municipality, and add 10 km (6.2 miles) for every increase of $1,000,000 in receipts. The company also offers to reduce the fare to a uniform rate of 10 cents, to construct a double line in the Avenida Central and to give to the municipality $241,250 for building purposes.

THE RATE OF RETURN*

BY THOMAS N. M'CARTER, PRESIDENT PUBLIC SERVICE CORPORATION OF NEW JERSEY

I have had no opportunity to prepare a carefully analyzed paper on the important topic about which I have been asked to speak, nor had I the inclination. My remarks, therefore, will be more of a desultory nature and I will give expression to the views which I have formed on this important branch of our work after years of experience and after ripe thought.

The subject which I have been asked to start a discussion about—for that is more properly what my talk may be called—is "The Rate of Return."

I have thought it wise to put it before you from what I consider to be the practical standpoint and not to delve into the theories of what *ought* or *might* be, but what *can* be with the conditions as we find them. As Grover Cleveland said many years ago, "We are confronted by a condition and not a theory," and that situation pertains to us to-day in the matter of the return on our business.

The first thought I would endeavor to lodge with you is this: that our hope should be—speaking now of urban and suburban properties—that the 5-cent, the flat 5-cent, fare shall be and remain the unit. I know that in some places, notably in the neighborhood of Boston, companies have been able to procure from the Massachusetts commission the authority to charge 6-cent fares, and it has worked very well, probably in some instances saving those companies from misfortune. But I believe that experience to be the exception rather than the rule. We all know that the difference between the 5 cents received and the outgo which it costs to carry the person who pays the 5 cents is fast diminishing. Mr. Sergeant's description of the disappearing difference, made some time ago, was illuminating. The increased cost of operating is continuing, and if I am right in my postulate that the flat 5-cent fare should be our hope the first thing to do is to withstand the onward march of operating expenses to the limit. It is apparent that if the operating expenses are to be further substantially increased, either by the increased cost of new materials, increased cost of labor or the one thousand and one matters that enter into the operation of a street railway enterprise, the slight difference now remaining between receipts and outgo will disappear and bring chaos to the entire business.

I do not believe it will ever be practical, even should operating expenses continue as they now are or increase, generally to increase the unit of the 5-cent fare except indirectly. I do not believe the American people, so long as we have the zone system, will, generally speaking, go to a 6-cent, 7-cent or other rate of fare. I think the 5-cent fare has come to stay in this industry, as far as we can see it, rather as a maximum than as a minimum. But our endeavor should be, the country over, to insist upon no curtailment of that fare by selling tickets six for a quarter, or workingmen's tickets, or any other similar device. If that 5-cent fare does not suffice to give us profit the only daylight I see is the indirect raising of the fare by the curtailment of the transfer privilege, which, as we all know, is much abused throughout the land. I do believe that should a serious situation arise over the country, in which it could be made to appear that the difference between income and outgo has disappeared, it would be practical to convince commissions or other authorities, or even the public, of the propriety of a curtailment of the transfer privilege, rather than convince them of the propriety of the 6-cent fare. So I propose to stand pat on the flat 5-cent fare, without modification of any character, nursing the hope of reducing transfer facilities if it ever becomes necessary to do anything in the line of fares to enable the company to obtain a reasonable profit.

So much, therefore, for the practical thought with reference to what we can get out of this business and what we must give for it.

I now reach a different branch of the same subject, and that

*Abstract of remarks before the American Electric Railway Association, New York, N. Y., Jan. 27, 1911.

is the capitalization of these companies and the rate of return thereon to those who own them, assuming the fare question to be settled. That is the real question that underlies the rate of return to-day and which is so serious the country over.

At the present time there are many divergent views on this subject; they are hard to reconcile; they are part and parcel of the radicalism sweeping over the country to-day in all matters relating to political and economic conditions. The radicals, as exemplified by Senator La Follette, believe that properties of this character should be valued by the government and, that value having been reached, the rate should be so fixed that those who own them shall be entitled to earn what they call interest on the property—say, 6 per cent—and that no rate shall be allowed to remain in force that will permit an earning of the property in excess of the interest rate to which I have referred.

As I have already stated in discussion of this subject—I think at Atlantic City—any such proposition seems ruinous to the investor and disastrous to the country. There certainly will be no further expansion of properties of this character, whether steam or electrical railroads or gas or electric light properties. There is nothing in it, as we all know—we who are familiar with the intricacies of this business, and we certainly know better than anyone else that there is nothing in the business if there is only to be a return of that character. But we must recognize conditions as we find them, and the question is what, all things considered, is perhaps the best solution of this question? What is the happy medium between the radicalism of La Follette on the one side and the reactionary on the other, who believes it is private business and that it is nobody's business what anybody makes out of it? There is a middle ground between those two which can be safely relied upon. That ground depends on a multitude of circumstances. It depends on whether it is a brand new and untried proposition or whether it is a going concern, whether a suburban or urban or interurban proposition. All these things must be considered in this discussion, so in this short talk I am undertaking to start we can only mention generalities. Let us assume, if you please, that it is a new property which we are about to finance—I don't use the word "exploit," for perhaps that word had better be forgotten in connection with enterprises of our character; but I use advisedly the word "finance," which includes something besides the actual dollars and cents which rails and equipment cost.

Now, the first thing that will arise at the time the new enterprise is launched to confront the projectors and the promoters is: "What times are we in and what is money worth?" Take to-day, for example: My sympathy would go with anybody who went to Wall Street with any such new enterprise, no matter where it was located or on what terms he sought capital. Again, times will be with us when money will be easier, the country prosperous and it will be possible to project such an enterprise, whereas it would not be possible to do so to-day. So we can only look at the average conditions that will by and large prevail. So I lay down the proposition that the first money which goes toward starting an enterprise should receive bonds for it to the extent, say, of one-half the cost, and they will cost the enterprise in one way or another 8 per cent—by and large. I do not believe year in and year out these enterprises can be projected and in the main added to as time goes on through the medium of the bankers or investors if they do not net such banker or investor approximately 8 per cent.

You sell a 5 or 6 per cent bond, but you do not sell it at par, or if you sell at par they require a bonus of stock to go with it, so that the net result is 7 or 8 per cent. But as the industry has settled down, and, trying to average the situation between the two extreme poles I spoke of, I am satisfied that 8 per cent is what you have got to reckon on with the banker before you get through with him. Now, in the supposititious case, such as I have assumed, we have taken care of one-half of the money which went into the enterprise—sometimes more than half can thus be realized—but the banker will make you show earnings, or expected earnings, for twice the amount of his interest. If that is true, the other half of the money must come from somewhere else.

Having disposed of the money which is on an 8 per cent basis, what about the man who puts his time or money into the enterprise behind the banker? When I say the man who puts in his time I mean this: I think we are all agreed that the old-fashioned stock-watering day is over, but a reasonable fee, either in cash or in securities, to the man who has given months and years to the projection of an enterprise, is not watering your stock—it is compensating effort just as you compensate the steel mill that rolls the rails for you. However, there is a line beyond which you cannot go without stock-watering; but on the right side of that line the payment of the stock promoter is as legitimate an expense as any other connected with the enterprise.

So, having arrived at the real capitalization, which represents the cost of the enterprise, what of the man who owns the securities behind the bonds? I say that that man in my judgment—perhaps the public won't follow in this view—but I think that man is entitled to 12 per cent before we begin to talk about lowering rates. I do not mean it is wise for the company to pay 12 per cent even if it has it, but before the agitation for lower fares comes that man is entitled to his 12 per cent. Average that 8 per cent to the banker and the 12 per cent to the stockholder and you get an average of 10 per cent for the whole property, which, all things considered, as a practical matter, I maintain is a perfectly legitimate distribution of earnings, free from criticism on the part of the just-minded public.

In most enterprises it will be a long time before such earnings can be achieved. The longer the wait the more surely it should be allowed when it comes. As I said, the dividends should not be declared, even if earned, until certain things have been accomplished. I do not think it prudent for a company to declare dividends in excess of 8 per cent until two or three things are reasonably certain. First, that you have got, what so many of us have not got, a large cash surplus in the company's pocketbook ready for a rainy day. Second, that you have got assets and funds which protect you from unexpected contingencies, such as a panic or a strike. It is very wise also for a corporation not to be compelled to go back to the banker every year for renewals; the corporation will be more welcome if it has failed to call on the banker for a year or two. So, before we distribute earnings in excess of 8 per cent I think it is wise to have a cash surplus on hand for such a contingency as the strike in Philadelphia, which cost the company there over $1,000,000, and also a cash surplus for panicky years. Third, we must consider whether the public is in a frame of mind to receive it—that is, whether the public agrees with the views which I have been urging. Get the public to see the wisdom of a 10 per cent dividend and then more particularly the wisdom of a 12 per cent dividend before you declare it.

I believe that is entirely practical. The Union Pacific Railroad is now on a 10 per cent basis. The Lehigh Valley Railroad within a few weeks has gone on a 10 per cent basis. The Lackawanna business regularly pays a very high dividend, 20 per cent, I think, and there are extra dividends besides. It parallels the Erie Road, and the Erie Road, with its enormous capitalization, barely gets along.

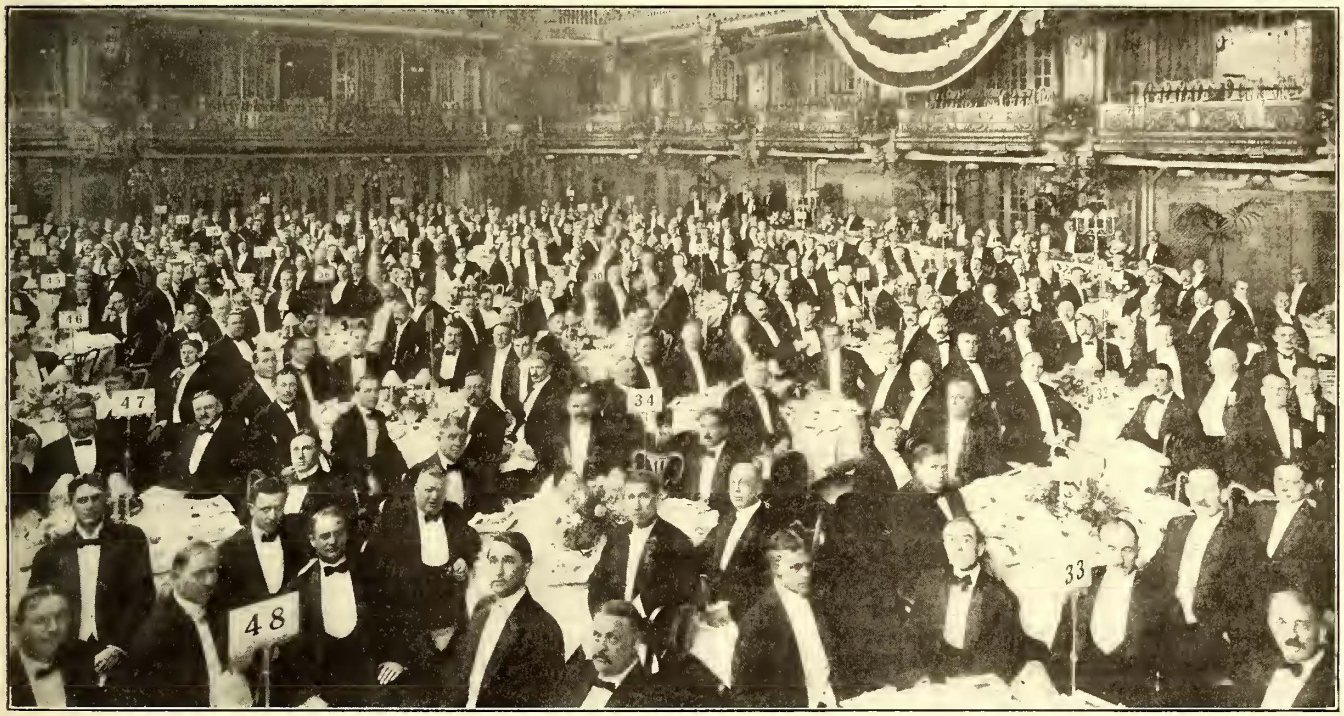
These are the sober, practical views which I hold after much reflection, sobered by the serious responsibility of a corporation of $250,000,000 capital under my direction and that of my fellow-directors.

An American consul in an Asiatic city reports that the letting of tramway and other concessions is being considered by the municipal authorities. A map showing the plan of the entire city and the principal streets accompanied the report and can be obtained from the United States Bureau of Manufactures, subject No. 6009.

THE ANNUAL BANQUET

The annual banquet given by the American Electric Railway Manufacturers' Association to the American Electric Railway Association in connection with the mid-year meeting was held on Jan. 27 at the Hotel Astor, New York. The function was a great success, from the standpoints of both attendance and sociability. There were over 500 people present, most of whom were divided into parties of nine or ten seated at round tables. While dining the guests were entertained by selections given on the splendid organ with which this banquet room is furnished.

Five speakers were scheduled, but one of them, Hon. John A. Dix, Governor of New York, was unable to attend on account of an unforeseen engagement. The speakers of the evening were Arthur W. Brady, president American Electric Railway Association, who spoke on "The Association"; Hon. William B. McKinley, United States Congressman and president Illinois Traction System, on "The Public and Public Utilities"; Col. H. G. Prout, vice-president and general manager Union Switch & Signal Company, on "The Manufacturer," and Patrick Calhoun, president United Railroads of San Francisco, on "Intelligent Popular Government and Public Utilities." The toastmaster of the evening was C. C. Castle, president American Electric Railway Manufacturers' Association.



Guests at the Banquet of the American Electric Railway Association

Mr. Brady's speech is given elsewhere in this issue. Congress and McKinley spoke in a very happy vein of the pleasant relations which exist between the interurban electric railways of the Central West and the people whom they serve. He gave an entertaining history of the growth of the Illinois Traction System, illustrating it by mentioning the gradual increase in the length of the standard passenger cars and the inauguration of express, freight and sleeping car business. The speaker said that the Illinois Traction System could justly boast that it had attained the miracle of "tipless porters." Another feature of the sleeping-car service is the serving of free coffee and rolls for breakfast to the passengers. Congressman McKinley believed that the relations between the railways and the public would be greatly improved by the company impressing upon the trainmen the value of politeness. He said that the book of rules of the Illinois Traction System has on its cover the sentence, "Be civil and you will comply with the greatest rule of all." The speaker said that there need be no antagonism between the public and the operators of traction properties. His own election and re-elections to Congress seemed good evidence to him that electric traction management and political service for the people were not incompatible.

Colonel Prout spoke on the relations between the electric railways and the manufacturers who supply their equipment. The feeling of the public toward the electric railways was of great importance to the manufacturers because their prosperity depended so much on that of the traction interests. The speaker emphasized his points by many interesting anecdotes which kept his auditors in the best of humor throughout his discourse. Colonel Prout also said, in part:

"The sport of jumping on corporations is nowadays safer than hunting lions in Africa. Exaggerated interest in it has been aroused by socialism, on the one hand, and by vote-seekers on the other. We are letting a spectre called 'government' oppress us. Some 14,000 laws were passed by Congress and the State Legislatures in 1909. Socialism doesn't frighten me much because as soon as a Socialist becomes competent enough to do anything practical for himself, let alone other people, he becomes an individualist and forgets his socialism. All these laws are the result chiefly of young men who write for 15-cent magazines. The associations of railroad officials of this country, however, are beginning to get in touch with the various public service commissions and with the saner newspaper editors, and I think a reaction is soon due."

Mr. Calhoun aroused the audience to a high pitch of enthusiasm by a speech which brought out the fact that great oratorical ability has not departed from the Calhoun family. He first discussed the ideas which were in the minds of the framers of the American Constitution with regard to checks upon hasty action by the body of people, as shown by the creation of two legislative chambers, of a Presidential electoral college and the courts. He strongly condemned the agitators who criticise judges for rendering decisions in accordance with the law as based on the Constitution rather than submitting tamely to the demagogic ideas which are so rampant among certain classes to-day. If the American people wanted good government it was necessary that they should have good administrators, so that the public service corporations could be left to conduct their business in a manner most useful to the people and without being subjected to blackmail or other political jobbery. The greatest political crime was to attempt to bribe an entire community by imbuing the people with the idea that they should take away the property of the public utilities corporations which were faithfully serving them.

MEETING OF INDIANA OPERATORS AND COMMISSION

Representatives of the Indiana interurban lines and members of the Indiana Railroad Commission met on Jan. 24, according to the agreement of Jan. 5. The recommendation made by the commission at the former meeting that all interurban railway motormen should have at least one year's experience in train service, either with interurban or steam roads, and that all conductors must show a clean record before being employed by interurban companies, was practically accepted.

The question of the adoption of block signals by all roads was not settled at this meeting, the committee on this subject wishing more time to investigate further the various available systems, including certain newly presented systems. At the last meeting with the commission, the railway people expressed themselves as being favorable to the block system. Several systems are now being used by different roads, and it is said that the one now used by the Indiana Union Traction Company cannot be used efficiently on lines that carry high-tension power. Action on this subject was deferred until Feb. 24.

At a former meeting of the commissioners the double order system was worked out in detail by the committee of operators and the system was accepted by the commission.

It was stated by the commission that a bill will be introduced in the General Assembly giving the commission full authority, both as to steam and interurban roads, over the installation of block signals.

RECOMMENDATIONS OF THE COMMISSION

A circular issued by the Railroad Commission of Indiana to interurban companies on Jan. 27 says in part:

"To the companies on whose lines accidents took place we made certain specific recommendations. Afterward all the interurban companies were called to a conference with the Railroad Commission by the Governor of the State, and the conference commencing then was carried on with committees appointed by those companies until this commission and those committees came to an agreement embodying substantially the recommendations made by the commission. These recommendations we now formally make to the interurban railroad companies as follows:

"1—(a) That each company shall secure and employ better railroad men for motormen and conductors, taking such steps as are necessary to secure capable and fit men and to keep them in its service.

"(b) That applicants for positions as motormen or conductors shall not be employed until their former records have been carefully investigated and all letters of reference and recommendations have been carefully considered.

"(c) That all motormen hereafter employed shall have at least one year's experience in train service on steam or interurban railroads. This rule not to be varied from unless in the judgment of the manager of the interurban company it would be best for the service to employ a man who has not had one year's experience in train service, and any such employment, with the reasons therefor, to be reported to the Railroad Commission within 60 days from the date of employment. If, upon receipt of such report, the Railroad Commission is of the opinion that such man should not have been employed, then upon direction of the commission so to do the interurban company shall dispense with the service of such man until he has had one year's experience as above mentioned.

"(d) That, generally, no other duties be assigned to motormen than the operation of their cars, and that they be relieved from all duties in connection with baggage and express matter except at stations, and that the conductor and agents shall give to the motorman at stations all assistance possible so as not to require from the motorman any attention to baggage and express while the car is at stations as above indicated.

"(e) That separate compartments shall be provided for motormen so that their exclusive attention may be given to operating their cars and so that they may not be diverted by the conversation of passengers or other persons.

"(f) That when a trailer or additional car for carrying passengers is attached to the motor car a third man shall be put on to assist and work under the direction of the conductor.

"2—That interurban railroad companies shall proceed to install block signals on their lines, or parts of their lines, and will do so in such reasonable time as may be agreed upon by the commission and the committee composed of interurban officials and the expert of this commission. In explanation of this recommendation you are advised that a committee composed of the expert block signal inspector employed by this commission and of interurban owners and operators have now under consideration the matter of the best block signal system to be adopted and used on the interurban railroads of this State; that the expert of the commission has visited and inspected and examined such systems as are now in use in this country and in Canada, and a final report is to be made on this subject to the commission on Feb. 24, 1911, at which time it is expected that important improvements and additions may be known.

"3—That said companies shall enforce hereafter the double system of dispatching on their lines, and to this end shall put in force immediately the following rule:

"'To obtain orders the motorman or conductor, whichever is more convenient, will call the dispatcher, who will then give such orders as are necessary. The one taking the order will write the same plainly without abbreviation, with carbon copy, on the blank provided for the purpose. When he has finished writing the order he will repeat it to the dispatcher. If correct the dispatcher will O. K. same. The one taking the order will then give his name to the dispatcher and at the same time sign the order. The one who has not taken the order will then repeat it without abbreviation to the dispatcher and give his name and at the same time sign the order. If correct, the dispatcher will then give the initials of the superintendent or other designated authority and the train order number, which must be repeated back to the dispatcher by the one then at the 'phone. If correct, the dispatcher will say, "Complete at ——" (giving the time), which completes the order and puts it in full force and effect. If for any reason the dispatcher does not complete the order, it is of no effect and must be treated as if it has not been given. After the order is completed the motorman and conductor will each take a copy of same.

"'Where it is not practicable for both members of the crews to leave the car at the same time, at important places designated by bulletin, in emergency at other places, after authority has been given by the train dispatcher on duty at the time, one member of the crew may receive and complete the order, the second member being required to read the order aloud to the one who has taken and repeated it, before the train is started, the dispatcher making a full record of the facts and reasons on his record book for every order completed by his instructions in this manner.'

"4—That said companies shall proceed to eliminate obstructions to sight at curves where sight is badly obstructed, and that until this is done said companies on the order of the Railroad Commission may be required to post slow-speed signals at such curves and to reduce speed of cars to a speed limit not exceeding 15 miles per hour.

"5—That division superintendents and trainmasters (by this is meant those immediately in charge of trainmen) shall not be burdened with other duties than those pertaining to train operation, including supervision of agents.

"6—That train dispatchers shall not be required to handle interlocking plants or to perform other duties than those pertaining to the dispatching of trains.

"By virtue of the authority conferred on this commission and in accordance with the agreements made between this commission and the committees representing the interurban companies of the State, we make to each of you the recommendations above set out, and we direct that by March 1, 1911, you put the same in operation on your line."

COMMITTEE'S LETTER ON EMPLOYMENT OF MOTORMEN AND ON BAGGAGE HANDLING

The recommendations of the Indiana Railroad Commission with regard to the employment of motormen were based in part on the following amended report of the committee of interurban representatives appointed by the commission on the subject of employment of motormen and handling of baggage, as finally agreed to by the commission on Jan. 24, 1911:

"Your committee appointed on Dec. 23, 1910, to consider and report to you regarding the following recommendations made by you, to wit:

"'That all motormen hereafter employed shall have at least one year's experience in train service.

"'That no other duties be assigned to motormen than the operation of their cars and that they should not be required to do the work or assist in doing the work of baggageman or expressman.'

"We beg to report that we have had several meetings and have carefully discussed and considered the recommendations referred to us and report our conclusions as follows:

"First—Regarding the requirement of one year's train service in the employment of a motorman we are of the opinion that the proposition is one which has its advantages and should be adopted and followed wherever it can be done without injury to the service; but, after the most careful consideration, we believe that a hard and fast rule of this kind would interfere to such an extent with the operation of the roads as to render the service less efficient than it otherwise would be. We suggest that to the recommendation of the commission on this subject be added the following:

"'This rule shall not be varied from unless in the judgment of the manager of the traction company it would be best for the service to employ a man who has not had one year's experience in train service, and any such employment, together with all the facts, must then be reported to the Railroad Commission within 60 days. If, upon receipt of such report, the Railroad Commission is of the opinion that such man should not have employment, then, upon direction of the commission so to do, the traction company shall discharge him.'

"We also suggest, as part of our report, the wisdom and propriety of giving preference in employment of a man as motorman to such as may already have had shop, station or other similar experience and be familiar with the road and many of the rules incident to the operation of the cars over the same. We also ask the commission in this connection to construe the term 'one year's experience in train service' to mean one year's experience in train service on steam roads, interurban roads, suburban roads or city street car lines.

"Second—As to the other recommendation made by you and referred to us, that the motorman be not required to handle baggage or express matter, we beg to report that the recommendation as made is somewhat too far reaching to meet entirely with our approval. We believe that the motorman may well be relieved from all duties in connection with baggage and express matter except at stations and that the conductor should be required to give him, in connection with the accounting for baggage and express, all the assistance which he can in addition to his other duties, so as not to require from the motorman any attention to these matters except while the car is at station, as above indicated; and, also, at stations where there are agents or baggage handlers, that they be required to assist the motorman in the handling of baggage and express."

This report was submitted on Jan. 5, 1911, by Charles L. Henry, H. A. Nicholl, W. G. Irwin, C. E. Morgan and H. D. Murdock.

Of the tramways owned by the Cordoba (Argentina) Electric Tramways Construction Company (Ltd.), 14½ miles of electric track have been constructed, of which 12 miles are now in operation. A concession also has been obtained for the conversion of 10 miles of horse tramways to electric traction. When this has been effected there will be 26 miles of electric track.

REPORT OF THE MASSACHUSETTS JOINT BOARD ON ELECTRIFICATION

The report of the Massachusetts Joint Board on Metropolitan Improvements, consisting of the Board of Harbor and Land Commissioners, the Metropolitan Park Commission, the Board of Railroad Commissioners and the Boston Transit Commission, was presented to the Legislature Jan. 30. This board was appointed in 1910 to investigate a considerable number of proposed public improvements in the vicinity of Boston and to report conclusions to the Legislature of 1911, which is now in session. The results of these investigations appear in an exhaustive report of nearly 150 pages, which has just been made public, chief interest being attached to the question of steam railroad electrification at Boston, including a discussion of the desirability of constructing a tunnel between the North and South terminal stations.

Upon the main question nine of the 16 members are convinced that electrification is at present financially impracticable for the Boston conditions. These nine members consist of all three members of the Harbor and Land Commission, Messrs. Swain and Noyes of the Transit commission and four of the five members of the Park commission. Of the minority, five, consisting of Messrs. Hall and Bishop of the Railroad commission, Crocker and Allen of the Transit commission, and De Las Casas, of the Park commission, are of the opinion that electrification is feasible within a cost far from prohibitive and that it should be set in motion by positive legislation. The remaining two members, consisting of Mr. White, of the Railroad commission, and Mr. Quincy, of the Transit commission, state that the report of the majority is too conservative and its tendency is unduly to discourage even voluntary electrification. They believe that further studies should be made on the subject by some public board before legislation should be enacted requiring electrification.

After referring to the estimates on the cost of equipping the lines (published on page 1031 of the ELECTRIC RAILWAY JOURNAL for Nov. 19, 1910), the report of the majority of the committee states that the experience in New York has thus far shown that electric operation is not more economical than steam operation, but is more expensive, independent of the interest on the capital required for the installation. It believes that in many respects the conditions in Boston are even more unfavorable, as there are some 21 branch lines radiating from the city and for the expenditure of twice the sum required in New York a passenger would be carried only one-half as far. Another element is that the lease by which the New York, New Haven & Hartford Railroad Company operates the Boston & Providence Railroad provides that all permanent improvements shall be paid for by the lessee, but at the expiration of the lease shall become the property of the lessor. The cost of electrifying this division would be over $6,000,000, or 50 per cent more than the entire capital stock of the Boston & Providence Railroad.

Continuing, the report of the majority of the board says: "Moreover, there are other elements which in the opinion of the board render unwise at this time the hastening of electrification. In the first place, the best system of electrification is still undetermined. The situation is somewhat similar to the situation regarding couplers 20 years ago, when no standard form had been adopted. The future relations of the railroad systems cannot be predicted, and it seems unwise to hasten electrification in advance of standardization."

It says that the disadvantage involved in the use of different systems by the two railroads is in some respects not as great in Boston as it is in New York. In Boston the trains of each railroad would run almost entirely upon its own tracks. But if the third-rail system should require overhead construction at certain points in the yard complications might arise which cannot now be formulated. However, it would be distinctly unfortunate if the two great railroad systems entering into and operating in the city should adopt different systems of electri-

fication. It would seem unwise to unduly hasten electrification in advance of standardization.

The board also in its report discussed at some length the advantages and disadvantages of electrical operation, among the advantages being the possibility of utilizing the space over the tracks, the saving in fuel, the diminution of corrosion of overhead structures, the saving of switching in terminals if the multiple-unit system is used and the added convenience to passengers due to the absence of smoke and cinders.

Referring to the advantages of electric operation the report says: "The saving in fuel is considerable and undoubted. The corrosion of overhead structures, due to the smoke and steam from the locomotives, is diminished in proportion to the amount of steam service eliminated. If the multiple-unit suburban service is used there are certain savings in train movements, especially if the trains can be run continuously around loops at the terminals and do not have to reverse their direction. It is unquestioned that there are elements of economy in electrification which would be immediately felt. There are also some possible elements of economy which may be found to result, but are more more or less hypothetical. For instance, with electrical operation high trainsheds become unnecessary. The trains can be run into a terminal station occupying simply one story and the space over the tracks is theoretically available for other uses. Whether it is practically so available will depend upon circumstances and is a real estate problem. If the operation of trains in a terminal station is by electricity instead of steam, without altering the location of the tracks, it is then a question whether it would pay to put up a building for commercial uses in which the first floor and basement would not be available. If the tracks are depressed and the electrically operated trains occupy the basement floor, it would then be a question whether the rental which could be obtained from a commercial building on that site, of which no space would be available below the ground floor, would be sufficient to justify the expense of lowering the tracks and constructing the building. In some cases there may be a considerable profit here; in other cases not. There would be more apt to be a profit if the site is in a large city, where the land is valuable; and in some cases the profit from the real estate investment might be such as to offset to a considerable degree not only the expense directly connected with the building operations, but the expense of electrification. The New York Central & Hudson River Railroad Company in its reconstruction of the terminal in New York intends to erect over the tracks a high building from which it expects to secure a considerable revenue. The Pennsylvania Railroad Company, on the other hand, whose station is farther downtown and occupies the space under two city blocks, has not planned any such real estate investment on the block occupied by the main portion of the station."

The greatest obstacle, the board believes, to speedy electrification is the large capital required and the fact that the railroad companies would be obliged to pay interest upon the double investment—that for steam and that for electricity. According to the regulations of the Interstate Commerce Commission a railroad company is obliged to replace in kind any of its structures or equipment out of earnings. If it abandons a roundhouse and replaces it by another one of the same materials and capacity it must pay for the new one entirely out of earnings. The same is true with reference to equipment; it must pay out of earnings the book value of the locomotives or cars, less the salvage from them. Independent, therefore, of interest on new capital and of a possible loss from electric operation, which experience thus far indicates to be an actual loss, the board considers that there is likely to be a further charge upon earnings due to property replaced. The problem of electrification is, therefore, not only an engineering one, but equally a financial one, involving provision of the necessary capital to make an improvemcnt which will result, so far as experience has yet shown, in increased expenditure for operation, with an uncertain increase of traffic to offset it.

While admitting that electricity provides a cleaner, more convenient and altogether more desirable method of operation than steam, the board thinks that it is a serious question whether it is wise by legislative enactment to endeavor to hasten a change rather than to await its natural development. In this connection it says: "Two points of view are especially to be kept in mind: In the first place, it must be remembered that the railroad companies in this country need to spend very large sums of money each year to provide increased facilities which are demanded in order that they may be able to carry the increased traffic which results from increasing population and business. Additional tracks, sidings, yards, structures, heavier bridges and equipment and many other things must be provided. These things are demanded by considerations of necessity. Safety appliances are also demanded for the protection of life, such as block signals, the elimination of grade crossings and many other expensive additions to railroad property.

"Electrification, however, stands in a different position. It is, it is true, very desirable, but its desirability arises not from considerations of safety or of necessity, but mainly, if not entirely, from those of convenience. It is a luxury. The railroads can operate by steam as safely as they can by electricity. How far, then, is it wise to hasten by legislative enactment an improvement which is undoubted and which is desired by every one, but from considerations of convenience alone?

"In the second place, our railroads are subject to legislative restrictions of many kinds. They have been required to spend large sums for safety appliances, and their rates are subject to regulation by the State. To raise the large sums of money which they must spend for improvements they must offer inducements to private capital. Capital, however, is deterred from making investments subject to public regulation which cannot be foreseen and which may be unwise. It is likely, therefore, to be seriously deterred and the business of the entire country to suffer correspondingly if it has reason to believe that the State will compel the expenditure of large sums of money which it is not necessary to spend, except from considerations of convenience. A wise and just regulation of the railroads by the State is undoubtedly proper. Railroad operation must be reasonably safe and rates must be reasonable. Capital, if it is assured that such regulation will be wise and just, will not be deterred. The board is of the opinion, however, that legislation compelling the railroads to adopt electricity as a motive power is unwise and not for the best interests of the public and that it will make it more difficult, if not impossible, for the railroads to secure the capital which they need for necessary improvements which the country demands.

"Since experience thus far indicates that electrification is not a source of economy, but rather the reverse, and since a return has to be earned on the additional capital necessary and a further charge to operating expenses made for property abandoned or replaced, there seems to be no escape from the conclusion that the railroads should be allowed to increase the revenues sufficiently to provide a return on the investment large enough to attract investors."

The board considers that it would not be fair, even if it were possible, to require the railroad companies to expend the money required for electrification in Boston unless they were also assured of an adequate return on that expenditure, but also thinks that an increase in the rates of fare on the lines equipped might not increase the net revenue. The benefit of electrification in the Metropolitan District it considers "would be mostly felt by the short-distance suburban passengers and the abutters who would be relieved from the annoyance of smoke and cinders. The long-distance traveler would not be especially affected, since the greater part of his trip would still be made with steam locomotives. In strict justice, therefore, if fares were to be increased the burden should be laid principally on the short-distance suburban traffic. This traffic, however, is likely to be just the kind which is least able and willing to stand such an increase. Moreover, the traffic is precisely the traffic which is least stable and most likely to desert the steam rail-

road entirely and patronize the street railway lines if the latter are conveniently located. In such cases the additional revenue required would necessarily have to be gained from the long-distance passenger traffic or even from the freight traffic, neither of which is benefited at all by electrification. It appears, therefore, that the class of traffic which would most benefit by electrification is the class which is most likely to change and patronize some other form of transportation; that it is the least profitable part of the passenger traffic and the part which is least able to afford the additional revenues which the cost of electrification would render necessary."

CONCLUSIONS

The following is a summary of the conclusions reached by the majority of the board:

(1) The electrification of steam roads is a development much to be desired. It would add to the comfort and convenience of the public and would have advantages for the railroads as well.

(2) The best method of electrification is still undetermined. The science is in a state of rapid change and standardization is much to be desired before extensive electrification is undertaken.

(3) So far as experience has yet shown the electrification of the terminals of steam railroads under present conditions does not result in economy, but, on the contrary, increased expense, aside from the interest on the first cost incurred.

(4) If a greatly increased traffic should result from electrification this expense would be reduced and might ultimately be changed to a profit.

(5) Electrification would probably result for some time in obliging the railroads to make charges to operating expenses due to property abandoned or replaced, in addition to interest on new capital and increased expense of operation.

(6) Electrification would, therefore, in all probability require an increase of passenger fares and perhaps of freight rates to produce the revenue required to pay for it.

(7) Electrification, while desirable, is not necessary nor is it required on grounds of public safety. It is desirable mainly, if not entirely, on account of added convenience and comfort.

(8) There are other expenditures which should be made by the railroads which are demanded by considerations of necessity to enable them to meet the demands of increasing traffic and which should have precedence of electrification. To compel electrification would postpone these more important improvements.

(9) The railroads are already subject to much regulation by the State and the nation. To require them to expend large sums of money for electrification would make it difficult if not impossible for them to raise the capital required to move the increasing traffic of the country and would thus hamper industrial development.

(10) As a result of the foregoing conclusions the board believes that it is not wise nor in the public interest to enact legislation compelling any electrification of railroads.

(11) To pass a bill making compulsory the electrification of the passenger traffic on all the steam railroad lines in the Metropolitan District of Boston within a stated time, as contemplated by the resolve, would be particularly unwise because of the difficulty presented by the lease of the Boston & Providence Railroad, already described; because no definite plan has yet been adopted for the construction of a tunnel between the North and South Stations, and because the limit of electrification should not be definitely fixed as coinciding with the limits of the Metropolitan District. The limit should be dependent upon traffic conditions.

(12) If a tunnel is constructed and used for passenger traffic in Boston this would necessitate electric operation through the tunnel and for a certain distance on either end, and this would naturally lead to an extension of the electrification to a reasonable distance beyond. If the tunnel is not to be constructed the demand for electrification is based on the convenience which would result to the public, and this demand, if logical, should require electrification for both kinds of traffic.

(13) The traffic to be handled in Boston is nearly three times that at the Grand Central Station in New York and, on account of the radiating traffic in Boston (as compared with the north and south traffic in New York) and the large number of lines in Boston (as compared with the single line with three branches in New York), the expense in Boston is very much greater. There is not sufficient justification for requiring the railroads to spend this sum of money here.

(14) If electrification of steam roads, either for passenger or freight traffic or both, is required by law, it should also be provided that the revenue may be increased so as to afford reasonable compensation to the roads for the expense involved and to make it possible to raise the necessary capital.

(15) If the expense of electrification is forced upon the railroads by legislative enactment a fair increase of rates and fares will be inevitable, and it should fairly be laid upon Boston business and might add to the disadvantages under which Boston now labors.

(16) The benefits of electrification in Boston will accrue mainly to the commuters and short-distance traffic and also in a very large degree to owners of property along the lines electrified. To raise suburban fares simply would place the burden where it mainly belongs, but where it is least capable of being borne; and such action would in itself tend in some measure to discourage the development of suburban territory and to divert travel from the steam lines.

(17) Electricity is probably the coming form of traction power; indeed, it is not improbable that at some time in the future all the trunk lines of the country over which there is heavy traffic will be electrified. The problem, however, is not like that of providing safety appliances, such as air brakes, signals, standard couplers or the abolition of the car stove and replacing it by steam heat from the locomotive. All of these matters were required from considerations of safety. The public demand for electrification, however, arises not from considerations of necessity or of safety, but from those of convenience. Considering that there are other improvements which are necessary in order to meet the demands of increasing traffic, the joint board believes that an improvement resting on considerations of convenience should be allowed to work itself out without legislative enactment.

(18) As stated in another part of the report of this joint board, permissive authority should be granted for the construction of a tunnel connecting the North and South Stations. If such authority is availed of, it will necessitate electrical operation and will lead gradually to the extension of such operation as similar causes have led to such extensions in the neighborhood of New York.

(19) It should be recognized that all improvements of this kind, whether they are the construction of tunnels or the electrification of lines, which afford greater facilities to the public and involve the expenditure of large sums on the part of the railroad companies, if not offset entirely by increased earnings or reduced expenses, should be accompanied by such increase of fares or rates as will enable the roads to maintain a fair rate of return upon their total investment. In all such improvements the public is a partner in the undertaking. The principal benefit accrues to it with no risk. Its attitude should be such as to encourage the legitimate and economical expenditure of capital and to compensate it fairly and even liberally for any risks involved. Under the laws of this State there is little danger of a misuse of capital expenditures.

Those agreeing with the majority report on electrification were: George E. Smith, Samuel M. Mansfield and Heman A. Harding, of the Board of Harbor and Land Commissioners; George F. Swain and James B. Noyes, of the Boston Transit Commission; Edwin U. Curtis, David N. Skillings, Ellerton P. Whitney and Everett C. Benton, of the Metropolitan Park Commission.

FIRST MINORITY REPORT

Walter Perley Hall, George W. Bishop, George G. Crocker, Horace G. Allen and William B. De Las Casas united in the following minority report:

"The undersigned dissent from so much of the report as relates to electrification and submit the following statement. Without undertaking to discuss in detail the statements and conclusions set forth in said report, it is enough to say that, taken together, they amount to a declaration that electrification is for the present impracticable. In our opinion, experience elsewhere has demonstrated both the feasibility and the financial ability of railroad corporations to equip a portion of their lines with electricity, and we find no conditions in Boston or its vicinity which lead us to a different conclusion. Indeed, the officers of the New York, New Haven & Hartford Railroad Company have stated to the Commission on Commerce and Industry, and on several occasions to the public, their purpose, if allowed to control the Boston & Maine system, which control is now effected, 'to equip both systems with electricity for a considerable distance near Boston.' The further proposals of this management to electrify the Boston, Revere Beach & Lynn Railroad, if authority to acquire the same is granted by the General Court, is additional evidence that electrification to some extent is both feasible and within the financial ability of the companies. The studies submitted to the joint board by the New York Central & Hudson River Railroad Company for the electrification of certain portions of the Boston & Albany Railroad also indicate feasibility within a cost far from prohibitive.

"We are convinced that the public welfare demands some legislation with respect to electrification. While we are not in favor of legislation compelling the electrification of all steam railroads of standard gage in the Metropolitan District before a date now to be fixed, we do not believe that leaving the matter in the hands of the several railroad companies exclusively will result in as speedy action as will follow some legislative requirement plainly indicating the policy of the State. Experience has shown that similar legislation as to automatic car couplers, fenders and vestibules for street cars, the prohibition of car stoves and the like has been found in the public interest and has accomplished good results.

"We are of opinion that any legislation should secure to the railroad companies the greatest latitude with respect to lines first to be electrified, but that the time for commencing the actual work of construction for electrical operation should be fixed at a reasonable date by the General Court or some public agency designated by it, with authority to such agency to extend the time for good cause shown."

SECOND MINORITY REPORT

Clinton White and Josiah Quincy joined in the following minority report:

"The undersigned dissent from so much of the report as relates to electrification, but are unable to join in the above statement of the views of the minority for the reason set forth below. We are unwilling to give our assent to all of the arguments, inferences and statements set forth in the majority report and we believe that its whole tendency is unduly to discourage and postpone electrification, even by the voluntary action of the railroad companies. In our opinion, continued study of the subject under legislative authority and reports to some public authority setting forth progress made will tend to advance electrification and to promote agreement upon and adoption of that system of electrical operation best adapted for general use and for facilitating interchange of traffic between different systems. We, therefore, believe that legislation should be enacted directing some public board to prosecute further investigations and make report to the Legislature and requiring the railroad companies, under the supervision of such board, to make further studies with plans and estimates not confined within the arbitrary limits of the Metropolitan District and including freight as well as passenger traffic. We think that it should be left to such board to recommend compulsory legislation if and when it is found to be called for.

"We are not, however, convinced of the advisability at the present time of any legislation requiring electrification. The fixing of the time within which the work of construction for electrical operation must be begun by all railroads within the Metropolitan District, even though some public authority is given the power of extending such time for good cause shown, seems to us to be compulsory legislation, the wisdom and necessity of which are yet to be demonstrated. However strong the desire of the public may be that all railroads within the Metropolitan District should be electrified, we doubt whether the problem has yet reached the stage where any form of compulsory legislation is warranted by the facts shown or will really expedite an intelligent and comprehensive settlement of the question. We also believe that the effect of the great expense of electrification in justifying or requiring an increase in rates of fare within the Metropolitan District should be more fully considered before any form of compulsory legislation is recommended."

ALPHABETICAL LIST OF ITEMS OF EXPENSE

The Central Electric Accounting Conference has issued a pamphlet containing an alphabetical list of the items of expense in the operating of electric railways. The items are classified in accordance with the Interstate Commerce Commission and the American Electric Railway Accountants' Association standard classification of accounts. Extra copies of the pamphlet may be secured upon application to A. F. Elkins, secretary and treasurer of the conference and auditor of the Columbus, Delaware & Marion Railway, Columbus, Ohio. The pamphlets are sold at the rate of three copies for $1. The introduction to the pamphlet states that it is not assumed that the list is complete, but that it is comprehensive enough for the general requirements of clerks and others engaged in distributing charges to the proper operating accounts when used as an auxiliary to the text of the accounts.

PROPOSAL BY MR. SPRAGUE FOR A RAPID TRANSIT SYSTEM

On Jan. 25 Frank J. Sprague, in behalf of himself, Oscar T. Crosby and associates, presented to the Public Service Commission, First District, New York, a proposal for the equipment and operation of an independent city-built rapid transit line. The route proposed is shown on the map on page 229 and follows very closely, in Manhattan, the route advocated by Mr. Sprague at a public meeting at the Engineering Societies Building about three months ago; that is, it consists of a West Side route on Seventh Avenue below Forty-second Street, an East Side uptown route on Lexington Avenue and a connection, as now arranged, on Thirty-fourth Street. Mr. Sprague stated in his proposal that he represented certain independent financial and engineering interests and was prepared to file a reasonable bond for the execution of the contract if it should be awarded to him. He described the route which he proposed to build as follows:

"A four-track, one-level subway from Times Square and Forty-fifth Street down Seventh Avenue, extended, and through Varick Street, both of which sections can be built for less cost than a double-deck line on Lexington Avenue below Forty-second Street; an extension thence through Church Street to Liberty Street, with two tracks to the Battery.

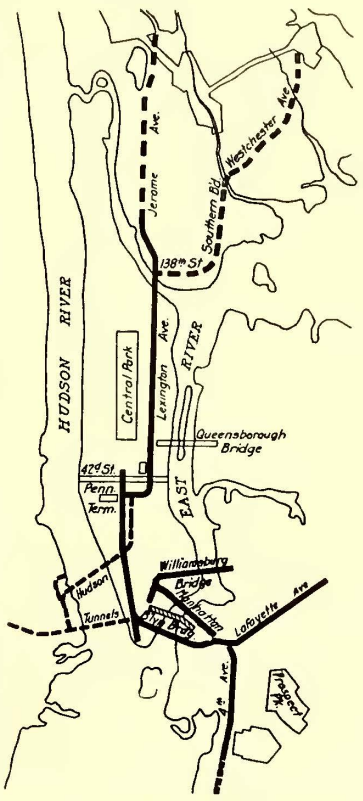
"A four-track cross-town connection through Thirty-fourth Street from Seventh Avenue to Lexington Avenue.

"A four-track extension from Thirty-fourth Street up Lexington Avenue to 138th Street, with a connection for providing a future extension through 138th Street and Southern Boulevard, as already planned; thence north from the 138th Street junction to 157th Street, to connect with a future three-track elevated up River and Jerome Avenues to Jerome Park Reservoir.

"A two-track extension from Liberty Street, through separate tunnels under the East River, to Flatbush Avenue and Fulton Street via the Manhattan Bridge Brooklyn extension,

and then out Lafayette Avenue to Broadway or out the Eastern Parkway, as may be agreed."

According to Mr. Sprague's proposal the city is to provide the easements and right-of-way, but the operator would provide the necessary yards and car houses at an estimated cost of $2,000,000. Under the plans proposed Mr. Sprague estimated that the total construction cost to the city would not exceed $75,000,000. The company would have an authorized stock and bond capital of $40,000,000, which would provide for all of the equipment necessary, including the power station. Mr. Sprague proposes that after the deduction of operating expenses, including maintenance, depreciation and an obsolescent fund of three-quarters of 1 per cent on $40,000,000, the net earnings shall be devoted, first, to the payment of 5 per cent on the $40,000,000 capitalization of the company and then that the city should receive 4¼ per cent on its estimated invested capital in construction, or $75,000,000. After that, each interest should receive pro rata to its investment a sinking fund up to 1 per cent of its investment and then the surplus earnings should be divided in like proportion between the two parties to the agreement; that is, in the ratio of 40 to private capital and 75 to the city.



Route Proposed by Mr. Sprague

The company will carry passengers for 5 cents and will offer to exchange passengers with the present subway system at meeting points without extra charge, but on the company debit and credit basis of 2½ cents or such other equitable sum as may be determined.

Mr. Sprague declared that those represented with him in this enterprise are entirely independent of either of the existing companies which have made proposals, and offered to provide a surety bond of $1,000,000 or a deposit of city bonds of like amount to carry out the contract if the city would engage in it and to deposit $100,000 with the Public Service Commission or the Board of Estimate and Apportionment if they had authority to receive such sum as a guarantee that he would provide the surety bond as stipulated above. The proposal was stated to be open for consideration for a period of not less than three weeks, but the right was reserved of withdrawing it on one week's written notice after the lapse of two weeks if no contract along the lines set forth seemed likely to the bidders.

Mr. Sprague's proposal was accompanied by a number of tables and other data to prove the greater desirability of his proposal than of that recently made by Mr. McAdoo or the Interborough Rapid Transit Company. Among other points Mr. Sprague shows that the investment required by the city was about $20,000,000 less than in the McAdoo proposal for a greater mileage and that it proposed a prior lien at a definite and reasonable rate on net earnings for $10,000,000 less private capital and also a larger ratio of division of surplus earnings. Mr. Sprague also pointed out a number of engineering features in which his proposal was very desirable as compared with others offered to the city.

MESSAGES OF THE GOVERNORS

The following abstracts from the messages of the Governors supplement those published in the ELECTRIC RAILWAY JOURNAL of Jan. 14, 1911, page 75, and Jan. 21, 1911, page 125.

GOVERNOR W. R. STUBBS OF KANSAS

At the last session of the Legislature I recommended the enactment of a public utilities law which would provide for a public utilities commission to take the place of the present Board of Railroad Commissioners and enlarge its powers to cover all State-wide public utilities, using the present railroad law as a basis and adding thereto the best features of the Wisconsin and New York public utilities laws.

I now renew this recommendation to this Legislature and recommend that you enact a law that will place all State-wide public utilities, railroads, telegraph, telephone, street railway, pipe-line, express and Pullman companies and common carriers of all kinds under the control of a State commission having full authority over the issue of stocks and bonds, giving them means and power to obtain the physical valuation of the property and plants of these corporations, to fix and adjust rates upon their own motion and to regulate rates and services in the interest of the people of Kansas and the investors and employees of these corporations.

I recommend that the City Council, or City Commission in cities having a commission form of government, be constituted a public utilities board, to have control of local public utilities such as gas, electric light, water supply, telephones and utilities of this character; giving the right to the corporation, the local public utilities commission or any taxpayer to appeal to the State-wide public utilities commission in cases of disagreement, similar to the Wisconsin law, which has proved beneficial and satisfactory to citizens and public utilities alike.

I also recommend the enactment of an employers' liability law, following the provisions of the federal law and the advanced views of the Supreme Court of Kansas on that subject.

GOVERNOR FRANCIS E. M'GOVERN OF WISCONSIN

No subject of more lasting importance than a workmen's compensation act will engage the attention of this Legislature. No matter from what standpoint it may be viewed, justice, humanity, economy and self-interest alike plead for prompt and thoroughgoing legislative reform along these lines. I feel I cannot too strongly urge it upon your attention.

GOVERNOR M. E. HAY OF WASHINGTON

I recommend that you abolish the offices of Railroad Commission, Tax Commission and Insurance Commissioner, the latter at the end of the term of the present commissioner, and in the place of these create the two following commissions:

First—A public service commission, to perform the duties now exercised by the Railroad Commission as relates to transportation, telegraph and telephone companies, with the added powers of supervision and regulative control over light, power, gas, water and irrigation companies or corporations doing business in the State.

Second—A public revenue commission, whose duties will include those now imposed on the Tax Commission, and which in addition thereto shall administer the insurance department, the collection of the motor vehicle tax, game licenses and such other indirect taxes as are not collected through established departments.

Last July the Tacoma Commercial Club called a conference of employers and employees to consider this subject. At that conference a resolution was passed requesting the Governor to appoint a commission of ten to study the question of employees' compensation and draft a bill embodying their conclusions for submission to this session of the Legislature. Acting upon this request, I appointed a commission composed of five well-known employers of labor and five representative employees. The members of this commission have devoted much time and careful study to the subject in hand, and the draft of the bill that they submit to your honorable body represents a most earnest and conscientious effort on their part to arrive at an

equitable solution of the problem. I commend it to your serious consideration and trust that it will meet with favorable action at this session.

I recommend that the section in regard to logging be amended, in that any railroad, tramway or electric railway built across State lands shall be a common carrier, so far as the timber is concerned, on the State land or from any State land that may be within a mile of the road anywhere throughout its length, and that the rates to be charged for hauling logs or other material from State lands be subject to regulation by the State Railroad Commission.

GOVERNOR JOHN K. TENER OF PENNSYLVANIA

The present Railroad Commission has done well, but circumscribed as to its limitations, it cannot fulfil the present requirements in the treatment of the relations between the people and the public service corporations. There should be a commission vested with all possible power to have the general supervision and control of the corporations and individuals having to do with public utilities, and the present Railroad Commission should be abolished.

Properly conducted this public service commission would create a better feeling between the people and the corporations; would keep these companies within their lawful bounds and compel them to render to the public the reasonable and satisfactory service for which their franchises were granted. It would prevent the building of unnecessary railroads and works and the issuance of obligations not fully represented by actual value given; it would protect these companies against unfair attacks; while at the same time the rights of the people would be fully conserved. I recommend the enactment of legislation creating such a commission. It is desired by the people and should be welcomed by all fairly disposed corporations.

I believe that the Commonwealth of Pennsylvania, the greatest of all industrial States, should be the first to put into operation advanced legislation in respect to compensation of workmen who are injured, and as a means to that end advise the appointment of a commission of representative workmen and employers, whose duty it shall be to investigate every phase of the question and recommend to the Legislature a bill in accordance with the result of their investigations.

I also believe it would be well to establish in the State a museum of safety devices and industrial hygiene. Such a department placed in the hands of competent instructors would be able to furnish employers of labor with drawings of safety devices, which devices, if placed on dangerous machinery, would reduce considerably the number of accidents which occur annually in the mining, manufacturing and transportation industries.

As a general rule, employees and employers should be left to themselves to settle their differences, but when a strike results which affects the public then there should be a method of having these differences and that strike properly adjusted and settled. If differences cannot be voluntarily, promptly and feasibly adjusted, then the law should provide a remedy. In such cases the people as a whole have rights paramount and they should not be compelled to suffer while the spleen of the combatants is being satisfied. I am in favor of a compulsory arbitration law, and if such cannot now be legally enacted I recommend a constitutional amendment to authorize it. With such a law there will be fewer disputes and no strikes.

GOVERNOR JAMES H. HAWLEY OF IDAHO

The last Legislature passed an employers' liability law which in my judgment, is absolutely ineffective. The only change as I view it that has been made in the system theretofore prevailing in this State is to limit the amount that could be collected by reason of an accident resulting in death. Action should be taken at this coming session to amend this law so as to make it conform to the laws enacted during the past decade by the Legislatures of most of the States of the Union and to give proper protection to the employees engaged in all branches of labor. Similar measures passed in the majority of the States have been conducive of great good and have worked no real disadvantage to the employers of labor.

GOVERNOR O. B. COLQUITT OF TEXAS

Our laws regulating and defining the rights of corporations are very strong and efficient, and I do not believe we need or that the people demand further restrictive legislation along this line at this time, but there is a very urgent demand that the people be given time to adjust themselves to the laws we already have and rest from the passage of new ones and the consequent agitation and uncertainty that precedes and follows their enactment.

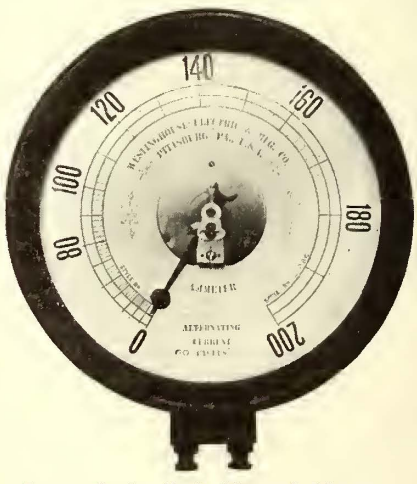
GOVERNOR JOHN BURKE OF NORTH DAKOTA

In the report of the Railroad Commissioners you will find many valuable suggestions, much important information and recommendations, to some of which I call special attention. It is first suggested that the tenure of office of the railroad commissioners be changed in such a way that there will always be a majority of holdovers on the board, thus enabling the board to keep a working membership who are familiar with the details of the work. * * * That the commission be given supervision over telephone, telegraph, gas, water and electric companies and other public utility corporations. * * * To all of which I call your attention and ask your careful consideration.

LONG SCALE SWITCHBOARD METERS

The Westinghouse Electric & Manufacturing Company is placing on the market a complete line of type F a. c. switchboard meters. These are round-pattern meters of the usual size, about 9½ in. in diameter, with scales subtending an arc of 300 deg. and about 14½ in. long. The length of scale usually found only in the large illuminated dial meters is thus obtained in a meter of normal size. There is no metal front on the meter, but instead a round glass cover is used. This makes it possible thoroughly to illuminate the dial from the front and thus avoid the use of special lamps.

The meters operate on the induction principle. The torque depends on the action of a rotating magnetic field on a light, pivoted drum. This principle makes connections to the moving element unnecessary, and, by avoiding the use of a copper coil or iron core for the moving part, reduces the weight on



Long Scale Switchboard Meter

the pivot bearings and consequently the friction. The moving element also has inherent damping qualities and the torque developed is very high.

The type F meters are furnished as ammeters, voltmeters, single-phase and polyphase wattmeters, power-factor meters and direct-reading frequency meters. All of these meters utilize different forms of the induction principle. Type F single-phase and polyphase static ground detectors are also furnished, harmonizing in size and general appearance with the rest of the line. The type B synchroscopes and the type FL direct-current meters made by the Westinghouse company are also of the same size and appearance, so that a complete harmonious switchboard can be arranged.

EXTRUDED TROLLEY EARS

An extruded trolley ear is about to be placed on the market by the Ohio Brass Company, of Mansfield, Ohio. The accompanying illustration shows that the extruded ear consists of two pieces, a runner piece and a boss. The boss is made of malleable galvanized iron and is pressed upon the runner piece and then securely riveted in place.

The runner piece or portion which grips the trolley wire is made of extruded metal, which is the special feature of the

Extruded Ear Applied

ear. A brief description of the extruded metal of which the runner piece is made, and how it is produced, will aid in perceiving the good qualities asserted for this trolley wire support.

A billet of pure cast bronze is placed in a furnace and heated to a bright red heat, after which it is taken out and immediately inserted in a very thick walled, laminated steel drum having a tungsten steel die clamped against the opposite end of this cylindrical drum. This die has an opening in it exactly the shape of the section of the extruded metal device which it is desired to produce. Both the steel drum and tungsten steel die are especially designed to withstand enormous pressures at high temperatures. A hydraulic ram is brought to bear upon the red-hot billet of cast bronze, forcing it out through the die under several tons pressure. The metal, as it emerges from the die, is cooled rapidly by a very strong blast of cold air.

Due to this process of extrusion and not to the composition of the metal, the sections which are being put into these ears have a tensile strength of 70,000 lb. per square inch, an elastic limit of about 50,000 lb. and an elongation of 33 per cent. These physical properties as given, coupled with the additional assurance that the sections must come absolutely true in dimensions, and have a perfectly smooth surface for gripping the trolley wires, make the metal peculiarly adapted for use as a trolley wire support.

The great strength of the extruded section permits the lips which grip the trolley wire to be very thin, so that they offer the least amount of obstruction to the passage of the trolley wheel. Furthermore, this metal is capable of being easily hammered down to a perfectly smooth fit around the trolley wire without leaving crimps or bumps to cause continual chattering of the wheel in passing under them, as is often the case in cast ears. The manufacturer believes that the new ears will effect a considerable saving in line maintenance over the ordinary types of ears.

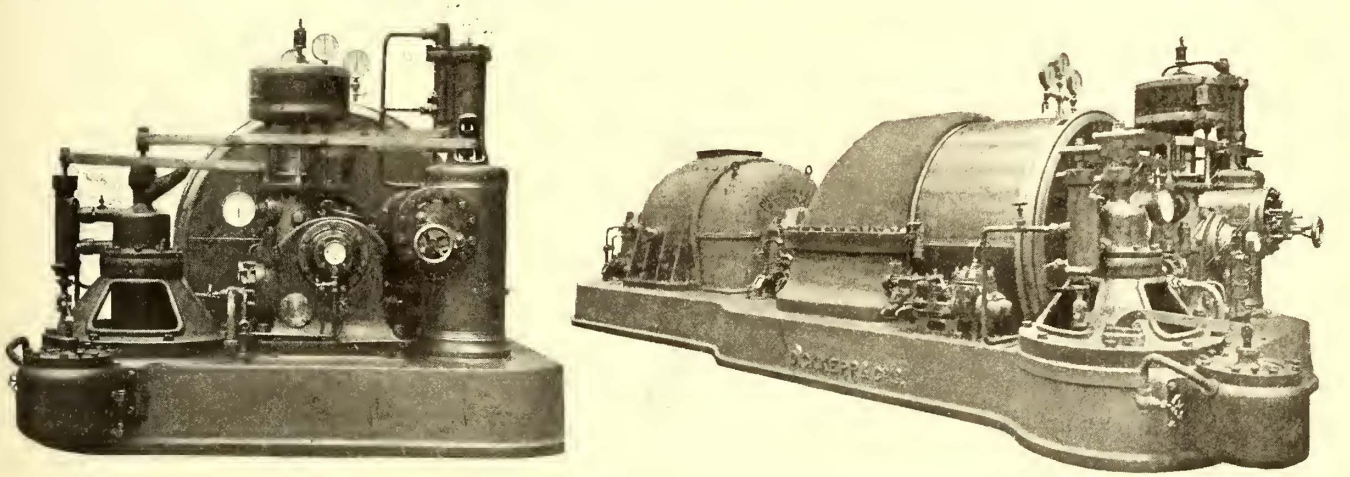
MIXED-PRESSURE TURBO-ALTERNATOR SETS

In the accompanying illustrations are shown two views of a 500-kw mixed-pressure steam turbo-alternator supplied by Dick, Kerr & Company, London, England, to a colliery in Scotland.

The turbine, which is of the impulse type, is designed to give 500 kw with exhaust steam having a pressure of 16 lb. per square inch absolute, or with dry saturated live steam of 90 lb. per square inch, or with a combination of both pressures, and to give the full output when working condensing with a vacuum of 27.5 in., the barometric pressure being 30 in. The turbine is mounted on a combination base, and is complete with two bearings and directly connected to its alternator through a flexible coupling.

The turbine is provided with high-pressure and low-pressure main stop valves, high-pressure steam separator, governor, steam and oil-gage pipes, emergency device for stopping when normal speed is exceeded by 10 per cent, oil receptacles with filter, directly connected oil pump, separate steam oil pumps for flooding the bearings before starting up, speed-adjusting device, etc.

The governor, which is said to be extremely sensitive, is based on a principle which allows steam to enter into the turbine in a continuous and steady flow, whether running on mixed pressure or on live steam, or when changing from one to the other.



End and Side Views of Mixed Pressure Turbo-Alternator

The following are the principal features of the turbo-alternator in this combination:

It is designed to give 625 kva (500 kw at 80 per cent power-factor) at 3000 volts and 50 cycles when running at 3000 r.p.m. The temperature rise is said not to exceed 70 deg. Fahr. above an air temperature of 77 deg. Fahr. after an eight hours' run at full load.

RECENT CONTRACTS FOR PAY-WITHIN CARS

Announcement is made by the Electric Service Supplies Company, Philadelphia and Chicago, that it has closed contracts for pay-within cars during the last 60 days with the following companies:

The American Railways Company, Philadelphia, has contracted for license and equipment for 35 cars for the People's Railway Company, of Dayton, Ohio, and for 10 new cars for the Scranton Railways Company, of Scranton, Pa. Of the Dayton cars, 25 single-truck and 10 double-truck cars will be converted to the standard pay-within four-leaf folding-door type. Six of these cars are new prepayment cars of another type, which are to be converted to the pay-within type before being placed in service. The Scranton cars are being built by the Cincinnati Car Company, Cincinnati, Ohio; they are 43 ft. long over all, having single arched roof, 6-ft. platforms without

bulkheads, equipped with four-leaf folding doors and steps at all four corners. They will be used on the Scranton company's new high-speed mountain lines to Moosic Lake, where the vestibuling of the platforms is of particular importance. They also will be used in regular city service during the winter.

The Boston Elevated Railway Company, Boston, Mass., has purchased license and equipment for 50 cahs which are being built by the Laconia Car Company, Laconia, N. H. The Capital Traction Company, Washington, D. C., has purchased equipment and license for 80 new cars, which are being built by the Jewett Car Company, Newark, Ohio. When these cars are completed this company will have a total of 115 in service.

The Central Pennsylvania Traction Company, of Harrisburg, Pa., has purchased license and equipment for six new cars, which are being built by The J. G. Brill Company.

The Cleveland Railways Company has obtained the license to convert 50 equipments, which, when installed, will make a total of 400 cars of this type in Cleveland. The Illinois Traction System has ordered 13 equipments for the conversion of cars on the Urbana & Champaign Railway and 17 equipments for the conversion of cars of the Danville Street Railway & Light Company. The Oakwood Street Railway Company, of Dayton, Ohio, has ordered equipment and license for 13 single-truck cars, which are now in process of conversion. The Philadelphia Rapid Transit Company has ordered 11 equipments with manual control. When these are installed this company will have in operation 742 pay-within cars.

SHUNTED GRAPHIC RECORDING METERS

The Sangamo Electric Company, of Springfield, Ill., has developed shunted graphic recording wattmeters and ammeters which are a radical departure from the forms heretofore employed. The record is made on a paper chart ruled with rectangular co-ordinates and driven by clockwork. The movement of the recording pen across the chart is proportioned to the quantity measured and the speed of the record chart is controlled by a driving clock.

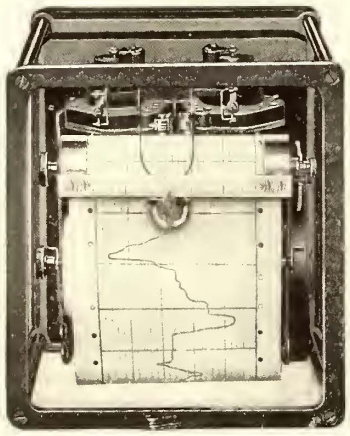


Fig. 1—Shunted Type D.C. Switchboard Wattmeter

The switchboard form is shown in Fig. 1 and the portable type in Fig. 2. The measuring elements consist of two mercury-floated motor elements so located as to actuate a common indicator to which is attached a recording pen for tracing a line or curve on the moving chart. Each meter has two measuring elements connected in series and in turn connected across an external shunt. The moving element consists of a simple metal disk or sector rigidly attached to a shaft carrying the recording pen mounting and control springs. The moving disk is floated in a mercury chamber which not only serves as a conducting medium for the current to be measured, but also by the damping action of the disk passing through the mercury renders the meter indications highly aperiodic or dead beat. This is a very important and desirable feature when meters are measuring fluctuating loads, as it insures a true record free from false indications or "overshooting."

Surrounding the moving disk is a magnetic field generated by electromagnets in the wattmeter and permanent magnets in the ammeters. The magnetic field of the fixed elements is in such relative position to the moving system or armature that it cuts or passes through the armature field and tends to rotate the moving system. This rotative movement causes the recording pen to move across the chart against the restraining force of the control springs, which tend to return the pen to zero position. The turning force of the mercury-floated moving element is thus balanced against the restraining or coercive force of the control springs and their point of balance or equilibrium is a measure of the current flowing in the measuring coils.

As the meters are of the direct deflection type the use of relays, control magnets, contacts, etc., with their attendant trouble, is entirely avoided. The construction adopted is also said to be unique in that it secures a torque or turning moment much higher than has been heretofore attained. This high torque in conjunction with the minimum friction value of the mercury floated moving element gives a ratio of "torque to weight and friction" of such value that errors due to pen friction on the chart are eliminated.

An important feature is that the moving element of the measuring system is inherently damped or rendered highly aperiodic dead beat by the dash-pot action of the copper vane traveling through the mercury chamber. This very desirable and essential quality is thus secured without employing the usual auxiliary means for damping.

An eight-day inclosed hand-wound clock has been adopted as a standard to avoid the inherent weaknesses of the open type electrically wound clocks, in which trouble invariably develops, due to entrance of dust or oxidizing of the contacts which control the winding circuit.

The mercury-floated type of graphic recording meter is considered particularly well adapted for measuring the output of electric railway generating stations, as it is of the shunted type and does not require the use of heavy conductors leading to the meter, as in the older type or series meters. This shunted feature is very desirable where heavy currents are to be measured, as in large installations the cost of the conductors and labor incident to their installation may exceed the initial cost of the series meter. The shunted meter requires that only two small wires be carried to the meter, as the shunt is external and is located at any accessible point in the circuit, such as the switch terminals, generator leads, etc.

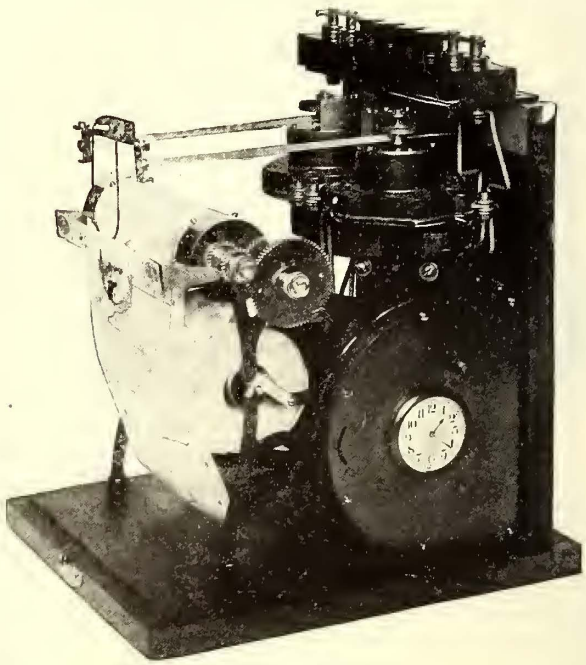


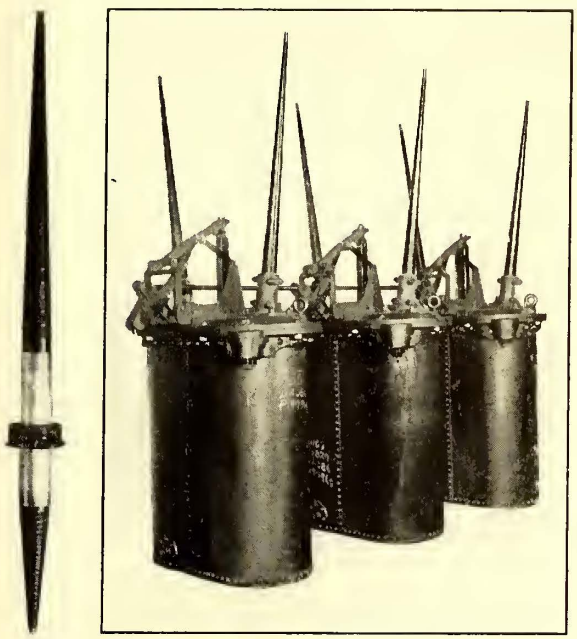
Fig. 2.—Shunted Type Multiple Capacity Portable Ammeter

The manager, therefore, is enabled to mount the meter in his own office and have a constant indication or record of current or kilowatt load being carried. No auxiliary leads are required to accomplish this result, as the use of relays or control circuits has been entirely eliminated. Another advantage incident to this type of meter is that, as it indicates in addition to recording, the cost of switchboards may be reduced by omitting the ordinary indicating meters.

HIGH-TENSION CONDENSER-TYPE TERMINALS

A new type of terminal for high-tension apparatus has recently been developed by the Westinghouse Electric & Manufacturing Company, utilizing a principle not employed for this purpose before.

The terminal is constructed of alternate concentric insulating and conducting layers, forming a series of condensers



High-Tension Condenser Type Terminals

which serve to make the distribution of potential stresses in the insulating material uniform and thus increase the dielectric strength of the terminal. As a result a much smaller terminal can be used for a given voltage with a corresponding saving in the cost of the entire piece of apparatus and a gain in dependability under conditions of abnormal stresses due to surges, lightning and similar causes.

It can be readily seen that any terminal passing through a metal tank forms in effect a curved condenser, the plates of which are the surface of the terminal and the surface of the hole or bushing in the tank. The insulation between the two is the dielectric of a condenser and is subject to all the conditions affecting such a dielectric. It can be shown both mathematically and experimentally that the static stresses in the dielectric of a curved condenser are not uniform throughout the thickness, but are greatest near the inner surface. Therefore the thickness of the insulation must be made such that the inner layers will not be subjected to dangerous stresses, which result in the outer layers being thicker than necessary. Looking at the matter in another way, if the insulation is designed for a certain voltage per inch of thickness there will be danger of breakdown due to the higher stresses near the inner surface. For low voltages the unnecessary thickness of insulation is not important, but for voltages of 70,000 and over the ordinary insulator becomes so large as to necessitate an increase in the size of the entire apparatus.

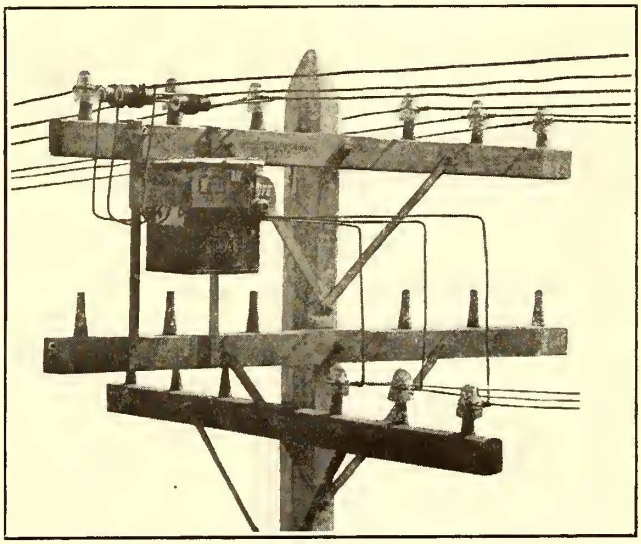
By interposing the metal layers the difference in diameters of the plates of each condenser is reduced and the distribution of potential made more uniform, which results in a saving of unnecessary thickness of insulation. An idea of the saving affected can be had by a comparison of two terminals designed and tested for 200,000 volts. An ordinary bulk type terminal for this voltage is about 9 ft. in length and 16 in. in diameter, including insulation. A condenser-type of terminal for the same voltage is 7 ft. in length and 4 in. in diameter, the volume of the former being eight times the latter.

The general appearance of a condenser-type terminal is shown in the smaller illustration. The terminal is constructed by winding successive layers on a central outlet tube. The insulating layers consist largely of a special grade of paper wound under pressure and cemented and pressed together into a solid mass without weak spots. On each thickness of insulation is wound a layer of metal foil. The layers are so finished that each is shorter than the one beneath it, thus tapering the terminal and providing a creeping surface between successive conducting layers. The creeping surfaces on the end projecting into the air are, naturally, larger than those at the end submerged in oil. A heavy metallic flange is fastened to the outside of the terminal to serve as a support for mounting it in the tank. The larger illustration shows a 60,000-volt oil circuit-breaker equipped with condenser-type terminals.

OIL-BREAK POLE-LINE SWITCH

The General Electric Company recently has designed an oil-break pole-line switch which is simple in design and easily installed. It can be mounted on a flat surface, or by use of strap-iron hooks, on transmission pole cross-arms like pole-type transformers.

This switch is known as type F, form P. It is thoroughly weatherproof, as it is entirely enclosed in a cast-iron frame which is fitted with a removable cover, grooved on the under side to fit closely to the edge of the frame and supplied with a suitable gasket. A detachable oil vessel, with insulating line and barriers between the switch poles, fits around a flange at the bottom of the frame. The stationary contacts are flared fingers of drop-forged copper, supported from the contact blocks of the copper current-carrying studs by a heavy flat steel frame. The studs are supported by and insulated from the frame by porcelain insulators. The movable contacts are wedge-shaped copper blades hinged at one end. They are actuated by specially treated wooden rods connected to the shaft, which in turn is operated by the crank and handle outside of the frame. The construction of the stationary and movable contacts is such that any burning, due to rupturing the arc, is confined to the tips of the stationary contact fingers and the upper extremity of the movable contacts, preserving the actual



Oil-Break Pole-Line Switch Installed

current-carrying surfaces. This feature of construction insures clean contact surface and uniform contact pressure without retarding the opening of the switch.

This switch is built in sizes up to 200 amp at 15,000 volts. The method of bringing the leads to the switch varies somewhat according to the voltage, but in every case the leads enter through porcelain bushings which are protected from the weather by the overhang of the frame. The switches up to 4500 volts are designed for use with insulated wire, while for potentials between 4500 volts and 15,000 volts bushings are furnished to allow the use of bare wire.

LONDON LETTER

(From Our Regular Correspondent)

Reference has frequently been made in the Electric Railway Journal to the improvements which the Metropolitan District Railway has made since electricity was installed as motive power to displace steam, about six years ago. The Metropolitan Railway, the only other railway similar to the Metropolitan District Railway, has been slower to commence improvements in the details of its stations, etc., but now extensive work is being carried out at Liverpool Street, Moorgate Street and King's Cross Stations, and a new station is being erected at Baker Street Junction to replace the present one. At Liverpool Street Station an arcade about 300 ft. long by 18 ft. wide is to be made with provision for shops on each side of the arcade. At Moorgate Street a new subway will be constructed to connect the station with the City & South London and the Great Northern tubes, so as to encourage traffic between these lines. The plans for King's Cross embody the erection of the largest reinforced concrete span road bridge in London. This bridge will form a new thoroughfare from Pentonville Road to King's Cross Road, and will enable the London County Council Tramways from Highgate to run from Caledonian Road into Gray's Inn Road without the deflection which they make at present to avoid the King's Cross Station. The structure is a skew bridge 130 ft. long, with two principal spans 53 ft. and 30 ft. respectively. The bridge will be 60 ft. wide, with a 36-ft. roadway to accommodate two lines of electric tramway. The steady growth of the through traffic between the stations on the Circle line and those on the St. John's Wood and Harrow line have made the Baker Street improvements necessary. At present the through connection is made by a single track, but two tracks will be installed with additional tracks for the trains which start north from the Baker Street Station.

During the next session 16 bills for permission to install trackless trolleys will be introduced in Parliament by municipalities and companies chiefly for lines in outlying districts. It is expected that by March 1, 1911, the Manchester Corporation will be ready to experiment with the trackless trolley, and that trackless trolleys will be running in Bradford by April 1, 1911.

Mr. Baker, general manager of the Birmingham tramways, believes that the trackless trolley can be of service only in districts incapable of developing traffic to support a tramway. For large towns whose areas will expand he prefers to procure cheap land on which track can be built and maintained cheaper than in a public road. A road of this description is being constructed to a district five miles from Birmingham.

Mr. McElroy, general manager of the Manchester Corporation Tramways, has issued a report in regard to the demand of the drivers and guards of the corporation for an eight-hour day. The conditions of service of the men in Manchester are compared with those of men in other large towns, and the effect of the increase on the rates is indicated. On the strength of the report the tramway committee has recommended the City Council not to accede to the men's demands, and the Council has supported the committee.

The London County Council has deposited only one measure for the consideration of Parliament which relates to tramways. The principal tramway scheme is the four-mile line from Marble Arch to Cricklewood, which is strongly opposed by the Paddington Borough Council because it fears that the Cricklewood scheme may be followed by an extension along the Bayswater Road. The Marylebone Borough Council is inclined to favor the measure. On the other hand, Willesden and Hampstead feel that the plans do not indicate a sufficient width of road. At Cricklewood the proposed line would join with the lines of the Middlesex County Council, which operates tramways through parts of Middlesex and Hertfordshire. The bill includes tramways in other parts of London, and the estimated cost of construction of the proposed lines is £830,340.

When Mr. Rider resigned as chief electrical engineer of the London County Council recently the Council authorized the appointment of a traffic assistant at a salary of £600 a year. Applications were invited by public advertisement, and Lewis Slattery, general manager of the Oldham Corporation Tramways, has been appointed to the position.

As outlined last month, Glasgow has recently been considering the problem of reduction in fares. At present a ride of more than 2½ miles is given for one penny in Glasgow. In addition, rides of half-mile stages are given for a halfpenny. An effort was made to have the committee adopt two halfpenny stages for one halfpenny, but it was decided that a ride of a mile for a halfpenny would result in serious financial loss. Subsequently it was decided to give two halfpenny stages for 3 farthings. It was also intended originally to issue books containing 12 tickets for 9d, each ticket to be available for two halfpenny stages. As a certain amount of hardship to poor people would be involved if they were required to buy tickets in quantity it has been decided to permit passengers to travel two consecutive halfpenny stations and a similar distance on another car for 1½d for a period of four months, thus making it unnecessary to use farthings. This will be called the "two-stage fare," and is an experiment. The modus operandi follow: The passenger will ask the conductor for a two-stage ticket, and on paying 1½d the conductor will give him a yellow ticket which will be punched to indicate the station from which the journey begins and will be available for the two half-mile stages. The passenger will retain this ticket on leaving the car, as it can be presented on any other part of the system on which he may wish to travel two other stages. The passenger will then present this ticket to the second conductor, who in exchange will give him another ticket punched to indicate the station to which he is entitled to travel. This latter ticket is, of course, valueless when these two stages have been traveled, and may be discarded. The first two-stage ticket will be marked "1½d—two-stage," and the instructions printed on the ticket are: "Ticket is available to station opposite punch hole, and also for two consecutive halfpenny stages on any other car on production complete to conductor." The experiment will be watched carefully by tramway officials generally, because it appears to approach the minimum in municipal tramway fares.

So successful has the electrification of the South London portion of the Brighton Railway been that work is under way on an extension which will take in the Crystal Palace, and it has been decided that even that line will be extended to Croydon. Arrangements for this line will have to be made between the railway and the Corydon Borough Council.

It is proposed to extend the Central London Railway from the present terminus at Wood Lane, Shepherd's Bush, to Ealing Broadway, a distance of about 4½ miles. The chief object in seeking power to make this extension is to bring the line into direct communication with the Great Western Company's main line, and thus to facilitate communication with all parts of the metropolis. The Great Western Company is contributing substantially toward the cost, and if the extension is carried out Great Western trains will call at Ealing Broadway, so that not only will this become an important exchange, but the western suburbs will have another important alternative route to the city. The bill in Parliament provides for working agreements between the two companies. As the extension of the Central London Railway from the Bank to Liverpool Street is expected to be completed next year it will be possible for passengers traveling by the Great Western system to proceed direct to the Great Eastern Company's line.

An ambitious scheme for which the authority of Parliament is being sought has for its object the incorporation of the Greater London Railway to construct various railways in Middlesex and Essex. The lines, starting at Feltham, will pass through or connect the following places: Isleworth, Heston-Isleworth, Norwood, Southall-Norwood, Hayes, Northolt, Greenford, Wembley, Kingsbury, Hendon, Finchley, Friern Barnet, Hornsey, Wood Green, Southgate, Tottenham and Edmonton, in Middlesex; Walthamstow, Wanstead, Ilford, East Ham, West Ham, Romford, Dagenham, Hornchurch, Rainham, Upminster, South Ockendon, North Ockendon, Stifford, Orsett, Grays Thurrock, and Little Thurrock, in Essex. In addition to connecting these important centers of population this proposed line will afford direct facilities to all the main lines. A. C. S.

News of Electric Railways

Cleveland Traction Situation

At the annual meeting of the stockholders of the Cleveland Railway on Jan. 24, 1911, the directors were re-elected. The board organized by electing these officers: President, J. J. Stanley; vice-presidents, C. F. Emery and R. A. Harman; secretary and treasurer, Henry J. Davies; executive committee, J. J. Stanley, Horace E. Andrews, L. C. Hanna, Thomas P. Schmidt, Samuel Mather, C. F. Emery and H. P. McIntosh. R. A. Harman, as vice-president, succeeds J. J. Stanley, who was elected president some time ago, and Thomas P. Schmidt fills the place formerly occupied by Mr. Harman on the executive committee.

John H. Clarke, general counsel for the Nickel Plate Railroad, opposed the proposed authorization of an issue of $35,000,000 of bonds as illegal and said that it would weaken the stock on the market. He held that no authorization of bonds could be greater in amount than the capital stock and refused to change his view upon the suggestion that the authorization should be for the full amount asked with the amount to be issued limited to $15,000,000 or a sum equal to the amount of stock outstanding at any time.

Horace E. Andrews and Attorney Andrew Squire explained that the proposed issue was intended to benefit the stock and the company and that it was not intended that the issue of bonds should ever exceed the amount of stock. Mr. Andrews said that the step was decided upon after a consultation with N. W. Harris & Company, who are expected to take the bonds. Mr. Squire said that the purpose was to have the issue sufficient to cover the needs of the company through the life of the franchise. At least $25,000,000 would have to be expended upon the property in that time. Both he and Mr. Andrews said that additional bonds could be issued under the original mortgage and that there would be no need for an issue under a second mortgage. The resolution authorizing a mortgage for $35,000,000 was carried. It provides that not more than 6 per cent interest shall be paid.

President Stanley pointed out that at a rate of fare of 3 cents, with 1 cent for transfers, the average rate per passenger for the 10 months of operation was 3.39 cents, and including income from other sources 3.57 cents. In the interest fund at the close of the fiscal year there was $750,921.31 in cash, or $250,921.31 more than the original $500,000 borrowed to start the fund. A portion of this represents reserves for the payment of interest not payable until March 1 of this year. The total receipts were $5,196,471.60 and expenses $5,314,897.40, leaving a deficit of $118,425.80. For the two months under the receiver's control there was a surplus of $46,947.56, leaving a net deficit for the year of $71,478.24.

Sales of stock during the year have aggregated $386,200, but the company was compelled to borrow an amount which increased the floating debt to $1,222,500. The capital stock is placed at practically $15,000,000, while the bonded and floating debt amount to $9,400,000.

Transit Affairs in New York

The Board of Estimate of New York on Jan. 31, 1911, authorized the committee appointed to confer with the Public Service Commission concerning modifications of the Interborough subway offer to confer also with the officials of the Interborough Rapid Transit Company. The resolution, which Borough President McAneny himself proposed, as finally adopted, bore an amendment offered by Controller Prendergast. The amendment recognized the section of the original resolution of the board appointing the committee, which instructed it to consider any alternative plans, including independent routes, which the Public Service Commission might suggest or receive. The resolution as finally adopted follows:

"Resolved, That the special committee appointed in pursuance of the resolution adopted by the board at its meeting of Jan. 19 to confer with the Public Service Commission with relation to the pending proposition of the Interborough Rapid Transit Company, or to such alternative plans, including independent routes, as may be presented, be authorized to confer also with the officers of the Interborough Rapid Transit Company, with a view toward ascertaining whether that company will enter into a contract for the construction, equipment and operation of subway extensions upon terms acceptable to the city, and be it further

"Resolved, That the committee be requested to report to the board as early as may be practicable the results of such conferences, in order that the board, if the general terms proposed prove acceptable to it, may authorize the Public Service Commission to proceed with the negotiation of a contract."

Chairman Willcox, of the Public Service Commission, has made the following statement in regard to the report that the Public Service Commission, which some time ago produced tentative forms of contract giving the Interborough Rapid Transit Company, among other things, 80-year franchises on its elevated third tracking, had agreed with that company to put such provisions into the final contracts for the elevated third tracking and extensions.

"No agreement as to franchises for third tracks on the elevated lines or extensions of the same has been reached between the Interborough Rapid Transit Company and the Public Service Commission, nor has the commission adopted the certificates for either the third tracking or elevated extensions.

"Since the public hearing was held upon the form of certificates many alterations have been made in the certificates and conferences have been had between representatives of the commission and of the Interborough company, but no agreement has been reached, nor have the certificates been adopted by the commission.

"It is well known that the commission is now having conferences with a committee of the Board of Estimate on the subway situation, and, as the Interborough company has stated that its subway proposition is contingent upon its elevated proposal, it is probable that the commission will take no formal action on the elevated certificates until the conferences with the committee of the Board of Estimate have been concluded."

The Riverbank Subway in Boston

The Railroad Commissioners of Massachusetts have handed down the following decision in regard to the application of the Boston Elevated Railway for a revision of the determination of the Boston Transit Commission relative to stations in the Riverbank subway in Boston:

"The Riverbank subway is authorized by Chapter 573, Acts of 1907. Under the provisions of this act the Boston Transit Commission on Nov. 3, 1910, passed the following vote:

"'Voted: That the stations in the Riverbank subway be located on Massachusetts Avenue, Dartmouth Street and Charles Street.'

"The Boston Elevated Railway, under the provisions of said act, has applied to the board for a revision of such determination and 'requests the board to consider and finally determine the question as to whether or not there shall be any stations in said Riverbank subway, and if so the number and location thereof.'

"In making its determination the board adopts as a controlling factor the principle laid down in its decision of March 29, 1905, upon a former appeal of the same company from the determination of the Boston Transit Commission relative to the location of an entrance to the Washington Street tunnel. The following language was then used:

"'The governing thought must, of course, be the largest convenience of the public consistent with a reasonable economy in construction.'

"Applying the foregoing rule to the application before us, we are of opinion that three stations, as located by the Boston Transit Commission, would afford the largest convenience to the public, and that their installation can be consistently secured with a reasonable economy in construction.

"In arriving at the foregoing conclusion we must take

the situation as we find it, and confine ourselves to the narrow issue presented by the application. The only legislative authority for the construction of a subway in this section of the city is for the proposed Riverbank subway, designed to contain two railway tracks and running under the terms of the act from a connection with the Park Street station in and under the Charles River embankment, so called, to a point west of the Harvard bridge in Boston. What our conclusions might be on the application before us if another subway in this section of the city were in progress of construction or had been authorized by the General Court it is not necessary to discuss.

"The board, therefore, has considered and now finally determines that there shall be three stations in the Riverbank subway as located by the Boston Transit Commission on Nov. 3, 1910."

Association Meetings

Massachusetts Street Railway Association—Boston, Mass., Feb. 8.

Central Electric Traffic Association—Indianapolis, Ind., Feb. 13, 14 and 15.

Illinois Electric Railway Association—Chicago, Ill., Feb. 17.

New England Street Railway Club—Boston, Mass., Feb. 23.

Central Electric Railway Association—Columbus, Ohio, March 23.

Central Electric Accounting Conference—Springfield, Ohio. Date to be fixed.

Iowa Street & Interurban Railway Association—Davenport, Ia., April.

Missouri Electric, Gas, Street Railway & Water Works Association—St. Louis, April.

Mayor Whitlock Continues to Improve.—Brand Whitlock, Mayor of Toledo, Ohio, was able to receive some of the city officials at his room in the hospital on Jan. 25, 1911, and continues to convalesce rapidly. He will not, however, be able to take up work in connection with the franchise matter for some time.

New Tunnel for Surface Cars Opened in Chicago.—Madison Street cars of the Chicago (Ill.) Railways are being operated through the new Washington Street tunnel of the company. The tunnel will relieve downtown traffic congestion. The bore is 1520 ft. long between Franklin Street in the business district and Clinton Street on the West Side.

Report on Philadelphia.—Ford, Bacon & Davis, New York, N. Y., who have been retained by the Pennsylvania State Railroad Commission to report on transit affairs in Philadelphia, have advised the commission that the first part of their report will be ready within a few days, but that the complete report will not be ready before March 1, 1911.

Meeting of Southwestern Electrical & Gas Association.—At a called meeting of the advisory and executive committees of the Southwestern Electrical & Gas Association it was decided to hold the seventh annual convention of the association in Houston, Tex., on April 27, 28 and 29, 1911. D. G. Fisher, 1316 Commerce Street, Dallas, Tex., is third vice-president and secretary of the association.

City-Owned Subway Proposed in Philadelphia.—Mayor Reyburn, of Philadelphia, Pa., advocates a four-track subway the entire length of Broad Street, which is 11 miles long, to be owned by the city; the extension of the Market Street subway system of the Philadelphia Rapid Transit Company to Camden through tunnels under the Delaware River, and the erection of an immense convention hall on the edge of Fairmount Park. All the projected improvements, it is suggested, should be made under a $60,000,000 city loan, of which $28,000,000 will be spent on the Broad Street subway.

Right of Minneapolis to Order Railway Extensions.—In an opinion filed with the city clerk, Judge Daniel Fish, city attorney of Minneapolis, Minn., holds that the City Council has power to order and enforce construction of new street car lines and extensions and to regulate service by the Minneapolis Street Railway. Judge Fish's opinion was prepared at the request of the Council. Judge Fish declares the Minneapolis Street Railway has an exclusive franchise to give service to the people of Minneapolis. The company, he holds, is bound by the franchise of 1875, which requires it to accommodate passengers comfortably. Further, he holds the company, by an ordinance of 1890, is bound by all subsequent ordinances regarding service. After declaring the Council has the right to force the construction of new lines and extensions, Judge Fish discusses the section of the ordinance which provides that whenever the company refuses to build new lines it forfeits its exclusive franchise on those streets and the Council has authority to issue franchises to new companies. He says: "It has been supposed that the forfeiture of the exclusive franchise on these streets is the only remedy, but I believe that to be an entirely mistaken view. On the face of this provision it would be futile for the Council to try to enforce the construction of extensions. It is plain, I believe, that whenever your honorable body shall see fit to order reasonable extensions and new lines the company is bound to abide by the order. I believe also the Council's authority applies to the proposed snow and ice ordinance."

LEGISLATION AFFECTING ELECTRIC RAILWAYS

California.—A bill to create a public service commission was introduced in both houses of the Legislature on Jan. 20. The bill provides for the appointment by the Governor of three commissioners to hold office at the pleasure of the Governor and to receive a salary of $8,000 a year each. One member of the board must be an attorney and another must have had experience with a public service corporation. The commission is to have charge of all matters relating to the service of light, water, heat, power, telephone and telegraph and telephone except that it is to exercise none of the functions of the State Railroad Commission. A measure has been introduced to limit governing bodies to the issuance of indeterminate franchises or franchises to run not more than 20 years. Senator Finn has introduced a bill to give San Francisco the right to construct and maintain a municipal street railway over lands of the State from the eastern boundary line of the Presidio to the San Mateo County line. R. J. Callaghan has introduced in the Assembly a bill which provides that every transfer issued by a street railway shall be honored by the conductor of the line for which the transfer is issued at any time during the day that it is issued.

Indiana.—Senator Carelton proposes to introduce a bill to create a public utilities commission to succeed the railroad commission. Senate bill No. 105 has been passed. It is pointed out that the bill, which provides that foreign corporations operating in Indiana shall be restricted to the powers, rights and privileges that are enjoyed by domestic corporations, would compel railroads to sell tickets to points beyond the State line not to exceed 2 cents a mile, the Indiana rate. Senate bill No. 256, recently introduced, provides for the examination of employees and officials of interurban and steam railroads and for regulating the system of "tracking" interurban employees by "spotters." The bill provides that an officer shall be allowed only one day in which to file charges against an employee, and that such employee shall be informed of such charges within one day after they are filed. A 12-hour limitation is placed on the working day of employees and immediate discharge is required of any train dispatcher issuing "lap orders" to train crews. Senate bill No. 263 provides for the installation of block signal systems on all steam and interurban roads at the option of the Railroad Commission. House bill No. 258 would regulate the construction of interurban passenger cars relative to partitions between baggage, smoking and passenger compartments, sanitation, ventilation, etc. Senate bill No. 251 would compel interurban railways to maintain suitable waiting rooms and sanitary conveniences in cities of 5000 or more population.

Massachusetts.—The joint board upon metropolitan improvements at Boston, which consists of the Massachusetts Railroad, Boston Transit, Metropolitan Park and Harbor and Land Commissions, has submitted a report to the Legislature upon the electrification of railroads within the Boston district. The majority of the joint board has concluded that the cost of the work is too great to require the railroads to undertake it at the present time. The minority report in favor of electrification is signed by a majority of the Massachusetts Railroad and Boston Transit Commissions. The close division of the board throws the question

upon the Legislature for further consideration, and active discussion of the electrification problem will unquestionably be a feature of the session. A bill has been introduced into the Senate which provides that all future extensions of railroads and street railways shall be double-tracked. A bill has been introduced into the House which provides for the repeal of the Riverbank subway act, designed to provide rapid transit for the outlying suburban districts to the west of the city. Sentiment has recently developed in favor of a subway under Boylston Street instead of under the southerly embankment of the Charles River. House Chairman Cushing, of the committee on metropolitan affairs, is of the opinion that the committee will be slow to recommend any positive subway legislation without an expert report by the Railroad Commission.

Missouri.—A measure to create a State Public Service Commission was introduced in the House on Jan. 17 by Representative Roach. The bill would abolish the Railroad & Warehouse Commission. It provides for a commission of five, to be appointed by the Governor for a term of four years, at an annual salary of $3,500 for each member. The Governor is not permitted to appoint more than three men from any one party.

New York.—A bill has been introduced by Assemblyman Graubard to insert a new section in the railroad law to require the Public Service Commission to give 30 days' notice to every corporation in New York City operating a street surface railroad by "animal or horsepower" to change such motive power to electricity. Such notices are to be given not later than Jan. 1, 1912. Violation is punishable by a fine of $100 a day for each car. Two bills relating to transfers on surface railways in New York City were introduced on Jan. 31 by Assemblyman Goldberg. One requires an interchange of transfers on all railroads crossing any bridges connecting the Boroughs of Manhattan and the Bronx. Certificates permitting the operation of railroads over the bridges are to be withheld until the companies agree to such interchange of transfers. The other measure requires the railroad companies of Manhattan and the Bronx whose lines run north and south to operate a system of transfers with intersecting lines running east and west. Senator J. Mayhew Wainwright has prepared a bill which gives the Public Service Commission of the First District of New York practically the same powers that the Interstate Commerce Commission has to suspend railroad rate schedules. Governor Dix has tendered W. A. Huppuch a place on the Public Service Commission of the Second District of New York to succeed J. N. Carlisle.

Pennsylvania.—It is stated that Governor Tener will appoint Judge Shull, of Perry County, as railroad commissioner, to succeed John Y. Boyd, resigned. Attorney-General Bell and his assistants are preparing an administration measure to create a public utilities commission to succeed the present State Railroad Commission. There is a disposition to enlarge the new commission from three to five members, at least one of whom is to be learned in the law. The terms of the first commissioners appointed are to expire on the first Mondays of January, 1913, 1914, 1915, 1916 and 1917, respectively. After that commissioners are to be appointed for five years. There is a provision which forbids the appointment as commissioners of persons interested in corporations. The main offices of the commission are to be at Harrisburg, but it is directed to maintain offices in Pittsburg and Philadelphia. The commission is to meet once a week in Harrisburg. A majority of the commission is to constitute a quorum.

Utah.—The creation of a public utilities commission, with jurisdiction over all public service corporations in the State, is authorized by a bill introduced by Senator Badger, of Salt Lake. The bill gives the commission executive powers over the corporations specified with reference to fixing standards of rates to be charged, adjusting differences and regulating the business of the corporations. The commission is to consist of three members, appointed by the Governor. Not more than two of the members shall be affiliated with the same political party. One commissioner is to be appointed for two years, another for four years and the third for six years. At the expiration of each term the successor of the original appointee is to be named for six years. One commissioner is to devote all of his time to the work and the other two part of their time.

Financial and Corporate

New York Stock and Money Market

Jan. 31, 1911.

The Wall Street market for the past week has been strong with moderate activity. While prices have advanced fractionally the general condition of the market is little improved because no outside interest has developed. The announcement, made to-day, that the Harriman lines in the West intended to issue $75,000,000 of new securities braced the market. The bond market continues to be very satisfactory and the money market is easy. Quoted rates to-day were: Call, 2⅜@2½ per cent; 90 days, 3¼@3½ per cent.

Other Markets

In Philadelphia there was a good deal of activity in Rapid Transit and Union Traction, but neither buyers nor sellers were insistent. There was an active buying demand for Lehigh Valley Transit during the week and the price was advanced several points.

In the Chicago market there was a steady business last week in the certificates of the Railways company. The demand, however, was not sufficient to advance prices to any considerable extent. Other tractions were neglected.

Boston Elevated was fairly active last week, but there were no price changes of importance. Massachusetts Electric shares also continued to sell in small quantities at old prices.

In the Baltimore market during the week there has been some activity in United Railway shares and the price has been advanced as high as 18⅛. The bond market has been good at former prices.

Quotations of traction and manufacturing securities as compared with last week follow:

	Jan. 24.	Feb. 1.
American Light & Traction Company (common)	a288	a288
American Light & Traction Company (preferred)	a105	a105
American Railways Company	a44½	a45
Aurora, Elgin & Chicago Railroad (common)	a42	a12¾
Aurora, Elgin & Chicago Railroad (preferred)	83	a87
Boston Elevated Railway	129½	a129¾
Boston Suburban Electric Companies (common)	a16	a16
Boston Suburban Electric Companies (preferred)	a71	a71
Boston & Worcester Electric Companies (common)	a10½	a10
Boston & Worcester Electric Companies (preferred)	a30½	a30
Brooklyn Rapid Transit	77¼	77½
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	83⅞	83⅞
Capital Traction Company, Washington	a130	128¾
Chicago City Railway	a200	a195
Chicago & Oak Park Elevated Railroad (common)	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7¼	*7¼
Chicago Railways, ptcptg., ctf. 1	a93	a93
Chicago Railways, ptcptg., ctf. 2	a25	a25½
Chicago Railways, ptcptg., ctf. 3	a9	a9½
Chicago Railways, ptcptg., ctf. 4	a6½	a6¼
Cleveland Railway	*91½	*91½
Consolidated Traction of New Jersey	a73½	a74
Consolidated Traction of N. J., 5 per cent bonds	a104½	a105
Detroit United Railway	a71½	a72
General Electric Company	a152	a154
Georgia Railway & Electric Company (common)	a118	a120
Georgia Railway & Electric Company (preferred)	88	a88
Interborough-Metropolitan Company (common)	19¼	19¾
Interborough-Metropolitan Company (preferred)	52⅞	54
Interborough-Metropolitan Company (4½s)	79	79
Kansas City Railway & Light Company (common)	a21	a22
Kansas City Railway & Light Company (preferred)	a71	a71
Manhattan Railway	140	137¾
Massachusetts Electric Company (common)	a18	a18
Massachusetts Electric Companies (preferred)	a86	a85½
Metropolitan, West Side, Chicago (common)	21	23
Metropolitan West Side, Chicago (preferred)	*69½	68
Metropolitan Street Railway, New York	*19½	*19½
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	70¾	72⅝
Northwestern Elevated Railroad (common)	a22½	a23
Northwestern Elevated Railroad (preferred)	a63	a63
Philadelphia Company, Pittsburgh (common)	53	53
Philadelphia Company, Pittsburgh (preferred)	44½	44½
Philadelphia Rapid Transit Company	20¼	20⅛
Philadelphia Traction Company	86½	*86½
Public Service Corporation, 5 per cent col. notes	a96½	a96½
Public Service Corporation, ctfs.	a115¾	a101½
Seattle Electric Company (common)	a110	a110
Seattle Electric Company (preferred)	a102	a101½
South Side Elevated Railroad (Chicago)	a70	a70
Third Avenue Railroad, New York	a10½	a11
Toledo Railways & Light Company	a8	a9
Twin City Rapid Transit, Minneapolis (common)	a110	a110
Union Traction Company, Philadelphia	a48	a47¾
United Rys. & Electric Company, Baltimore	a17	a18⅛
United Rys. Inv. Co. (common)	43	44⅞
United Rys. Inv. Co. (preferred)	68	69¾
Washington Ry. & Electric Company (common)	38½	a38
Washington Ry. & Electric Company (preferred)	a89½	a89½
West End Street Railway, Boston (common)	a91½	a91
West End Street Railway, Boston (preferred)	a105	a105
Westinghouse Elec. & Mfg. Co.	68	68
Westinghouse Elec. & Mfg. Company (1st pref.)	*124	119

aAsked. *Last sale.

Revival of Railway Consolidation Rumors in Chicago

It is reported that negotiations are under way between the Chicago & Milwaukee Electric Railroad and the Northwestern Elevated Railroad, Chicago, Ill., by which the former will obtain terminal facilities in Chicago connecting with the Northwestern Elevated Railroad's tracks at Evanston. That there is to be an actual consolidation between the two companies is denied in some quarters, where it is stated that the arrangement is simply a traffic agreement. The Chicago & Milwaukee Electric Railroad is in the hands of receivers, but A. C. Frost, who was formerly president of the company, is reported to have said that the road will pass under new management. It is also reported that Mason B. Starring, president of the Northwestern Elevated Railroad, will be president of the new company in process of formation to combine the franchises of the two existing companies.

The report that all the surface and elevated railways of Chicago are to be combined has been revived. It is said that J. P. Morgan & Company, New York, N. Y., are interested in the project, which has been discussed at intervals for several years. It would seem that this possible consolidation would have an effect on the reported amalgamation of the Chicago & Milwaukee Electric Railroad and the Northwestern Elevated Railroad.

Chicago Railways Bonds

The Chicago (Ill.) Railways has sold to the National City Bank, New York, and Harris, Forbes & Company, New York, $15,000,000 of first mortgage 5 per cent gold bonds dated Feb. 1, 1907, and due Feb. 1, 1927, and these bonds are now being offered for subscription at 98 and interest. A statement showing the earnings and expenses for the fiscal year ending Jan. 31, 1911, partly estimated, follows:

Gross earnings	$13,935,000
Operating expenses, including taxes and maintenance	9,754,500
Net earnings	$4,180,500
*Annual interest charge on $40,955,000 first 5s, including the present issue	2,047,750
Balance	$2,132,750

*The entire $40,955,000 first mortgage bonds were not outstanding during this period. The actual interest charges on outstanding first mortgage bonds amounted to only $1,270,000, leaving a balance of $2,910,500. The earnings include approximately one month's operations of the recently acquired city lines of the Chicago Consolidated Traction property.

In a statement issued by the bankers they say:

"The Chicago Railways, pursuant to an ordinance passed Oct. 10, 1910, recently purchased 128 miles single track located entirely within the city limits and formerly owned by the Chicago Consolidated Traction Company. Through the acquisition of this property the company has increased its trackage by more than 40 per cent, now having a total of more than 445 miles measured as single track. With the operation of the entire mileage of the company, it is estimated that the earnings will show a large increase. The gross receipts of the Chicago Consolidated Traction System have shown annual increases for the past 10 years, averaging more than 9 per cent.

"There will be indorsed on each bond a certificate of the Comptroller of the City of Chicago, identifying the bond as being entitled to a first lien upon the entire property of the Chicago Railways, including the additional property just acquired.

"The City of Chicago placed a valuation upon the properties as of Feb. 1, 1907, of $30,779,874.94, which, under the ordinance granting the company its franchise, is to remain as a minimum equity behind the first mortgage bonds. When the proceeds of the bonds now offered have been expended the valuation as fixed by the city will amount to at least $71,734,874.94.

"The franchise provides for a straight 5-cent fare with universal transfers, and the city is entitled to 55 per cent of the surplus earnings after first providing for all operating expenses, including taxes and full charges for maintenance and depreciation and 5 per cent upon the value of the properties as imposed from time to time. Under the division of profits the city is partner of the company, at least equally interested in increasing its earnings, and these first mortgage bonds are therefore in a certain way quasi-municipal securities.

"The major part of the property has been reconstructed during the past few years, and the money that will be spent on recently acquired mileage will place it in the same excellent condition of operating efficiency, while the franchise provides for large maintenance and depreciation funds to be charged to operating expenses."

Earnings of Interborough Rapid Transit Company for Six Months

The Interborough Rapid Transit Company, New York, N. Y., has made public the following statement, which shows the earnings of the company for the six months ended Dec. 31, 1910, compared with the six months ended Dec. 31, 1909:

Six Months Ended Dec. 31,	1910.	1909.
Gross operating revenue	$14,286,689	$13,924,809
Operating expenses	5,926,563	5,379,808
Net operating revenue	$8,360,126	$8,545,001
Taxes	923,476	833,779
Income from operation	$7,436,650	$7,711,222
Non-operating income	174,447	227,999
Gross income	$7,611,097	$7,939,221
Interest, rentals, etc., including Manhattan Guarantee	5,333,866	5,272,932
Net income	$2,277,231	$2,666,289
Dividends on $35,000,000, Interborough Rapid Transit Company capital stock for 6 months ended Dec. 31, 1910, at the rate of 9 per cent. per annum	1,575,000	1,575,000
Surplus	$702,231	$1,091,288
Operating, per cent	41.48	38.63
Passengers carried	277,186,032	270,337,628

It is explained that the increase in operating expenses is largely due to extraordinary expenditures, the result of changes in subway equipment made necessary in connection with the operation of 10-car express and 6-car local trains.

Boston & Northern Street Railway, Boston, Mass.—William A. Read & Company, New York, N. Y., offer for subscription at 92¾ and interest, netting 4.37 per cent, the unsold portion of $2,050,000 of first-mortgage refunding 4 per cent gold bonds, dated 1904 and due July 1, 1954. The authorized issue of these bonds is $15,000,000, and of this amount $4,618,000 is outstanding.

Brooklyn (N. Y.) Rapid Transit Company.—At the annual meeting of the stockholders of the Brooklyn Rapid Transit Company on Jan. 27, 1911, the following directors were elected to serve for three years: T. S. Williams, Colgate Hoyt, Nicholas F. Brady and C. D. Meneely. George W. Davidson was chosen to serve for two years. Mr. Hoyt, Mr. Brady and Mr. Davidson succeed David Valentine, deceased, and Edwin W. Winter and Norman B. Ream, retired. As mentioned elsewhere in this issue, Mr. Winter has announced that at the meeting of the directors he will retire as president of the company.

Columbus, New Albany & Johnstown Traction Company, Columbus, Ohio.—The Columbus, Mount Vernon & Mansfield Traction Company, which is to take over the Columbus, New Albany & Johnstown Traction Company, is selling its 5 per cent bonds at 85 and giving a bonus of 40 per cent of the stock of the company.

Detroit (Mich.) United Railway.—The Detroit United Railway has sold to William A. Read & Company, New York, N. Y., $1,500,000 of 5 per cent collateral trust notes dated Feb. 15, 1911, and due Jan. 1, 1912. The notes, which are secured by $1,880,000 of the company's first consolidated 4½ per cent bonds and other collateral, have been resold by the bankers. Recently Montreal bankers contracted to purchase from the company $1,500,000 of first consolidated 4½ per cent bonds.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—The Public Service Commission of the Second District of New York has authorized the Elmira Water, Light & Railroad Company to issue its 5 per cent first consolidated mortgage bonds to the amount of $243,995, to be sold at not less than 87. The proceeds are to be used to discharge indebtedness incurred for capital purposes and various extensions and improvements in Elmira and vicinity.

Farmington Street Railway, Hartford, Conn.—The New York, New Haven & Hartford Railroad, which took over the Farmington Street Railway in December, 1909, called for payment on Jan. 1, 1911, the $30,000 of 5 per cent

debenture bonds of the Farmington Street Railway, which were due to mature on July 1, 1924.

Georgia Railway & Electric Company, Atlanta, Ga.—Twenty-five first consolidated mortgage 5 per cent bonds of the Atlanta Consolidated Street Railway have been drawn for redemption on Feb. 1, 1911, at 105 and interest at the office of the Mercantile Trust & Deposit Company, Baltimore, Md., trustee.

Illinois Traction System, Champaign, Ill.—The Milwaukee Trust Company, Milwaukee, Wis., is offering for subscription at 95 and interest, yielding 5.35 per cent, first and refunding mortgage 5 per cent gold bonds of the Bloomington, Decatur & Champaign Railroad, due Nov. 1, 1940. According to the bankers the bonds are "an absolute first mortgage at the rate of $16,000 per mile of main track, of which more than 81 miles is on private right-of-way, averaging 66 ft. in width." The replacement value of the physical property, without including franchises and good will, is said to be $1,248,000 in excess of the outstanding bonded debt. The net earnings are more than 1¾ times the interest charge on the outstanding bonds. The property is an integral part of the Illinois Traction System.

Indianapolis, Crawfordsville & Western Traction Company, Indianapolis, Ind.—The report of Harry J. Milligan, receiver for the Indianapolis, Crawfordsville & Western Traction Company for December, 1910, shows that the total earnings were $15,382.49 and the net earnings $2,211.80. The balance on hand Jan. 1, 1911, was $11,759.02.

International Transit Company, Sault Ste. Marie, Mich.—A. E. Ames & Company, Ltd., Toronto, Ont., have recently offered at a price to yield 5¾ per cent $280,000 of 5 per cent first mortgage serial 15-year gold bonds of the International Transit Company, dated July 1, 1910, due $20,000 annually on July 1 each year to and including 1925. The principal of these bonds is guaranteed by the Lake Superior Power Company.

Metropolitan West Side Elevated Railway, Chicago, Ill.—F. A. Delano, chairman of the board of directors of the Metropolitan West Side Elevated Railway, has denied that negotiations are pending between the Metropolitan West Side Elevated Railway and the Aurora, Elgin & Chicago Railroad which have for their purpose a closer affiliation of the companies than is implied in the present traffic agreement between them.

Northern Ohio Traction & Light Company, Akron, Ohio.—The annual meeting of the stockholders of the Northern Ohio Traction & Light Company was held in the offices of the company on Jan. 21, 1911. H. A. Everett, E. W. Moore, C. W. Wason, Barney Mahler, J. R. Nutt, F. S. Borton, Will Christy, Charles Currie, W. E. Hutton, L. E. Beilstein and C. J. McCuaig were elected to the board of directors. The board organized by the election of the following officers: Henry A. Everett, president; Will Christy, first vice-president; Charles Currie, second vice-president and general manager; C. F. Moore, secretary; J. R. Nutt, treasurer, and C. H. Lahn, auditor.

Quakertown (Pa.) Traction Company.—The time limit for the deposit of the 5 per cent bonds of the Quakertown Traction Company in acceptance of the Lehigh Valley Transit Company's exchange offer has been extended to Feb. 9, 1911. Thus far $240,000 of the bonds out of the total issue of $300,000 have been deposited.

Second Avenue Railroad, New York, N. Y.—Wilbur Larremore, as referee, filed a report with the Supreme Court on Jan. 24, 1911, recommending that the application of George W. Linch, receiver of the Second Avenue Railroad, to issue $500,000 receiver's certificates, should be granted. The money is to be applied to renovating the tracks, equipment, and rolling stock, $200,000 to be spent in replacing tracks within the next six months.

Shelburne Falls & Colerain Street Railway, Shelburne Falls, Mass.—The $50,000 of first mortgage 6 per cent bonds of the Shelburne Falls & Colerain Street Railway, dated 1896, have been called for payment at the Shelburne Falls National Bank, Shelburne Falls, Mass., on March 1, 1911. The company has made the Federal Trust Company, Boston, Mass., trustee of the $100,000 of 20-year sinking fund 5 per cent bonds issued to refund old bonds, fund floating debt, etc.

Twin City Rapid Transit Company, Minneapolis, Minn.—The directors of the Minneapolis & St. Paul Suburban Railway, a subsidiary of the Twin City Rapid Transit Company, have voted to increase the capital stock of the Minneapolis & St. Paul Suburban Railway from $1,000,000 to $3,000,000.

Washington Railway & Electric Company, Washington, D. C.—Clarence P. King has been elected a director of the Washington Railway & Electric Company, to succeed Ward Thornton, resigned.

Washington Water Power Company, Spokane, Wash.—The Washington Water Power Company has declared a quarterly dividend of 2 per cent on its $9,245,800 of stock, payable on April 1, 1911, to stock of record of March 15, 1911. This dividend compares with 1¾ per cent paid quarterly since 1905.

Dividends Declared

Duluth-Superior Traction Company, Duluth, Minn., quarterly, 1 per cent, preferred; quarterly, 1¼ per cent, preferred.

Fairmont & Clarksburg Traction Co., Fairmont, W. Va., 2½ per cent, preferred.

Kokomo, Marion & Western Traction Company, Kokomo, Ind., 1½ per cent, common.

Lincoln (Neb.) Traction Company, quarterly, 1½ per cent, preferred.

Ohio Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred.

Philadelphia Company, Pittsburgh, Pa., 2½ per cent, preferred.

Public Service Investment Company, Boston, Mass., quarterly, 1½ per cent, preferred; 1½ per cent, common.

Susquehanna Railway, Light & Power Company, Lancaster, Pa., 2½ per cent, preferred.

Tampa (Fla.) Electric Company, quarterly, 2 per cent.

Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio, quarterly, 1¼ per cent, preferred.

Twin City Rapid Transit Company, Minneapolis, Minn., quarterly, 1¾ per cent, preferred; quarterly, 1½ per cent, common.

West Penn Railways Pittsburgh, Pa. quarterly, 1¼ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

CAPE BRETON ELECTRIC COMPANY.

Period.			Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1m.,	Nov.	'10	$29,960	$14,279	$15,681	$6,066	$9,614
1 "	"	'09	26,535	13,776	12,759	6,175	6,584
12 "	"	'10	324,400	170,825	153,575	73,825	79,751
12 "	"	'09	282,689	167,995	114,693	73,992	40,702

CLEVELAND, PAINESVILLE & EASTERN RAILROAD.

1m.,	Dec.	'10	$27,234	*$14,647	$12,587	$7,947	$4,639
1 "	"	'09	23,600	*12,887	10,713	7,969	2,744
12 "	"	'10	355,469	*185,202	170,267	96,585	73,682
12 "	"	'09	321,173	*174,267	146,906	90,924	55,981

JACKSONVILLE ELECTRIC COMPANY.

1m.,	Nov.	'10	$48,904	$26,961	$21,943	$9,498	$12,445
1 "	"	'09	45,611	23,053	22,558	9,482	13,077
12 "	"	'10	569,696	305,936	263,760	112,312	151,449
12 "	"	'09	476,731	268,637	208,094	112,649	95,445

LAKE SHORE ELECTRIC RAILWAY SYSTEM.

1m.,	Dec.	'10	$95,571	*$52,640	$42,930	$34,703	$8,228
1 "	"	'09	89,062	*47,755	41,308	35,011	6,296
12 "	"	'10	1,206,112	*632,533	573,579	417,050	156,529
12 "	"	'09	1,109,084	*586,184	522,900	414,950	107,949

NORTHERN OHIO TRACTION & LIGHT COMPANY.

1m.,	Dec.	'10	$201,073	$115,016	$86,957	$44,175	$42,782
1 "	"	'09	182,912	101,555	81,358	43,210	38,148
12 "	"	'10	2,437,426	1,348,963	1,088,463	521,069	567,394
12 "	"	'09	2,177,642	1,190,057	987,585	524,066	463,519

PUGET SOUND ELECTRIC RAILWAY.

1m.,	Nov.	'10	$150,274	$106,037	$44,237	$49,699	†$5,462
1 "	"	'09	139,018	97,507	41,511	48,930	†7,419
12 "	"	'10	1,906,301	1,257,119	649,183	607,093	42,090
12 "	"	'09	1,856,678	1,234,895	621,783	504,323	57,400

SAVANNAH ELECTRIC COMPANY.

1m.,	Nov.	'10	$56,863	$39,346	$17,517	$17,435	$82
1 "	"	'09	51,088	33,516	17,572	17,555	17
12 "	"	'10	629,130	412,900	216,230	215,131	1,099
12 "	"	'09	607,527	393,404	214,123	209,171	4,952

SEATTLE ELECTRIC COMPANY.

1m.,	Nov.	'10	$469,334	$256,618	$212,716	$106,026	$106,690
1 "	"	'09	451,533	265,088	186,445	104,179	82,261
12 "	"	'10	5,576,239	3,241,023	2,335,216	1,303,586	1,031,630
12 "	"	'09	5,787,362	3,359,304	2,428,058	1,234,268	1,193,790

Traffic and Transportation

Merit System in Sheboygan

To stimulate and encourage employees in the prompt, faithful and intelligent performance of their duties the Sheboygan Railway & Electric Company, Sheboygan, Wis., adopted a merit and demerit system on Jan. 1, 1911, on which date the employees were divided into four classes, A, B, C and D, as follows: Class A—Those who have satisfactorily served the company for one year. Class B—Those who have satisfactorily served the company for two years. Class C—Those who have satisfactorily served the company for five years. Class D—Those who have satisfactorily served the company for ten years.

For each additional year of good and efficient service members of each class will receive stated sums of money as a gratuitous reward, which is in no way connected with wages. The cash bonus to each eligible member of each class will be as follows: Class A—The sum of $30. Class B—The sum of $45. Class C—The sum of $60. Class D—The sum of $75.

The names of trainmen will be classified on Jan. 1 of each year only and awards will be made on the same day for the year just ended, excepting that there will be no awards for 1910.

Each trainman's account will be opened with a credit of 100 merit marks. Demerits will be deducted and merits will be added and on the first day of each month the standing of each man will be shown. When a trainman's net score reaches the net amount of 50 his case will be considered by a board consisting of the general manager, the superintendent and the three other department managers, who will act as the case seems to warrant, the penalty ranging from reduction in the list to discharge. If the trainman persists in reducing his net score until it reaches zero his case will again be considered and the board will act as seems best. To be eligible for the bonus the trainsman must have a net score of 100 on Jan. 1. In other words, merits and demerits must balance so that a man shall end the year with the same score he had at the beginning of the year. No trainman who resigns or is discharged during the year will participate in any bonus or premiums on Jan. 1.

The merits and demerits as prescribed under the system adopted by the company follow:

MERITS

1. Securing names and addresses of witnesses who saw accident, other than those on accident report, 2 to 10.
2. Assistance rendered in case of accident such as to bring commendation from passengers, 2 to 10.
3. Politeness and attention to passengers calling special commendation from them(2 to 10.
4. Complete and perfect accident reports, 2.
5. Careful handling of car, 5.
6. Clear record for one month, 10.
7. Turning in transportation or badges ordered up by the company, 5.
8. Special meritorious act calling for recognition by the company, 10 to 50.
9. Neatness in personal appearance, 5 to 20.
10. Informing the company of matters which are for the best interests of the service, 5 to 20.

DEMERITS

11. Disloyalty to the company, immediate discharge.
12. False statements, immediate discharge.
13. Intoxication or drinking while on duty or about to go on duty, immediate discharge.
14. Gross, ungentlemanly conduct, immediate discharge.
15. Disobeying positive orders or running by signals set at danger, immediate discharge.
16. General incompetency, immediate discharge.
17. Running by train meets, immediate discharge.
18. Failure to report accidents, 10 to discharge.
19. Incomplete and poor accident reports, 1 to 5.
20. Talking to others than proper officers of the company about accidents, 20.
21. Running railroad crossings without proper flagging, where required, 20.
22. Fast running over crossings, switches, around curves and along streets requiring slow speed, 5 to 20.
23. Not ringing gong when passing car, 5.
24. Passing standing car on streets without coming under complete control, 5 to 20.
25. Starting car without proper signal, except to avoid accident, 5 to 10.
26. Not obeying conductor's signal, 5.
27. Failure of conductor to give proper signals, 2 to 10.
28. Following car in front too close, 2 to 10.
29. Leaving car without taking reverse lever or notifying conductor, 5 to 10.
30. Feeding current too fast, 5 to 10.
31. Careless and indifferent operating of car, 5 to 20.
32. Running ahead of schedule time, 5 to 10.
33. Allowing unauthorized persons to ride in front vestibule except as provided in bulletins, 5 to discharge.
34. Running away from passengers, 5 to 20.
35. Failure to report trouble with car or appliances, 5 to 10.
36. Giving bells too quickly before passengers are safely on or off, 5 to 30.
37. Inattention to passengers, 5 to 20.
38. Unnecessary conversation with passengers, 5.
39. Unnecessary conversation with motorman, 5 to 20.
40. Riding in front vestibule with motorman unless absolutely necessary in special cases, 5 to 20.
41. Dirty cars, 5.
42. Untidy condition of dress, 5.
43. Reading while on duty, except such as pertains directly to your duties, 10.
44. Sitting down while on duty, except as provided for in bulletins, 2 to 20.
45. Not looking to the rear when starting when conductor is ahead, 2 to 10.
46. Jerking car when starting or stopping, 2 to 10.
47. Laying over at the end of the line after leaving time, 2 to 20.
48. Missing fares—each fare, 5.
49. Failure to register fares—each fare, 10.
50. Bunching fares, 5.
51. Making change before registering fare, 5.
52. Carrying persons free, 20.
53. Starting car from front when aisle is clear, 10.
54. Backing any double-end car in the city without first turning trolley and reversing position of trainmen—except to avoid collision or accident, 2 to 10.
55. Failure to properly reset registers at proper time and place, 5.
56. Errors or omissions on report trip sheets or envelopes, 1 to 5.
57. Not having markers and other necessary signals lighted at sunset, 5.
58. Impolite remarks to passengers (on all reports received from passengers complaining of the actions or conduct of trainmen there will be a charge against the trainman under this head even though the charge is not sustained by investigation), 5 to discharge.
59. Failure to warn passengers to wait for car to stop when alighting, 5.
60. Failure to regulate the heating and ventilation of cars in accordance with the bulletins, 2 to 10.
61. Carrying passengers by their destination when previously notified of same, 1 to 10.
62. Failure to cancel all tickets at the time of receiving same, 1 to 10.
63. All acts or omissions detrimental to good service in the opinion of the superintendent, 5 to discharge.

Interborough Bulletin

The Interborough Rapid Transit Company, New York, N. Y., has begun the publication of the *Interborough Bulletin* to foster cordial relations between the company's employees and the public. The publication is 9 in. x 12 in. and the first issue contains 12 pages. The purpose of the *Interborough Bulletin* is set forth by Theodore P. Shonts, president of the company, in a statement in which he says in part:

"The *Interborough Bulletin* is published for circulation among the employees of the company. From time to time the necessity arises of calling their attention to matters affecting the interests of the corporation and their relation thereto, which cannot well be put in the form of specific

orders, but are nevertheless of great importance. In order to put the various departments in touch with each other and with the employees generally the *Bulletin* is printed for free circulation, so that all may avail themselves of the information it contains and may in turn make use of it to express their own ideas and opinions so far as they relate to the management and maintenance of the corporate business. It is desirable that the loyalty and efficiency of the army of men concerned in the work of the company be fostered, developed and recognized by making it evident that there is a true community of interest and that what is for the good of the company is for the good of each and every man in the service. The promotion of cordial relations with the public is a matter of great importance to the company and to all connected with it; such relations can be cultivated by efficient service and by courteous and considerate treatment of passengers. Suggestions from employees with respect to betterment of service and to convenience and comfort of passengers necessarily will be valuable in many instances and are invited."

Near Stops in Indianapolis.—The Indianapolis Traction & Terminal Company, Indianapolis, Ind., has informed the Indianapolis Board of Works that the recent ruling which requires city cars to stop at the near crossings in downtown districts passed before the holidays by the board prevents accidents and saves time by reducing the number of stops.

Destination Signs on the New York Elevated Lines.—The Interborough Rapid Transit Company, New York, N. Y., has adopted a system of denoting the destination of the elevated trains similar to that now in use in the subway. Cars of the Second, Third, Sixth and Ninth Avenue lines will be soon equipped with reversible steel boards marked with the destination.

Service in Memphis.—T. H. Tutwiler, president of the Memphis (Tenn.) Street Railway, conferred recently with a committee of citizens and Thomas Dies, Commissioner of Public Utilities, Grounds and Buildings, of Memphis. Mr. Tutwiler said that it was the policy of the company to strive to remedy all weak spots. The company had spent $5,000,000 in the last five years in improvements. Objection has developed to the safety gates on cars which are not opened until the cars have come to a stop.

Petition for Reduction in Fare on Harrisburg Suburban Line.—The State Railroad Commission of Pennsylvania has been petitioned by persons living along the Rockville line of the Central Pennsylvania Traction Company, Harrisburg, Pa., to take up with the company the matter of granting a 5-cent fare between Moclay Street, Harrisburg, and Rockville. The present fare is 10 cents. The petitioners allege that the rate is excessive compared with the rate charged by the company on other suburban lines.

Protest Against Increase in Fee for Checking Parcels.—The Public Service Commission of the Second District of New York has received a complaint against the Buffalo, Lockport & Rochester Railway in regard to the increase from 5 cents to 10 cents in the fee for checking parcels. The complaint alleges the change to be unwarranted and unreasonable and out of proportion to the trouble and expense to which the company is put and asks that the former rate of 5 cents be restored. The company has been asked to answer the complaint within 20 days.

Mail Rate Too Low to Be Attractive.—Citizens of Jeffersontown, Ky., which is located on the Louisville & Interurban Railroad, petitioned the railway mail service to have mail carried on the company's line instead of by the steam railroad, over which trains are operated at infrequent intervals. H. M. Swetnam, chief clerk of the service in Louisville, offered to pay the Louisville & Interurban Railroad 3 cents a mile, the rate paid the railroads, but the offer was declined, though the company intimated that it would be glad to handle the business at a higher rate.

Car-Ahead Question in Albany, N. Y.—The United Traction Company, Albany, N. Y., has replied to the complaint filed with the Public Service Commission of the Second District of New York by H. H. Horner, of the State Education Department, in which he cited an instance where passengers on one of the company's cars who refused to transfer to a car ahead were carried to the railroad station and back. In replying to the complaint, E. S. Fassett, general manager of the company, said that the practice of turning cars in times of delays obtains on almost all street railways. The commission has taken the case under advisement.

To Reduce Railway Fare.—The Public Service Commission, Second District of New York, has received a complaint from E. J. Jennings, president of the West Hempstead Gardens & Lake View Association, against the Jamaica division of the New York & Long Island Traction Company, as to the rate of fare from the junction of Fulton Street and Jericho Turnpike, in Queens County, to the intersection of Front Street and Main Street, in Hempstead. The franchise granted to the company provided for a 10-cent fare between the two points, and the company is now charging 15 cents. The commission is asked to require the company to charge not more than 10 cents between these points.

President Taft's Proposed Trip by Electric Railway.—On Feb. 11, 1911, President Taft will board private car 233, of the Illinois Traction System, at Decatur, and be conveyed to Springfield, where he will be the guest of honor at the Lincoln banquet. He will arrive at Decatur over the Wabash Railroad from Chicago, and make the trip from Decatur to Springfield as the guest of Congressman William B. McKinley, who is president of the Illinois Traction System. The presidential special will consist of office car 233, which will pull Mr. McKinley's private car Champaign. The train will be under the personal supervision of General Superintendent C. F. Handshy. It will be preceded by a pilot car, as is the custom on railroads. The presidential party will be followed by a special car carrying members of the press who will attend the visitor. Besides Mr. McKinley, Vice-President Executive H. E. Chubbuck and Vice-President-Treasurer G. M. Mattis, of the Illinois Traction System, State officials and prominent visitors will make up the party.

Handling Newspapers in Rochester.—The New York State Railways, Rochester lines, has filed with the Public Service Commission of the Second District of New York changes in the regulations governing the transportation of newspapers on passenger cars. Newspapers in bundles may be carried on the date of issue, or in the case of afternoon papers during the forenoon of the following day, in the front vestibule of all scheduled passenger cars at 25 cents per 100 lbs., subject to the following conditions: Publishers or agents must deliver papers to cars at any one of the following points: Corner Main and Water Streets, corner Main and State Streets, corner Main and St. Paul Streets, corner Main and Clinton Streets, and tender to motorman a shipping order of form to be approved by the general passenger agent; shipping order to show the number of bundles loaded on any one car, together with total weights. The company reserves the right at any time to restrict the number of bundles to be carried on any one car. Newspapers will not be received for transportation between the hours of 6:30 a. m. and 8 a. m. and between 5 and 6:30 p. m.

Good Work Done by the Little Rock Railway & Electric Company.—Recently, in speaking of the work done during the past year by his department, Superintendent of Public Works E. A. Kingsley, of Little Rock, Ark., stated: "In the West Eighth District, instead of paving between the tracks with brick, D. A. Hegarty, general manager of the Little Rock Railway & Electric Company, has adopted the concrete pavement. This is not only a magnificent piece of work but I believe will last better and give more satisfaction between the track than will any other character of pavement excepting creosoted blocks. I shall commend to the City Council Mr. Hegarty, general manager of the Little Rock Railway & Electric Company, not only for the aid and assistance that he has given this department and the city at large in prosecuting the improvements where his lines are affected, but also for the exceptionally good character of work which he is doing. There will be found nowhere in this country, even in cities much larger than ours, better street car construction than in Little Rock. It has been a source of congratulation that the Department of Public Works has secured heartier co-operation with the street car management of the city, both in construction and repair work, than any other city of my acquaintance."

Personal Mention.

Mr. Z. V. Taylor has been elected president and general manager of the Charlotte Electric Railway, Light & Power Company, Charlotte, N. C.

Mr. F. M. Johnston, auditor of the Fort Dodge, Des Moines & Southern Railroad, Boone, Ia., has been appointed purchasing agent of the company.

Mr. W. W. S. Butler has resigned as general manager and purchasing agent of the Newport News & Old Point Railway & Electric Company, Newport News, Va.

Mr. H. A. Fiske has been appointed electrical engineer of the Fort Dodge, Des Moines & Southern Railroad, Boone, Ia., in charge of all the electrical affairs of the company.

Mr. Louis J. Fohr has been appointed superintendent of the Vincennes (Ind.) Traction Company, to succeed Mr. George E. Henry, who has resigned, effective on Feb. 1, 1911.

Mr. F. H. Cooke, of the Central Savannah Lines, has been appointed general agent of the Illinois Traction System, with headquarters at St. Louis, Mo., reporting direct to the traffic manager.

Mr. R. G. Hutchins has been elected to the newly created office of vice-president of the Chicago (Ill.) Railways. Mr. Hutchins is connected with the Harris Trust & Savings Bank, Chicago, Ill.

Mr. Charles B. Metcalfe has been elected secretary and treasurer of the San Angelo (Tex.) Street Railway to succeed Mr. Charles W. Hobbs as secretary and Mr. C. A. Broome as treasurer.

Mr. E. E. Kester, formerly general agent of the Illinois Traction System at Peoria, Ill., and recently acting general agent of the company at St. Louis, Mo., has returned to Peoria as general agent of the company.

Mr. C. M. Bridge, formerly acting general agent of the Illinois Traction System, Peoria, Ill., has been appointed commercial agent of the Illinois Traction System, with headquarters at St. Louis, Mo., reporting to Mr. F. H. Cooke, general agent.

Mr. R. A. Harman has been elected vice-president of the Cleveland (Ohio) Railway to succeed Mr. J. J. Stanley, formerly vice-president and general manager of the company, who was elected president and general manager of the company some time ago.

Mr. W. H. De Witt has been appointed superintendent of transportation of the Fort Dodge, Des Moines & Southern Railroad, Boone, Ia., to succeed Mr. Frank Arnold, whose resignation from the company was announced in the Electric Railway Journal of Jan. 14, 1911.

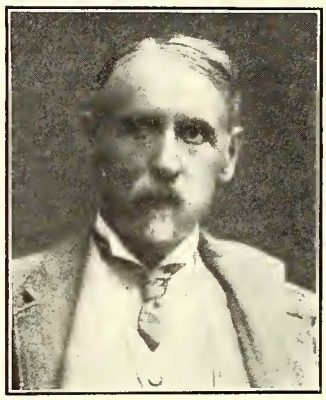
Mr. Eugene E. Soules, formerly with the Peoria *Star,* has been appointed publicity agent of the Michigan United Railways, with headquarters at Jackson, Mich. Mr. Soules' experience includes daily newspaper work and the promotion of several public amusement resorts.

Mr. E. E. Strong has been appointed chief inspector of the Syracuse (N. Y.) Rapid Transit Railway. Mr. Strong was graduated from Syracuse University with the degree of electrical engineer in June, 1908, and entered the employ of the Syracuse Rapid Transit Railway Company in its mechanical department, where he was employed in different capacities until his appointment as chief instructor in October, 1909.

Mr. Thomas Roycraft has been appointed general manager of the Grand Forks (N. D.) Street Railway. Mr. Roycraft has been identified with the gas and electric industries for 28 years. He was formerly located at Fargo, but more recently has been secretary and superintendent of the Grand Forks Gas & Electric Company, from which he retired recently, following the purchase of the property by H. M. Byllesby & Company, Chicago, Ill.

Mr. George F. Henry has resigned as superintendent of the Vincennes (Ind.) Traction Company, effective Feb. 1, 1911, and has formed a partnership with Henry M. Williams in a machine shop in Vincennes which makes a specialty of overhauling automobiles and manufacturing a trolley wheel patented by Mr. Henry. Mr. Henry has been connected with the Vincennes Traction Company and its predecessors for seven years as vice-president and general manager. After the property changed hands in 1909 he was retained as superintendent. He was formerly with the Hudnut Company, Terre Haute, Ind., and the American Hominy Company, Indianapolis, Ind., as superintendent and builder of mills for 18 years. He resigned from the American Hominy Company in 1904 to become connected with the Vincennes Citizens' Street Railway, afterward the Vincennes Traction Company.

Mr. Edwin W. Winter, president of the Brooklyn (N. Y.) Rapid Transit Company, resigned as a director of that company at the annual meeting of the stockholders on Jan. 27, 1911, and announced that he would resign as president of the company at the next meeting of the directors. Mr. Winter has been president of the company since January, 1903. He was born in Vermont on Nov. 18, 1845, and entered railway service in 1867 with the construction department of the Union Pacific Railway. From 1870 to 1873 he was a contractor's agent on the construction of various railroads, and from 1873 to 1876 was general claim agent of the Chicago & Northwestern Railway. He served as general superintendent of the West Wisconsin Railway from 1876 to 1879, and subsequently served for a year as general superintendent of the Chicago, St. Paul & Minneapolis Railway. During 1880 and 1881 he was general superintendent of the St. Paul, Minnesota & Omaha Railway and from 1881 to Nov. 16, 1885, he was assistant to the president of this company. From Nov. 16, 1885, to July, 1896, he was general manager of the St. Paul, Minnesota & Omaha Railway. From July, 1896, to Aug. 31, 1897, he was president of the Northern Pacific Railway, and from September, 1899, to February, 1902, he was president of the Chicago Transfer & Clearing Company at Chicago, Ill. Following Mr. Winter's election as president of the Brooklyn Rapid Transit Company the scheme of organization of the company was changed and its personnel strengthened materially, and with the exception of a few defections it is the same staff that began work under Mr. Winter which has carried to a successful consummation the very large and important rehabilitation work, to the description of which so much space has been given from time to time in the Street Railway Journal and the Electric Railway Journal. Mr. Winter made public a statement in regard to his retirement in which he said: "The outlook of the company at the close of 1902 was not over-encouraging. I made only one promise—to do my best—when I came in and I see no occasion for apology as I go out." Mr. Winter will hereafter devote himself entirely to his private interests. In commenting editorially on Mr. Winter's retirement the Brooklyn *Daily Eagle* said: "No man commanded more respect from Brooklyn, and no man showed more for Brooklyn than Mr. Winter has done. Nor eventually did any officer in Mr. Winter's place create more regard and few deserved so much as he. Only as an executive and administrator of a great transit enterprise has he been known or sought to be known, and his record in that field has been distinguished by integrity, wisdom, energy and unequaled success."



E. W. Winter

OBITUARY

J. W. Brock, president of the Chicago, Kankakee & Urbana Railroad, Paxton, Ill., which is building an electric railway between Kankakee, Urbana and Champaign, died on Jan. 17, 1911, at his home in Urbana.

Ernest Benson Prior, roadmaster of surface lines of the Brooklyn (N. Y.) Rapid Transit Company, died on Jan. 29, 1911, following an operation for appendicitis. Mr. Prior was born at Hillsdale, N. Y., 47 years ago, and had lived in Brooklyn for 15 years. He was the inventor of a number of railway devices, one of them a protected heel switch, described in the Street Railway Journal of July 28, 1906, and made by the Lorain Steel Company under the Prior patents.

Construction News

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

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

RECENT INCOPORATIONS

***City Railroad, Birmingham, Ala.**—Application for a charter has been filed in Alabama to build an electric railway in Birmingham. Capital stock, $3,000. Officers: Paul Mitchell, president; DeWitt B. Lightber, vice-president and treasurer, and A. F. Kummer, secretary.

***Fresno, Coalinga & Tidewater Company, Fresno, Cal.**—Incorporated in California to build an electric railway to connect Fresno, Coalinga, Tidewater and Monterey. Capital stock, $300,000. Directors: Charles J. Shaw, Hollister; A. G. Metz, Monterey; W. J. Kilby and Frank Cheney, Coalinga; J. W. Briscoe, Bakersfield; G. W. Cartwright, G. P. Cummings, Roy Hall, T. C. White and W. T. Burks, Montgomery; H. H. Alexander and C. S. Pierce, Fresno.

***Kentucky Securities Corporation, Lexington, Ky.**—Incorporated in Virginia with a capital stock of $5,000,000. Incorporators: Percy M. Chandler, Philadelphia; J. K. Trimble, Philadelphia, secretary; J. N. Trimble, Philadelphia, treasurer, and John A. McArthy, Philadelphia; Thomas B. Gay, Richmond; Caldwell Hardy, Norfolk; G. W. Cook, Lansdown, Pa., and Howard Loeb, Elkins Park, Pa., directors.

***Chehalis & Cowlitz Railroad, Chehalis, Ore.**—Incorporated in Oregon to build an electric or steam railway from Chehalis to a point on the Cowlitz River on Cowlitz Prairie, 20 miles southeast of Chehalis. Much of the right-of-way has been secured. Capital stock, $300,000. Incorporators: H. C. Coffman and George A. Robinson, Chehalis.

***Orangeburg Railway, Springfield, S. C.**—Chartered in South Carolina to build a 30-mile steam or electric railway from Orangeburg to Springfield. Capital stock, $50,000. Officers: W. C. Wolfe, Orangeburg, president; J. A. Berry, Orangeburg, secretary, and Lawrence Manning, Sumter, director.

FRANCHISES

Los Angeles, Cal.—The Los Angeles-Pacific Railway, Los Angeles, has been awarded a franchise by the Board of Supervisors for an electric railway in the San Fernando Valley near Burbank.

San Francisco, Cal.—The United Railways has asked the supervisors for a franchise to extend its Ninth Avenue line to meet the Corbett Road in San Francisco.

Stockton, Cal.—The San Joaquin Valley Electric Railway, Stockton, has asked the Board of Supervisors for a franchise to build its railway over McKinley Avenue, in Stockton.

Delta, Colo.—Chas. C. Montz and Watson Zeigler, representing the Fairview Interurban Railway, will ask the City Council for a franchise to build an electric railway in Delta. This proposed 25-mile electric railway will connect Delta and Fairview Coal Mine with a branch to Cedaredge, California Mesa and Montrose. [E. R. J., Nov. 12, '10.]

New Haven, Conn.—The Connecticut Company will ask the General Assembly for the right to build a new electric railway from New Hartford to New Boston, through the Farmington Valley, probably following the line of the old Lee & New Haven Railroad. The line will make a short route for through travel from New Haven to Pittsfield and Albany, cutting off the long, roundabout turn by way of Canaan.

Chicago, Ill.—The Chicago, Aurora & Elgin Railway has received a franchise from the Village Boards to build its tracks in Maywood and Melrose Park.

Galesburg, Ill.—The Galesburg Railway & Light Company has received a franchise from the City Council to build several extensions of its railway into various parts of the city.

Joplin, Mo.—The Southwest Missouri Electric Railway, Webb City, has asked for a franchise to extend its railway from the junction of Main Street and Twentieth Street south to the city limits.

***St. Louis, Mo.**—E. A. Hildenbrandt, T. G. Portis and C. F. Vogel, representing the St. Louis, Arcadia & Jefferson City Railroad, St. Louis, will ask the House of Delegates for a franchise to build an electric railway from Grand Avenue and Wyoming Avenue, to the western city limits at Bancroft Avenue, in St. Louis.

Brooklyn, N. Y.—The Brooklyn Rapid Transit Company has filed a certificate with the State Department asking for authority to extend its railway along Sixteenth Avenue, between Forty-ninth Street and Sixty-fourth Street.

Youngstown, Ohio.—The Lake Erie & Youngstown Railway has received an extension of its franchise from the City Council to build its railway in Youngstown. The franchise permits the company to operate cars over part of the right-of-way of the Mahoning Valley line in Youngstown. This projected railway will connect Conneaut and Youngstown. John H. Ruhlman, Youngstown, promoter. [E. R. J., Aug. 28, '10.]

***Tulsa, Okla.**—Charles Page, Tulsa, has asked the City Council for a franchise to build an electric railway from Tulsa to his proposed amusement park.

Toronto, Ont.—The Toronto Interurban Railway will ask the Ontario Legislature for a franchise to build an electric railway from Toronto to Barrie.

Portland, Ore.—The Portland Subway Company, Salem, will ask the City Council for a franchise giving it the right to enter into a general street railway business and to construct a tube under the Willamette River and through a loop aggregating a mile in length under West Side streets. This is part of a plan to build 150 miles of track on the east and west sides of Portland. A. K. Bentley. [E. R. J., Dec. 31, '10.]

Knoxville, Tenn.—The Knoxville Railway & Light Company, Knoxville, has received a franchise for double-tracking its Oakline line in Oakland to the city limits.

Wheeling, W. Va.—The Wheeling Traction Company will ask the City Council for a franchise to lay a third rail to its tracks from Jonathan's ravine to the northern limits of the city. The company plans to run its cars all the way to Glennova.

TRACK AND ROADWAY

Montgomery (Ala.) Traction Company.—During 1911 this company expects to build 3 miles of new track in Montgomery.

Fort Smith Light & Traction Company, Fort Smith, Ark.—This company is said to be considering plans for building a 4-mile extension of its line from Van Buren to Fort Smith.

Los Angeles Pacific Railway, Los Angeles, Cal.—This company will build 2 miles of track in Los Angeles and a 25-mile extension of its line from Hollywood to Van Nuys via Lankershim during 1911.

Craggs & Canon Railway, Denver, Col.—This company will build 11 miles of track between Craggs, Eldorado Springs and Boulder during 1911.

Denver, Greeley & Northwestern Railway, Greeley, Col.—This company has secured rights-of-way, financial backing and important terminals for its railway between Denver and Greeley. It will circle northern Colorado with stations at Boulder, Fort Collins, Pierce, Nunn, Ault, Eaton, Greeley and Denver. J. D. Houseman, general manager.

Sanford (Fla.) Traction Company.—It is reported that this company is considering plans for building a 15-mile extension of its railway. A. P. Connelly, general manager.

Sandpoint & Interurban Railway, Sandpoint, Idaho.—Subject to certain conditions about 3 miles of railway will be built by this company between Sandpoint and Dover during 1911.

Dixon, Rock Falls & Southwestern Electric Railway, Tampico, Ill.—This company will place contracts during the next two months for building a 10-mile extension of its railway. J. J. Burns, Isabella Building, Chicago, purchasing agent.

Taylorville Railway, Light, Heat & Power Company, Taylorville, Ill.—About 3 miles of new track will be built in Taylorville by this company in the spring.

Chicago, South Bend & Northern Indiana Railway, South Bend, Ind.—This company has completed and placed in

operation the stretch of track between Chesterton and Laporte.

Kentucky & Tennessee Traction Company, Hopkinsville, Ky.—This company has secured rights of way and a bond issue will be authorized shortly for the purpose of securing funds with which to construct this proposed 25-mile electric railway to connect Hopkinsville, Salubria, Sulphur, Mineral Springs, Pembroke, Trenton and Guthrie. It is the intention to extend this line to Nashville, Tenn. Charles Van den Burgh, Hopkinsville, general manager. [E. R. J., Oct. 15, '10.]

Somerset Water, Light & Traction Company, Somerset, Ky.—It is announced that this company will spend about $50,000 for improvements which include an extension to the railroad shops. J. H. Gibson, Somerset, president.

Rockland, Southern Thomaston & St. George Railway, Portland, Maine.—This company will construct about 2 miles of new track between Matin's and Southern Thomaston during 1911.

Union Street Railway, New Bedford, Mass.—At a recent meeting of the directors of this company an expenditure to the amount of $400,000 for improvements, was authorized. Among the improvements will be the building of several extensions. Henry H. Crapo, president.

***Mankato, Minn.**—Henry E. Hance, Mankato, is reported to be projecting an electric railway from Mankato to St. Peter.

Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn.—About 70 miles of railway will be constructed by this company during the year between Sarebault, Owatonna, Dodge Center, Cassen and Rochester. M. W. Savage, Minneapolis, president.

Whitefish & Polson Electric Railway, Kalispell, Mont.—This company has secured 55 miles of right-of-way from Whitefish to Kalispell, and has surveyed 30 miles of the route. The company has a capital stock of $200,000, of which over half is said to have been subscribed. It is said that as soon as the remainder of the stock is subscribed contracts for construction and for materials will be placed. Officers: J. A. Edge, president; O. P. J. Mosby, vice-president; J. H. Stevens, secretary; A. W. Swaney, treasurer, and G. H. Adams and J. E. White, directors. [E. R. J., March 12, '10.]

St. John (N. B.) Railway.—This company will construct about 2 miles of railway in St. John during 1911.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—This company will build about a mile of new track with 60-lb. T-rails during the next few weeks.

New York City Interurban Railway, New York, N. Y.—About 10 miles of new track will be built by this company during 1911 in New York.

Northern Ohio Traction & Light Company, Akron, Ohio.—This company has formed plans which will shorten the time from Canton to Cleveland about 2 hours. The company has secured right-of-way for the purpose of double-tracking its line between Cuyahoga Falls and Newburg. It is said that the work will begin in the spring and about $600,000 will be spent in improvements.

Oklahoma Union Traction Company, Tulsa, Okla.—This company expects to complete its 15-mile railway from Tulsa to Sapulpa via Redbank and Tamaha during 1911. Contracts have been let and construction has begun.

Guelph (Ont.) Radial Railway.—This company will place contracts during the next two months for building one mile of single track with 60-lb. T-rails in Guelph. J. J. Hackney, purchasing agent.

Sarnia (Ont.) Street Railway.—The Board of Trade at Sarnia, Ont., has requested this company to extend its line a mile further along the shore of Lake Huron, in connection with the proposed extension of the summer resort at that point. The company has practically agreed to build the line on condition that the Board of Trade procure the necessary right-of-way from the property owners along the route.

Easton (Pa.) Transit Company.—This company will soon purchase 55 tons of 90-lb. A. S. C. E. T-rails to rebuild and double-track the East Northampton Street line in Easton. H. R. Fehr, Easton, purchasing agent.

Southern Cambria Railway, Johnstown, Pa.—This company states that it is now making plans for building an extension of its line from South Fork to connect with the lines of the Northern Cambria Street Railway at Carrolltown. Negotiations for the financing of the extension to Ebensburg will soon be closed. It is expected that this railway will soon be double-tracked and operated by the third-rail system.

Johnson City Traction Company, Johnson City, Tenn.—This company is securing right-of-way for building an extension of its railway to the State Normal School site in Johnson City.

Memphis (Tenn.) Street Railway.—About 4 miles of new track will be built by this company in Memphis during 1911.

Texas Traction Company, Dallas, Tex.—During 1911 this company will build about a mile of new track in Sherman and about 3 miles of track in McKinney. R. B. Sticher, general manager.

Northern Texas Traction Company, Fort Worth, Tex.—A loop line extension to the baseball park will be built by this company in Fort Worth.

***Greenville (Tex.) Development Company.**—It is reported that this company will soon build a 3-mile electric railway from Greenville to Mineral Heights.

***Mexia, Tex.**—J. Sanford Smith and associates are considering plans for building an electric railway between Mexia and Waco.

Lynchburg Traction & Light Company, Lynchburg, Va.—This company expects to place a contract during the next two months for building about one mile of new track in Lynchburg. D. C. Frost, superintendent.

Olympia Light & Power Company, Olympia, Wash.—It is stated that this company will build about 2 miles of new track in Olympia during 1911.

***Martinsburg, W. Va.**—F. S. Felker, Martinsburg, Richard Hammersley and associates are considering plans for building an electric railway from Martinsburg to Glengary via North Mountain.

Chicago & Wisconsin Valley Railroad, Madison, Wis.—This company will begin work April 1 on the construction of its railway to Portage. Surveys from Madison to Stevens Point will begin soon. This projected interurban railway will connect Janesville and Merrill via Friendship, Easton, Portage, Lodi, Middleton, Wausau, Stevens Point and Madison. Allen T. Russell, Chicago, general manager. [E. R. J., Oct. 29, '10.]

Sparta-Melrose Electric Railway & Power Company, Sparta, Wis.—This company will complete its 30-mile railway from Sparta to Melrose during this year. The work is being done by the Western Transportation Company. A. B. Karns, 401 American National Bank Building, St. Paul, secretary. [E. R. J., April 2, '10.]

SHOPS AND BUILDINGS

British Columbia Electric Railway, Vancouver, B. C.—This company is preparing plans for building extensive freight terminals on the north shore of False Creek. A permit will shortly be requested for the first of the buildings, being a freight house 80 ft. x 120 ft.

Los Angeles (Cal.) Railway.—This company is said to be considering plans for erecting an office building and transfer station in Los Angeles on the block bounded by Eleventh Street, Hill Street, Main Street and Twelfth Street.

Stockton (Cal.) Electric Railroad.—This company has purchased 12 acres of land north of the car houses and adjacent to Oak Park, in Stockton. It is stated that the land will be used for extending the car houses, material yards and shops of the company.

Connecticut Company, New Haven, Conn.—This company is considering plans for building another story to its new car houses on State Street and James Street, in New Haven. The plans call for a 1-story structure with the walls of sufficient thickness to allow for the adding of a second story in the future if desired.

Boston (Mass.) Elevated Railroad.—The site for the new terminal of this company in East Cambridge will be in Lechmere Square, between Bridge Street and Cambridge Street. It is expected to begin work in the near future. Edward Mahler, purchasing agent.

Union Street Railway, New Bedford, Mass.—This company is considering plans for building a west wing to its car house on Pope's Island, New Bedford. This wing will be a duplicate of the present east wing of the car house, and will accommodate about 50 cars. E. S. Wilde, New Bedford, purchasing agent.

Ogdensburg (N. Y.) Street Railway.—The car house and seven open summer cars and the entire repair equipment of this company at Ogdensburg were destroyed by fire on Jan. 24. It is said that the loss is about $17,000. It is reported that the loss is covered by insurance, and that the company will rebuild at once, probably in a more central location.

Cincinnati Union Depot Terminal Company, Cincinnati, Ohio.—This company has completed new plans for building a combined steam and interurban union station at Cincinnati. The buildings and grounds will both be larger than contemplated in the original plans, and several other changes have been made. J. E. Bleekman, vice-president. [E. R. J., May 28, '10.]

Columbus Interurban Terminal Company, Columbus, Ohio.—This company is taking new bids for building a new terminal station at Columbus. The structure will have two stories and basement, and will be 60 x 150 ft., of brick construction. D. H. Burnham & Company, 9 Jackson Boulevard, Chicago, are receiving the bids.

Nashville (Tenn.) Interurban Railway.—This company has completed and opened to the public its new station at Seventh Avenue and Broadway, in Nashville. The offices of the company will be moved into this building.

Cleburne (Tex.) Street Railway.—This company has nearly completed its new brick car house in Cleburne. [E. R. J., Sept. 10, '10.]

Janesville Traction Company, Madison, Wis.—This company has nearly completed its new car house in Janesville. The structure will accommodate about 15 cars. The cost is estimated to be about $10,000.

POWER HOUSES AND SUBSTATIONS

Sacramento & Sierra Railroad, Sacramento, Cal.—This company is considering plans for building a new power plant at Chili Bar on the south fork of the American River. B. F. Hulings, Sacramento, local representative. [E. R. J., April 23, '10.]

Dixon, Rock Falls & Southwestern Electric Railway, Tampico, Ill.—This company will place contracts during the next two months for equipment for one power station. J. J. Burns, Isabella Building, Chicago, Ill., purchasing agent.

Fort Dodge, Des Moines & Southern Railroad, Fort Dodge, Ia.—The substation of this company at Boone was recently destroyed by fire. Frank Arnold, Boone, superintendent.

Waterville & Fairfield Railway & Light Company, Waterville, Maine.—During the next 10 weeks this company will purchase a two-phase, 60-cycle, 2300-volt, 400-kw or 500-kw turbo-generator. Ralph J. Patterson, Waterville, purchasing agent.

Tide Water Power Company, Wilmington, N. C.—This company will soon purchase one boiler, one 500-kw rotary and two 200-kw transformers. A. B. Skelding, Wilmington, purchasing agent.

Rutland Railway, Light & Power Company, Rutland, Vt.—Preparations are being made by this company to begin the construction of a new substation near the Eureka quarry at North Poultney. The structure will be 20 ft. x 20 ft., of concrete and fireproof construction. It will contain 75-kw transformers stepping the current from 13,200 volts to 2300 volts. G. Tracy Rogers, president.

Lynchburg Traction & Light Company, Lynchburg, Va.—This company has purchased and will install in March one 1000-kw Curtis turbine generator at its power plant in Lynchburg.

Manufactures & Supplies

ROLLING STOCK

Columbus (Ga.) Railroad expects to purchase six single-truck cars.

Kankakee (Ill.) Electric Railway will purchase two passenger cars.

Goldsboro (N. C.) Traction Company will purchase two passenger cars.

Wilkes-Barre (Pa.) Railway will purchase 20 additional passenger cars.

Hull (Que.) Electric Company proposes to remodel 20 of its passenger cars.

Peterborough (Ont.) Radial Railway will order two or three single-truck cars.

Enid (Okla.) Interurban Traction Company will purchase three storage battery cars.

Tri-City Railway & Light Company, Davenport, Ia., will order ten interurban cars.

Peoria (Ill.) Railway has purchased two McGuire-Cummings standard snow sweepers.

Guelph (Ont.) Radial Railway expects to purchase a number of pay-as-you-enter cars and trucks.

Wichita Railroad & Light Company, Wichita, Kan., expects to purchase a number of motor cars.

Salt Lake & Ogden Railway, Salt Lake, Utah, will purchase ten trail cars and ten hot-water heaters.

Sandwich, Windsor & Amherstburg Railway, Windsor, Ont., will purchase four closed passenger cars.

Morgantown & Southern Railway, Morgantown, W. Va., will order two passenger cars, one open and one closed.

Pittsburgh, McKeesport & Westmoreland Railway, McKeesport, Pa., will order two new open cars and equipment.

Dayton & Troy Electric Railway, Dayton, Ohio, will purchase two 60-ft. three-compartment passenger car bodies.

Homestead & Mifflin Street Railway, Homestead, Pa., will purchase one car, complete, with all necessary equipment.

Scranton (Pa.) Railway has ordered ten 43-ft. cars, of the pay-within type, from the Cincinnati Car Company, Cincinnati, Ohio.

Rockland, South Thomaston & St. George Railway, Rockland, Me., will order one work car, with trucks and motors, one snow plow and two trucks.

Texas Traction Company, Dallas, Tex., expects to purchase four single-truck cars, with 18-ft. car bodies and two 30-hp motor equipment for each car.

Wilmington & Philadelphia Traction Company, Wilmington, Del., has ordered through J. G. White & Company, Inc., New York, N. Y., 22 cars, 38 ft. long, from The J. G. Brill Company.

Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids, Ia., it is reported, will purchase six fully equipped interurban cars and one 50-ton locomotive.

Long Island Railroad, New York, N. Y., will purchase 30 steel passenger cars, 10 steel parlor cars, 5 steel combination cars and 5 steel combination mail and passenger cars.

Winona Interurban Railway, Winona Lake, Ind., reports that it has for sale three 13-bench open cars, mounted on Taylor trucks and built by the Jewett Car Company. The cars have never been used.

TRADE NOTES

McKeen Motor Car Company, Omaha, Neb., has received an order from the Ann Arbor Railroad for five 70-ft. gasoline motor cars.

Pressed Steel Car Company, Pittsburgh, Pa., has elected O. C. Gayley a director of the company to succeed F. G. Ely, deceased.

Hicks Locomotive & Car Works, Chicago Heights, Ill., valued at $750,000, will be sold by William McInnes, receiver, at Chicago, Ill., on Feb. 21, 1911.

Ackley Brake Company, New York, N. Y., has shipped large orders of Ackley adjustable brakes to Johannesburg and Durban, Natal, and Cape Town, South Africa.

General Railway Signal Company, Rochester, N. Y., will move its New York offices on Feb. 4, 1911, from the Night & Day Bank Building to suite 2806 Liberty Tower, 55 Liberty Street.

American Ship Windlass Company, Providence, R. I., has furnished the Cleveland Railway three Taylor furnaces with overfeed extension grates which have been installed under three 512-hp B. & W. boilers at the Cedar Avenue power plant. This equipment was placed in operation Dec. 12, 1910.

Harold Kirschberg has been appointed engineer for the Heany Lamp Company, the Novelty Incandescent Lamp Company and the Tipless Lamp Company, with headquarters at 1733 Broadway, New York. Mr. Kirschberg, up to this time, has been illuminating engineer of the Pennsylvania Railroad.

Burton W. Mudge & Company, Chicago, Ill., have elected Thomas H. Garland vice-president. In this capacity Mr. Garland will devote his time to the manufacture of various devices which he has designed and patented. Mr. Garland recently resigned as general agent of the refrigerator service of the Chicago, Burlington & Quincy Railroad.

Chicago Pneumatic Tool Company, Chicago, Ill., has appointed W. P. Pressinger manager of the compressor department, with headquarters in New York. Mr. Pressinger resigned as vice-president of the Keller Manufacturing Company, Philadelphia, a short time ago, and at that time sold his interest in the company.

Scullin-Gallagher Iron & Steel Company, St. Louis, Mo., has appointed S. R. Fuller, Jr., district manager in charge of the Chicago office. Mr. Fuller was formerly sales agent in the New York office. George L. L. Davis, assistant to the vice-president, has been elected third vice-president of the company. Mr. Davis will remain in charge of the St. Louis sales office.

Lord Manufacturing Company, New York, N. Y., reports that during the year 1910 it sold enough Earll catchers to equip all city cars purchased in the United States and Canada, and more than enough Earll retrievers to equip all interurban or suburban cars purchased. It still has a large number of unfilled contracts and future orders on hand. Aside from the large output in the United States the company has also made shipments of these same devices to nearly every foreign country.

National Carbon Company, Cleveland, Ohio, has just completed its fifth annual salesmen's convention, which was held at the general offices. During the convention a great deal of time was given to the demonstration of various products used in connection with different types of apparatus. A good part of the time was spent in the brush-testing laboratory, where the Laclede railway motor brush was demonstrated in practically every type of service that it is possible to reproduce. The brush-testing laboratory is thoroughly equipped with apparatus to reproduce every known phase of brush service. About 150 people attended the convention. The annual banquet was held at the Colonial Hotel, with Dr. Steinmetz, of the General Electric Company of Schenectady, as speaker of the evening.

Allis-Chalmers Company, Milwaukee, Wis., has announced the appointment of E. T. Pardee, formerly manager of its Boston office, as manager of its power and electrical department. Mr. Pardee began his business experience with the Western Union Telegraph Company at Syracuse, N. Y., with which company he was connected from 1885 to 1891. Subsequently he represented the Fort Wayne Electric Corporation at Omaha and San Francisco from 1891 to 1898, being advanced in the latter year to manager of the Boston office, which position he held until 1901. In that year he entered the Boston office of the Bullock Electric Manufacturing Company as a salesman, and remained with Allis-Chalmers Company in a similar capacity after it acquired the Bullock Company. Mr. Pardee was made manager of the Boston office of Allis-Chalmers Company in 1905. He will be succeeded as manager of the Boston office of Allis-Chalmers Company by T. J. Lynch, who for the past seven years has been manager of the Toronto office of Allis-Chalmers-Bullock Company, Limited.

ADVERTISING LITERATURE

United States Electric Company, New York, N. Y., has issued bulletin No. 101 on Gill selectors for telegraph service.

National Tube Company, Pittsburgh, Pa., has issued a small booklet, describing Shelby seamless cold-drawn steel trolley poles.

Allis-Chalmers Company, Milwaukee, Wis., has issued bulletin No. 1510, on direct-connected Reynolds-Corliss engines and generators.

Western Electric Company, New York, N. Y., has issued bulletin No. 1117, illustrating and describing central-battery telephone sets and accessories.

Parmenter Fender & Wheel Guard Company, Boston, Mass., has issued a catalog illustrating and describing the Parmenter fenders and wheel guards.

Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., has issued a stuffer circular, No. 257, describing the new six-station inter-connu-phone.

Universal Safety Tread Company, Boston, Mass., has publishing a catalog on the Universal safety tread for use on stairways, thresholds, subway platforms, sidewalks, bridges and car steps.

Robert W. Hunt & Company, Chicago, Ill., has republished in pamphlet form the report of the joint committee of the American Society for Testing Materials on "Concrete and Reinforced Concrete."

Steel City Electric Company, Pittsburgh, Pa., has issued bulletin C, on "Universal Insulation Supports." In this connection the company has also printed blotters illustrating and describing the supports.

Heath & Milligan Manufacturing Company, Chicago, Ill., has published "Co-operation and Expansion" for January, 1911, in which is stated that the contest which was carried on during 1910 will be repeated in 1911, owing to its great success.

Fairbanks, Morse & Company, Chicago, Ill., have published a very interesting booklet entitled "Catechism on Direct-Current Apparatus," giving definitions of electrical terms and describing the construction and uses of different electrical machines.

Jordan Brothers, New York, N. Y., have issued a circular letter calling attention to the electrical equipment manufactured by them. Accompanying this is a large map of greater New York, containing general information about the city and a number of views, which show some of the methods of attaching the "Jordan" commutator truing device.

General Incandescent Lamp Company, Cleveland, Ohio, has just issued a folder describing railway "Tantalum" lamps. The folder is illustrated with two engravings, one showing a car lighted with 25 16-cp carbon lamps, consuming 1600 watts, the other showing the same car, lighted with 25 16-cp "Tantalum" lamps, consuming 925 watts.

United States Electric Company, New York, N. Y., has issued bulletin No. 501, on "Gill Selectors" for telephone train dispatching. The bulletin contains a number of illustrations and describes the development of the selective calling system particularly in its application to railway telephony and explains the functions and service of the selector and the answer back. The company also states that, although the first installation of the system was put in service less than four years ago, there are now more than 35,000 miles of line being used by the railways of the United States.

J. G. Brill Company, Philadelphia, Pa., has issued the "Brill Magazine" for January, which contains a biographical sketch of Arthur W. Brady, president of the Indiana Union Traction Company and the American Electric Railway Association. The sketch is accompanied with an excellent portrait of Mr. Brady, as a supplement. Among the feature articles are the following: "Conditions Which Govern the Type of Car for City Service, Buenos Aires, Argentina," "Interesting Interurban Cars for the Chicago & Joliet Railway," "Open and Closed Cars for Athens, Georgia," "Baggage Car for the Washington Railway & Electric Company," "Semi-Convertible Cars for the Clinton Street Railway," "Pay-As-You-Enter Cars for Columbus, Ohio," and "A History of The J. G. Brill Company."