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SQUARE DEAL FOR PUBLIC SERVICE MEN Elsewhere in this issue is printed a digest of an address delivered in New York recently by Thomas N. McCarter, president of the Public Service Corporation of New Jersey. As usual Mr. McCarter's remarks were vigorous, frank and non-apologetic. He did not condone the past or present faults of public utility officials and promoters, but he did claim that these men are as good a class of citizens as any other and that there was no reason why a public service official should be considered a criminal simply because of the position which he occupies. Mr. McCarter welcomed the opportunity to state the company side of the case, a side for which, he said, it is extremely difficult to get a fair hearing. There is no doubt that the attitude of scepticism, displayed by a part of the public toward the utterances of railway managers and criticised by Mr. McCarter, is extremely unfortunate from the educational standpoint because it cuts off the supply of information from the only source from which first-hand data can be secured. If all utterances by utility officials are received with incredulity while the editorial pages of those newspapers which reflect what their readers think rather than the facts are regarded as gospel, the present unfortunate condition must continue. It can be removed only by a tedious process of truth dissemination and by object lesson after object lesson. Theoretically the public should be willing to give the corporation a square deal, but the public is an enormous mass of individuals largely incoherent unless compacted by some momentous and threatening issue. The officials personify the utility in the public mind. They must possess personality and ability to command confidence. Only through them and their work will the unfortunate conditions outlined by Mr. McCarter be corrected.

CLASSIFICATION OF SIGNAL FAILURES The authors of the two communications published elsewhere in this issue on the subject of definitions for a signal failure are obviously in accord as to the desirability of using the general term in the broadest possible manner, but in addition both advocate classification into two or more sub-divisions. The point is timely. Signal failures are produced by such a multiplicity of causes that separate consideration of the different classes may be quite permissible. On the other hand, the comparative records of signal performance are certain to lose in effectiveness if an extended classification is introduced, for the reason that

different opinions as to the relative importance of the various sub-divisions will becloud the main issue, which is, after all, nothing more than the definite determination of signal efficiency. Of course, if signal efficiency could be completely expressed by a single number, the ideal condition would be attained because comparisons could then be made directly without the necessity for confusing the mind with a lot of qualifying conditions which might or might not be of real importance in the final result. However, as indicated by our correspondents, it is obvious that classification of signal failures will serve as a compromise between the opinions of those who wish to limit the definition of a signal failure to actual derangements of the mechanism and of those who wish to use the term in its broadest sense, and, if the classification involves the use of only one of two new terms such as the "creditable failure" suggested by Mr. Leisenring little objection can be taken on the grounds of its introducing confusion.

UNEQUAL GROWTH OF TRAFFIC Among the interesting points of Alexander Jackson's valuable paper on the rarely-treated subject of "The Development of Time-tables," which is published elsewhere in this issue, is a reference to the unequal growth of rush-hour and midday traffic on suburban lines. Mr. Jackson quotes a specific case where the business during the morning and evening rush hours has doubled and tripled, respectively in each case, within ten years, whereas the midday travel has remained almost stationary. In other words, the peaks have grown higher relatively as well as actually from year to year. The condition so accurately stated by Mr. Jackson is by no means unusual on other large city systems, although attention is seldom called to it. In the earlier stages of the growth of a suburb the lack of good stores and schools and the fondness for old associations are responsible for much of the intra-rush hour travel. As the section grows, a local business, educational and social center is created, with the result that the midday traffic tends to remain stationary in spite of the increase in population. The rush-hour traffic, on the contrary, grows constantly with the population because the essential character of this business, namely, transportation between home and place of business, undergoes comparatively little change. To be sure, the continued growth of the suburb also creates some purely local travel, but this is seldom important enough to affect the through-line service. It is self-evident that a condition of this

kind adds greatly to the difficulty of giving the rush-hour personnel a full day's work. In the instance quoted by Mr. Jackson two-car operation has been adopted because, aside from other advantages, this train service requires only 50 per cent more men with every 100 per cent increase in cars.

APPOINTMENT OF MR. DANIELS

The long delay in the Senate over the confirmation of the appointment of Winthrop More Daniels of New Jersey as a member of the Interstate Commerce Commission was an object lesson to the country of the lack of fair-mindedness which characterizes some of those who occupy prominent positions in the national government. The opposition to Mr. Daniels was enlightening. It was based on the fact that the New Jersey Board of Public Utility Commissioners, of which Mr. Daniels was a member, rendered a decision in the Public Service Gas Company case in which it made an allowance for non-physical values. The fact that the values are real and that the cost of them was just as tangible as the cost of any item of physical property entering into the investment were superfluous details to the objecting Senators. They pressed the charge that the New Jersey decision unduly favored the company because it made an allowance for values that were not physical. If the decision had declined to allow any values that were not physical would the Senate have held that Mr. Daniels could not make a fair Interstate Commerce Commissioner because he unduly favored the consuming public? It is agreeable to note that the position taken by President Wilson during the controversy was that he sought a fair-minded man for the office; with that quality of mind he would trust the decisions that would follow. The decision in the New Jersey case allowed 17.6 per cent for overhead charges and 30 per cent for going value. It would be evidence of rank prejudice of mind for a seeker after a commission appointment to declare that there are no values except physical values. It is fortunate that this low standard of public policy and morals did not apply in the selection of the new member of the Interstate Commerce Commission.

THE PHILADELPHIA ELECTRIFICATION

The suburban electrification project of the Pennsylvania Railroad between Philadelphia and Paoli, of which a preliminary account is published elsewhere in this issue, presents a great many unusual features. Prominent among these is the fact that only suburban traffic is to be handled electrically, the through trains being operated by steam as heretofore, and although this might seem to involve a failure to make use of the advantages of electric traction for a considerable part of the traffic regardless of the large investment for the overhead construction, the peculiar local conditions make the procedure a most logical one.

The reasons will be found in the basic idea upon which the project has been undertaken. This is that electric operation of the numerous suburban trains on the main line will relieve congestion at the Broad Street terminal

in Philadelphia to a marked extent owing to the rapidity of handling and elimination of switching movements with the multiple-unit equipment, and the extension of the terminal, which otherwise would be required, can be postponed for several years. Indeed, standing purely by itself, the Paoli electrification is not considered as an exceptionally good example for demonstrating the economies of electric operation. The installation, however, will effect a sufficient reduction in operating expense to pay at least the interest charges on the whole investment and, for this reason, it becomes an infinitely better means for providing relief from the existing terminal congestion in Philadelphia than would the extension of the present tracks and terminal building and the retention of steam—a course which would probably involve quite as large an outlay without any hope of direct return. As time goes on, and the growth of traffic begins again to tax terminal facilities the electrification of the other suburban lines radiating from Philadelphia appears to be inevitable. Each one of these, when served by multiple-unit trains, will do its share in reducing congestion, and as the percentage of electrified routes in the district increases, the possible economies will obviously grow greater.

The provisions that have been made for the necessary car equipment furnish material for thought on the part of all steam railroad officials. The cars which are to be used in the electric zone are steel coaches now in regular steam passenger service. They were adopted as standard on the Pennsylvania railroad several years ago and were designed with the expectation of eventual use as multiple-unit equipments. In consequence, the decision to electrify the line to Paoli has involved expense only for the overhead construction and equipment and for the actual electrical apparatus on the cars. Electrification has required nothing to be scrapped. The lesson is obvious, and in view of the inevitability of electrification it may well be considered by every steam-railroad official.

The type of overhead construction to be used is novel, but it is by no means as novel as the thorough methods adopted by the consulting engineers in their investigations prior to the selections of the final design. This has included the erection of an experimental mile of four-track overhead construction in which has been installed every possibly satisfactory arrangement of catenary, hanger, insulator and contact wire. For months these various arrangements have been subjected to severe mechanical tests, and the undesirable constructions have been discovered without necessity for recourse to the costly experience of actual service.

Judged by the standard set by existing installations all of the constructions shown in the illustrations accompanying the description of the new line are exceedingly light. It may be that some will find fault with them for that reason, but, as a matter of fact, when one realizes the excellent service given by the overhead constructions characteristic of the interurban lines of the Middle West, it is difficult to avoid the conclusion that extreme substantiability for a trolley system is not necessary. Certainly any tendency toward

lighter construction is most welcome for the reduction which it effects in the cost of installation.

UNIFORMITY IN FINANCIAL STATEMENTS

To the close reviewer of the annual reports of electric railways one of the most striking facts, in view of the long-continued movement for the standardization of accounts, is the dissimilarity existing among such reports as regards the make-up of the two financial statements—the statement of income, profit and loss and the balance sheet. As early as 1892 one of the speakers before the Street Railway Accountants' Association remarked that operating officials differed greatly in opinion as to the necessity and value of financial and statistical reports, and that it was almost impossible to get reliable data for the comparison of companies. It might be supposed that the promulgation of the several forms of statements from 1894 to date would have cleared up this difficulty. It appears, however, that although practically all companies use a detailed classification of accounts for their own records and for their reports to state commissions, there is a very wide variety in the forms in which they issue their annual reports to their stockholders. An examination of several of such reports recently received shows this variation in a striking way.

For instance, one operating report (South Carolina Light, Power & Railways Company) showed no itemization of gross earnings or operating expenses and handled taxes as a separate deduction from net earnings before interest was deducted. A second report (Atlantic Shore Railway) showed subdivisions for operating revenue but none for operating expenses, and included taxes, interest and adjusting entries in separate amounts among deductions from income. A third report (Public Service Corporation of New Jersey) was that of a company operating gas, electric light and electric railway properties, and although the operating revenues were allocated to these divisions, the operating expenses were given only in total. The chief features of report No. 4 (Northern Ohio Traction & Light Company) were that the operating expenses and taxes were included in one amount and that depreciation was made a profit and loss charge. In report No. 5 (Bay State Street Railway) taxes were grouped with interest and rentals in one total, as a deduction from gross income less operating expenses. Furthermore, dividends were deducted from the net divisible income, and the resulting surplus was increased by the surplus at the end of the former period, instead of the two surpluses being combined and then dispensed for dividends and other profit and loss charges, as in report No. 4. It is interesting to note that the title "gross income" used for the first revenue entry in report No. 5, from which operating expenses were deducted, was identical with the title used in report No. 2 for the sum obtained by adding miscellaneous income to the difference between operating revenue and operating expenses. In report No. 6 (Milwaukee Electric Railway & Light Company) depreciation and taxes were added

to the operating expenses and deducted from the operating revenues. In report No. 7 (United Railways of St. Louis), however, the operating expenses and depreciation were all included in one total, and the taxes were subtracted from an amount called "surplus over operating expenses" in order to obtain the income from operation, instead of being included with either operating expenses or deductions from income. The final income statement (Honolulu Rapid Transit & Land Company) showed depreciation being accounted for as a deduction from income instead of as an operating expense or profit and loss charge.

Similar differences of form, arrangement and grouping of items appear in connection with the balance sheets. One report (Cleveland Railway) adopted a typographical arrangement in which the titles of the asset and the liability accounts are placed in the same column, while the amounts of the assets are carried in the second column and the liability amounts in a third column. Another statement (Cleveland, Painesville & Eastern Railroad), contrary to the usual accounting practice in America but like that in England, showed the liabilities ahead of the assets. Other differences almost as great in arrangement are shown in the other reports.

We realize that there may be local reasons in some cases for the methods of arrangement employed. At the same time greater uniformity in the printed reports issued to stockholders and often, as well, more detailed information, especially in regard to the operating accounts, would be of great assistance. The determination of whether the proper expenditures have been made for maintenance generally depends on a subdivision of the operating expense group, and the location of tax and depreciation charges has a marked effect on the relation between the operating revenues and the operating expenses, between the operating income and the operating revenues and between the total or gross income and the deductions from income. If one company includes taxes and depreciation charges in deductions from income and another does not, comparisons of the margins of safety of these companies are useless.

It should not be inferred that we are advocating that companies should give to their stockholders all the multitudinous detail that may finally accompany the entire Interstate Commerce Commission form of annual report, but the main divisions should be followed. It does not suffice that the facts are given to a state regulatory commission. The reports filed there are limited in value to the average investor because he is generally unable to visit the state capital to examine them and because the annual report of the commission is usually published long after the company's annual report and contains only the barest abstract of the financial operations of the individual companies. For this reason the average investor prefers to leave to the commission the task of watching the financial operations of the company during the fiscal period and to look to the company itself for the full data showing the actual results of these operations.

Philadelphia-Paoli Electrification on the Pennsylvania

This Suburban Electrification, Which Will Be Completed Within the Present Year, Possesses Many Novel Features, Including the Use of Standard Steam-Railroad Passenger Coaches, Electrically Equipped, and a New Form of Overhead Construction—A Preliminary Description Is Published

George Gibbs, during the course of his remarks before the last meeting of the New York Railroad Club, briefly outlined the immediate plans for electrification on the Pennsylvania Railroad which include the equipment of the main line from Broad Street Station in Philadelphia westward to Paoli—a distance of 20 miles.

others continue west to the end of the suburban zone at Westchester, 31 miles from Philadelphia.

There are forty-seven outbound suburban trains and forty-nine inbound, making a very frequent schedule which has to be arranged so that the suburban traffic is sandwiched in between the through trains be-



Philadelphia Electrification—View of Experimental Installation on the Main Line Showing Preferred Type of Construction Over Left-Hand Track—Test Cars in Background

The active work of construction on this project is to commence within a few weeks, with the expectation of having it ready for testing by Dec. 31 of the present year; and, as the plans of the engineers, Gibbs & Hill, are now nearing completion, an amplification of Mr. Gibbs' remarks regarding this electrification is published in the following paragraphs. The project, while not of extraordinary physical magnitude, possesses unusual interest, first, because of the selection of the single-phase system of operation for suburban service, and second, because of natural interest in the Pennsylvania Railroad's vast electrification scheme, of which the present installation is a beginning.

EXISTING CONDITIONS

The proposed electrified section to Paoli will cover the first 20 miles of the main line west of Philadelphia. At present an exceedingly heavy suburban traffic is being handled over it in addition to the through trains. Most of the local trains are run to Paoli although some

tween Philadelphia and Pittsburgh. Of these through trains there are thirty-three outbound and thirty-six inbound, making a total, for all classes of passenger service, of 165 trains daily. The line has four tracks and the operating difficulties, once the trains are clear of the city of Philadelphia, are by no means acute. At Broad Street Station, however, a condition of congestion exists which has already established a limit to the amount of traffic that can be handled at the terminal. The station contains sixteen platform tracks, but these are led into a throat just outside of the station where six suburban routes converge, and this point sets a limit to the possible number of train movements in and out of the station and between the station and the storage yard just beyond the throat. The congestion at this point is considerably more of a handicap to train movement than that caused by the limited number of station platform tracks.

Suburban traffic over the main line west of Philadelphia is now handled in three-car trains during the



Philadelphia Electrification—Curve on Experimental Section Equipped with a Special Type of Flexible Hanger Supporting a Single Contact Wire

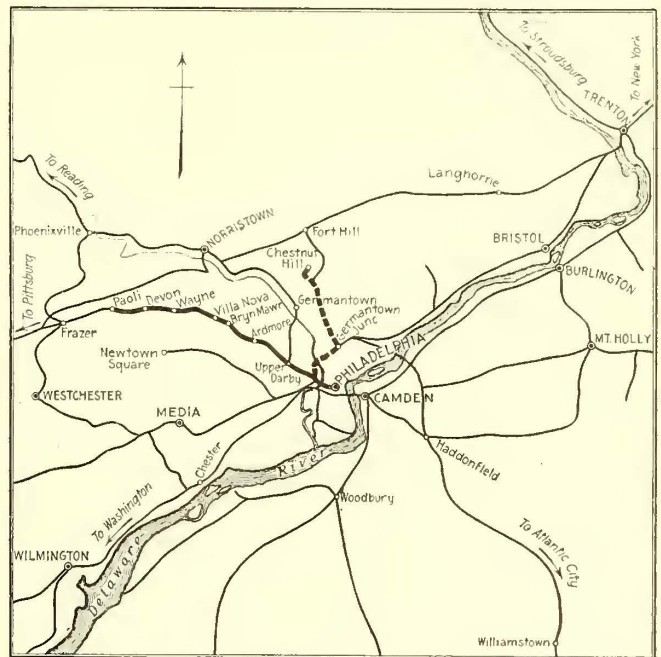
non-rush hours and, with one exception, in five-car and six-car trains during the rush hours. These small trains are hauled by passenger locomotives of almost the largest type in use on the Pennsylvania System, and, in consequence, the great excess of tractive power furnished for each train becomes available for producing rapid acceleration. The scheduled speed from Philadelphia to Paoli is 21 m.p.h. including nineteen stops, practically one stop per mile, and from this it will be seen that, so far as quick service goes, the operation by steam is exceptionally good.

REASONS FOR ELECTRIFICATION

At the present time the natural growth of traffic over the system under the conditions outlined above has reached the limit set by existing terminal facilities, and within the last few years the railroad company has faced the problem of providing some means for taking care of it. This could have been done either by increasing the terminal facilities at Broad Street at a large expense or else by introducing electric operation for the heavy suburban traffic. The latter plan has been adopted for the reason that it provides economies in operation which will be sufficient to pay the interest charges on the cost of installation, so that, practically speaking, the increase in capacity can be made to pay for itself. With the other alternative there would have been no opportunity for obtaining a direct return upon the heavy investment, and this has made obvious the desirability of electrifying the line.

Through the use of electrically-operated trains for the suburban traffic on the main line west from Broad Street Station, it has been found that a material reduction of train movement through the throat between the station and yard could be effected. The decrease has been estimated to be between 16 and 20 per cent. This is due in large part to the fact that the storage yard lies beyond the throat and that trains and steam locomotives entering the station have to be taken back through the throat after entering the station.

With multiple-unit electric cars these reverse movements will be unnecessary and the reduction in congestion will become almost proportional to the percentage of electrically-operated trains in service. In addition it has been found that the use of multiple-unit trains will provide the equivalent of two extra platform tracks in the station itself because the electric trains can be made ready for a return trip promptly after arrival in the station. This increase of 12½ per cent in the station platform capacity and the reduction in the number of movements through the throat have been estimated to be sufficient to care for the normal growth of



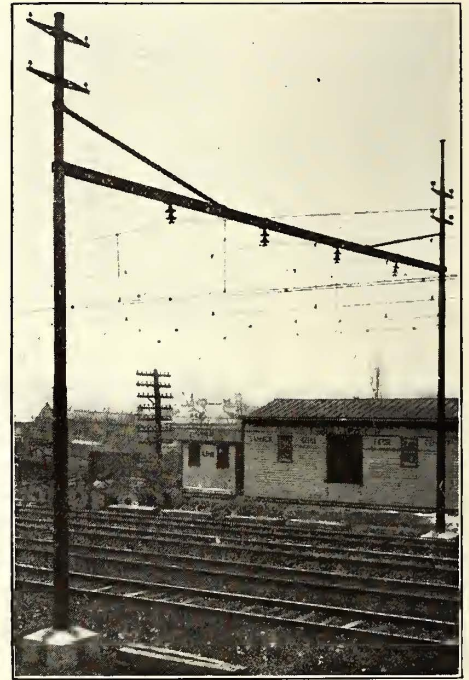
Philadelphia Electrification—Map Showing Suburban Lines of Pennsylvania Railroad and Proposed Electrifications

traffic for the next six years, and as the economies effected by the improvement will pay interest charges on the investment required, the plans for electrification have been considered most satisfactory.

The single-phase system of operation has been adopted for the electrification not so much as a result of calculations based upon the conditions existing on the suburban line being equipped but more in the nature of a logical step toward the accomplishment of the Pennsylvania's general electrification plans, which include the introduction of electric operation between New York and Philadelphia, and its later extension on the main line west of Philadelphia. In this comprehensive scheme the actual requirements involved by the conditions surrounding the suburban traffic out of Philadelphia are, of course, of somewhat minor importance, and, as the whole problem has been the subject of continuous study and investigation by

cable will be carried across the tracks between two tubular steel poles at 300 ft. intervals. From this will be suspended a single longitudinal catenary with a secondary messenger wire of copper and a trolley or contact wire of bronze. This cross-catenary type of overhead construction over a four-track main line has never been used heretofore in this country. Its obvious advantage outside of ease of erection and reduced maintenance and first cost is that the installation of transverse cables instead of structural steel bridges obstructs the view of motormen but little and, in consequence, the arrestive effect of semaphore signals at a distance is not diminished.

The longitudinal catenary will consist of a messenger cable supported from the cross-catenary cable, and from this in turn will be suspended the secondary messenger and trolley wires, both of the latter being practically horizontal. The secondary messenger wire acts



Philadelphia Electrification—Views of an Experimental Form of Catenary Bridge. The Cross-Catenary Type of Supporting Structure Has Been Found to Be Superior to This and Will Be Used for the Permanent Installation

Gibbs & Hill, consulting engineers for the Pennsylvania Railroad, for several years, the choice of the single-phase system for the suburban line came as a natural consequence through the studies which applied to the general plan. Broadly speaking, the general reasons for the decision to use single-phase have been that the type of overhead construction for this system and the method of transmission makes possible the use of any type of tractor which has so far been suggested in the history of steam railroad trunk line electrification. In addition the apparatus as installed especially for the single-phase system is available for the split-phase locomotive, for any of the various types of single-phase motors, or for the use of the rectifier in case that becomes a practical commercial development; and there exist the advantages of high transmission voltage and ease of transformation from three-phase power lines working on twenty-five cycle frequency.

OVERHEAD CONSTRUCTION

Power will be furnished to the cars from an overhead catenary system carried on supports of the cross-catenary type. In this arrangement no structural steel bridges are to be used, but instead a span wire of heavy

as a conductor as well as a means for producing flexibility in the trolley wire, against which run the pantographs of the cars. In general the use of two lower wires is well known abroad and also in this country through the installations of the New York, New Haven & Hartford Railroad and the New York, Westchester & Boston Railway, but on the Pennsylvania installation the method of supporting the contact wire from the secondary messenger will differ materially from that used on these two roads. Small, two-piece clips will fasten the wires together at intervals of about 15 ft., and between every second pair of clips, or at intervals of about 30 ft., a hanger from the catenary will be attached to the upper wire. In the previously-mentioned installations a hanger is installed between every pair of clips instead of between every second pair, so that the new form of construction obviously reduces the number of hangers from the catenary cable without necessarily reducing the number of clips.

Current will be supplied from the contact wire at 11,000 volts, power being transmitted along the line at 33,000 volts or 44,000 volts and being reduced to 11,000 in three transformer stations. One of these stations is to be a central receiving station where the

power, which is to be purchased from the Philadelphia Electric Company, is transformed from 13,200 volts and supplied to the single-phase railroad transmission line. The location of the various transformer-station feeder points is to be made with a view to minimizing the inductive effect of the single-phase current, the line being sectionalized, and this engineering problem is being worked out at the present time. However, it may be said that, independent of the requirements of the electrification and simply because of the disastrous effects of the recent blizzard on the Pennsylvania Railroad, all telephone and telegraph wires along the right of way are to be placed underground. In consequence the question of inductive interference applies chiefly to commercial wires within the towns along the line of the railroad.

One of the most interesting features of the prelim-

I-beam about 15 ft. out from the pole. From these I-beams is hung the longitudinal catenary construction, two suspension insulators being provided at each point of support. Structural steel anchor bridges will be installed at half-mile intervals.

Another general form of construction, and the one which is to be adopted with possibly some changes in detail, consists of a cross-catenary cable which replaces the I-beam. With this construction the poles are guyed by two 1¼-in. steel rods with turn-buckles. These are attached to the pole at the point of connection for the cross-catenary cables, and are anchored in back of the pole. On both curves and tangents, with this type of construction, the high points of the longitudinal catenary cables are provided with horizontal steady strains insulated from poles by double porcelain insulators, and wooden insulators about 3 ft. long are



Philadelphia Electrification—View at End of Experimental Section of Track Showing Construction of Anchor Bridges Which Will Be Installed at Half-Mile Intervals

inary engineering work introduced by the consulting engineers has been the erection of an experimental mile of overhead construction at St. Davids Station on the main line, 14 miles west of Philadelphia. Views of this are shown in the accompanying illustrations. In the experimental section, which includes all four main-line tracks, a number of different forms of catenary construction have been installed, and these have been subjected to exhaustive tests for purposes of comparison. In all cases tubular steel poles with 10-in. butts set in heavy concrete foundations have been used for the main supports of the overhead system. Each pole is made up of three telescope sections with the bottom reinforced with an extra section of tubing extending several inches above the top of the concrete foundation, thus providing additional strength at the point of greatest tendency toward corrosion.

Two general forms of bridge support have been tried out. One of these has for the cross-bar an I-beam of about 8-in. depth which is attached to the pole by means of split clamps, the halves of these being bolted together. The I-beam is reinforced by diagonal T-bars extending from the pole downward to a point on the

installed between each pair of tracks so that the different tracks may be kept separated electrically.

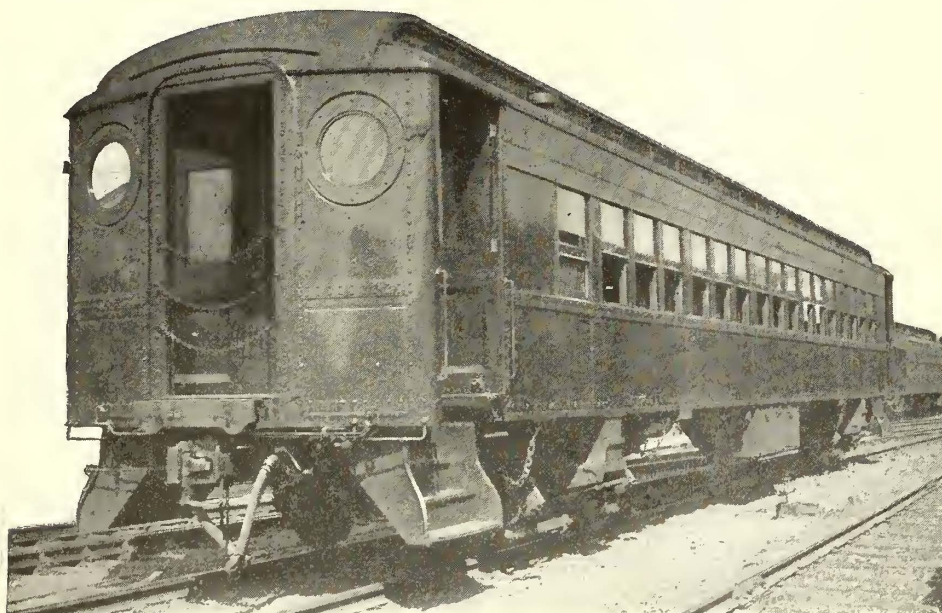
In some cases a single contact wire has been tried out, the hangers from the catenary being made of light, flexible wire. The same type of flexible hanger has been installed over some parts of the line that are equipped with the secondary messenger wire, although most of the construction has solid rods for hangers.

The experimental construction has not been operated under power and the tests have been carried on by mechanical means only. The testing outfit consists of a pair of cars equipped with pantographs and platforms for observers from which the contact wire may be inspected from close range. The tests have included hammer blows delivered in series at intervals of a few seconds for the purpose of demonstrating the ability of the construction to withstand vibration, and the test cars have also been run over the track by a steam locomotive attached to them. As the platforms provided for the observers are located at ample height the operation of both pantograph and overhead construction may be closely examined even when the test car is traveling at high speed.

CAR EQUIPMENT

The proposed installation includes consideration only of multiple-unit car service for the suburban traffic. For the present no electric locomotives are to be operated over the line and none are to be purchased for the installation. No freight of any kind is to be moved over the electrified section except by steam. The through passenger trains that run over the electrified zone number thirty-three outbound and thirty-six inbound, and these are also to be operated by steam. The same thing applies to several local trains which terminate at points considerably beyond the limits of the electrified zone. In the case of a few local trains which terminate at points only a comparatively short distance beyond Paoli, steam locomotives will be coupled direct to the electrically operated cars when they reach that station and they will be hauled as trailers beyond the electrified section. It should be said, however, that the greater part of the suburban traffic on the main line ends at Paoli.

One hundred multiple-unit cars will be required for the electric service as planned, and in making provision for this equipment Gibbs & Hill have put into practice an idea which is unique in steam railroad electrifica-



Philadelphia Electrification—Standard Type of Steel Passenger Coach Which Will Be Equipped with Motors for Use on Electrified Line

tion and which is of far-reaching importance. The cars to be used are of the Pennsylvania "MP-54" type, of which there are already a large number in operation as standard passenger coaches in steam trains. They were designed and standardized several years ago solely with regard for future use as electric motor cars.

These coaches are of all-steel construction and are 54 ft. 6 in. long over corner posts with end platforms 5 ft. long at each end. The width over eaves is 9 ft. 11½ in. and the height to the top of the roof from the rail is 13 ft. The seating capacity is sixty-eight, there being thirty-two transverse double seats and four single corner seats. End and side doors are installed in the vestibules, but no center-entrance is provided for the car in accordance with the customary scheme of steam railroad practice. The weight of the body is approximately 54,000 lb. and the weight of the two trucks approximates 33,000 lb. The weight of electrical equipment will approximate 30,000 lb.

Each of the cars will be equipped with two 225-hp single-phase, commutator-type motors, both mounted on

one truck. They will be furnished with multiple-unit control and the controller will be located in the vestibule, being protected when not in use by the end door at one side which opens inwardly. The circular end window behind which the motorman stands is hinged to swing inward when desired. A switchboard is to be mounted on the left-hand side of the end bulkhead at the motor-truck end and it will be inclosed by a pressed-steel door.

At the cars have been designed for use in steam passenger service on the Pennsylvania and also with the idea of using them eventually in multiple-unit electric trains, they are, with the addition of the electrical equipment and wiring, capable of being put into electric service at any time. The trucks installed on the cars for steam railroad service are suitable for trailer trucks under the cars after they are converted for electric service, but are not suitable for carrying motors. Therefore, when the car is changed over one of the trucks has to be replaced by a new motor truck.

The estimated requirements of the service are approximately 100 motor cars, and these will be converted from MP-54 coaches now in service or on order, the trucks discarded from the converted cars being used for trailer trucks under new cars which are to be built in the future. The motor trucks will be built by the railroad company in its own shops and the equipment for them will be purchased within a short time.

No trail cars will be operated in the multiple-unit trains in the electric zone, and in this respect the standard practice of the electric service on the Pennsylvania Terminal in New York will be followed. It will be noted that the cars for the single-phase Paoli line, which will be similar to those used in the Pennsylvania Terminal service, are to be equipped with motors only 2½ per cent larger, as the 600-volt d.c. cars in New York have 215-hp motors as against 225-hp motors on the new ones.

Current for the cars will be collected from the overhead wire by pantographs, one of which will be installed over the truck at one end of each car. The high-tension current will be carried by heavily insulated cables in conduits to a single main transformer hung from the framing underneath the car, and from this point it will be delivered to the motors at about 320 volts.

CHESTNUT HILL ELECTRIFICATION

A further step in the Pennsylvania electrification plans after electrifying the main line to Paoli, as announced by Mr. Gibbs, will be the equipment of the line to Chestnut Hill, 12 miles north of Broad Street Station in Philadelphia. This line is shown in the map on page 861 by heavy dotted lines. It is strictly a suburban line, twenty-nine trains a day being operated each way between the two terminal points to accommodate the present traffic, although this is rapidly increasing. This electrification will still further relieve the conditions in Broad Street Station, but the work of construction is not immediately in hand and will not be taken up until such time as business conditions warrant the installation.

Report on Winnipeg

From an Examination Made by R. M. Feustel, Recommendations Are Made for Pay-as-You-Enter Cars, Higher Speed, Elimination of Certain Stops, Etc.—The Viewpoints of the Public Utility and Public Are Considered and Their Relations Are Discussed

In August, 1912, H. A. Robson, Public Service Commissioner of Manitoba, employed the firm of Sloan, Huddle, Feustel & Freeman, of Madison, Wis., to investigate and make a preliminary report on the service being furnished by the Winnipeg Electric Railway in Winnipeg and vicinity. A preliminary report was made at that time, dealing with certain special traffic problems, and it was arranged to have a complete survey made during the heavy traffic period. This was done during the four months beginning Feb. 1, 1913, and a complete traffic survey was made under the direction of Mr. Feustel, now chief engineer of the Public Utilities Commission of Illinois. The completed report was filed with the Public Service Commission about Oct. 1, 1913, and was referred to the City Council, which adopted it after a conference with the officials of the company. Objections were made on the part of the company to certain minor provisions, but in the main the report was accepted.

The data collected were taken in the usual detail followed in such traffic surveys, and the results were plotted in the form of "Seat Demand," "Fluctuation in Traffic and Variation in Headway" and "Car Loading" curves.

The problem was considered in the report almost entirely from an adequacy-of-service standpoint. While it was understood that an equitable rate of return must be had in order that any company can continue in operating condition, no investigation was made as to earnings or operating expenses. These factors, however, were kept in mind in all the recommendations which were made for improvements in the service.

SOME OF THE DIFFICULTIES OF THE PROBLEM

In discussing some of the difficulties of the traffic problem on city railways the report says:

"The fact that the transportation business was well developed before the public became aware of its real importance and the relation it had to civic growth makes the problem somewhat harder to deal with. The utility has gone through a series of changes in the course of its development. The earlier systems have been done away with, horse cars giving way to steam and cable cars, and those in turn having been followed by the electric lines. Rolling stock and plant equipment have been scrapped, promotion profits have been taken out of the business by those interested in reorganizations, franchises have been bought and sold, lines have been built into unprofitable territory because of political influence, and to-day we have the utility company usually part of some larger syndicate with a relation to the people considerably different from that which was intended at the beginning of its existence.

"If there has been any fault in this matter the responsibility for the trouble lies quite as often with the public as with the utility. The public, through its representatives, has sold or given franchises to competing companies and cheerfully accepted the benefits of destructive competition, and many times by a demand for changes of equipment has placed a burden on the business which later on the public is to some extent obliged to carry under the agreements which are considered fair and reasonable between public utilities and cities at the present time. It is a matter now of the public and

the utility coming to an understanding as to their relation to one another, and with this better understanding will come improved service to the community and more economical operating conditions for the company.

THE PROBLEM AS IT APPEARS TO THE PATRON

"The patron feels that he has a right to expect adequate service, which to him means a sufficient number of cars so that long waits will be unnecessary. He believes that as a usual thing comfortable seats should be furnished for all passengers except during certain portions of the rush hour, that the cars should be comfortably heated in winter, properly ventilated at all times and operated with safety and with the maximum amount of speed consistent with this safety. He feels that he should be able to go by the shortest reasonable routes to his destination, that there should be a universal transfer system and that the single fare zone should include the entire city with its immediate suburbs.

THE PROBLEM AS IT APPEARS TO THE UTILITY OWNER

"The owner feels that as long as his service is adequate and the rate of fare reasonable he should be allowed a virtual monopoly of the transportation business in the community. He feels that he should be allowed to operate the most approved type of equipment that the business can afford and that franchises should be freely given for tracks to be laid along such streets as will best serve the traveling public. He feels that cars in general should have the prior right-of-way over the streets along which they operate and that, especially during the rush hour, this right-of-way should be freely extended in order to facilitate the handling of these peak loads. He believes that full co-operation should be had from the public in the observance of such reasonable operating rules as are put in force by the company.

THE PROBLEM AS THE REAL ESTATE OWNER SEES IT

"The man who owns property or operates business often unfortunately views the problem in a rather narrow light. It is a rather easy matter for him to be convinced that the building of a line to some new suburban district in which he owns property or the routing of cars past his place of business is of paramount importance to the solution of the traffic problem of his city. This view, of course, is not held by all business men and property owners, but it is sufficiently prevalent to be a factor to be considered in dealing with the complaints of the service which come to those who are responsible for it.

THE PROBLEM AS IT APPEARS TO THE CITY OFFICIALS

"City officials feel that the best service is given if passengers are carried to and from their place of business by the most direct route possible and over lines and in equipment which are well maintained. They feel that the company should at all times maintain the pavement between and adjacent to its tracks and that the company should pay for the cost of such reconstruction to its tracks as is necessary in making street improvements. They feel that extra cost of bridges or subways due to placing of tracks on or through such structures should be paid for by the company. They be-

lieve that free transportation should be given to certain of such public officials as mail carriers, firemen, policemen, etc. They believe that the company should be willing to remove unsightly poles or to place wires and track at its own expense in such position as might best meet any public improvement desired by the community as a whole. In the matter of franchises it is felt that the agreement should be of an indeterminate nature and that some ready means should be had whereby the readjustment of rates or investigation of service can be made either at stated periods or as the need becomes apparent.

ADEQUACY OF SERVICE

"It becomes necessary to give proper weight to the ideas held by these different interests, and it resolves itself into a determination as to what is the adequate service for the community in question. One statement as to what constitutes adequate street railway service might be as follows: That it consists in furnishing a sufficient number of cars to carry all the passengers who desire to ride with the greatest degree of safety to the passenger on the car and to the public on the street, with the maximum amount of speed consistent with such safety and with the maximum degree of regularity and certainty of schedule, with the maximum comfort to the passengers going over the shortest routes, and with an adequate return to the company for such service furnished."

METHOD OF TAKING TRAFFIC DATA

To determine the adequacy of service, inspectors were placed on the cars, and passenger counts were made showing the number of passengers on the car when passing all the important traffic points. These records were plotted in the form of car-loading curves, separate curves being plotted for the different characteristic periods of the day. From the car-loading curves the point of maximum loading was determined and inspectors were placed on the street at these points to note the fluctuation in headway and the number of passengers riding for the entire day. From these data the fluctuation of traffic and variation in headway diagrams were plotted. Totals for fifteen-minute periods were taken for the entire day, showing the number of people riding and the number of seats furnished for each fifteen-minute period. The totals for all the passengers riding for half-hour periods for all the lines for the entire day were also made, and the ratio of the maximum load to the average load was computed. This ratio was found to be approximately 140 per cent.

STANDARDS OF SERVICE

In measuring the service furnished it was considered that during the non-rush hours, except for accidental loads, seats should be furnished for all passengers who desired to ride. In order to furnish seats for all these passengers, from the ratio of the maximum to the average as computed for the lines, it was found necessary to furnish 40 per cent more seats than passengers riding during the non-rush hour.

The service during the rush hour was based on a maximum car capacity. The average seating capacity of the Winnipeg cars was determined, and to this seating capacity an allowable standing capacity of 4 sq. ft. per passenger was added. This gave the maximum load for the largest car as eighty-five passengers and an average load of seventy-nine passengers for all cars. It was considered reasonable to establish eighty-five as the extreme maximum load which should be allowed for schedule making.

In the determination of the ratio of the maximum

load to the average load for the rush-hour period, 145 per cent was found to be the average for all of the lines. With a maximum allowable car load of eighty-five passengers, the average car load would necessarily be 85 divided by 1.45, or fifty-nine passengers. The seating capacity of the cars being forty-two, the number of seats necessary to keep the average load to fifty-nine passengers would be the ratio of 42 to 59, or approximately 71 per cent. In order, therefore, to limit the maximum load to eighty-five passengers during the rush-hour period, it would be necessary to furnish 70 per cent as many seats as there were passengers riding. To make a check as to the adequacy of service, a count was therefore made for at least three normal days of the total number of passengers riding by the point of maximum loading to determine whether 140 per cent as many seats were furnished as there were passengers riding for the non-rush hours and 70 per cent as many seats were furnished as there were passengers riding for the rush hours, the service being considered adequate. The change from the 70 per cent to the 140 per cent ratio ought to be made, the report says, in as gradual a manner as will be suitable to the particular line in question.

At present the company is building all of its own cars and has adopted as standard a double-truck closed car with a seating capacity of forty-two. The entrances and exits are both in the rear of the car, and there is only an emergency exit in the front of the car for the motorman. The seats are longitudinal and upholstered in plush. The report recommends the pay-as-you-enter system with front exit, cross seats for the middle part of the car and short longitudinal seats for each end and the use of rattan or slats instead of plush upholstery. The report also recommended the near-side stop.

PROPER UNDERSTANDING BETWEEN PUBLIC AND COMPANY

In discussing the relations between the company and the public, particularly so far as operating conditions are concerned, the report says:

"While the first general need for satisfactory service is to have plenty of cars properly routed, there must be, in addition, the proper understanding and co-operation between the company and the public in respect to all matters of operation. While the public has a right to demand that the most improved methods for giving the best and safest service should be adopted, it, in return, should give the necessary co-operation that will make this service possible. The best co-operation is always had where there is a thorough understanding of the problems that must be met.

"Most of the larger utility companies have come to realize this growing need for getting closer to the people, and a publicity department has taken its place as a permanent feature of most utility organizations. This department has the special task of keeping the public informed as to what the company is doing to meet its needs. Complaints of service and suggestions receive real attention. Courteous explanations are made which often turn the possible faultfinder into a 'booster.' There is scarcely any branch of service where the public is met while in a mood that makes it harder to handle than is the case with passengers traveling during the evening rush hours.

The patrons are returning home after a day's work, usually tired and perhaps hungry. They are bent on getting home or to recreation as early as possible, and they feel that as soon as they leave their work their time is their own. By far the greater portion of complaints which a company receives comes from these evening rush-hour patrons. Many times the complaints are unreasonable, but they are made and will

continue to be made until the service is bettered or a satisfactory explanation is given. The two most prolific causes for complaint are, perhaps, the irregularity of schedule and slow operation, with the interminable number of stops on certain lines."

SPEED OF OPERATION

The average speed of operation for the entire Winnipeg system during the non-rush-hour period was found to be about 8½ m.p.h. This was considered as from 10 per cent to 15 per cent slower than might safely be maintained, and it was suggested that the average speed should be as nearly as possible 9½ m.p.h. The accompanying table of non-rush hour speed in other cities is appended.

TABLE SHOWING COMPARATIVE AVERAGE SPEED IN MILES PER HOUR DURING NON-RUSH-HOUR PERIOD FOR DIFFERENT SYSTEMS

	Speed in M. P. H.
*Cincinnati	8.36
Cleveland	10.50
Columbus	9.50
Detroit	9.50
Indianapolis	9.80
Kansas City	9.00
Milwaukee	9.07
Omaha and Council Bluffs.....	9.50
St. Louis	9.40
St. Paul and Minneapolis.....	9.38
Winnipeg	8.35

*Slow speed in Cincinnati partly due to excessive grades.

ELIMINATION OF STOPS

The report also recommends a reduction in the number of stops. On this point it says:

"Most patrons are willing to admit that there are too many stops, but reluctance is shown at once if their own particular stop is questioned. It is felt that the inconvenience which would be experienced is over-estimated. One of the larger systems in the United States was contemplating the elimination of certain stops and decided that after the congested district was passed the cars would stop at every third street. A study was made to see the effect this would have on the increased walking necessary per passenger. The cars were run as usual, stopping at every street, and inspectors were placed on the cars to note the number of passengers getting off the cars at points where under the new system no stop would be made. The number getting off at these streets was found on the average to be less than 33 per cent, as might have been expected. Other inspectors watched the direction taken by the passengers after they had left the car, and the data when analyzed showed that there would be about three-fourths of a block extra walk necessary per passenger for those getting off at the test points if the cars stopped at every third street. If this was limited to every other street, it can readily be seen that for those living on the particular cross street the extra walk would amount to one block, but for those living on parallel streets the walk might not be increased at all.

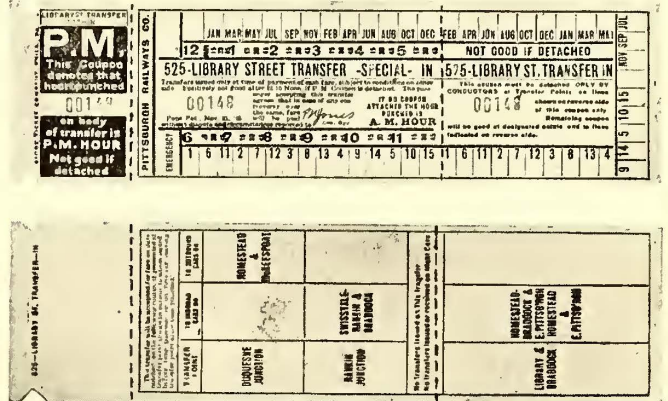
"As there are two parallel blocks to every cross block in distance away from the car line, the walk per passenger would be as follows if the population was evenly distributed: One-third would have one block, one-third would have one-half block extra, and one-third would have no extra walk, with an average of one-half block per passenger ordinarily using that particular street. The improved service for the through lines would much more than compensate for the time required in walking this extra distance. Of course, there would necessarily be exceptions, and stops would be made at all important traffic points. The system is recommended only for such lines as are now loaded beyond the comfortable limit."

NEW TRANSFERS IN PITTSBURGH

A new system of transfers has been recently developed by the Pittsburgh Railways. This eliminates the necessity for issuing a transfer on a transfer except in the case of certain short shuttle lines, for which a special form of ticket is issued.

The system provides three different types of ticket. One of these is of the usual form and is used in ordinary city work. Each route is supplied with its own transfers. The date numbers are arranged out of sequence to prevent disputes as to the intention of punch marks.

The other two types of ticket are provided with one and two detachable coupons, respectively, for re-transfer when the passenger wishes to ride on two or three different lines. It is required, however, that the



Front and Reverse Side of Single Coupon Transfer, Pittsburgh Railways

passenger shall indicate his destination when asking for his transfer so that in general passengers are prevented from retaining any part of the ticket. These transfers are changed every half month, the date numbers being 1-15 on one form and 16-31 on the other.

On the back of the coupon tickets are printed directions which limit the methods available to the passenger for reaching his objective point. The necessity for this is involved by the Pittsburgh scheme of running many different routes over the same street as the cars diverge from the business district of the city. The passenger is therefore obliged to select the proper car going to his destination, and he is not allowed to transfer over routes diverging from the main artery of travel if they have through cars of their own. In addition, the transfer points for two routes have in all cases been changed to the first point of intersection outside of the business districts of the city, toward which all the important streets converge. This obviates the possibility of using the transfer as a stop-over.

In some cases the limitations printed on the back of the ticket include every possible transfer that can be made from the route, but in general the passenger may not transfer from an inbound route to one which may eventually get him upon an outbound car on one of the major lines paralleling his original route.

ROLLS FOR STANDARD RAILS

It has been announced that the Lorain Steel Company is cutting rolls for the standard 7-in. girder grooved rail of the American Electric Railway Engineering Association, described by Mr. Schreiber in the last issue of this paper, and also for the standard 7-in. guard rail to go with this girder rail. These sections will be known as L. S. sections 122-467 and 140-468.

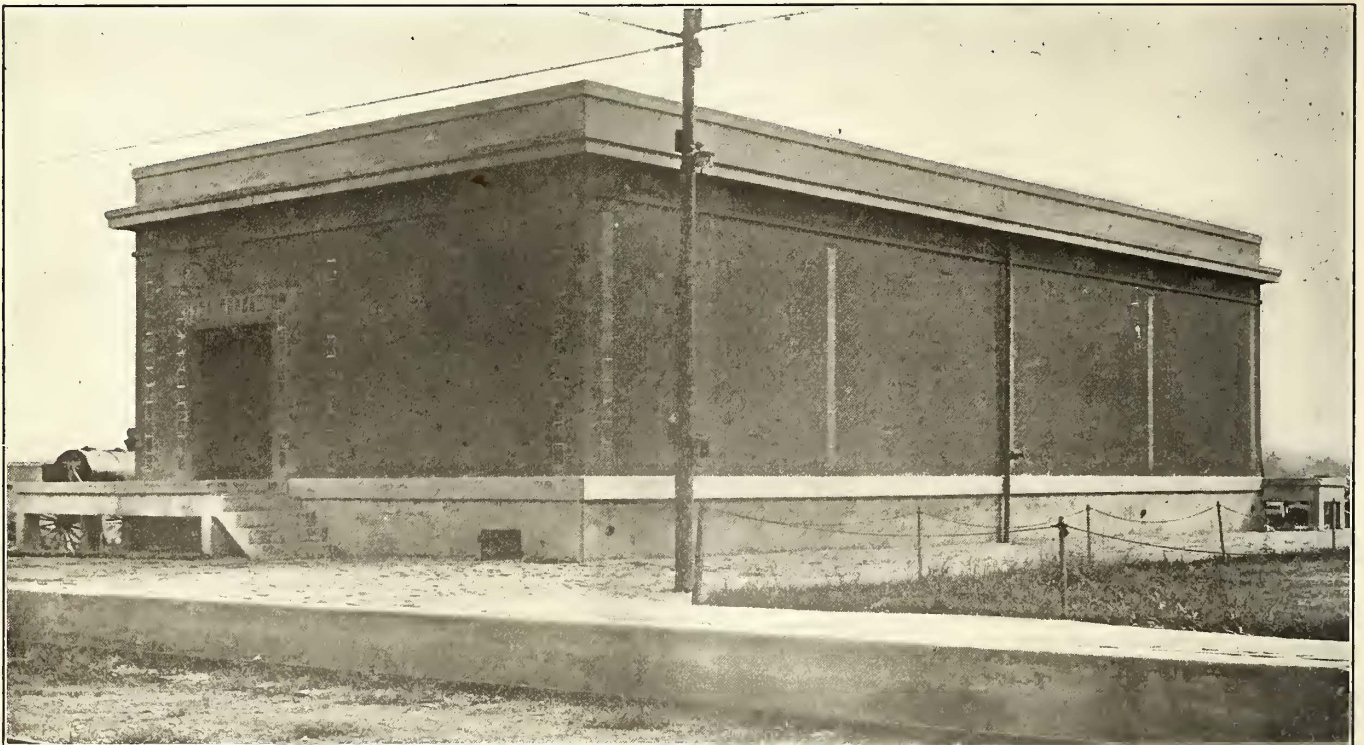
Oil and Paint Storage Building at Baltimore

The Building Is of Artistic Design and Has an Unusually Safe and Efficient Method of Oil Storage and Handling—Paint Mixing Is Done by Machine

During 1913 the United Railways & Electric Company of Baltimore erected on its property at the Carroll Park shops a fireproof reinforced concrete oil and paint storage building. The structure is 60 ft. long, 30 ft. wide and 19 ft. high and is situated about 300 ft. from the group of shop buildings. The front of the structure is set back about 10 ft. from the edge of the transfer table pit. Consequently, the transfer table plays an important rôle in conveying oils and paints from the oil house to the paint shop itself. Its location is very favorable in minimizing the hazard to

x 7-ft. doorway fitted with double sliding fire doors. The rear entrance has a 4-ft. x 7-ft. doorway fitted with a single sliding fire door. Both front and rear entrances are approached by means of concrete stairs and platforms. The platforms are arranged just high enough to allow trucks to back up and discharge their loads of oil drums and barrels, so that railroad shipments can be conveniently handled.

The roof, which consists of a covering of slag on a reinforced concrete slab, has four large skylights, giving plenty of light to the interior of the building.



Baltimore Oil House—View of Building with Transfer Table Track in Foreground

the large group of buildings that might result from any possible fire or explosion in the oil or paint storage building.

CONSTRUCTION

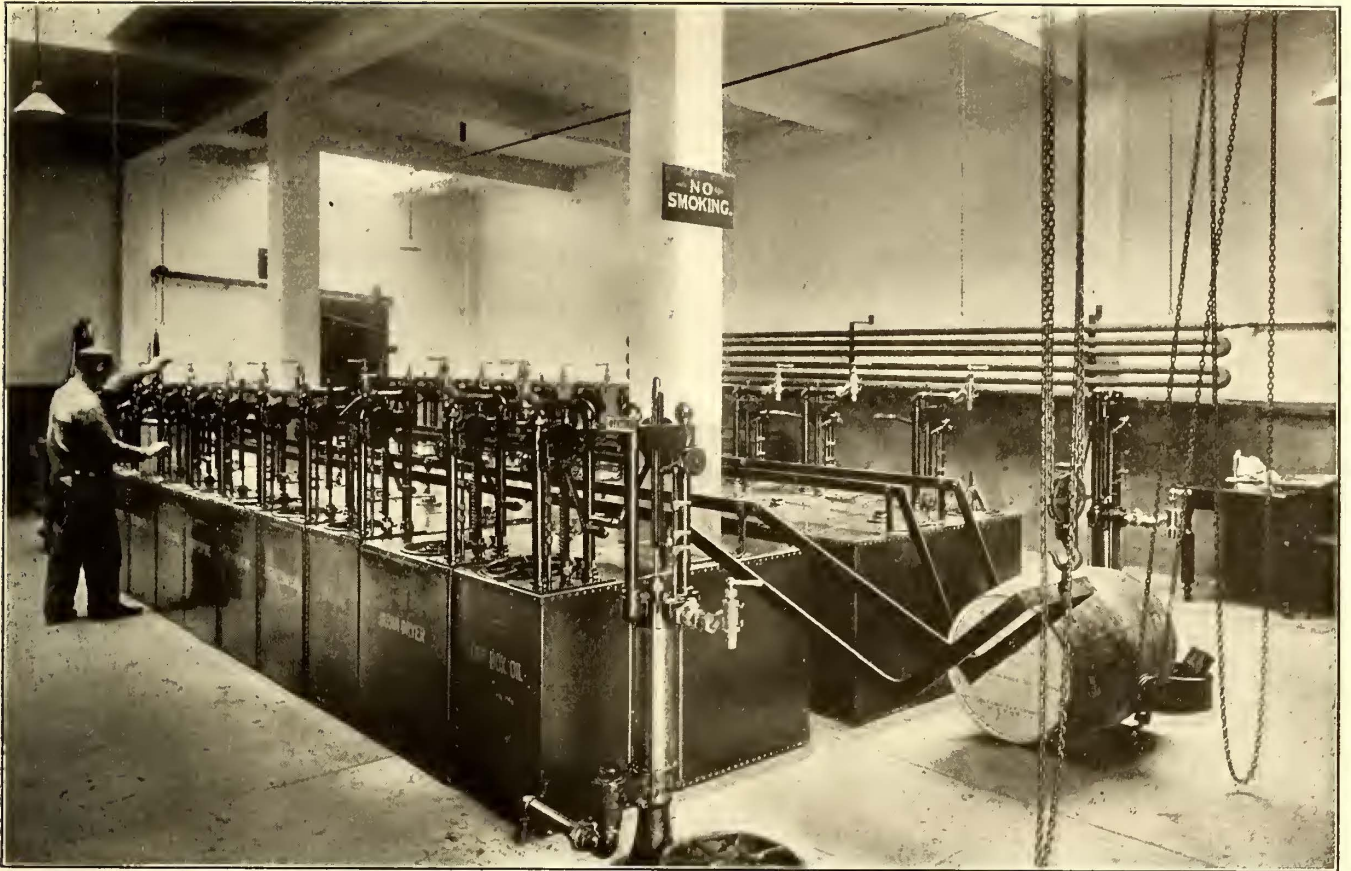
The exterior presents a very artistic appearance. The walls have a smooth cement finish for a distance of 4 ft. from the ground, then a "Moustic" finish for the remaining height with the exception of a smooth finish around the parapet. Flush with the outside surface of the walls are red tile inserts arranged in vertical rows and spaced at regular intervals. A strip of ground about 20 ft. wide paved with Belgian block encircles the entire building. This pavement is arranged to assist the heavy hauling of teams to and from the oil house.

The interior of the building consists of two rooms, one 44 ft. long x 29 ft. wide, containing tanks for storing oils, paints, varnishes and greases, and the other 14 ft. long x 29 ft. wide for a paint-mixing room. The rooms are separated from each other by a 6-in. concrete wall having a 4-ft. x 7-ft. doorway arranged with a single fire door. The front entrance has a 6-ft.

In the skylight construction heavy wired glass was used. A parapet about 18 in. high surrounds the entire roof. Access is gained to the roof by means of an iron ladder placed on the outside of the building and fastened to the rear wall. As the walls are entirely void of windows, the interior receives natural light from the skylights only. Artificial light is furnished by ten 110-volt, 40-watt tungsten lamps, arranged in two series of five lamps each on a 550-volt circuit and spaced at proper intervals. One lamp of each series is placed in a bracket above the front and rear entrances, while the remaining eight lamps are used for the illumination of the interior. All wiring is inclosed in iron conduits.

STORAGE EQUIPMENT

In order to dispose of all oils, paints, etc., as economically as possible and to facilitate their proper handling, a novel storage system has been installed by the Gilbert & Barker Company, Springfield, Mass. Arranged in the middle of the floor of the oil room are twenty-four tanks of 200-gal. capacity. These are placed in two rows of twelve tanks each. All tanks



Baltimore Oil House—Storage Tanks and Barrel-Conveying Outfit, with Benzine Pump to Underground Storage in the Foreground

are rectangular in shape, and each is equipped with measuring pumps, a strainer for admitting surplus oil back into the tank, a vent covered with a screw cap which can be opened when about to refill tank from a drum or barrel, and also a measuring stick. This stick is fastened to a screw plug to aid in its



Baltimore Oil House—Mixing Paint by Means of an Old Bi-polar Motor, Belt Drive and Gearing

easy removal when necessary to take a reading of the amount of oil in the tank.

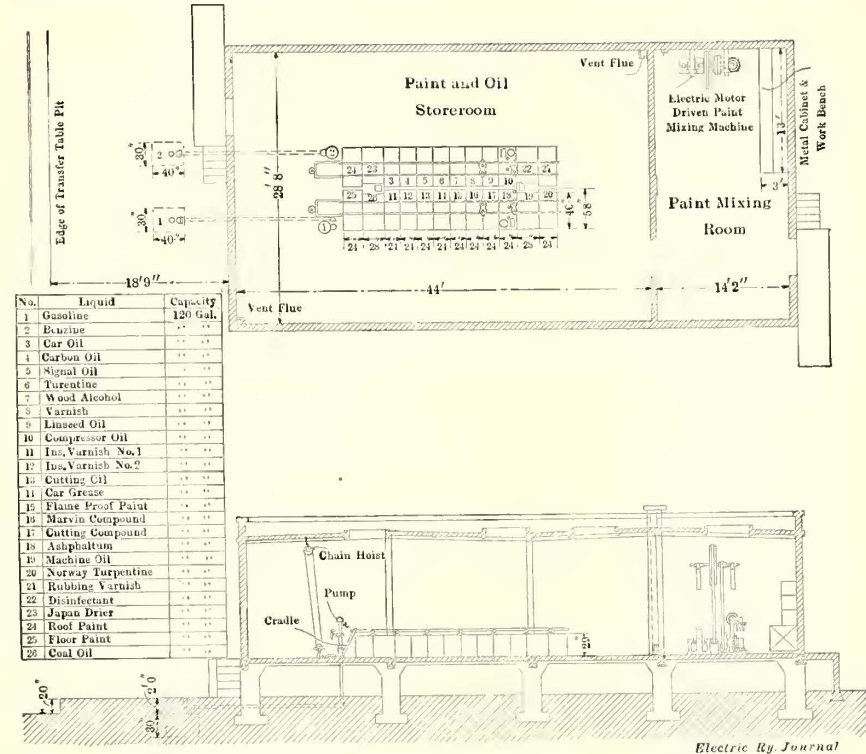
A runway, supported about 6 in. above the tanks by iron brackets, extends from end to end of each row. At one end of each runway is an iron cradle attached with a hinged joint to the runway, and the

separate tanks just in front of the building and buried 4 ft. in the ground. Each of these tanks is connected with a pipe to a measuring pump just inside the front entrance, one pump being in front and at one side of each row of tanks. The refilling of these tanks is readily accomplished by means of pipes leading to them from above the ground. The top of each pipe is capped and securely locked. One can readily perceive what a great improvement this method of distributing oils, etc., is over the old way of placing a number of barrels in a row with an ordinary valve or faucet rammed into each one. This latter practice is not only wasteful but increases the fire risk tenfold over the better scheme.

In the paint room the mixing of the paints is readily accomplished by means of a machine driven by a 10-hp 550-volt motor. After the standard colors are mixed they are placed in large cans, which are labeled and set aside ready for use. A large steel cabinet is also placed near the rear wall, in which are stored all sample cans of paints, varnishes, driers, etc.

The oil house has now been in use nearly one year and is giving entire satisfaction. In building and equipping this installation the company felt that no amount of trouble and expense should be spared in the construction of a building for storing such a dangerous combustible as oil or those products in which the use of oil plays an important part.

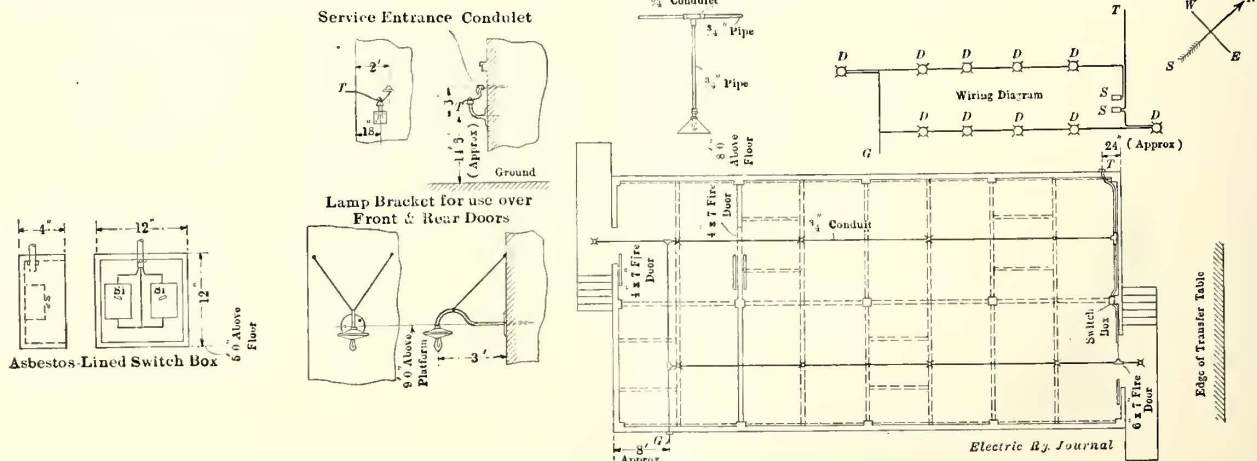
The entire building is steam-heated from the main steam plant contained in one of the group of shop buildings.



Baltimore Oil House—General Layout, Showing Quantities and Location of Materials Stored, Transport Means, Etc.

other end of the cradle is secured to a small chain hoist. When it is necessary to refill a tank the barrel or drum is simply rolled onto the cradle from the floor, the hook of the hoist is attached to the cradle, and the operator hoists the barrel until the cradle is level with the runway. The barrel is then rolled along the runway until it reaches the tank needing refilling. After the barrel has been emptied, it is rolled

The Massachusetts Institute of Technology has issued a bulletin of its summer technical course to be offered during the months of June, July, August and September, 1914. These courses are open to persons not students in the Institute, if they possess the neces-



Baltimore Oil House—Wiring Details for Electric Lighting

back again to the cradle, lowered to the floor and removed outside the building, ready to be carted away.

As benzine and gasoline are of a highly explosive nature and as the Board of Fire Underwriters will permit the storing of only a very small quantity within any building, both of these liquids are kept in

sary qualifications, and are of particular advantage to persons planning to enter the Institute whether with or without advanced standing. A course on the principles of electrical engineering will be given if enough applications are received to indicate that the plan will be successful.

THE FUTURE OF PUBLIC UTILITIES

At a meeting of the Finance Forum held under the auspices of the Y. M. C. A. in New York City on April 14 Thomas N. McCarter, president of the Public Service Corporation of New Jersey, delivered a vigorous and frank statement of the public service companies' point of view on their duties and rights. Before taking up the subject proper the speaker outlined the present political situation in this country as he understands it. This has much to do with the public utility situation and with the present temper of the people with relation thereto.

In the first place the people distrust the public utility official. Mr. McCarter said that at one time he had occupied political positions of importance, but he realized that he has now and forever barred himself from political preferment by occupying his present position. Two years ago, when president of the American Electric Railway Association, he, in company with other railway men, had visited many of the important electric railway centers throughout the country, explaining the present situation. While he felt that the trip was well worth while, he humorously referred to the fact that the present disposition of the people toward electric railways showed no evidence of conviction produced as a result of his labors.

Referring to his appreciation of the opportunity to present the public utility's side of the question to an audience like that before him, the speaker recalled to his hearers' minds the famous mission of Henry Ward Beecher to England at the time of the Civil War. On one occasion Mr. Beecher addressed an audience inherently hostile but won an appreciative hearing for his cause by concentrating his attention upon a single hearer. Although the "forum" audience was not hostile in the sense of that of Mr. Beecher, the inference was clear that, as typical of the American public generally, it was not naturally in sympathy with the speaker's point of view. He registered a vigorous protest against the seemingly prevalent opinion that a public utility official cannot be as honest and as patriotic as other citizens. History disproves this, as was illustrated during the Civil War when the railroads were operated first for the welfare of the country, afterward for the owners' benefit.

Continuing his introduction, Mr. McCarter said that the political parties of the country had largely outlived their fundamental principles. While he personally was by tradition and choice a Republican he really would have trouble in defending his position, so uncertain are the present tenets of that as well as the other parties. It appears that what has occurred politically in England and Germany must eventually come about in this country, namely, a reclassification of the population politically into radicals and conservatives, old party demarcations being eliminated. The fate of public utilities is involved in this political situation as the new parties will disagree radically as to the management of these properties.

Coming now to the subject proper Mr. McCarter outlined the fundamentals of the political economy of electric railway administration under four heads as follows: Regulation; allowable rates of fare; character of future franchises, and municipal ownership.

The principle of regulation is now accepted generally as desirable, but the practical application of the principle involves many problems. Regulation as practiced is expensive, as evident from the annual expenditure of \$3,000,000 in New York State. Regulation may also have a depressing effect on the value of securities. Since the provisions of the Hepburn bill went into effect railroad securities have depreciated in value by \$3,000,000,000 and this is partly, at least, due to government

regulation. To be successful commissions must be composed of men of the highest character and best experience. Moreover, they must be restricted to their real functions. The exercise of plenary powers is municipal ownership without responsibility.

The allowable rate of return is a vital element of successful regulation. The conservative view is that a fair rate of return on a reasonable valuation should be provided for. This view has the support of President Wilson. Radical leaders like Senator La Follette would depreciate capitalization to a mere present physical valuation and limit the rate of return on the residue to 6 per cent, no more than can be secured from mortgages and other safe investments. As Senator Dryden stated, to follow this plan and eliminate by fiat \$7,000,000,000 of "water" would precipitate the greatest calamity of history. Assuming that the stock had been watered to the above extent, which Mr. McCarter did not believe, the proposed action would not punish the real culprit who long ago disposed of his holdings. The public must realize that public utilities are important assets to them as well as to the owners, and if improvements are to be made capital must be attracted to the investments. Mr. McCarter cited the Hudson & Manhattan tunnels as an example and called attention to their great benefit to the residents of New York and its vicinity, yet the investment is not a profitable one. There would obviously be no incentive to capitalists to put their money into such hazardous undertakings if rates were kept down without due regard to all factors involved. Just what is an average fair return the speaker was not prepared to state, but it should certainly not be less than 8 per cent.

In valuing property for the purpose of determining rates of fare, due allowance must be made for franchises, depreciation, etc., but the tendency is against this. Commissioner Daniels, formerly of the New Jersey Public Utilities Commission and now of the Interstate Commerce Commission, was publicly criticized and the confirmation of his appointment to the latter position was jeopardized because he was willing to make an allowance for intangible values in rate making.

There are many wrong impressions in the public mind as to the value of franchises. Existing franchises were in most cases granted to induce capital to build railways on the same principle as the federal government gave vast acreage of public land to the Union Pacific Railroad to induce it to extend its lines. Franchises should not be capitalized unless an 8 per cent return is assured, and franchises should not be limited in term. A limited-term franchise is like a limited-term lease of a lot upon which a valuable house is built. The only way in which such an investment is feasible is a sinking fund allowance which will cover the value of the house during the leasehold. An expiring franchise is a distressing spectacle, as seen in a few recent examples. During the last five years of such the property is allowed to run down and service is poor. There is now no valid objection to a perpetual franchise in view of the regulating tendency of the times. Such franchises should contain provision for periodical review to insure compliance with their provisions. If a limited term is insisted upon it should be long enough so that sinking fund payments will be reasonable. Obviously the shorter the term the higher will be the rate.

The chief objection to municipal ownership is furnished by the unsatisfactory results of municipal administration in this country. Our theories of federal and state government have worked out well, but not so our city government. Here graft, incompetent selection of officials and other evils have been conspicuous. When one considers the responsibilities already on the shoulders of municipal officials he concludes that they

are enough. Schools, sewers, public health, water supply, highways, police, in addition to minor divisions of administrative work, are surely sufficient in view of our lack of success in city government. Can the city fathers handle any more?

Another serious item is that of financing. Our cities now labor under serious financial burdens. If the electric railways of the country were purchased under a fair condemnation process the burden would be enormously augmented. No one claims that cities could operate railways more cheaply than individual companies, but it is supposed that they can borrow money at a lower rate. The fact is that if the cities were to go into public utility work on a large scale they could not get the money much more cheaply than individuals, and even if they did the losses due to less efficient operation would more than wipe out the difference. The only theoretical saving by municipal ownership is the difference between interest rate and the existing dividend rate which would soon vanish in graft and mismanagement.

In conclusion Mr. McCarter called attention to the efforts being made by public utilities for the welfare of employees. His own company has gone to the limit in this direction, and a loyal spirit has been developed. Old age pensions, sick and death benefits, participation in profits and other items of extra compensation are in effect. All of this is good but after all real manhood is at the bottom of success and the future of the public utility depends on this.

CHANGES IN THE SEVENTY-FOURTH STREET POWER STATION IN NEW YORK

An account was published in the *ELECTRIC RAILWAY JOURNAL* for Aug. 23, 1913, of the new 30,000-kw turbo-generator sets ordered by the Interborough Rapid Transit Company for its Seventy-fourth Street power station. Each set consists of a 15,000-kw, high-pressure, 1500-r.p.m. turbine and a low-pressure, 750-r.p.m. turbine of the same capacity. The construction of the new units has progressed rapidly. To make room for the new units four engines of 7500-kw capacity each are to be removed and will be scrapped. The first of these 7500-kw units was put out of commission on March 16 and is now being dismantled.

Two separate Worthington condensers each with 25,000 sq. ft. of cooling surface will be used with each turbine set. Each set will also have two circulating pumps of 35,000 gal. per minute capacity each, two turbine-driven centrifugal hot-well pumps and one large reciprocating-type air pump. Each air pump will have a capacity for carrying two turbine units and will be cross-connected between units.

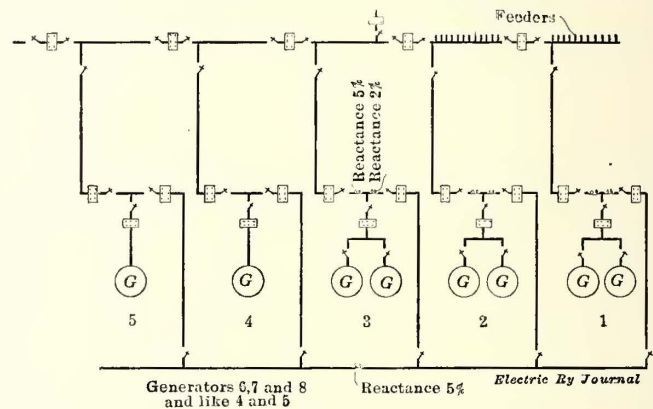
The foundations of the present engine will be removed and special steel and concrete foundations for the turbines substituted. A new motor tunnel is now being excavated and will have a capacity for circulating water sufficient for eight 30,000-kw units.

Stokers of the underfeed type will be installed in one-half the plant and new superheaters will be installed in the present boilers designed to give 200 deg. superheat at maximum load, 300 per cent of the normal rating. Feed-water heaters of the open type will also be employed.

In the electrical equipment of the remodeled station all switching apparatus throughout the plant will be new. Some of the cables to be used are of the three-conductor, sector type paper insulated and assigned for 19,000 volts working pressure. The manufacturers as well as the company's engineers are gratified to find that the cables as designed test up to about 100,000 volts pressure, which is higher than would probably be ob-

tained with cables of the round conductor type and with the same thickness of insulation.

In the discussion of reactances in power stations at the recent midwinter meeting of the American Institute of Electrical Engineers, H. G. Stott, superintendent of motor power of the Interborough Rapid Transit Company, described the new system of reactance-coil arrangement which will be used in the remodeled Seventy-fourth Street power station. It is shown in the accompanying illustration. The diagram shows the three new units and two of the five older units which will remain. The new units are connected to the main busbar through reactance coils containing 5 per cent reactance. Each is also connected to an auxiliary or transfer busbar through a coil having 2 per cent reactance. The new part of the transfer busbar is connected to the old through 5 per cent reactance. The arrangement of reactance coils is designed for protection of the cables primarily, rather than of the generator. It is a modification of the feeder reactance plan, accomplishing somewhat the same purpose at far less cost. The 2 per cent reactance coils, which were called by a speaker at the recent Institute meeting "synchronizing react-



Interborough Rapid Transit Company—Diagram of Electrical Connections in Power House

ances," assist in steadying the operation of the generators in parallel and supplement the internal reactance of the generators in case of a generator short-circuit.

By the changes outlined above the company is able to get into the same space now occupied by 30,000 kw a capacity of 90,000-kw. The floor space previously required for a 7500-kw engine now suffices for a 30,000-kw turbine. Forced firing of the boilers, together with the use of superheating devices and the low water rate of the new turbines, permits the rating of the boilers on the same floor space to be increased to correspond approximately to the increase in the engine room. The changes now under way will provide for immediate requirements, and by the time that the subway construction has proceeded far enough to demand additional power further changes will be made in the Seventy-fourth Street plant and also in the Fifty-ninth Street plant.

Feeders are shown connected only to the two right hand sections but they will, of course, be connected to all sections. The plan is to divide the substations into two parts and to supply one-half of the feeders to a substation from one section of the power-house switchboard and the other half of the feeders to that same substation from another section of the board. There may be three substations connected to each section of the bus, but the bus sections will not be connected together through the substation, as the substation bus will be cleared so as to prevent this, there being always at least four feeders to each substation.

Development of Time-tables

At the Regular Monthly Meeting of the Public Service Railway Section of the American Electric Railway Association, Alexander Jackson, Head of the Time-table Department, Presented a Paper Describing the Make-up of Time-tables—An Address by Prof. H. H. Norris Prefaced the Technical Paper

Two interesting subjects, one on "Present Tendencies in Self-Improvement" and the other on the "Development of Time-tables," were the features of the regular monthly meeting of the Public Service Railway section of the American Electric Railway Association held at Newark, N. J., on Thursday evening, April 16. About 100 members of the section were present.

PRESENT TENDENCIES IN SELF-IMPROVEMENT

H. H. Norris, chairman of the educational committee of the American Electric Railway Association and also associate editor *ELECTRIC RAILWAY JOURNAL*, was the first speaker. His topic was "Present Tendencies in Self-Improvement." After calling attention to the encouragement which the educational committee had received in the past from the Public Service Railway Company he complimented the men present on the activity of their employers in looking after their welfare.

Professor Norris then plunged into the midst of his subject, which he stated could be divided into two main topics: the tendency of the times to specialize in all manual and mental operations necessary in industrial life, together with the considerable tendency away from individual initiative and inventiveness and the reaction therefrom; and the necessity for and possibility of normal mental development under any conditions, assuming that the desire for it exists.

Now the individual's first duty to himself and to society is to know what he is aiming at, what he wants to accomplish. Like a marksman he must first select his target, which must, of course, be within range of his rifle. Having fixed his eye firmly on his target, or to change the figure, on his goal, the most difficult part of the task is done. Ideals are simply targets or goals. The accomplishments which inspire us most are the direct results of careful selection of ideals.

Having focused attention on the object of one's efforts, ideas follow inevitably. A story is told of a certain clerk in a New York store who thought he deserved promotion and went to his chief to ask for it. In order to fortify his request while awaiting an audience, he pondered the reasons which he should give. The more he thought the weaker his arguments seemed until he finally convinced himself that he was getting all that he earned. He then slipped out and back to his desk determined to be worth more. As he was simply under clerk there did not seem to be much chance, but he determined to be his ideal of a clerk. The sequel is just as natural as the happy finale of a popular novel. The fact that he is one of the leading merchants in New York at the present day surprises us less than that he had the sense to think the situation over while waiting in that ante-room. Of course, one might argue that if everyone had his ideals clearly in view there would be vigorous competition for all important positions and the condition of the worker would not be any better than at present. Well, this need not worry us, for there is no great evidence of such a tendency.

The present is an age of specialization. The old-fashioned "handy" man or mechanic who could do almost anything in the construction line is disappearing. Competition is so keen that we must work more efficiently than the old-time craftsman did.

Specialization tends to mental apathy because as

actions become automatic they are taken care of by the sub-consciousness. The hand performs its work accurately, perhaps, while the mind is free. If it is not exercised when thus liberated it becomes lazy and tends to lose strength and ability to generate ideas.

It is a reaction against the condition mentioned that there is such a widespread interest in extension education—night schools. Success or failure in such work depends upon the definiteness of the aim of the individual and the strength of his purpose. Just to take some course in a night school or correspondence school because it is a good thing on general principles will not bring the results desired. The individual must put some brain work into the planning of his course with all of the suggestions that he can get. But practically it is entirely up to him.

Now there is a wrong notion abroad that study has something to do with youth. As a matter of fact when study stops progress stops at any age. This does not mean necessarily book study, although books are the source of unlimited information. But the study principle must be applied in every detail. Here is a boy soldering up commutator leads. Is he content to make a merely passable job while his mind soars all over the universe or is he learning from his work everything that it will teach him, and using that as a basis for the study of commutators and everything that goes with them? Is he becoming the commutator expert of the shop? If not his progress will be slow.

If the conditions have been correctly delineated in the outline given, the American Electric Railway Association desires to assist in stimulating the employees of the member companies to make the most of themselves. The past and present plans are designed for no other purpose.

THE DEVELOPMENT OF TIME-TABLES

The importance of the time-table may be said to be three-fold: First, because it is, practically, the medium through which the character of the service rendered molds the public feeling for or against the railway company; second, because it influences the attitude of the employee, through the division of car hours; third, because it is the foundation upon which the whole financial structure is built.

DEFINITIONS

In my remarks I will use definitions of the terms used in conjunction with a time-table, as adopted by the American Electric Railway Association, in order that all may understand them.

Run—A group of trips shown on a time-table which constitute a day's work for a car crew.

Run Number—An arbitrary number assigned to a run.

Run Guide—An index of the "on" and "off time," and the total working time of each run.

Train—A car or cars operating as a unit making one or more trips.

Train Number—An arbitrary number or symbol used to designate one trip or a group of trips.

Patch—A substitute for a portion of a time-table in effect, applied in such a way as to cover parts of the table for the purpose of increasing or decreasing the service.

TRAIN	MAP	CL	C.H.	F.F.	BEEL	RRP	C.H.	C.L.	MAP
4628			505	538		550	610	619	627
4676			510		545	555	615	624	632
4619			515	548		600	620	629	637
4631			520		555	605	625	634	642
4677			525	558		610	630	639	647
4633			530		605	615	635	644	652
4630		527	535	608		620	640	649	657
4635			540		615	625	645	654	702
4601			545	618		630	650	659	707
4634		542	550		625	635	655	704	712
4617			555	628		640	700	709	
4636		552	600		635	645	705	714	722
4670			602	638		650	710	719	727
4606		556	605		638	648	708	717	
4637			607	641		653	713	722	730
4614		601	610	645		657	717	726	734
4639			612		645	655	715	724	
4610		605	614	648		700	720	729	
4679	545 558	607	616	652		704	724	733	741
4611		609	618		652	702	722	731	739
4647			620	654		706	726	735	
4607	605	613	622	658		710	730	739	
4605			624		658	708	728	737	745
4675		617	626	700		712	732	741	749
4618			628	704		716	736	745	753
4637	600 613	621	630		704	714	734	743	
4640		623	632	706		718	738	747	
4613	618	626	635	710		722	742	751	
4641		628	637		710	720	740	749	757
4638	623	631	640	713		725	745	754	802
4617		633	642	718		730	750	759	807

Headway Portion of Typical Week-day Table No. 2639

Tripper—One trip or a group of trips shown on the time-table for regular operation, but not assigned to regular crews.

Extra—A trip or group of trips, put out to supplement existing service, as required, but not shown on time-table.

DETERMINING RUNNING TIME AND LAYING-OUT HEADWAY SHEET

In making up time-tables the question of running time involves a distinct study of the system as a whole. Many points must be taken into consideration, such as franchise requirements, speed and stop ordinances, inter-sections, good crossings, width of streets. In fact,

to construct a time-table properly one must be thoroughly familiar with the section served, its business pursuits and hours of labor. A clear conception must also be had of the physical characteristics of the different municipalities, the location of the manufacturing industries and business districts, together with a full understanding of the operating difficulties such as the hours of pedestrian and vehicular congestion.

To illustrate the general principles of time-table construction, let us take a specific case; for instance, the "S" table, No. 2639.

The first step in the development of this time-table, having all the foregoing facts in mind, is the laying out of the headway sheet. We commence by taking a point nearest the end of the line which all cars must pass, in this case the carhouse, and put down the trips in sequence in the column under the heading "Carhouse." This will give the required main line headway. After the interval between cars, eastbound, is laid out, then schedule the trips needed to handle the business from the western terminals, using the carhouse time and setting the trips back the necessary number of minutes as per running time to cover the distance between the carhouse and the terminals from which cars are to be operated. As an example, a car is scheduled to pass the carhouse east-bound at 6:30 a. m. This car must leave the town of "M" at 6 a. m. according to the time points, that is to say, thirty minutes must be allowed between these points to maintain the headway. The same must be done with trips from the stop "S" and those from "F" Street, city line. When this portion has been completed follow each trip from the carhouse, east-bound, to the Pennsylvania loop on Market Street. A certain headway of cars is required to turn the loop, the rest operating east on Market and Ferry Streets to the junction of Hamburg Place and East Ferry Street, where the rest of the cars alternate, one trip going to the Hamburg Place terminal and the other to the end of East Ferry Street. To maintain an equalized headway, west-bound, the Pennsylvania loop is taken as the point from which to govern the interval between cars. As the cars turning the loop cannot be allowed

LINE WEEK-DAY TABLE NO. 2639 IN EFFECT JAN. 8TH 1914 SUPERSEDING NO. 2638

TRAIN	FROM	TO Ferry St & Hamburg Pl & Doria VIA															ON		OFF		ON	OFF	HRS	MIN
		F	CF	M	CF	CF	M	CF	M	CF	M	CF	M	CF	M	M	F	ON	OFF					
8	Ferry	708	841	1030	1218	706	840	1030	1218	706	840	1030	1218	706	840	1030	1218	1	601	1142	122	546	10	07
8	City Line	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	2					10	09
8	Car House	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	3					10	00
9	High St	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	4					10	29
9	Deeds & Mixl	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	5					10	12
9	Ferry Station	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	6					10	14
9	Jerome	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	7					10	00
9	Doria	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	8					10	39
10	Junction of Ferry & Henry = Time	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	9					10	11
10	Market	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	10					10	48
10	City Line	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	11					10	29
11	Ferry	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	12					10	12
11	Ferry	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	13					10	00
11	High St	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	14					10	00
11	Deeds & Mixl	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	15					10	40
11	Ferry Station	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	16					10	07
11	Jerome	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	17					10	00
11	Doria	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	18					10	00
11	Junction of Ferry & Henry = Time	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	19					11	00
11	Market	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	20					10	00
11	City Line	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	21					10	00
11	Ferry	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	22					10	00
11	Ferry	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	708	841	1030	1218	23					10	22

Portion of Train Sheet or Working Time-table

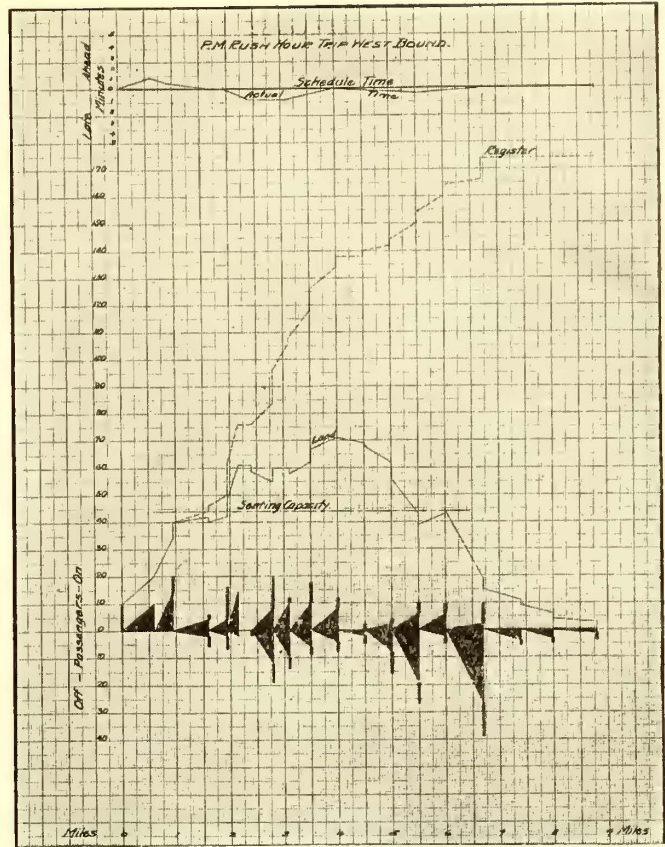
lay-over time, it becomes necessary to use whatever stand time may be required to have the cars operated on an even headway, west, from the Pennsylvania loop, at the East Ferry Street and Hamburg Place terminals. When this part of the work is completed, show the time all trips pass the carhouse and the time of arrival at the city line, sending enough cars through the town of "S" and the town of "M" to take care of the headway that is required to maintain the interval from each of these terminals. This is one of the points where careful figuring must be done to avoid having too much lay-over, as the same conditions will prevail at each of the three westerly terminals and needless expense might be incurred. Since the trips are now shown at all the points on the line the headway sheet is completed.

MAKING UP TRAIN SHEET

Next the train sheet is made up from the completed headway sheet. This train sheet shows the performance of each car or train during the entire day, also the division of platform time to train crews. All the many details to be taken into consideration in making up the train sheet and assignment of runs cannot be explained in a brief paper on the subject, as no two men go about making up a train sheet into runs in the same manner. No hard and fast rule can be followed, for no two lines will have the same lay-out or the same operating conditions.

To give an idea of the amount of work involved in the making of this time-table, the line known as "S" operates from seven terminals, four from the west, namely, "M," "S," City Line and Carhouse and three from the east, East Ferry Street and Bowery Street, Hamburg Place and Berlin Street and the Pennsylvania Loop on Market Street. We operate 360 trips on this line. They are shown on the headway sheet at eleven points as follows herewith: From "M," 88; from "S," 181; from City Line, 307; from Carhouse, 350. Returning trips run are as follows: From East Ferry Street, 167; from Hamburg Place, 161; from Pennsylvania loop, 360; to Carhouse, 360; to City Line, 342; to "S," 208; to "M," 86.

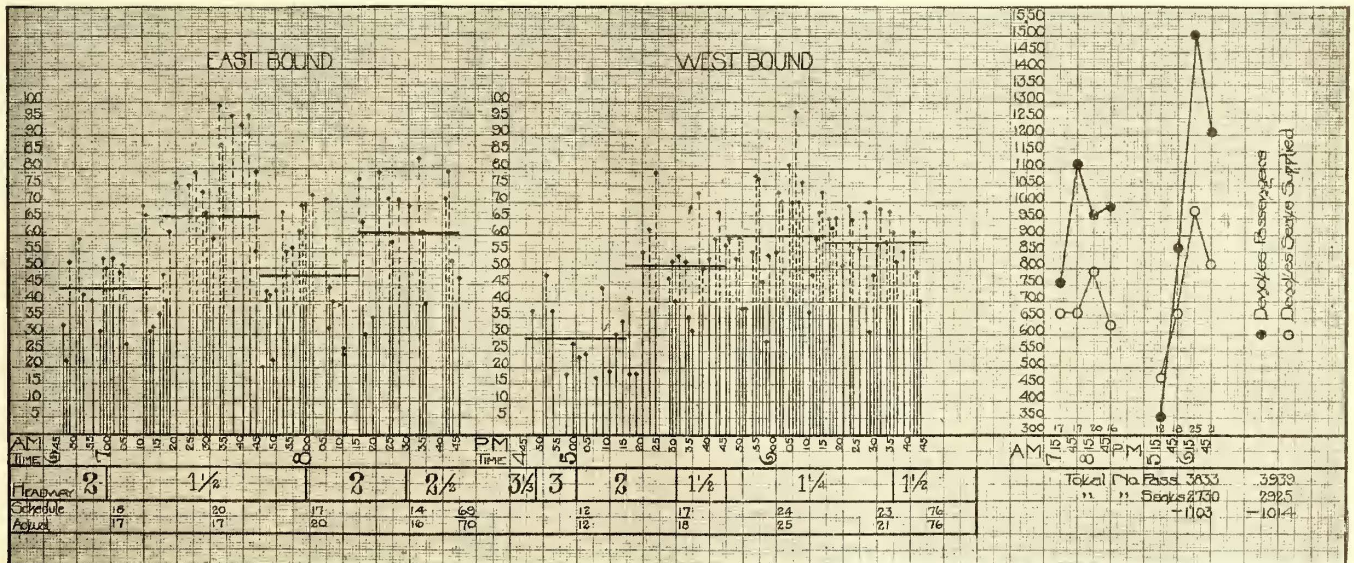
This means that the 360 trips when shown at these eleven points have been put down 2620 times, making a total of 9851 figures written if no erasures have to be made. In making a pencil copy a great many erasures will be made in the manipulation of the trips to equalize the headways from the different terminals. In copying from the headway sheet to the train sheet and making the trains into day's work for the train-



Sample of Distribution Chart

men 6816 more figures are added, making a total of 16,667. The work thus far has been in the rough pencil sketch. It is now turned over to the clerks to copy. When finished and ready for blueprinting the completed time-table has required the writing of more than 33,334 figures and letters. To do justice to a table of this size a week should be consumed in its development.

During the year 1903 the headway between cars on the line designated "S" was four minutes throughout the day. At present there is a two-minute headway for the a. m. rush, three and three-quarter minutes during the day, and one-minute headway during the p. m. peak. In 1903 the number of trips throughout the day was fifteen per hour. At present we run thirty trips per hour or a 100 per cent increase in the a. m. rush, one trip per hour more or 6 per cent during the



Typical Passenger Count Taken in Directions of Maximum Traffic for A.M. and P.M. Hours Respective

day, and forty-three cars per hour or 186 per cent increase during the evening rush. If the second car of the train is counted, as it should be, the increase is 202 per cent. This table now requires sixty-two cars to operate in the p. m. rush as against thirty-four in 1913, making an increase in equipment of 82 per cent. In the construction of this table next to the impossible was accomplished, that is to say, we increased the trips per hour in the evening rush more than 100 per cent over mid-day operation, without placing a great burden on our trainmen or supervising force, by having a large number of trippers operated by extras or by regular men after the completion of their regular runs.

This table is a fair example of those on the other large lines of this system. As the increase in mid-day or non-rush business does not keep pace with the increase in the rush-hour travel, the time-table situation on this property, as on other large systems, is one of great seriousness, for the breaking up of trains into full-pay runs for the train crews becomes more difficult as time goes on. If the coming ten years show the same percentage of increase as the last ten, the tripper situation will be one that will give the management and members of the time-table department a problem for still more study and consideration.

A great deal of time and study which is well spent is taken up in forming runs for the trainmen. Every effort is made to give the men the best that can be obtained, special care being taken to give as many men as possible a full day's wages, the same to be completed within reasonable hours.

During the year 1913 347 time-tables and eighteen patches were made, making a total of 365 turned out and placed in operation. In addition, about thirty were made that were not used.

ADHERENCE TO SCHEDULE AND PASSENGER COUNTS

Nothing will undo all the good work and time consumed in turning out a new time-table more quickly than poor headways and the failure of impressing upon trainmen the importance of observing their time points. Bad headway will upset the best made time-table by causing an unequal distribution of passengers carried. Too much attention cannot be given to maintaining regularity. Those who are responsible for the failure to maintain the schedule headway and for the haphazard running of cars are doing a gross injustice to the company. If two cars are running over the line close together, the second car, in nine cases out of ten, could just as well have been left in the carhouse for the first car has done all the work.

The periodical development of passenger counts is an absolute necessity in present-day operation. Not only are such records valuable as a means of determining service requirements and thus probably effecting increases in gross returns on decreasing operating cost, but also because they may be found of great aid in maintaining cordial relations with the traveling public by detecting conditions in need of correction and permitting the remedy to be applied before complaint is made or public criticism aroused. These counts are taken and tabulated on this property as follows: A car timer is stationed on the line "to be observed" at a particular point where the traffic is heaviest, namely, the point of the maximum number of passengers. The point selected is usually one where cars come to a stop so that the observer has a better opportunity to count the passengers. The observer puts down, on a standard form, the car number, train number, the time the car reaches him and the number of passengers on the car. Standard rush hour records are taken in the direction of greater traffic between the hours of 6:45 and 8:45 in the morning and between 4:45 and 6:45

in the evening. In many cases these hours are changed to cover peculiar conditions on certain lines, but they will cover the heavy rush period for most of our lines. Counts are also taken on a line at other than peak-load points. For instance, at a point where short-time service is turned back, to show the travel on through cars, or at an intersection where two branches of a line separate to run to different terminals; also in sections where complaints may originate regarding lack of sufficient service. A great many eighteen-hour records are also taken from 6 a. m. to 12 midnight. After the count is completed the observer comes into the office and makes a chart of his record on cross-section paper. This chart, when completed, shows the number of passengers on each car and the time the car passed him, the scheduled and operated headway, the number of cars scheduled to pass and the number operated in half-hourly periods, the average number of passengers carried per car in half-hourly periods and the number of seats supplied. The finished chart will show whether the schedule has been maintained as to headways and the number of cars operated; also if sufficient service is being given to take care of the business properly. Passenger counts during the past year were taken at 278 points on the system, and the 2446 charts tabulated show that the various lines were checked that number of times.

DISTRIBUTION CHARTS

Another form of chart used extensively by the time-table department is that which has been termed the "traffic distribution chart." This chart shows the performance of an individual car taken throughout a certain trip. Two men are used to take this test. One man is stationed at the rear platform of the car, where he records the name of the street at which each stop is made and the number of passengers boarding and alighting from the car at each stop. The other man, who is stationed near the front door of the car, keeps a record of each street at which the car stops, the number of passengers leaving the car from the front platform at each stop, the time of arrival at each time point along the line, and, with a stop watch, the time in seconds for each stop. This joint record is brought into the office and profiled. It is charted showing passengers on the vertical scale and the length of the line in miles on the horizontal scale. The chart will show where traffic originates and how it is distributed. A load curve is then developed from the continuous sum of passengers on and off. This curve starts at zero at the beginning of the trip and returns to zero when all passengers leave the car at the end of the trip, thus forming with the base line a closed area. The area, which has passengers for an altitude, and miles as a base, may be obtained by means of a planimeter and may be expressed in passenger miles. Then, by dividing the passenger miles by the total number of passengers boarding the car during the trip, the average length of ride per passenger is obtained. The average load on the car for the trip is reached by dividing the passenger miles by the length of the trip in miles. From the total number of passengers carried, and the stop-watch record of length of stops, the average time per passenger interchanged and also the average length of stop are computed. Other data which can be calculated from this record are, first, the percentage of passengers alighting from the front and rear platforms respectively; second, a separation of passenger stops and those due to delays from various causes, such as traffic regulations, vehicular interference, trolley pole trouble, throwing switches, etc.; third, average number of stops per mile; fourth, the actual trip speed, and its relation to schedule speed, also the trip speed

with stop time excluded, which with braking and acceleration time excluded will show free running speed. All of these data are very valuable from a traffic point of view, and they are used as a basis for changes in running time or any contemplated re-routing. Sometimes on these tests observations are made of the position of the controller handle. If a motorman is continually running on series position when not interrupted by traffic, it is clear that he has too much time for his trip. If this kind of operation is found to be general among the motormen on the line, it is safe to make a cut in the running time and to speed up the line.

I will now demonstrate some of the various cases in which the foregoing type of test is absolutely necessary. Suppose that short-line service is about to be inaugurated on a certain line, and there is a question as to the point on the line where the short service should be turned back. A series of distribution charts are taken to show where most of the short riders board and leave the cars, that is to say, the distance of short haul. The turn-back point can then be arranged to be just outside this short-haul district, thus giving the greatest amount of service at the smallest cost without any waste mileage. This practice increases the operating efficiency of the line, as the short service takes care of the short riders while the through service is still adequate for residents outside of this zone. On a line with two or more fare zones a question arises concerning the exact location of these zones, namely, how far should the passenger be carried for each nickel. These zones are usually defined carefully by franchise regulations, but if the franchisees have left any flexibility as to their location, the distribution chart will show the average length of ride per passenger on the line in question. With this length of ride known and used as a basis, fare zones of equal and reasonable length can be established.

These charts were used in just this type of case, about three years ago, when the residents of a certain section appealed to the Public Utility Commission to have the first fare zone on a certain line extended $\frac{1}{2}$ mile. These distribution charts showed the average distance that the passengers on the line were riding per fare paid, and the Commission ruled that it would be unreasonable to ask the company to extend the ride. This study has also been made useful in determining the operating speed and efficiency of different types of cars. Thus our 2400 type has shown itself much faster in handling passengers than the older types. This is largely due to their double exit door at the front which enables two passengers to leave the front platform at the same time, instead of alighting in single file, as from the older type of car. The average time per passenger interchanged for the 2400 type is sometimes as low as 1.3 seconds, while the older type of cars do well if they are less than 2 seconds. Seven-tenths of a second may seem a very small item to consider, but when it is remembered that if a car carries 100 passengers on a trip it will mean 200 interchanges, and if seven-tenths seconds is saved per interchange per passenger, 140 seconds or two minutes and twenty seconds will be saved per trip. If this amount of time could be saved on each trip of the 360 runs on the South Orange table already described, 840 minutes, or fourteen hours per day would represent the total saving in time. I mention this item to show that little things like this can amount to very much and should be given the closest supervision.

VARYING SPEED IN PASSENGER MOVEMENT

It is interesting to note the difference in the class of traffic handled at different times of the day. The rush-hour riders are always much faster than those during

the non-rush period. During these rush hours most of the passengers are men who are in a hurry to get to their place of business to get back home at night. They board a car as quickly as possible, and are usually unencumbered by bundles. There are few children, old or infirm persons. Now consider the non-rush period. We have the women shoppers, and with arms loaded with bundles, they cannot board a car in a hurry. If they are not loaded down with bundles they are generally accompanied by children, who must be helped on and off the car. Elderly and infirm persons do most of their traveling in this period, and they cannot be hurried. It is often argued that more running time should be allowed cars during the rush hour, because of the congestion coincident with the rush, but a study of the difference in the type of people traveling at different hours of the day shows that the rush-hour crowds are faster per passenger. Therefore, except in isolated cases, extra running time for rush-hour operation is not necessary.

Public Utility Commission hearings have brought up the question of the ratio of seating capacity to the number of passengers during rush hours, and inquiries have been made as to the distance passengers were compelled to stand before seats would be available. This can be shown immediately by distribution charts. Simply draw a horizontal line above the base line showing the rated seated capacity of the car, and the position of the curve above this line will show the exact distance that the last standee was compelled to stand. It will also show that enforced standing is of short duration because of the constant interchange of passengers at various points on the line.

CONDITIONS IN NEW TERRITORY—CONCLUSION

In undertaking the development of a time-table in new territory it is necessary to canvass the district to be served with a view of obtaining an estimate of the number of passengers expected as patrons, making a study of the location of the section, its business and manufacturing districts and of its railroad station. Data obtained in this manner are of material assistance in the development of the headways to be inaugurated. After the line is opened to traffic, passenger counts must be taken at different points on the line and a study made of them, so that the interval between cars can be adjusted to give the proper service where and when needed to those offering themselves for transportation. The time points and speed to be maintained by the cars will be governed to a great extent, at the beginning, by local conditions in the section through which they operate. Speed and headways are frequently limited by franchises.

In conclusion I would state that the duties of the members of the time-table department do not consist simply in the making of time-tables, but also involve the development of a great deal of statistical information for use in verifying or disproving various complaints made by municipal bodies, improvement associations and others regarding the service rendered. Their data are also used in hearings before the Public Utility Commissioners, and much data used by the various operating officials must be compiled by the time-table men.

Mr. Jackson's paper was followed by written discussion as contributed by Elmer L. Williams, division superintendent Hudson division, and D. H. Herflicker, supervisor Southern division. Informal discussions were also contributed by W. B. Graham, superintendent Essex division, and D. C. McDougall, division engineer. At the next meeting of the section, which will be held on May 21, Charles H. Coe will read a paper on "Training the Trainmen."

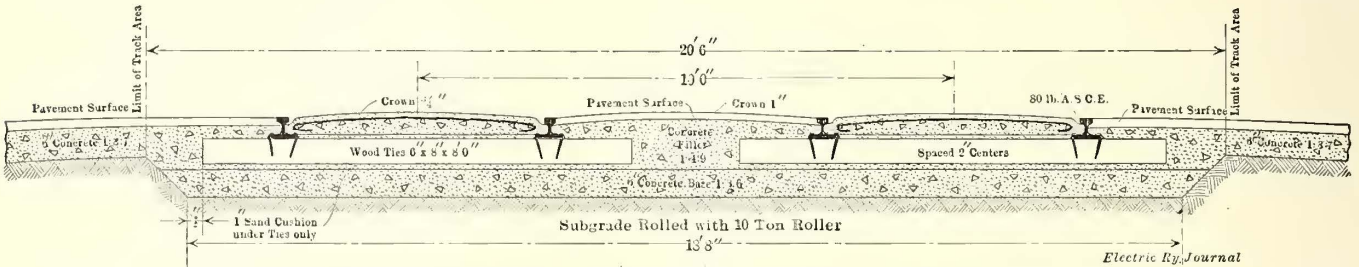
TRACK CONSTRUCTION IN EDMONTON, ALBERTA

BY H. C. SAUNDERS, ENGINEER EDMONTON RADIAL RAILWAY

Edmonton lies in the center of a rich farming country, and the nature of the soil has proven a very serious obstacle to the proper maintenance of street-car tracks in the city. The surface is composed almost entirely of a heavy clay, practically free from sand or stone. Under the sun's rays the surface will bake so hard that a pick cannot be sunk more than an inch or two into it, but a very slight rain softens it to a veritable bog. Ballast tamped in place over such a sub-grade disappears with the first day's rain. To illustrate this condition it is only necessary to state that during the rainy season two years ago the average number of derailments on the

necessitating constant repair and expensive shimming. In view of this experience the base type of construction was adopted with ties sufficiently numerous to bond the track firmly, reducing the vibratory effects to a minimum.

The sub-grade was first excavated to a depth of 18 in. below the finished grade and thoroughly rolled with a 10-ton roller to reduce settlement under service. A 6-in. layer of 1:3:6 concrete was poured on this and allowed to set two or three days before the track was laid. Fir ties 6 in. x 8 in. x 8 ft. were spaced 2 ft between centers, and 80-lb., A. S. C. E. rail in 60 ft. lengths was laid. A 22-in., four-hole continuous joint was used to approximate as closely as possible the stiffness of the rail section. The track was then surfaced and lined, and a 1-in. sand cushion was tamped firmly



Edmonton Permanent Track Construction—Cross Section, Double-Track, 10-Ft. Centers

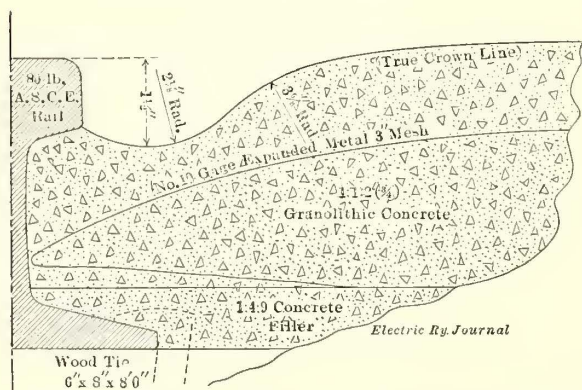
Edmonton Radial Railway was three and four per day over the unpaved tracks then in use.

In view of these conditions it was considered essential by the present management that as much as possible of the ballasted track be replaced by some form of permanent construction and that all future construction be built on a permanent basis. During the past year 21.71 miles of permanent track were laid in accordance with this program, replacing 8.17 miles of ballasted track of the former type.

In view of the extensive program contemplated, it was thought advisable to study the type of construction carefully, particularly as the former types of so-called permanent construction had given very poor satisfaction. These comprised all varieties of girder construction and consisted essentially of concrete girders lying

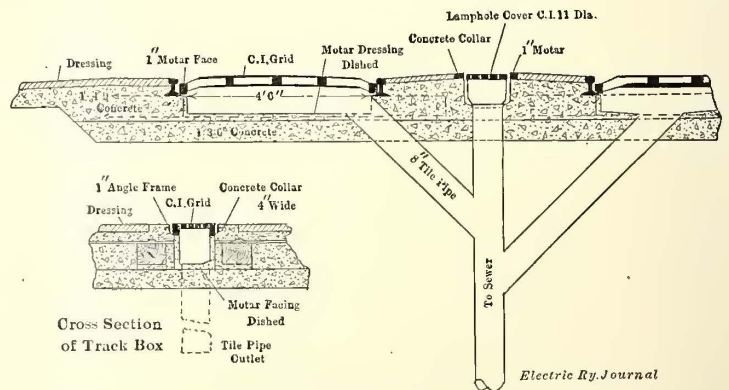
under the ties. The sand cushion served the double purpose of insuring accurate surfacing and absorbing to a large extent the vibrations which had previously proved so troublesome.

With the sand cushion in place, a weak filler of concrete mixed in the proportion of 1:4:9 was poured between the ties and brought to a level, 4 in. below the final surface, care being taken to spade the filler well between the ties. The final surface used was a granolithic concrete, composed of one part of cement, one part of sand and two parts of broken granite to pass through a 3/4-in. ring. In this was laid No. 10 gage expanded metal of 3-in. mesh, as previous surfaces of this type had shown a tendency to break away under traffic. It was believed that the reinforcing would counteract this.



Edmonton Permanent Track Construction—Detail of Flange Way Construction

longitudinally under the rails, connected under the ties with cross-girders of concrete. In practice, it was found that the vibration of the rail directly against the concrete caused a gradual crumbling away of the top and sides of the girder, so that the rails were ultimately balanced upon a knife edge of concrete. The same vibration destroyed any existing bond between the track construction and the adjoining pavement, and in from three to five years after laying, cases were noted where the rail had settled 4 in. and 5 in. below the paving,



Edmonton Permanent Track Construction—Detail of Track Box and Outlet Connection to Main Sewer

This surface was only adopted after considerable discussion, but it was finally finished for the following reasons. It could be easily finished to the required surface contour, it permitted the use of the 5-in. rail, and it was very much cheaper to construct in Edmonton than any type of block paving and at the same time it would stand up well under heavy traffic.

Special attention was paid to the design of the flange-way, it being desired to secure a self-clearing flange-way, which would cause the minimum of pounding from

wagon wheels crossing the track. The contour shown in the accompanying figure was finally adopted and has given very good satisfaction.

The paving adopted by the city for the streets not paved with cement concrete has been either sheet asphalt, asphalt concrete or bitulithic. These were carried right up to the outside of the rail, but were finished $\frac{1}{4}$ in. below the top to prevent cutting from worn car wheels.

Grooved girder rails were used throughout on special work, and in consequence it was possible to use the same sheet paving as on the rest of the streets, instead of carrying the more expensive granolithic finish over this area. This resulted in a much quieter intersection, besides reducing the cost, and so far the construction has stood up very well.

Provision for surface drainage was made by locating track boxes at all profile sags as shown in one of the accompanying diagrams. These boxes were installed in place in the concrete filler by the use of a removable form and were very readily and cheaply constructed. No provision was made for underground drainage, as it was considered that the well-rolled sub-grade would undergo no further appreciable settlement, and the ties were so thoroughly embedded in concrete that there was no danger of rot.

In our opinion the chief enemy to the life of permanent street railway construction is excessive vibration, and the type outlined above has been designed throughout to minimize it. Cheapness of replacement was also considered. As the ties are completely surrounded by concrete, vibration is practically non-existent in the base, and hence the life of the construction should be limited only by the life of the rail. When the time comes for replacement, the excavation of the old concrete should not have to go much below the rail, and that part of the construction below them should be practically everlasting.

Practically all the concrete work for the past season was done by contract, the street railway doing the track-laying and overhead work.

ILLUMINATING ENGINEERS DISCUSS SIGNAL ILLUMINATION

At a joint meeting of the Railway Signal Association and the Illuminating Engineering Society of Chicago papers discussing illumination of railway signals, signal lenses and the physiology of the eye in its relation to railway signaling were presented. Papers were read by T. S. Stevens, signal engineer Atchison, Topeka & Santa Fé Railroad; Dr. H. T. Gage, Corning, N. Y., and Dr. Nelson M. Black, of Milwaukee, Wis. The discussion of these brought out the fact that only 4 per cent or 5 per cent of all the railway signals now in operation in the United States were electrically illuminated. The discussion centered around the type of oil lamp known as the "Long Time Burner," although it was generally agreed that electrical illumination was more to be desired and was bound to become prevalent in the future. The opinion was generally expressed that the future signal would be given by means of transmitted light in day as well as night, although some engineers thought that it would probably take the form of some type of illuminated semaphore.

The Carbon Transit Company, Mauch Chunk, Pa., is building a new large dancing pavilion at Flagstaff Point overlooking the park, 800 ft. below. This pavilion will replace a similar one destroyed by fire last spring. The new building will be approximately 85 ft. x 150 ft. and is to be completed by May 1.

CENTRAL ELECTRIC COMMITTEES

The annual "Brown Book" of the Central Electric Railway Association has just been issued. It shows the officers for the ensuing year elected at the annual meeting of the association on Feb. 25 and already published in this paper. The book contains a list of the member companies of the association, including interurban roads with 4107 miles of track and two city lines, those in Cleveland and Toledo. It also shows the committees appointed by the new administration. The names of the members of these committees and of the new committees of the Central Electric Railway Traffic Association are published below. The "Brown Book" also shows charges for interchange and equipment and other information of association interest.

STANDING AUDITING COMMITTEE—Walter Shroyer (chairman), Union Traction Company of Indiana; L. T. Hixson, Terre Haute, Indianapolis & Eastern Traction Company; E. L. Kasemeier, Ohio Electric Railway.

ANNUAL TRANSPORTATION—H. A. Nicholl (chairman), Union Traction Company of Indiana; S. W. Greenland, Ft. Wayne & Northern Indiana Railway; C. J. Laney, Cleveland, Southwestern & Columbus Railway; C. P. Wilson, Interstate Public Service Company; C. O. Sullivan, Western Ohio Railroad.

CONSTITUTION AND BY-LAWS—A. W. Brady (chairman), Union Traction Company of Indiana; C. N. Wilcox, Western Ohio Railroad; C. L. Henry, Indianapolis & Cincinnati Traction Company; C. A. Floyd, Grand Rapids, Holland & Chicago Railway; G. O. Nagle, Wheeling Traction Company.

CLAIMS COMMITTEE—Wm. Tichenor (chairman), Terre Haute, Indianapolis & Eastern Traction Company; J. H. Shaw, Cleveland, Painesville & Eastern Railroad; J. E. Rankin, Detroit, Monroe & Toledo Short Line Railway; H. Rimmelspach, Lake Shore Electric Railway; C. P. Wilson, Louisville & Northern Railway & Lighting Company; S. W. Reynolds, Danville, Urbana & Champaign Railway; E. E. Slick, Union Traction Company of Indiana.

FINANCE COMMITTEE—F. D. Carpenter, (chairman), Western Ohio Railroad; W. H. Forse, Union Traction Company of Indiana; A. Benham, Ohio Electric Railway; H. E. Vordermark, Ft. Wayne & Northern Indiana Traction Company; C. N. Hawley, Northwestern Ohio Railway & Power Company; F. J. Green, Springfield, Troy & Piqua Railway.

HOTEL AND ARRANGEMENT COMMITTEE—L. J. Drake, Jr., (chairman), Galena Signal Oil Company; S. D. Hutchins, Westinghouse Traction Brake Company; W. H. Bloss, Ohio Brass Company; L. G. Parker, Cleveland Frog & Crossing Company; T. H. Henkle, Electric Service Supply Company; Thomas Ryan, General Electric Company; J. G. McMichael, Atlas Railway Supply Company.

INSURANCE COMMITTEE—F. W. Coen (chairman), Lake Shore Electric Railway; F. A. Healy, Ohio Electric Railway; W. H. Forse, Union Traction Company of Indiana.

COMMITTEE ON COMPENSATION FOR HANDLING UNITED STATES MAIL—E. B. Peck (chairman), Terre Haute, Indianapolis & Eastern Traction Company; R. A. Crume, Dayton & Troy Electric Railway; W. A. Carson, Evansville Railways Company; Geo. Whysall, Columbus, Marion & Bucyrus Railroad.

PUBLICITY COMMITTEE—E. M. Haas (chairman), *ELECTRIC RAILWAY JOURNAL*; H. F. Kenfield, *Electric Traction*; E. H. Farr, A. H. Pugh Printing Company.

STANDARDIZATION COMMITTEE—R. N. Hemming (chairman), Union Traction Company of Indiana; H. H. Buckman, Louisville & Northern Railway & Light

Company; F. J. Foote, Ohio Electric Railway; L. M. Clark, Terre Haute, Indianapolis & Eastern Traction Company; Charles Sigler, Winona Interurban Railway; F. J. Stevens, Ft. Wayne & Northern Indiana Traction Company; J. R. Fairchild, Western Ohio Railroad; E. Heydon, Terre Haute, Indianapolis & Eastern Traction Company; A. F. Rolston, Columbus, Delaware & Marion Railway.

SUBJECT COMMITTEE—E. B. Peck (chairman), Terre Haute, Indianapolis & Eastern Traction Company; W. S. Whitney, Ohio Electric Railway; J. Jordan, Cleveland, Painesville & Eastern Railroad; C. D. Emmons, Chicago, South Bend & Northern Indiana Railway; G. W. Parker, Detroit, Monroe & Toledo Short Line Railway; F. D. Carpenter, Western Ohio Railroad; Will H. Bloss, Ohio Brass Company.

RULES GOVERNING THE INTERCHANGE OF EQUIPMENT—H. A. Nicholl (chairman), Union Traction Company of Indiana; C. D. Emmons, Chicago, South Bend & Northern Indiana Railway; A. Benham, Ohio Electric Railway; E. L. Kasemeier, Ohio Electric Railway.

SUPPLY MEN'S COMMITTEE—S. D. Hutchins (chairman), Westinghouse Traction Brake Company; L. G. Parker, Cleveland Frog & Crossing Company; John F. Ohmer, Ohmer Fare Register Company; L. J. Drake, Jr., Galena Signal Oil Company; W. H. Bloss, Ohio Brass Company; J. H. Drew, Drew Electric & Manufacturing Company; John Benham, International Register Company; M. B. Lambert, Westinghouse Electric & Manufacturing Company; G. F. Allen, Railway Materials Company; A. G. Olberding, American Brake Shoe & Foundry Company; Thomas Ryan, General Electric Company; T. H. Henkle, Electric Service Supplies Company.

TRANSPORTATION COMMITTEE G. K. Jeffries (chairman), Terre Haute, Indianapolis & Eastern Traction Company; H. C. Warren, Toledo & Indiana Railroad; E. Smith, Toledo, Fostoria & Findlay Railway; Frank Smith, Interstate Public Service Company; J. F. Keys, Detroit, Monroe & Toledo Short Line Railway; A. Benham, Ohio Electric Railway; C. F. Franklin, Winona Interurban Railway; H. C. Mason, Benton Harbor-St. Joe Railway & Light Company.

VIGILANCE AND MEMBERSHIP COMMITTEE—C. D. Emmons (chairman), Chicago, South Bend & Northern Indiana Railway; A. C. Miller, Gary & Interurban Railway; F. J. Green, Springfield, Troy & Piqua Railway; R. A. Crume, Dayton & Troy Electric Railway; T. F. Grover, Terre Haute, Indianapolis & Eastern Traction Company; J. N. Tabb, Parkersburg, Marietta & Interurban Railway; C. J. A. Paul, Mahoning Valley Railway; Will H. Bloss, Ohio Brass Company; E. M. Haas, ELECTRIC RAILWAY JOURNAL.

WOOD PRESERVATION COMMITTEE—F. P. Smith (chairman), Interstate Public Service Company; T. B. McMath, Indianapolis Traction & Terminal Company; L. A. Mitchell, Union Traction Company of Indiana.

COMMITTEE ON JOINT WEIGHT AND INSPECTION BUREAU—J. H. Crall (chairman), Terre Haute, Indianapolis & Eastern Traction Company; R. A. Crume, Dayton & Troy Electric Railway; W. S. Whitney, Ohio Electric Railway.

JOINT FOLDER COMMITTEE—E. D. Peck (chairman), Terre Haute, Indianapolis & Eastern Traction Company; C. N. Wilcoxon, Chicago, Lake Shore & South Bend Railway; C. G. Taylor, Sandusky, Norwalk & Mansfield Electric Railway.

COMMITTEES OF THE CENTRAL ELECTRIC TRAFFIC ASSOCIATION.

STANDING AUDITING—Walter Shroyer (chairman), Union Traction Company of Indiana; L. T. Hixson,

Terre Haute, Indianapolis & Eastern Traction Company; E. L. Kasemeier, Ohio Electric Railway.

BOOSTER COMMITTEE—F. D. Norviel (chairman), Union Traction Company of Indiana; C. O. Sullivan, Western Ohio Railroad; J. H. Crall, Terre Haute, Indianapolis & Eastern Traction Company; O. H. Murlin, Dayton & Troy Electric Railway; J. H. Pounds, Benton Harbor-St. Joe Railway & Light Company.

CONSTITUTION AND BY-LAWS—C. J. Laney (chairman), Cleveland, Southwestern & Columbus Railway; Bert Weedon, Interstate Public Service Commission; E. Hamprecht, Toledo, Bowling Green & Southern Traction Company; B. E. Parker, Public Utilities Company; W. O. Woodard, Chicago, Lake Shore & South Bend Railway.

INTERCHANGEABLE MILEAGE TICKET—F. D. Norviel (chairman), Union Traction Company of Indiana; W. S. Whitney, Ohio Electric Railway; O. H. Murlin, Dayton & Troy Electric Railway.

INTERLINE BAGGAGE—O. H. Murlin (chairman), Dayton & Troy Electric Railway; C. O. Sullivan, Western Ohio Railroad; J. A. Greenland, Ft. Wayne & Northern Indiana & Columbus Railway.

JOINT PASSENGER TARIFFS—W. S. Whitney (chairman), Ohio Electric Railway; F. D. Norviel, Union Traction Company of Indiana; C. J. Laney, Cleveland, Southwestern & Columbus Railway.

JOINT FREIGHT TARIFFS—J. H. Pounds (chairman), Benton Harbor-St. Joe Railway & Light Company; C. O. Warfel, Indianapolis & Cincinnati Traction Company; C. B. Kleinhans, Toledo & Indiana Railroad; W. D. Stansifer, Winona Interurban Railway; J. C. Bradford, Scioto Valley Traction Company.

OFFICIAL INTERURBAN MAP—G. M. Patterson (chairman), Ft. Wayne & Northeastern Railway; J. H. Crall, Terre Haute, Indianapolis & Eastern Traction Company; O. H. Murlin, Dayton & Troy Electric Railway; W. S. Whitney, Ohio Electric Railway; C. C. Trees, Indianapolis Railways & Light Company.

OFFICIAL INTERURBAN GUIDE—C. O. Sullivan (chairman), Western Ohio Railroad; J. M. Brick, Springfield, Troy & Piqua Railway; F. D. Norviel, Union Traction Company of Indiana; J. F. Starkey, Lake Shore Electric Railway; J. A. Greenland, Ft. Wayne & Northern Indiana Traction Company.

JOINT EXCEPTION SHEET—C. O. Sullivan (chairman), Western Ohio Railroad; J. H. Crall, Terre Haute, Indianapolis & Eastern Traction Company; C. O. Warfel, Indianapolis & Cincinnati Traction Company; G. M. Patterson, Ft. Wayne & Northwestern Railway; J. H. Pounds, Benton Harbor & St. Joseph Railway & Light Company; W. S. Whitney, Ohio Electric Railway; F. D. Norviel, Union Traction Company of Indiana.

RULES GOVERNING SETTLEMENT OF FREIGHT CLAIMS—F. D. Norviel (chairman), Union Traction Company of Indiana; F. I. Hardy, Chicago, South Bend & Northern Indiana Railway; J. S. Clark, Marion, Bluffton & Eastern Traction Company; C. B. Kleinhans, Toledo & Indianapolis Railroad; C. O. Sullivan, Western Ohio Railroad.

JOINT WEIGHT AND INSPECTION BUREAU—J. H. Crall (chairman), Terre Haute, Indianapolis & Eastern Traction Company; F. D. Norviel, Union Traction Company of Indiana; W. S. Whitney, Ohio Electric Railway; F. I. Hardy, Chicago, South Bend & Northern Indiana Railway; O. H. Murlin, Dayton & Troy Electric Railway.

The electric road connecting Junction City and Manhattan, Kan., is likely to derive a good deal of revenue from students at the Agricultural College at Manhattan. The monthly round-trip rate is \$13.

COMMUNICATIONS

MAINTENANCE AND DEPRECIATION

NEW YORK CITY, April 10, 1914.

To the Editors:

In your issue of March 28, Col. T. S. Williams has pointed out some of the vital conditions pertaining to the present methods of accounting for "maintenance and depreciation" and requests that other opinions be expressed. In the examination of many properties I have found that depreciation, deterioration, obsolescence and amortization are terms that have been used without a clear and definite understanding of just what each classification covers. It is generally accepted that depreciation and deterioration are synonymous terms; but take as an example a new car: after one year of service it has a depreciated value, and there is also some deterioration to its various wearing parts, but the depreciation and deterioration have a widely varying ratio in computing duplication values of property.

Depreciation can be estimated and some standard accepted, but deterioration is so dependent upon whether the car is operated under a careful management and efficient maintenance during each year of its operation that it is extremely difficult to work out any standard that could be accepted. After depreciation and deterioration have reached a certain point—that is, when the real value of the car has depreciated by 75 per cent and the deterioration has gone so far that the maintenance becomes excessive, the investment in a new car would be warranted by the saving in operation. This should be taken care of by an amortization fund, created to insure the going value of the property. The life of each item of installation can be clearly estimated and a rate worked out for that item which would determine the percentage of value to be set aside each year to insure the going value of the installation. In case a twenty-foot car, for example, was replaced by a thirty-six foot car, the value of the twenty-foot car should be obtained from the amortization fund and the excess cost of the larger car, over and above the value of the twenty-foot car, charged to improvements and betterments.

The term obsolescence has been made to cover a multitude of sins, but should in reality cover what might be termed an unproductive account. A car in operation may be entirely adequate in seating capacity and equipment to meet the actual demand of the service, but there is a public demand to be met that calls for a car with lower steps and a new design of equipment. While this installation has an intangible value in increasing business and possibly in decreasing operating expenses, yet the investment could not justly be charged to improvements and betterments. On the other hand, under such conditions the equipment displaced has not served its full life so that the amortization fund could be charged with the account. Obsolescence seems to be an item that is generally provided for by a contingent expense, but it is a term that can be clearly defined when used in the classification of expenditures. It should have a classification entirely distinct from the improvement and betterment account, as in many cases it is an expenditure that is not warranted in dollars and cents by any return on the capital invested.

I believe it is possible to obtain an agreement upon standards of depreciation which, used in conjunction with the amortization fund, will take care of deterioration in a practical way. It is practically impossible to create any fund that would take care of obsolescence, as it is a contingency that is effected by new inventions, esthetic tastes and demands of the public.

W. W. COLE, Consulting Engineer.

DETROIT, MICH., April 9, 1914.

To the Editors:

The editorial on the subject of "Maintenance and Depreciation" in the March 21 issue is certainly timely, and the writer agrees with President Williams, of the Brooklyn Rapid Transit Company, that if by fair discussion a consensus of intelligent and practical opinion could be obtained, a great public service would be thereby rendered.

In a broad discussion of the subject it would seem that the following elements must necessarily be given consideration:—

(1) Insured earnings—these are absolutely essential to the continued existence of a public service utility in this day of an ever-increasing cost of furnishing service to the public, and at the same time an ever-decreasing rate for such service.

(2) The percentage of cost new at which a public service utility shall be maintained to afford the best and most economical service to the public.

(3) The amount necessary to be expended annually to maintain the utility at this established percentage of condition.

(4) The amount necessary to be provided annually to replace property used up in service—depreciation.

(5) The amount of insured earnings necessary to provide for such maintenance and depreciation, other operating expenses, taxes, interest and a fair profit on the investment devoted to the service so rendered.

Those who are familiar with the great problem under discussion believe that the legislative and regulating governmental bodies of the country have gone hastily, unadvisedly and ill-advisedly in the direction of an attempt at regulation of these matters. It is apparent, of course, that under the so-called regulations and practices of these governmental bodies, a serious situation has been brought about, jeopardizing even the continued existence of the properties affected and the welfare of the public to be served. These regulating bodies admit their inability to establish a rate of depreciation, and well they may. Certainly it is not possible to establish either a uniform rate of depreciation or a uniform rate of maintenance to apply alike to all transportation undertakings.

Take for example the case of tracks. When it is considered that a mile of track, in one of our larger cities, is subjected in a given time to greater usage than a mile of track in a smaller city, the question arises as to what are the elements to be considered in determining the relative depreciation. Perhaps we should first consider the relative condition as to the sub-foundation and main foundation, drainage, character of track construction, weight and character of equipment, speed operated and frequency of stops, relative live load carried and other causes contributing directly to depreciation.

A sharp line should be drawn here between depreciation and maintenance. The construction may be maintained as an item of expense until it is no longer serviceable, and when that condition is reached replacement must follow, and the cost thereof is depreciation. This, however, should not be confused with replacement growing out of obsolescence or occasioned by reason of the necessity of replacing a light structure with a heavier one to meet a condition which is the result of heavier traffic.

It may be practicable, if the date of beginning can be determined upon, to inaugurate a method of providing for depreciation on a car mileage basis. Under such a method it might be possible to determine the life of that part of the structure which is affected by atmospheric and other like conditions, and the life of that part of the structure which is affected by wear.

The problem is a difficult one to solve, and the writer would like to see a full, dispassionate discussion looking to that end, and for the purpose of inviting such a discussion the above suggestion of five elements to be considered has been made. Only by means of a thorough discussion will it be possible to reach a definite and universal conclusion on the subject of maintenance and depreciation by which the confusion "as to the best accounting treatment to be used" will be clarified, simplified and standardized.

R. B. RIFENBERICK, Consulting Engineer.

INTERNATIONAL RAILWAY COMPANY
BUFFALO, N. Y., April 14, 1914.

To the Editors:

All property subject to wear and tear and the elements will depreciate in value. When it has to be replaced for any reason, the cost thereof is an operating expense. The cost of maintaining it up to the time it is replaced is, of course, an operating charge also.

The best method of maintaining and equalizing the average charge for maintenance and renewals is to set aside each month a percentage of gross income to the credit of renewals and maintenance fund, sufficient to take care of current requirements, with a surplus to provide for exigencies and peaks in the cost of renewals. All expenditures for maintenance and renewal of property should be charged against this fund.

For a period of eight years ending Dec. 31, 1913, the International Railway Company expended for renewals and maintenance 14.90 per cent of its gross income. The property has been fairly well maintained, but in order to provide the depreciation fund with a sufficient surplus to take care of extraordinary charges in the way of renewals, it was determined that 16½ per cent of the gross income should be credited to the depreciation fund each month, which it is believed will be ample to provide for all current depreciation charges and take care of peaks in the cost of renewals.

During the winter months, when very little work is being done, the fund necessarily increases, whereas during the summer months the expenditures for renewals and maintenance generally exceed the amount set aside for this purpose; but on the average it is expected that this percentage will yield a surplus which may be applied to the credit of accrued depreciation.

E. G. CONNETTE, President.

DEPRECIATION FROM A CERTIFIED ACCOUNTANT'S POINT OF VIEW

NEW YORK UNIVERSITY
NEW YORK, April 15, 1914.

To the Editors:

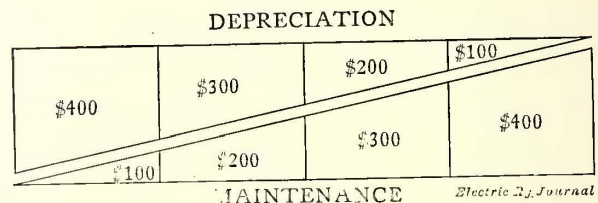
In view of the discussion appearing in your columns regarding the subject of "Maintenance and Depreciation," a résumé of this topic from the public accountant's point of view may not be inappropriate.

The value of all physical property tends to decrease, owing to such causes as use, abuse, oxidation, deterioration, disintegration, inadequacy, obsolescence and even change of ownership. Since the passing of physical property is inevitable, provision for its loss should be made from time to time out of profits. The accounting term used to denote this charge against profits is "depreciation."

Depreciation is usually defined in substance as "the decrease in the value of an asset due to wear and tear, deterioration, inadequacy or obsolescence." Such a definition is perhaps somewhat inappropriate in that it uses the words "wear and tear," which the operating man usually associates with maintenance. Imme-

diately the argument arises that if the property is adequately maintained a charge for depreciation is not necessary. Even if wear and tear were synonymous with maintenance (which it is probably not intended to be) there would still be going silently on that subtle deterioration which is accomplished by time and results ultimately in a condition wherein repairs and maintenance will not avail. It would seem, therefore, that the operating man must admit the necessity of a charge in excess of mere maintenance as he knows it, and the extent of the charge becomes the next question of interest.

The life of the property is primarily the basis for determining the duration of the value or better perhaps the rapidity with which the asset shall be written down. The value of the residue or scrap value must be taken into consideration and deducted before the amount to be written off is determined. With the amount to be written off and the estimated life determined, it is apparent that the next step should be to spread the amount equitably over the period covered by the life. To determine the life of railway property is in most cases almost as difficult as to determine the life of a human being. Tables bearing on physical property have been constructed by engineers and appraisers in the same way that tables of life probabilities have been worked



out by mortuary experts. Unlike human beings, however, physical property assumes so many different forms and exists under so many different conditions that it is almost impossible to classify it with sufficient exhaustion to make such a classification dependable. Past experience of our own and that of others as compiled in tables dealing in generalities are all that we have available. The best estimate must at all odds be somewhat arbitrary.

To determine the amount to be written off annually there are several methods at hand, namely, the fixed percentage, fractional method with weighted years, declining balance unscientific, declining balance scientific, sinking fund and revaluation. Without question the fixed percentage (wherein the amount to be written off is ascertained by dividing the value by the life) is most frequently used. The effect of this method is to charge an equal amount to operations yearly and will be objected to usually because of the fact that maintenance expenses are generally conceded to increase with the age of the property. Thus when the two charges of maintenance and depreciation are combined the burden falls in the later years. In view of this fact probably the most satisfactory method is that which computes the depreciation charge by applying the scientific percentage to the declining balance. This has the effect of charging to operation an amount gradually decreasing as time passes. The charge for depreciation is heaviest in the earlier years at the time when the maintenance expenses are lowest, and is lightest at the end of the period when the maintenance expenses are most burdensome. This combination, therefore, is thought to result in a well-balanced charge to operation. The scheme may be more clearly understood through reference to the accompanying diagram.

Few rules concerning depreciation may be consistently laid down. Of the necessity of providing for it,

however, there should be no question, even though the property is adequately maintained. The provision should be linked with that for maintenance in a way that will produce a well-balanced charge to operations annually. Moreover, the property should be classified exhaustively and the life of the constituent parts found. Finally, conservatism should govern, remembering that at best depreciation is only an estimate.

J. R. WILDMAN, Professor of Accounting.

INTERSTATE CLASSIFICATION OF ACCOUNTS

PACIFIC GAS & ELECTRIC COMPANY

SAN FRANCISCO, CAL., April 7, 1914.

To the Editors:

I have given the proposed Interstate Commerce Commission classification of accounts only a cursory examination, but such examination suggests the following:

With reference to detailed accounts under section 3—power: maintenance of dams, canals and pipe lines have been omitted, and it would appear that such account should be inserted in order to provide maintenance accounts similar to road and equipment accounts.

The description of the accounts No. 25—depreciation of way and structures; No. 39—depreciation of equipment, and No. 48—depreciation of power plant, buildings and equipment, does not include an allowance for obsolescence and inadequacy.

I would suggest that the accounts should be changed to read "amortization of way and structures"; "amortization of equipment," and "amortization of power plant, buildings and equipment," and that the description of the charges applicable to such accounts be charged to include an allowance for obsolescence and inadequacy, or that separate accounts be set up to cover such items under each of the above depreciation accounts.

The reason for making special provision for obsolescence and inadequacy is based on past experience of companies with electrical equipment of all kinds, that the type of equipment is constantly changing and that the liability of future changes is just as great owing to the many still unknown factors constituting electricity and electrical operations. The expense of installing apparatus or equipment of larger capacity because of the inadequacy of the original installation is an item of expense not coming under the headings of maintenance, depreciation or obsolescence. Such expense is a very large factor to companies operating over a large and growing territory such as is found in the West.

In presenting the form of income statement on page 49 of the accounting schedule, depreciation or amortization of capital has been included in operating expenses.

Unless the Interstate Commerce Commission will establish uniform rates of depreciation or amortization of capital and insist that each company use the rates applying to its particular territory, it would appear more desirable to have the income statement show the reserves for depreciation or amortization of capital separate from operating expenses in order to have the actual operating expenditures on a comparable basis as between companies.

The above, I believe, is particularly desirable owing to the indifferent attitude of a great many companies and the varied methods followed by them in setting up such allowances.

The form of the general balance sheet statement appearing on page 71 provides for deducting reserves for accrued depreciation from the investment amounts of road and equipment. In line with the growing practice of computing the rate of return of an operating company on its reproduction or service value it would more nearly serve the purposes of the balance sheet to carry

reserves for accrued depreciation under corporate surplus, changing, if desirable, the heading to "surplus and reserves."

The above is based on the assumption that the balance sheet statement is presented for the analysis of the operations of a going concern and not for purposes of sale. The fact that depreciation may have accrued on capital does not, I believe, justify the deduction of such accrual from the original value of capital which is still in operation and rendering the service for which it was originally intended.

The argument appears well-founded, that if a structure, facility or unit of equipment is rendering the service for which it was originally installed, it will cost the reproduction value or present market value to install similar capital for the same purposes.

M. H. BRIDGES, Auditor.

SUGGESTION FOR CLASSIFYING SIGNAL FAILURES

ILLINOIS TRACTION SYSTEM

SPRINGFIELD, ILL., April 14, 1914.

To the Editors:

The establishment of a standard definition for a signal failure is, as pointed out in your editorial of last week, a matter which should be given prompt consideration. However, I cannot altogether agree with your opinion as indicated in the last paragraph of the editorial in question.

The term "signal failure" has, itself, caused considerable discussion, the majority of engineers believing that when a signal indicates stop, due to some derangement of the apparatus or line wires, the signal does not really fail but that it does what it is designed to do, namely, to go to the safe indicating position when deranged. Therefore up to the present time no definition has been given by the definition committee of the Signal Association. It has always appeared to me, however, that this argument is a poor one, and I maintain that when a signal goes to stop for some cause other than the presence of a train in the controlling section the signal really does fail.

Railroads are not spending the amount of money that signal installations require in order to have this apparatus, when it is deranged, go to the safe position, but rather they are expecting that the signals will properly indicate to a train the condition of the block governing it, and by the expression "condition of the block" I mean whether or not it is occupied by another train. The side issues of protection from broken rails, open switches, disconnected wires, and other characteristics of this nature are not, in my mind, the primary object for installing signals, and I feel, therefore, that a signal in the stop position for any reason other than an occupied block is a failure.

To go further, when considering the matter in the above light, the term "creditable failure" becomes one full of meaning. I do not think, however, that "creditable failures" should include those due to derangement of apparatus but rather should apply only to those failures that cause the signal to display stop on account of some operating condition that makes unsafe the display of a clear indication. I feel that it might be well to develop a new term for the so-called "failure" when the block is actually occupied by another car, as in my estimation this is the one primary object for installing the signals.

However, on the Illinois Traction System at the present time we charge signal failures whenever a train is stopped improperly, regardless of whether line wires are broken, or whether any of the other multitude of causes exist which may make a signal indicate stop when no train is in the next block.

JOHN LEISENRING, Signal Engineer.

WHAT CONSTITUTES A SIGNAL FAILURE?

PUBLIC SERVICE RAILWAY COMPANY
NEWARK, N. J., April 14, 1914.

To the Editors:

The editorial entitled "What Constitutes a Signal Failure?" in the last issue of your paper brings up a timely and pertinent question for discussion. Whether a signal failure should be charged for every train improperly stopped by a signal seems to hinge upon whether the signal system is viewed from the single point of safeguarding the movement of trains or from the dual point of safety and facilitating train movements. It would appear that the latter is most likely of acceptance. This being the case it seems reasonable to charge a signal failure for every train improperly stopped by a signal.

Just where the signal system ends is not very clearly defined, but it appears fair to put it at the feeder panel where the current supply for signal operation leaves the station, or, if the current is derived from feeders supplying other devices, at the point of leaving such feeders. All interruptions between these points, up to and including the signals themselves, should be charged as failures. This looks to be drastic, as stated in the article, but it gives definiteness to the question and probably would tend towards a higher degree of efficiency in the inspection and maintenance of the signal feeder system.

In order that the Signal Department should be not unfairly charged with failures for which it is in no wise responsible, there should be a subdivision of failures, and signals set to stop by the delinquency of the trainman in failing to close a switch properly or by the carelessness of a sectionman in removing bonds or in short circuiting the tracks, should be charged to the department at fault. The really serious signal failure is the false clear indication which, fortunately, is rapidly becoming a rarity, thanks to the skill of the signal manufacturers, but nevertheless requires its inclusion in any definition of a signal failure. J. W. G. BROWN,

Assistant General Superintendent.

IMPROVEMENTS IN METHOD OF ACCOUNTING FOR FARES

BY W. H. FORSE, JR., SECRETARY AND TREASURER, UNION TRACTION COMPANY OF INDIANA

When the fare of a passenger is not properly accounted for it is the result of failure on the part of a conductor. This may be failure to collect the fare, failure to record its collection, or failure to deliver the fare to its owner, the railway company. These failures, like the failures which produce accidents, are very expensive.

The careful selection of trainmen is one of the greatest "improvements in fare accounting" that can be devised. If division superintendents and others who hire trainmen will select their men with as much regard to honesty and good character as to physical fitness and sobriety, the auditor's responsibilities will be lightened and the company's treasury will be benefited.

There are three methods generally used in accounting for passenger revenue. The plan most frequently adopted by American street railways comprises the use of a fare register with a large indicator and loud gong to attract the attention of the passenger. Some railways dispense with the use of a register and substitute paper slips in the form of receipts which are given to the passenger by the conductor. The third method, which is used by steam railways more commonly than by elec-

tric railways, consists of using neither the register nor the receipt, except in the case of cash fares, receipt for which is given by the conductor. With the first plan it is taken for granted that passengers and inspectors detect dishonest conductors by watching the registers and listening for the gong. Railway officials sometimes overlook this, the chief advantage of the fare-register.

The writer had this brought to his attention recently when he saw that the fare-register in a prepayment car in one of our large cities was located at the rear of the car on the inside, where it would not be seen by seated passengers when fares were being rung up. It is not surprising, in view of such seeming oversight on the part of railway companies, that they are taken advantage of by scheming conductors.

Various types of portable registers have been used to good advantage, from the "squeezer" of Providence to the "coffee-pot" of Toronto. But when it comes to collecting fares from a rushing, jostling crowd, there is no mechanical device which can gather in coins quite as quickly and accurately as a man's bare hands. The increasing use of prepayment cars has resulted in great improvement in the construction of fare boxes, and the use of these boxes goes far toward solving the problem of collecting fares in some localities and under some conditions.

The plan of dispensing with the fare register and with the receipt for fare collections can hardly be considered "a plan for safeguarding the revenues" and will, therefore, not be considered in this brief discussion.

The plan embracing the use of receipts to be given by the conductors for cash and ticket collections is subject to abuse. Passengers frequently throw the receipts upon the floor of the car and quite as often do not pay any attention to the receipts when handed to them. The use of these receipts in interurban service is subject to another abuse, whereby the conductor punches or perforates the stub retained by him and handed in to the auditor with a different (less) amount than the receipt portion which is given to the passenger. Lock-boxes have been provided, but these have not entirely put an end to the falsification of audit slips by conductors.

The European plan of having an inspector board the car at frequent intervals with the demand that passengers show their receipts for fares paid has its advantages and also has its disadvantages. It would be extremely difficult, for example, to have this practice followed during the rush-hours in the large cities, the times when mistakes or irregularities are particularly apt to occur.

Someone, some day, may discover a burglar-proof plan of safeguarding passenger receipts, but all of the plans now in use have their faults. "Spotters" and inspectors discover some of the irregularities, while careful auditing and comparisons of receipts of the various runs are to be commended. Such inspections and checks should be carefully made and the attention of conductors should be called to irregularities as they occur. There have been instances in which men have become dishonest because attention has not been called to first irregularities. Looseness on the part of the company result in similar looseness on the part of the trainmen.

Conductors as a class are no worse than other men and the ratio of dishonesty among them is not very large, considering the opportunities they have and the temptations to which they are subject. By careful selection and training of men this proportion can be materially reduced.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates)

OVERHEAD LINE PROBLEMS—SUSPENSION

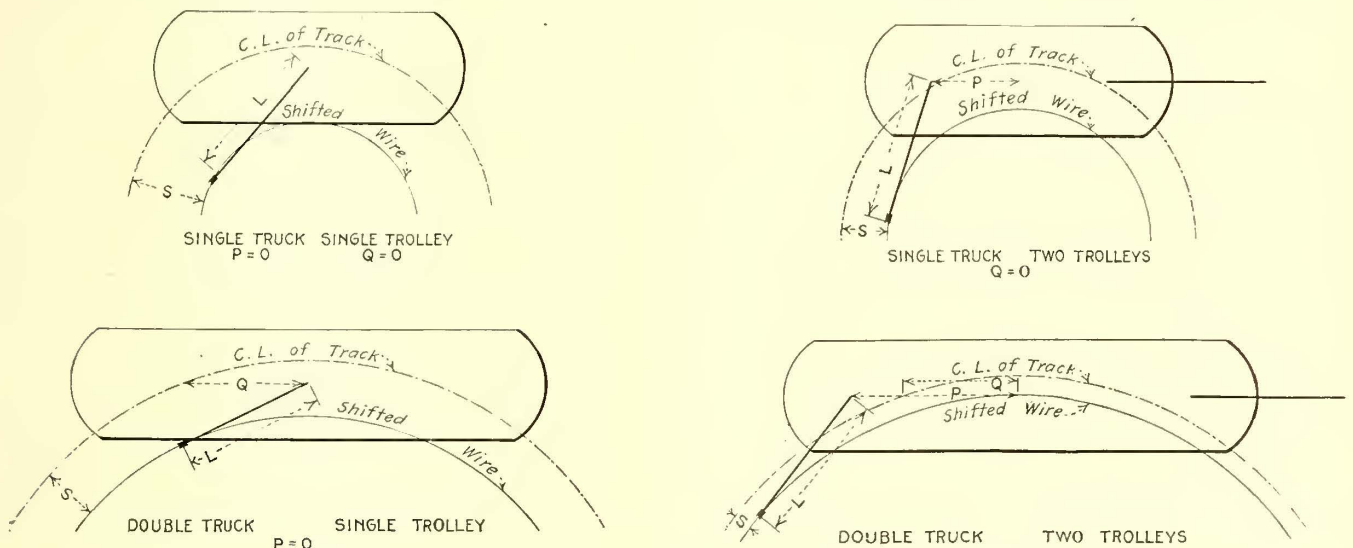
BY CHARLES RUFUS HARTE, CONSTRUCTION ENGINEER THE CONNECTICUT COMPANY

The development of the construction of overhead transmission and distribution lines is an interesting example of the employment of cut-and-dry methods rather than scientific analysis. Under such conditions the most economical type is distinguished only by extended comparison of the different forms, and a poor design often persists until some change in the service suddenly brings to light defects not before suspected.

This has been particularly the case with overhead trolley construction. In the early days every road was a law to itself as to both methods and material, for in its capacity as a conductor the trolley wire offers no serious

injurious to both track and rolling stock. In the case of the overhead trolley the situation is different only in that the collector can, and unhappily does, chatter on the wire at the points of condition change, thus enormously aggravating the troubles.

The ill effect of hard spots was well shown in the early form of the single-phase overhead electrification of the New Haven road, where the No. 0000 copper trolley was carried at the lower corners of triangular frames spaced 10 ft. apart and suspended by the other corners from a pair of messengers. The pressure wave "broke" at each of these supports as on a reef and caused most serious wire failures until E. H. McHenry, then vice-president, hit upon the happy expedient of suspending a second trolley wire from the first by clips located midway between the frames, thereby producing a uniformly flexible condition which completely obviated the difficulty. Sim-



Trolley Wire Offsets on Curves for Single and Double-Track Cars

problems; even though heavy service and small area of contact with the collector result in undue current density this area is rapidly shifting, and there is very rarely time for the resultant heating to reach dangerous proportions. Some of the first types of construction early showed their unfitness and were discarded, but many others persisted until the combination of high speed and heavy service forcibly emphasized the fact that the trolley wire is not merely a conductor but is a track as well and that in the latter capacity lies its chief weakness. To-day the maintenance troubles on not a few lines are due to failure to appreciate this fundamental fact.

A railroad way, as rigid as can be made with 100-lb. rail and stone ballast, if properly maintained, rides with perfect smoothness; and the same result obtains where bog conditions beneath give a uniformly yielding formation. It is where the wave of bending stress meets a soft spot in the otherwise hard track, or a hard spot in the soft track, the effect being most marked in the latter case, that there result, so to speak, breakers which are

ilar results have been accomplished both abroad and here by employing hinged or sliding hangers.

For simple suspension Joseph Mayer has suggested (*Transactions American Society of Civil Engineers*, Vol. LXI, page 1) long ears of special shape to dampen out the wave gradually, and believes it would permit spans of 300 ft., but so far as the writer knows no actual test has ever been made. Such treatment might well prove advantageous on the standard 100-ft. span, for even with a properly tight trolley the ears tend to curl up at the ends, while the more rigidly fixed points such as anchors, frogs, section insulators and the like are continually in trouble.

The early practice of attaching anchor half-ears on each side and tying them together over the top of the device still obtains with some companies, and, although they are designed merely to keep up the ends when the periodic break comes, they materially help conditions by dampening the wave before it reaches the critical rigid point. "Flexible approach" material, brought out a few years ago, has not met expectations as to flexibility but

more than holds its own in the forms which permit renewal of the ends without serious disturbance of the body. A tight trolley wire helps, but it has the practical disadvantage that the line gang is exceedingly apt to pull it too tight. The result is either a speedy break or wire stretch, with reduction of section at one point and consequent rapid wear at that spot. Opportunity exists for much improvement in respect to this whole matter.

WEAR OF OVERHEAD WIRE

The apparent lack of logic in compelling the soft and costly copper to take the wear of the collector becomes less obvious in most cases when the actual figures are considered. Troubles with brazes, not uncommon a few years ago, have been largely eliminated, thanks to the prompt action of the leading makers. Better attention to the details of drawing has done much to remove the fear that trolley wire making had all but become a lost art, and copper is still easily king of trolley wire material. Extra finishing treatments by drawing or rolling are believed by some to add materially to the life of the wire—as they certainly do to the cost—but a series of laboratory tests made for the writer not long ago showed little physical difference between the special and commercial wire.

Where there is excessive wear phono-electric and the allied bronzes are much the best under wheel operation. Steel, which has been ideal with pantograph service of main-line electrification, has developed a quite unanticipated peculiarity with the wheel collector. The wire rusts, and as the oxide gets between the wheel flanges and the wire it grinds away the latter to an astonishing extent. Further, the rust stains due to rain dripping from the wire are a nuisance, particularly with cars painted a light color.

Not infrequently excessive wear is due to improperly installed wire, and a little roof riding on the various types of car used under the wire in question will point a solution. Such investigation should always be made. The life of a bronze wire is shortened by misplacement just as much proportionately as in the case of commercial copper.

If a tangent to the wire at the point of contact is not parallel to the plane of the trolley wheel the sides of the latter grind against the wire. Unfortunately, however, this condition of parallelism is a function not only of the track elements, which are constant for any given curve, but it is also a function of certain car details as well. Hence if, as is almost invariably the case, more than one type of car is used under it, the shift must be the compromise which best fits all types. And if there is a switch involved the situation is further complicated by the necessity for sufficient "drag" to insure that in facing movements the trolley shall take the proper branch.

Apparently the first expression for the curve offset was worked out by R. E. Wade and the writer and published in the 1911 "Question Box" of the American Electric Railway Engineering Association. As recently simplified by Howard P. Michener this is:

$$S = \frac{EH}{G} + R - \sqrt{R^2 + P^2 - Q^2 - L^2}$$

Where S = radial offset of trolley wire toward center of curve,

E = superelevation of outer rail,

H = height of trolley wire above rail,

G = track gage,

R = radius of curve,

P = distance from center of car to pivot of trolley base,

Q = distance from center of car to center of truck, and

L = horizontal distance from pivot of trolley base to point of contact between trolley wheel and trolley wire.

All expressions are in terms of feet or in terms of inches.

When the trolley pivot is directly over the truck center $Q = P$, and the expression becomes:

$$S = \frac{EH}{G} + R - \sqrt{R^2 - L^2}$$

This offset should be tapered off from full value at the inside easement point to zero at the outside easement point, or if the curve is not eased the taper should start with full value a certain distance inside the curve and reduce uniformly to zero value the same distance outside the end of the curve. These distances are: Radius up to 100 ft., 20 ft.; from 100 ft. to 500 ft., 40 ft.; from 500 ft. to 1000 ft., 60 ft., and from 1000 ft. or over, 100 ft. The value of $R - \sqrt{R^2 + P^2 - Q^2 - L^2}$ can be graphically determined by employing large scale drawings of the curves and, on the same scale, celluloid templates of the cars with the truck centers marked, and having attached to each (so it can swing) an arm whose center is over the trolley base center and whose length is the horizontal projection of the trolley (" L " in the formula).

A template is needed for each type of car in which there are differences in the elements concerned, but if properly constructed such templates are also of great service in solving problems of clearance, etc. The application to curve offset was described in some detail in a paper by John H. Barnard before the thirty-first annual meeting of the New York Electric Railway Association (ELECTRIC RAILWAY JOURNAL, June 28, 1913, page 1155). At frogs the branch-off wire is necessarily started outside the track center to secure the drag required to insure proper operation, and it should be brought to proper position by the rate of change for easement. Incidentally, no frog should be tied in permanently until its operation has been carefully observed. A little time spent in making the best location at the outset will usually pay large dividends in its effect on later maintenance.

PNEUMATICALLY-OPERATED SAND-CAR EQUIPMENT

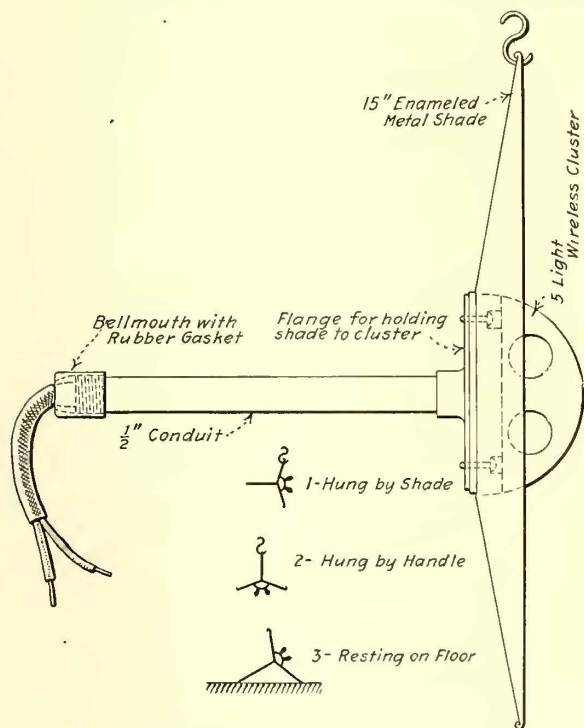
A correspondent who has watched the operation of the ordinary sand car suggests that it would be much more economical to substitute for the present hand-shoveling system means for distributing the sand with compressed air somewhat along the lines followed on many interurban cars. In the first place, the car should be of modern design, strong enough to be operated at the regular speeds and light enough to be hauled as a trailer. The interior would have the usual sand bins, and the sand would be blown against the rails by means of compressed air supplied from the brake equipment on the leading car. The control of the sand could be in charge of one man who would be located in the most convenient position. This scheme would make it unnecessary to have three or four men on the car shoveling at top speed and yet delaying the line. The use of compressed air would also greatly minimize trouble from caked or soggy sand.

The Public Service Section of the American Electric Railway Association, which is composed of employees of the Public Service Railway, Newark, N. J., makes it a point not only to print advance copies of the papers to be presented before each monthly meeting, but also to publish in pamphlet form a reprint of the paper and the complete discussion and minutes, with illustrations.

FLEXIBLE LAMP CLUSTER FOR CONTROLLER AND MOTOR WORK

BY R. H. PARSONS

Most men who work on controllers or under the car will substitute for a single lamp extension light, a five-lamp cluster in order to get more light. If left to their own resources the men usually make up a crude cluster from a board and any available sockets that they can find, the whole being wired up with more or less care. Of course, as better light insures better work there



Details of Connections for Wireless Cluster

is no good reason why clusters should not be used at times. On the other hand, one of the first trouble-makers sought for by the insurance inspectors is the old wooden cluster, the use of which has been positively forbidden. Another bad feature of such clusters is the breakage of lamps, which is rather expensive and inconvenient.

The accompanying cut illustrates a cluster which has the entire approval of the insurance inspectors, which is handy and convenient and which is also practically free from the breakage of lamps. It is made and used as follows:

A piece of 1/2-in. conduit to any length desired is taken, but a length of 12 in. is the most suitable. A bellmouth and gasket are attached at one end. On the other end is screwed a flange to which are fastened a five-light wireless cluster and a 15-in. metal enameled shade. These fittings are standard and are cheap, and are designed to be assembled in this manner. The wire used is No. 14 twin wire, made according to any approved specifications and formed into a cable to fit the 1/2-in. conduit; the cable is held tightly by the rubber bushing in the bellmouth, two flexible steel wires being woven into the cable to strengthen it. The ends of the conductor wires can be fitted with any appropriate attachments for connecting to the line circuit.

One hook is put into the rim of the shade and another around the pipe handle near the bellmouth so that the cluster can be suspended by the shade with the light reflected horizontally, or by the handle with

the light cast downward. Again, if the cluster is set on the floor, resting on the rim of the shade and the handle, the light can be reflected upward at an angle. The cluster is light and strong and if dropped will usually hit on the rim of the shade and the end of the handle rather than on the lamps. These clusters are convenient for use on outside work, where nothing except the trolley wire or conductor rail is accessible, as they are waterproof and therefore safe.

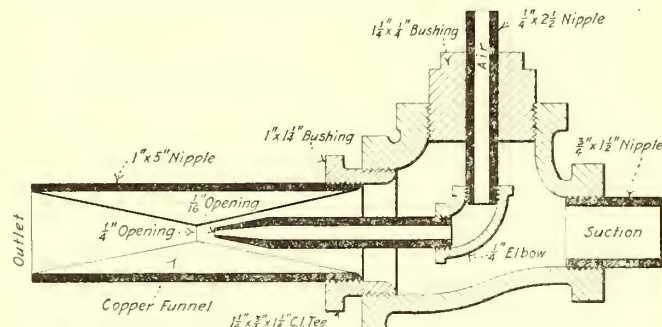
A HOME-MADE SUCTION CLEANER

BY CHARLES A. INGLE, ASSISTANT PURCHASING AGENT ROCKFORD & INTERURBAN RAILWAY

About a year ago we contemplated buying a vacuum cleaner for the plush seats, etc., in our interurban cars. For what we required the cost was from \$350 to \$400, but instead our shop foreman, J. N. Graham, made the device herein described and illustrated, which does as good work as the highest priced vacuum cleaner made. Any mechanic can make this cleaner at a cost of from 75 cents to \$1.25, outside of the hose and nozzle.

The body of the cleaner is a 1 1/4-in. x 3 3/4-in. x 1 1/4-in. cast-iron tee. Into this is screwed a 3/4-in. x 1 1/2-in. nipple to which is attached 25 ft. of 3/4-in. hose with 4-in. suction nozzle. This is the suction end. The air inlet is made up of a 1 1/4-in. x 1/4-in. bushing screwed into the body of the cleaner. A 1/4-in. x 2 1/2-in. nipple threaded the full length runs through the bushing. To the nipple is attached a length of 3/4-in. hose, which in turn is connected to the air reservoir on the car. Attached to the 1/4-in. x 2 1/2-in. nipple in the center of the body is a 1/4-in. ell with a 1/4-in. x 3-in. nipple drawn down to the 1/16-in. opening.

The outlet is made of a piece of 1-in. x 5-in. pipe which is lined with two copper funnels soldered together at the small end in the center, leaving a 1/4-in. opening.



Section of Home-Made Suction Cleaner

This is connected to the body of the cleaner with a 1-in. x 1 1/4-in. bushing. A short piece of 1 1/4-in. hose is attached to the outlet and connected to a small canvas bag into which the dirt is blown.

The device requires about 50 lb. to 60 lb. of air, with which it will do excellent work. It should be taken apart frequently and cleaned to prevent clogging and to give dust and dirt a free passage through the body of the cleaner.

F. L. Cranford, contractor for the lower part of the Broadway subway in Manhattan, has notified the Public Service Commission for the First District of New York that he has discovered a subterranean jail, which apparently dates back to the early days of New Amsterdam. The wall of the ancient prison has been cleared away for the width of the subway, although parts of it are still buried on the sides and underneath the floor of the new excavation.

HANDLING CITY STREET RAILWAY TRAFFIC BY TELEPHONE

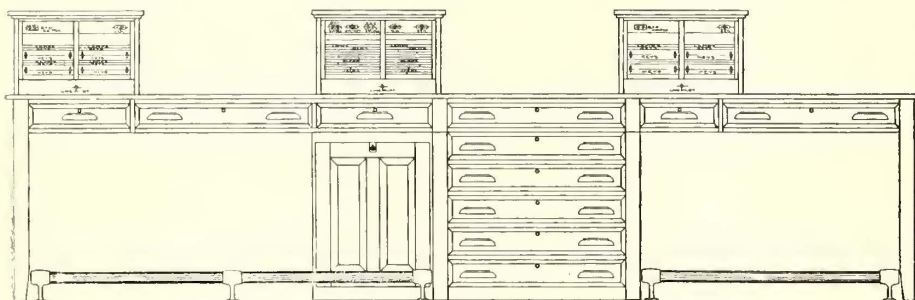
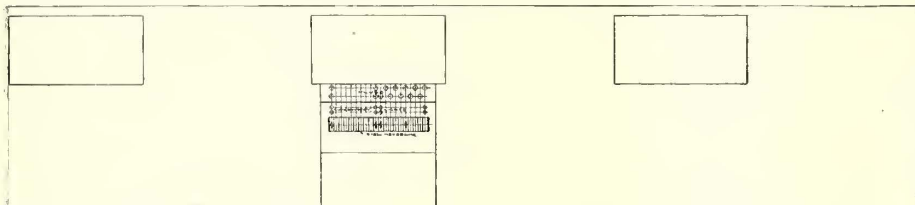
The problem of handling street railway service in Rochester, is one of unusual complexity, the underlying reason for this being found in the topographical features and in the layout of the streets in the central section of the city. There are two main transfer points, located on either side of the Genesee River, which flows through the heart of the city, dividing it very nearly into halves. Most of the fourteen lines radiate in all directions from these transfer points, like spokes of a wheel. The main street extends through the two main intersections and transfer points and it is on this connecting street that the greatest congestion occurs during rush hours. It naturally follows that the dispatching of the cars during the peak load is a serious problem. During the less busy hours of the day about 150 cars suffice to handle the traffic, but during the noon hour and also between 5.30 and 6.30 p. m. from 300 to 350 cars must be pressed into service. On some lines headways as low as $1\frac{3}{4}$ minutes are maintained.

The dispatching question has been very nicely worked out by the railway company by the use of a very complete telephone system to augment the work of twelve

pressing a key corresponding with the lamp, which places him in direct connection with the motorman. After receiving the call the dispatcher gives the motorman the time for his departure from that terminal and any special instructions that may be needed. The system in this way gives the dispatcher the exact location of all cars and advises him of any gaps in the service. In case of gaps he can easily order out "trippers" to fill in until service again becomes normal.

The switchboard used at the dispatcher's office is made up in the form of a flat-top desk having mounted on it three turret-apparatus cabinets. Two turrets include straight dispatching line equipments, while the third is a combination dispatcher's and commercial board. During the rush hours three dispatchers are required, but ordinarily one or two are sufficient. Two of the turrets contain forty dispatching lines each, while the third carries twenty dispatching lines and also a multiple of sixty commercial lines appearing in the railway company's private branch exchange. This arrangement permits the night dispatcher, whose duties are light, to care for the commercial business, thereby eliminating a night operator for the commercial or regular private branch exchange board.

Plenty of space is provided on the top of the desk for schedules, train sheets, etc. A tier of drawers accommodates past records, special schedules



Rochester Traffic—Plan and Elevation of Dispatchers' Switchboards and Desks



Rochester Traffic—Outdoor Telephone Set

inspectors and several street aides. The inspectors travel over the lines continually to assist in maintaining the scheduled time of the trains, while the street aides are stationed in the congested districts assisting the traveling public by announcing the destination of approaching cars, answering inquiries and making themselves generally useful.

The chief dispatcher and several assistants are stationed at a special dispatching telephone switchboard located in the railway company's office building. This switchboard is connected by means of wires leased from the Rochester Telephone Company to telephone sets located at every line terminal and at main intersections. Telephone sets are also located at canal lift bridges, grade crossings and other points where delays are most liable to occur. One of the accompanying illustrations shows the general appearance of the out-of-door installations.

Each motorman is required to report immediately upon his arrival at a terminal. The act of taking the receiver off the hook at the terminal telephone immediately illuminates the line lamp at the dispatcher's switchboard. The dispatcher answers the call simply by

and a supply of dispatching stationery. The train sheets, arranged by train number and also in chronological order, are always before each dispatcher so that the whole traffic situation at any moment can be read at a glance.

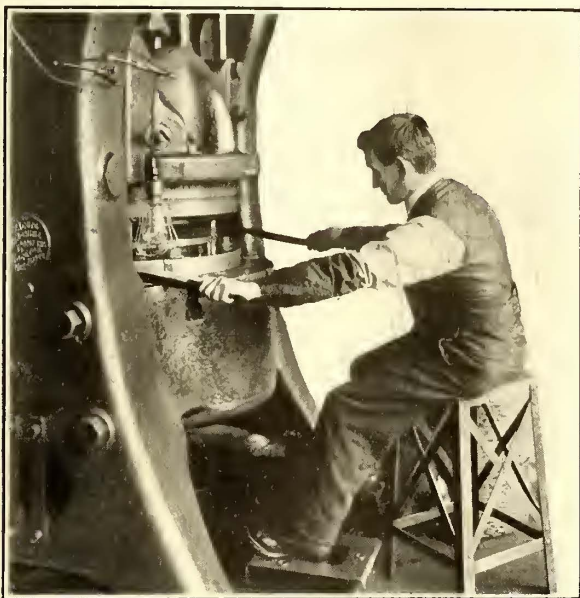
The important benefits of this system are readily apparent. Not only is the best of service under normal operating conditions assured, but a means for rapidly straightening out traffic tangles caused by delays is also provided. The system gives the railway company a permanent record of every train movement, late cars, and times of accidents. There is also available in cases of court actions much exact testimony in damage suits which would otherwise be based upon the inaccurate memory of witnesses. Furthermore, train crews promptly report trouble with cars and give many details which they would not bother to make out in written form.

All of the equipment used on this system was manufactured by the Stromberg-Carlson Telephone Manufacturing Company, and was installed by the Rochester Telephone Company for the Toledo Railways & Light Company.

SAFETY SUCTION DEVICES FOR PUNCH PRESSES

For some time the Westinghouse Electric & Manufacturing Company at East Pittsburgh, Pa., tried mechanical safety devices of various kinds for the punch shop but with unsatisfactory results. The operators found them unsuited because of the fact that they tended to retard the production and consequently their earnings, while the management also objected to them because they afforded only partial protection, as the operator had to place his hand under the press in every instance in order to remove the scrap.

The suction device illustrated herewith was developed to prevent the necessity of the operator approaching the danger point at any time during the operation, as he feeds and clears the press with the same tool. Another advantageous point is that the operator does not take hold of the material with his hands (this applies principally to the smaller sizes) and thereby escapes



Suction Device in Use on a Punch Press

the numerous small cuts to which he was subjected when inserting the blanks with his fingers.

The double-handle device used on large work shown in the illustration is absolutely safe. The operator is compelled to use the device owing to the size of the sheets handled, as it is impossible to get hold of the sheets any other way. Before adopting this method the man who was placed at the back of the press to feed in the sheets was the one most frequently injured because his fingers were entirely at the mercy of the operator.

Since the adoption of the suction device not one amputation has occurred on the large presses, and up to the present time no finger has been amputated in the punch shop. This happy result has been due to the operation of the devices and to the rigid enforcement of the shop rules. The suction device was exhibited and received the grand prize at the recent International Exposition of Safety and Sanitation in New York City and it is now on exhibition in the American Museum of Safety in New York City. The Westinghouse company also employs other safety devices such as magnetic lifters, sliding devices, etc., depending upon the kinds of punchings made.

The Auckland (New Zealand) Tramways contemplates putting self-propelled cars in operation on its road. It has not yet been decided whether storage battery or gasoline-electric cars will be used.

AUTOMATIC BLOCK SIGNALS ON PUGET SOUND
ELECTRIC RAILWAY

The automatic block signal system which is now being installed on the Puget Sound Electric Railway between Seattle and Tacoma comprises G. R. S. model 2-A semaphore signals operating in three positions in the upper left-hand quadrant and controlled by two-rail track circuits. The installation includes signal indicators to repeat the indications of certain signals, switch indicators at intermediate switches to indicate the condition of the blocks in both directions, and switch circuit controllers at all switches through which the control circuits are broken.

The signal arrangement for each block comprises starting signals located at the passing sidings with one pair of intermediate signals between sidings. The extent of the installation is approximately 31 miles, of which 23 miles is single-track and 8 miles double-track. The absolute-permissive block system will be installed on the single-track line and the usual system of signaling on the double-track line. The passing sidings average about 2½ miles apart and the approximate distance between signals that govern movements in the same direction is 1 mile.

Electrical energy for the operation of the signal system as well as the propulsion current is transmitted from the water-power generating station at Electron, Wash. The signal transmission line is single-phase, sixty cycles, 2200 volts, and the propulsion current is furnished at 600 volts d.c. A third-rail carries the propulsion current through the open country between towns and an overhead trolley is used through towns and cities.

The signal mechanisms are equipped with induction motors arranged for operation on 110 volts, single-phase, sixty cycles. Light for the night indications is supplied by two 12-volt, 5-watt electric bulbs, connected in multiple, mounted in each lamp case and operated on a lower voltage than the normal rating. The signal appliances were furnished by the General Railway Signal Company throughout, the signals, indicators, relays, impedance bonds, transformers and other mechanisms being the standard a.c. apparatus of that company. The signals are being installed by the railway company's forces.

METROPOLITAN STREET RAILWAY, OF KANSAS CITY,
INSTALLS FOLDING SEATS

The Metropolitan Street Railway, of Kansas City, has installed a folding seat on one of its cars. If the experiment proves successful the company will bring this arrangement into more general use. The new seat has been installed on the same car on which the folding front step recently was successfully tested. In essentials the seat resembles an ordinary theater chair, the chief differences being in the absence of the arm rest and the hat holder. The folding type apparently has many advantages over the stationary seats, and officers of the Metropolitan Street Railway are inclined to favor the former.

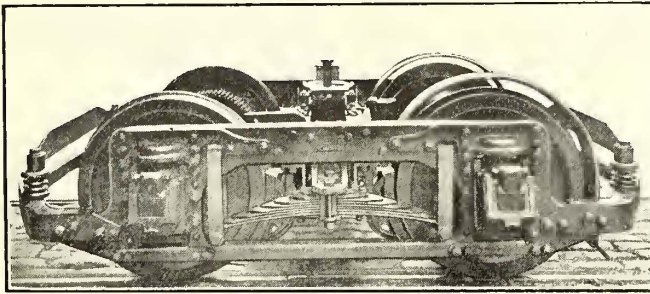
The occupant of an outside seat, with the folding arrangement in use, would not be compelled to move into the aisle to allow his seat-mate to leave the car, but would merely swing the folding seat back and stand for a moment. The folding seats also would facilitate sweeping and similar work. It is probable that the use of the folding sectional seat, as it is designated, also would allow the installation of more seats in a given area of floor space, although this is a phase which has not yet been investigated fully.

MOTOR TRUCKS FOR THE SAN FRANCISCO MUNICIPAL RAILWAYS

The accompanying illustration represents one of 250 motor trucks for city service, which are being built by the Baldwin Locomotive Works for the San Francisco Municipal Railways. The principal dimensions of these trucks are as follows:—Track gage, 4 ft. 8½ in.; truck wheelbase, 4 ft. 10 in.; wheels, Standard rolled steel, 34 in. diameter; journals, 4¼ in. x 8 in., and maximum center-pin load, 27,000 lb.

These trucks are used under cars which have a seating capacity of fifty passengers, but in which 200 passengers may at times be carried. The difficulties in preparing a design suitable for meeting these extreme variations in load were increased by the fact that an unusually light truck was required. The Baldwin Class "L" plate truck was selected to meet these conditions. It is extremely light in proportion to its carrying capacity. The side frame, end reinforcements, pedestals, pedestal ties and frame gusset are all formed from a single piece of flanged steel. The transoms and end frames consist of angle irons. While the resulting structure is light it provides both horizontal and vertical strength and rigidity. The motors are outside hung, with suspension bars supported by the end frames.

This truck is of the pedestal type, and the frames are supported by coiled springs which are mounted over the boxes. The pedestals have removable shoes against



Latest Motor Truck for San Francisco Municipal Railways

which the boxes bear. The bolster is a steel casting and is carried at each end by a half-elliptic spring. The spring hangers are allowed a limited amount of lateral swing. The brakes are inside hung, and the brake shoes are suspended from the transoms. Renewable chafing plates are applied to the bolster and transoms. The construction is simple throughout, and the truck can be easily maintained in any shop with ordinary facilities.

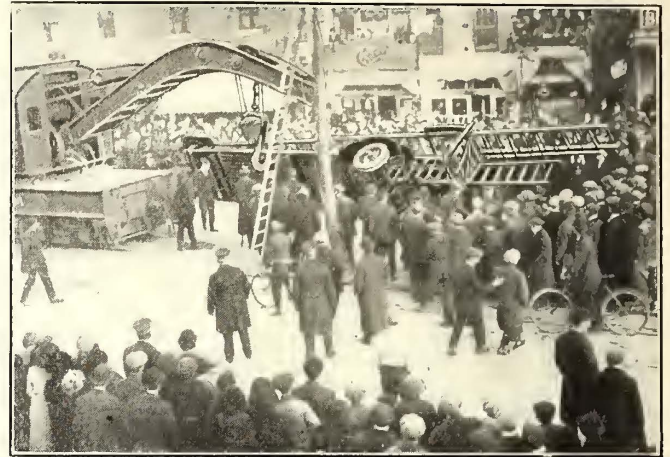
TESTS OF CAR COUPLERS AT THE UNIVERSITY OF ILLINOIS

A series of tests is being conducted by the University of Illinois for the Scullin-Gallagher Iron & Steel Company of St. Louis, on a new style of car coupler. The new coupler eliminates the likelihood of fracture at the face by having a solid face and a new type of tail knuckle. A former test made by the university, showed that when failure of the new style coupler occurred, it was generally at the knuckle. After the first tests, the design was changed so as to add about 15 lb. of metal to the knuckle. The new design is now being tested under the supervision of Prof. J. M. Snodgrass of the railway engineering department.

Four sets of tests are made: the "striking test," the "jerk test," the "guard-arm test," and the "pulling test." In the striking test the coupler is placed in the drop testing machine and a 1640-lb. weight let fall on it from varying heights.

RESCUE BY WEST JERSEY & SEASHORE WRECKER

The accompanying illustration shows a wrecking car belonging to the West Jersey & Seashore Railroad in the act of rescuing a new \$12,000, 10-ton automobile ladder truck belonging to the Atlantic City, N. J., fire department. The wrecker responded to a hurry call sent to the railroad company by George S. Faber, general superintendent of the Atlantic City & Shore Railroad Company.



Wrecking Car Rescuing a Hook and Ladder Truck at Atlantic City

In answering a fire-alarm recently on its first service trip, the automobile truck was proceeding swiftly down the main business street of the city, Atlantic Avenue, when at the intersection with Michigan Avenue it hit an opening in the pavement where sewer work had previously been done, causing the driver to lose all control of the apparatus. The truck went wild and struck a trolley pole, breaking a wheel off the axle, doing severe damage to the truck and killing one man and injuring three.

ELECTRICAL DEVELOPMENT IN JERUSALEM

The rapidity with which Jerusalem is growing, owing to the return of the Jews in great numbers to the home of their ancestors, has made revolutionary changes necessary. It has been found imperative to pull down the ancient walls and massive towers of this ancient city in order to provide it with a modern electric street car service, electric light and a much-needed water supply. To the north and west of the old city there have sprung up within the last ten years large Jewish colonies, populous residential sections, as well as convents, institutions, schools and other buildings, with the result that to-day there is a larger Jerusalem without the walls than within.

Four separate tramways are to be constructed. They will start from the Jaffa Gate, the principal entrance into the city, and run outside the city walls through the newer parts of Jerusalem. The first, which will have a length of about 2 miles, will give easy access to what may be termed the business quarter of the city. The second, of similar length, will link up the large Jewish colonies to the north with the city's north gate, that of Damascus. The third will encircle the old city, embracing many of its historic sites, such as the Tomb of the Kings and the Mount of Olives. The fourth line will run from Jaffa Gate to Bethlehem, about 6 miles away, traveling the most sacred thoroughfare in the world. The work of laying the rails is to begin this spring.

News of Electric Railways

Franchise Draft Submitted in Toledo

Henry L. Doherty, representing the Toledo Railways & Light Company, Toledo, Ohio, submitted a plan of settlement to the franchise committee of the City Council on April 9. It is in the form of an ordinance which was prepared by his attorneys and himself. Mr. Doherty explained the proposed ordinance briefly and told the committee that the rate of fare could be tested for one year, after which the City Council could fix the rate to cover the necessities. During the first year, however, the property would be operated under the supervision of a commission. The ordinance provides for a twenty-five-year franchise.

Members of the committee intimated that the operation of the street railway within the city should be placed in the hands of a commissioner so as to divorce the whole question from politics. The form of supervision used in Cleveland seemed to appeal to them as best.

Mr. Doherty suggested that the franchise should be granted before an attempt is made to rearrange the lines in an endeavor to secure an ideal system. This, he said, would prevent opposition from property owners on streets where lines might possibly be eliminated. Some of the members of the committee argued that the lines should be rearranged before the franchise is granted, as property owners could enjoin the elimination of tracks after a franchise had been granted for them. Chairman Hassenzahl objected that everybody affected by the changes would vote against the ordinance at a referendum election, if the changes are announced before the ordinance is passed.

Peter Witt, street railway commissioner at Cleveland, was one of the principal speakers at a mass meeting at Zenobia Hall on April 8, called by the Toledo Commerce Club. Henry L. Doherty was also one of the speakers. Mr. Witt said Toledo would profit by securing an immediate settlement of the question on a basis of transportation at cost, the city to govern the service, rather than to adopt an arbitrary rate of 3 cents or any other amount. He did not attempt to advise the city as to how the question should be settled. Among other things he said:

"Protect your own interests in your streets, but remember that there are other people in the streets. The city cannot exist without transportation facilities."

Mr. Witt contended that under the plan in operation at Cleveland the people were riding in better cars, over better tracks and at a lower fare than in any other city in the United States. The Cleveland plan was based on the idea of Judge R. W. Taylor that the people should be transported at cost. The company was as free to operate as ever, but control of the service still rested with the people. The fare in Cleveland was 3 cents, and about \$2,000,000 of the earnings had been put back into the company. The 1 cent charge for transfers may, however, have to be resorted to for a few months. Mr. Witt advised the city to rid itself of the two rates of fare that have existed in Toledo for some time—rates lower at some hours of the day than at others. It costs as much to haul the man in overalls as the millionaire, and the workingman does not want charity. He wants justice. This is a special privilege, and the workingman will have to make up for it in some other way.

Mr. Doherty said that if he had Mr. Witt's patience to work out problems of re-routing, alternating stops and other means of reducing cost of operation, they would do as well in Toledo as in Cleveland. Mr. Doherty was constantly interrupted, but took the matter good naturedly.

F. M. Dotson, secretary of the Council franchise committee, spoke briefly on some of the points at issue. He asserted that the proposal made by Mr. Doherty some days since had furnished the committee a basis for work.

The tentative ordinance as proposed by Mr. Doherty provides that during the first four months a rearrangement of the lines of the company within the city shall be prepared by experts with a view to giving the best service to the public consistent with the highest operating efficiency. The system to be reported upon is to provide for a cross-town line located as the city may require. The company is to pay

all compensation and expenses of the experts for the city up to a sum not exceeding \$25,000. The company is to charge and receive rates of fare as follows: Children in arms are to be carried free; children under the age of eight years, at 1 cent each; policemen, firemen, sanitary officers whenever in uniform and detectives upon display of their badges are to be carried free. All other passengers are to be carried at a single cash fare of 5 cents each, and for the first twelve months of said term of twenty-five years at the rate of five tickets for 15 cents. The tickets are to be on sale on all passenger cars. Passengers are to be entitled without extra charge to a transfer from the route upon which they paid their fare to any other route except in the substantially opposite direction or a route parallel or substantially parallel to the first route.

The city is to reserve the right to designate from time to time the points of transfer and to regulate reasonably the routes from and to which such transfers are to be issued. The city is to have the right to appoint a commissioner or commissioners with authority during the first twelve months' period to examine the books, receipts, records and maps of the company pertaining to its street railway system and have full opportunity to ascertain the income and operating expense of the railway system, and, if the city so desires, the value of the property used for railway purposes. Such commissioner or commissioners are during the period of twelve months to have the right to direct through the president of the company the operation of the railway system as to routing, re-routing, schedule of cars and general supervision of operation. The commissioners are to report to the city so as to assist in arriving at an equitable rate at which tickets shall be sold by the company for the first five-year period after the expiration of the first twelve months.

Sections 6 and 7 of the proposed ordinance, which relate to the rates of fare for the first five years after the original experimental period of one year, and to the right of the city to purchase, are as follows:

"Section 6. On or before the expiration of the twelve months' period mentioned in Section 3 hereof, the rates of fare at which tickets shall be sold by the company for a period of not less than five years after the expiration of said first twelve months, for the carrying of passengers upon the said street railway system, shall be stated by a resolution or an ordinance which shall be passed or adopted by the Council, or such other board or officers then having the powers now exercised by said Council in that respect, and upon such basis and rates that the company shall then and thereafter, while such rate of fare is in force, receive a gross income from such fares sufficient to pay the cost of operation and maintenance of its street railway system, and the taxes thereon, and a reasonable return upon the reasonable value of the property owned and to be used by the company in its said street railways system. Included in the operating expenses shall be allowed a fair and reasonable price for the electric current used in such operation. And the rate of fare so stated, as aforesaid, shall continue so long as neither party hereto shall ask a revision thereof, but in no event for a period of less than five years; and from time to time during the term hereof, after the expiration of any five-year period, either party may ask in writing for and have a revision of ticket fares, which shall be arrived at in the same manner and upon the basis aforesaid, within sixty days after such request, and any such revised ticket fares shall remain in force for a period of not less than five years, but in no event longer than the term of this ordinance.

"Section 7. The city expressly reserves the right to purchase the street railway property of the company at its appraised value, which shall be determined as hereinafter provided, at any time during the term hereof, upon notice in writing to the company of at least twelve months, or upon the purchase of the company's property being submitted to a referendum vote, and a majority of the qualified voters of Toledo expressing themselves favorable to the purchase of said property, then the right of purchase may be exercised after sixty days from the date on which the result of such an election is determined. The property so to be purchased

shall include all property owned by the company which is used in the operation of its electric railroad system, but not including its power station. To arrive at said appraised value, the city shall appoint one arbitrator, and the company shall appoint one arbitrator, and the two arbitrators thus chosen shall appoint a third, and such arbitrators shall make a full and complete inventory and appraisal of said property, and the decision in writing of a majority of said arbitrators shall determine the appraised value of said property."

The ordinance provides for the entrance of interurban railways to the city over the lines of the Toledo Railways & Light Company. The compensation to be paid by the interurban companies for the use of the tracks of the city company is to be agreed upon by the company and the interurban company seeking the entrance. In the event that the companies are unable to agree each company is to appoint an arbitrator, and the compensation determined by these two arbitrators, or by these two arbitrators and an umpire appointed by the city in case an umpire should be necessary. The terms of the compensation to the city company from the interurban company for entrance to the city are to be readjusted every five years. Provision is made for the transportation of freight in suitable cars by the company at night. There is also a provision for the operation of funeral cars, observation cars, express mail service and other special cars. The freight service is to be operated between the hours of 12 midnight and 5 a. m. Provisions in regard to keeping up the paving of the streets in which the company operates are stated in detail.

Decision in St. Louis Transfer Case

Circuit Judge Grimm at St. Louis, Mo., in an opinion handed down recently decided the United Railways of that city must grant a transfer on a transfer on all of its lines. His decision was the result of a mandamus suit brought by the city against the company on Jan. 8, 1912. The writ issued by Judge Grimm commands the company to issue to every passenger, who makes a request, such transfers or successive transfers over intersecting or connecting lines as will transport the passenger by a continuous trip for a single fare from any point he may board the car in the city to any other point in the city by the most direct route practicable. The decision of the court reads in part as follows:

"Ordinance 19,352, under which the United Railways operates, distinctly requires of respondent that transfers shall be given so as to transport passengers by a continuous trip from any point on the system to any other point on the system. While the ordinance has the effect of law it may very properly be viewed as a contract between the city and the respondent. It grants valuable privileges and rights under certain conditions. Respondent accepted those conditions and is enjoying the rights and privileges, and is legally as well as morally bound to discharge fairly the obligations which it assumed.

"It seems quite clear to me that the intention was to require the respondent to carry a passenger from any point on its system to any other point by the most direct route practicable over connecting lines. The respondent has no right to say to a passenger, 'You must be content with a transfer over a single connecting line which will leave you three blocks from your destination,' notwithstanding the fact that by issuing a second transfer it could take him in a more direct route directly to his destination. Nor can it say to the passenger that he must be content to accept a single transfer which will take him to his precise destination, but by an indirect route, when he could be carried directly over several connecting lines.

"On the witness stand, Capt. McCulloch stated that his company objected to the giving of the transfer by a passenger to some other person to be used by the latter, or the passenger calling for transfers in such a way that he could not only reach his point of destination, but also after transacting his business there, return to the point from whence he started, all for one fare. It is quite clear that the ordinance does not contemplate that a passenger should receive a round trip for one fare, or that he should transfer his right to a ride to somebody else, and the court would not think of requiring respondent to accept a transfer attempted to

be used by a passenger to make a return trip or one which had been given to another person by the passenger to whom it had been issued. However, the fact that some unscrupulous persons might take advantage of the respondent's very extensive system, to accomplish improper results is no reason or excuse for respondent's refusal to carry a passenger to his destination at a point on one of its lines by a direct route, even though it may require a second transfer.

"If the respondent is justified in refusing a second transfer merely because the passenger might give it to someone else to use, it might be the same logic to refuse the first transfer, for it may, and no doubt does occasionally happen that a person boarding a car will take a transfer when he has no intention of using it, and afterward give it to some other person.

"If the respondent can devise any means of preventing unscrupulous persons from imposing upon it and avoid the illegitimate use of transfers without denying the people of the city their rights, it may, of course, adopt such means for its own protection, but the court is under no obligation to and, as a matter of fact, cannot devise such rules for respondent, any more than it could protect it against the possibility of receiving counterfeit money.

"The court realizes that there may be some practical difficulties of operation resulting from the fact that the traffic on certain lines is much heavier than that on others, but those difficulties must be met by the respondent's operating department and by some method other than that of routing passengers according to the convenience of respondent when that results in loss of time and inconvenience to its passengers."

Former Judge Henry S. Priest, general counsel for the United Railways, is quoted in part as follows in regard to the decision:

"We think we have been complying with the ordinance. In any event we shall insist upon protecting ourselves against the misuse of transfers. We think we ought to have the privilege of routing passengers by the most direct route, and that it is our right to make the routes for the best interests of the traveling public and the United Railways. We are not opposed to a universal transfer system, but feel that there must be reasonable regulations against the fraudulent use of transfers."

New Haven Affairs

The Interstate Commerce Commission has indefinitely adjourned its inquiry into the affairs of the New York, New Haven & Hartford Railroad on account of the refusal to answer on April 10 on the advice of counsel by witness summoned by the commission to tell about the transactions between the company and the Billard Company. Joseph W. Folk, chief counsel for the commission, announced that he would apply to the Supreme Court of the District of Columbia for a mandamus to compel the unwilling witnesses to produce the books of the Billard Company. It is not likely the investigation will be resumed until after the District Court has rendered its decision on this application.

In this connection Howard Elliott, chairman of the board of the New York, New Haven & Hartford Railroad, said in New York on the same day:

"The Billard Company matters, which are now under investigation by the Commerce Commission, relate to happenings several years ago, before I was connected with the New Haven company. Every facility has been given by the New Haven company to the investigators of the Commerce Commission for the purpose of obtaining information about any transactions with the Billard Company. The New Haven company does not in any way control the Billard Company nor has it control of the books and papers of that company."

In view of the questions to be voted upon by the stockholders of the New York, New Haven & Hartford Railroad at the special meeting to be held in New Haven on April 21, particularly that relating to the proposed agreement with the Attorney-General for the segregation of the properties as recommended by the directors, Mr. Elliott issued on April 11 a very complete statement not only about the proposed agreement but also in regard to the general situation confronting the company at this time.

Judge Walter C. Noyes, New London; William W. Hyde,

Hartford; Lyman B. Brainard, Hartford; George E. Hill, Bridgeport, and Charles Cheney, South Manchester, Conn., were named on April 14 as trustees to take over the electric railways in Connecticut owned by the New Haven Railroad. Rathbone Gardner, Theodore F. Green, John O. Ames, John P. Farnsworth and Charles C. Mumford, all of Providence, were chosen to take over the Rhode Island trolleys. The announcement of the names of the trustees was accompanied by a statement of two sentences. In one the Department of Justice said the men had been selected to serve "in case the suggested adjustment of the New Haven transportation problem is carried out," and in the other said "it is believed that the trustees agreed upon will accept."

Middlesex & Boston Arbitration Hearings Begun

Hearings by the arbitration board in the wages dispute on the Middlesex & Boston Street Railway were begun on April 13 in the municipal court room at West Newton, Mass. The board consists of ex-mayor George L. Mayberry, of Waltham, Mass., chairman; Arthur A. Ballantine, of Gaston, Snow & Saltonstall, Boston, for the company; and James H. Vahey, Watertown, Mass., for the employees' union. George M. Cox, general manager, appeared for the company and Joseph Eastman and Fred Fay were present on behalf of the men. In opening it was stated that 302 employees are concerned and that the uniformed men desire an increase from 21 to 27 cents an hour for first-year men, 30 cents for second-year men and 33 cents thereafter, with a 20 per cent increase for other employees. The arbitration agreement provides that the award shall extend three years, terminating in 1916. Prior to opening the hearings the board was taken over important parts of the system, visiting carhouses and substations. Mr. Cox was the first witness called and was on the stand for about three days, testifying as to the detailed operation of the road. The company operates 105 miles of track and the population of the territory served is 174,378. Last year the road paid \$37,582 in damage claims. In the early hearings the evidence was confined largely to the duties of trainmen.

Machine Gun Equipment Protects Mexico Plant

The experiences of the Mexican Light & Power Company illustrate the difficulties under which one public utility in Mexico is operating at present. The company operates the largest hydroelectric station in Mexico. Its plant is at Necaxa, about 125 miles from Mexico City. The equipment comprises two 10,000-kw General Electric machines and six 5000-kw Siemens-Schuckert machines, all operating in parallel and feeding into four transmission lines tied together at Necaxa and at Mexico City. The generators are wound for 4400 volts, three-phase and operate at a frequency of fifty cycles. Oil-insulated, water-cooled transformers raise the emf to 88,000 volts.

One of the first troubles experienced by the company was encountered at night by miscreants within the station who tripped the exciter circuit breakers and tampered with important switches. Cement dust was sprinkled on the concrete floor for the purpose of discovering whether the offenders wore shoes, peon sandals or were barefoot. A 30-in. projector is used at night to sweep the surrounding country in search of rebels and bandits. All the employees in the power house are armed with Mauser rifles furnished by the company. The trail to the plant is lighted by a line of tungsten lamps controlled by a switch at the sentry box overlooking the trail, and from five to eighty-five soldiers are quartered at the station. The defensive equipment of these men at the station includes a Hotchkiss rapid-fire field gun and three Colt machine guns.

The rebels have abandoned the practice which they adopted at first of climbing the transmission towers and attempting to cut the power lines carrying 88,000 volts with machetes. This line of attack proved altogether too hazardous. The insulators are targets for their shots, however. During the New Year's celebration the transmission lines were put out of business and the theaters and dance halls in Mexico City were left in darkness. The street railway system in that city was also tied up until a small steam

plant could be started. This was the only time in which the four lines went down at once. Since then the lines have all been constantly patrolled so that trouble from this source has been almost entirely eliminated. There are no wagon roads in the vicinity of the generating station so that no wheeled vehicles are to be found anywhere about the plant. Strategically considered, the power plant is almost impregnable.

The Administration's Legislative Program

It was intimated in anticipation of the return of President Wilson to Washington on April 13 that congressional leaders were seriously discussing whether the effort to pass the proposed administration bills should not be abandoned for the present session. The President promptly let it be known that there was no intention on the part of the administration to abandon or curtail the legislative program. He said that the administration must keep faith with the people; that it had pledged itself to this legislation, and that the country expected it to be passed at this session. He thought the program could be completed in time to enable Congress to adjourn in July.

Closely following this declaration Representative Henry D. Clayton, chairman of the House judiciary committee, made public the revised anti-trust bill. He also introduced the bill in the House and it has been referred to the House judiciary committee. The new bill takes the place of the four measures introduced some time ago, which were the basis of hearings by the judiciary committee. The revised bill prohibits interlocking directorates, holding companies, and certain trade practices, suggests some new Sherman law definitions, and contains new provisions fixing the status of labor unions under the law (Section 6) and limiting the power of federal courts in the issuance of injunctions and providing for jury trials in cases of indirect contempt of court (Sections 12 to 22). The labor features of the bill stand out prominently in the revised measure. The injunction provisions follow the lines of the Clayton bill which passed the House in the Sixty-second Congress. The provision for jury trials in cases of indirect contempt is also based on the Clayton contempt bill, which the House passed in the last Congress. The holding company bill, as originally introduced, has been somewhat modified and incorporated in the new trust bill. In the anti-trust bills as originally presented subsidiary concerns representing the legitimate growth of corporations were prohibited. Under the revised program the holding company prohibition does not apply to subsidiaries of this character.

The section of the bill in regard to investments is not to apply to corporations purchasing stock solely for investment, and not using the same to bring about the lessening of competition. A corporation engaged in commerce will not be prevented from causing the formation of subsidiary corporations to carry on lawful business or be prevented from owning and holding all or a part of the stock of such subsidiary corporations when the effect of such formation is not to eliminate or lessen competition. Any railroad corporation will be permitted to construct branch or short line railroads so located as to become feeders to the main line of the company and will also be permitted to acquire and own all or any part of the stock of a branch or short line railroad constructed by an independent company where there is no substantial competition between the company owning the branch line and the company owning the main line acquiring the property.

From and after two years from the date of the approval of the act no person who is a member of a partnership or is a director or other officer of a corporation that is engaged in the business in whole or in part of producing or selling equipment, materials or supplies to or in the construction or maintenance of railroads or other common carriers engaged in commerce, is to act as a director or other officer or employee of any common carrier engaged in commerce, to which he or such partnership or corporation sells or leases directly or indirectly equipment materials or supplies. There is a somewhat similar provision against any person who is engaged as an individual or as an officer or employee in the conduct of a bank or trust company, acting "as a director or other officer or employee of any com-

mon carrier, for which he or such partnership, or bank, or trust company acts, either separately or in connection with others, as agent in the disposal of, or is interested in the underwriting of, or from which he or such partnership, or bank or trust company purchases, either separately or in connection with others issues or parts of issues of securities of such common carrier."

Service Resumed in Hazelton

The Lehigh Traction Company, Hazelton, Pa., the employees of which have been on strike for some time, has resumed practically its full schedule. The company has issued a statement to the effect that it will exhaust every resource at its command to protect those who work for it and that finally it will ask for a receiver to operate the road if that should be deemed necessary to protect its interests. The company has placed its case frankly before the public. It has printed correspondence of the secretary of the local division of the Amalgamated Association of Street Railway Employees giving proof of the effort of that body to compel the company to discriminate in hiring employees. The company cited the case of an Italian-American who applied to it some time ago for work and was assigned to practice duty. This man left the service without complaint to the company. Upon investigation it was learned that secret sessions of the organized men in the employ of the company had been held and a determined effort made not to instruct the man. The letter from the secretary of the local division addressed to A. F. Harger, general superintendent of the company, follows:

"I have been authorized by the division to write you in regard to the Italian who is at present practicing for conductor. The boys are all heartily opposed to it and not one of us are in favor of having him among us. Hoping you will look into the matter seriously and give us due consideration, I remain."

The statement from the company to the public reviewing the entire strike situation was signed by C. D. Houck, vice-president.

Contracts for Equipment for Brooklyn Subway.—The Public Service Commission for the First District is rapidly closing the contracts for the purchase of track materials, including rails, ties, etc., for the equipment of the Fourth Avenue subway in Brooklyn.

Mayor Jost Re-elected in Kansas City.—On April 7 Henry L. Jost was re-elected Mayor of Kansas City, Mo., by an overwhelming majority. Mayor Jost announced he would take up the franchise question in his inaugural address on April 20. The negotiations between the Metropolitan Street Railway and the city were suspended some time ago to remove the issue from politics.

Elevated Railroad Franchise in Havana.—A franchise to build a network of elevated railroads throughout the city of Havana has been granted to Señor Tiburcio Perez Castañeda by the Common Council of the city. During the debate it was pointed out that Havana had a perfect surface car system which covered all sections of the city, and that an elevated structure in the narrow streets of the city was inadvisable.

Consents for Third-Tracking Elevated Secured in Brooklyn.—The New York Municipal Railway Corporation has obtained the consents of property owners needed for the third-tracking of the Broadway elevated line of the Brooklyn Rapid Transit System in Brooklyn from the plaza of the Williamsburg Bridge to Fulton Street. The company previously filed consents for the third-tracking of the Fulton Street elevated railroad in Brooklyn.

Mr. Whitridge's Parting Contribution.—F. W. Whitridge, president of the Third Avenue Railway, New York, N. Y., who sailed for Europe recently, did not disappoint the newspaper men who sought him out at the last minute. His parting contribution included the following: "The Interstate Commerce Commission has proved worse than the Public Service Commission. The only thing to clear the air is one or two great bankruptcies. We will get them. The Third Avenue Railway is virtuous and prosperous."

Accident in New Haven Electric Zone.—The Green Mountain express on the New York, New Haven & Hartford Railroad was derailed at 8:45 a. m. on April 12, half way between Harrison and Rye, N. Y., without serious injury to any of its two hundred passengers. The electric locomotive, followed by two steel mail coaches, a wooden combination baggage and smoking car, and a wooden day coach, left the rails and plunged into an embankment without overturning. The rest of the train, consisting of a wooden chair car, a Pullman, and two wooden day coaches, stayed on the rails.

Lack of Capital Prevents Further New Haven Electrification.—In the statement which has been issued by Howard Elliott, chairman of the board of the New York, New Haven & Hartford Railroad, to the stockholders of that company, mentioned elsewhere in this issue, the following reference is made to future electrification: "The electrification of the road between New York and New Haven has been very costly, and until the work is completed and full electric service is in operation any possible economies cannot be realized. Any further electrification must be postponed because of lack of capital."

Seattle Considering Construction of Rainier Valley Lines.—The City Council of Seattle, Wash., has adopted a resolution authorizing and directing the Board of Public Works to prepare plans and specifications and submit an estimate of the cost of building an electric railway on Rainier Avenue, from Dearborn Street to Hudson Street; on Rainier Avenue from Hudson Street to Ryan Street; on Dearborn Street, Seattle Boulevard and Fourth Avenue South from Rainier Avenue to Jackson Street, and on Fourth Avenue South and Spokane Street from Seattle Boulevard to Iowa Street, to connect with the Lake Burien Line.

Short Strike in Colorado Springs.—The lines of the Colorado Springs & Interurban Railway, Colorado Springs, Col., were tied up on April 14 as a result of a combined lockout and strike. B. M. Lathrop, superintendent of the company, ordered watchmen to lock the carhouse on April 13 should the men vote to go on strike at a meeting called for 1 o'clock on the morning of April 14. The men did not vote in favor of the strike, but the watchmen locked the carhouse and refused to allow the men to go to work when they reported. D. H. Rice, president of the company, promised to pay the men for the time which they lost. The men, however, refused to accept the explanation and would not go to work. An adjustment was reached later in the day and service was resumed.

Patent Decision on Car Doors.—The United States Circuit Court of Appeals, Second Circuit, Judges Lacombe, Coxe and Rodgers, has just handed down a decision affirming the judgment rendered by Judge Veeder of the District Court, Eastern District of New York, in favor of the defendant, the Orange County Traction Company, Newburgh, N. Y. This was a suit for damages for the infringement of patent No. 935,929 granted on Oct. 5, 1909, to Harold Rowntree, and owned by the Prepayment Car Sales Company. The suit was defended by the manufacturer of the car, the McGuire-Cummings Manufacturing Company. The Prepayment Car Sales Company in commenting on the decision says that it does not invalidate the patent but declares that the Newburgh car did not infringe the claims of the patent under which the suit was brought, and that other suits will be brought immediately under other patents which it owns and which cover the same car.

San Francisco Starts Construction of New Municipal Line.—The construction of the new Van Ness Avenue line of the San Francisco Municipal Street Railway was commenced on April 6. The new line begins at Market Street and Van Ness Avenue, follows along the latter for a distance of 2 miles, and on Chestnut Street for 1.3 miles. Its primary purposes is to handle traffic to the exposition grounds. The contract for the construction of the track, laying the conduits and setting concrete poles on Chestnut Street was awarded to Mahoney Brothers for \$219,747.50, with the stipulation that the work be completed in 150 days. For completing the work in advance of this limiting time, the contractors are to be allowed a bonus of \$500 per day, up to a maximum of thirty days. As soon as the proposed lines on Eleventh and Church Streets have been built, it

will be possible for passengers to use municipal cars direct from the Potrero district south of the city to the exposition.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

MARYLAND

The Maryland Legislature adjourned on April 6. Among the bills passed at the session were the following: to urge the building of a railroad from Indianhead to Washington; to require locomotives on single-track railroads to be equipped with electric headlights; to repeal the charter of the Southern Maryland Railroad; to provide for the forfeiture of rights, powers and franchises for failure to comply with orders of the Public Service Commission; to incorporate the Salisbury Interurban Railway; to authorize the consolidation of the Edison Electric Illuminating Company and the Cumberland Railways. The bill to confer upon persons riding on the platforms or running-boards of street cars the right of passengers in bringing suit for damages if injured was indefinitely postponed after debate. The House bill to require the segregation of white and colored passengers on street cars was indefinitely postponed.

MASSACHUSETTS

The committee on street railways has voted to report a bill permitting companies to issue bonds to an amount not exceeding 120 per cent of their total outstanding capital stock. The action of the committee was suggested by the Public Service Commission. The bill is designed to afford a measure of relief to many companies in the State whose stock is selling below par, and which, under the present law, cannot issue additional stock. The companies desired the privilege of issuing bonds to twice the amount of their outstanding stock. The Public Service Commission considered the latter limit inadvisable and the bill recommended by the committee is therefore made a compromise measure. The committee has reported leave to withdraw the following bills: a measure granting half fares on street railways to children under fourteen years of age when traveling between their homes and places of employment, such fares to be collected by ticket sales; and a bill requiring street railways in Worcester to place their feed wires underground; but a bill granting half fares on street railways to normal school pupils when en route between school and home has been favorably reported. The committee on metropolitan affairs has reported leave to withdraw the bill abolishing the Boston Transit Commission and transferring its functions and powers to the Public Service Commission.

PROGRAMS OF ASSOCIATION MEETINGS

New England Street Railway Club

The next meeting of the New England Street Railway Club will be held at the American House, Boston, on the evening of April 23. The speaker of the evening is to be G. H. Stickney, illuminating engineer of the Incandescent Lamp Works, General Electric Company, Harrison, N. J. His subject will be "Car Lighting," to be illustrated by lantern slides. Mr. Stickney will also touch on illumination in general.

Iowa Street & Interurban Railway Association

The tenth annual convention of the Iowa Street & Interurban Railway Association will be held at the Montrose Hotel, Cedar Rapids, Ia., on April 23 and 24. The address of welcome will be delivered by Louis Roth, Mayor of Cedar Rapids. J. F. Hanlon, Waterloo, president of the association, will respond. The papers to be presented follow:

Paper, "Some Results Obtained from 'Safety First' Campaign," by M. A. Welsh, Jr., of the Waterloo, Cedar Falls & Northern Railway.

Paper, "Shop Practice," by T. E. Wood, master mechanic of the Omaha & Council Bluffs Street Railway.

Paper, "Car Cleaning and Sanitation," by M. M. Lloyd, master mechanic of the Des Moines City Railway.

Paper, "Modern Public Policies of Public Service Corporations," by P. P. Crafts, vice-president and general manager of the Iowa & Illinois Railway.

Financial and Corporate

Stock and Money Markets

April 15, 1914.

In the trading on the New York Stock Exchange to-day net losses were recorded in a majority of the leading issues. Early in the day trading was quite active, but toward the close business was naturally restricted by the attention paid to the city bond sale. Government bonds were unchanged. Railway and other bonds were irregular. Rates in the money market to-day were: Call, 2 per cent; sixty days, 2½ @ 2¾ per cent; four months, 2¾ per cent @ 3 per cent; six months, 3 per cent @ 3¼ per cent.

In the Philadelphia market the local issues were in more liberal supply. Philadelphia Rapid Transit was offered at 16¾ and 42½ was bid for Union Traction. At the close Rapid Transit reacted further to 16.

The market for stocks in Chicago to-day was narrow and dull. The transactions totaled only 517 shares. The demand for bonds, however, was fair.

The Boston market to-day was active but irregular in specialties. There were small transactions in Boston Elevated, Massachusetts Electric and West End.

In Baltimore the sales of stock to-day totaled 925 shares. Bond transactions totaled 80,000, par value.

	Apr. 8	Apr. 15
American Brake Shoe & Foundry (com.).....	88½	87½
American Brake Shoe & Foundry (pref.).....	139	137½
American Cities Company (com.).....	35¾	35½
American Cities Company (pref.).....	62	61½
American Light & Traction Company (com.)..	365	348
American Light & Traction Company (pref.)..	107	105½
American Railways Company	37½	37¾
Aurora, Elgin & Chicago Railroad (com.)....	41	37
Aurora, Elgin & Chicago Railroad (pref.)....	77	*77
Boston Elevated Railway	81	80
Boston Suburban Electric Companies (com.)..	7	7
Boston Suburban Electric Companies (pref.)..	*63	*63
Boston & Worcester Electric Companies (com.)	*6¼	*6¼
Boston & Worcester Electric Companies (pref.)	37	37
Brooklyn Rapid Transit Company.....	92¼	91¼
Capital Traction Company, Washington.....	101	100
Chicago City Railway	145	170
Chicago Elevated Railways (com.).....	20	20
Chicago Elevated Railways (pref.).....	65	65
Chicago Railways, pteptg., ctf. 1.....	90½	90½
Chicago Railways, pteptg., ctf. 2.....	32	31¾
Chicago Railways, pteptg., ctf. 3.....	6	5
Chicago Railways, pteptg., ctf. 4.....	2	1½
Cincinnati Street Railway	105	105
Cleveland Railway	103	103½
Cleveland, Southwestern & Columbus Ry. (com.)	*4	*4
Cleveland, Southwestern & Columbus Ry. (pref.)	a23	a23
Columbus Railway & Light Company.....	13	13
Columbus Railway (com.).....	53	53
Columbus Railway (pref.).....	79½	79½
Denver & Northwestern Railway	*71	*71
Detroit United Railway	a80	a80
General Electric Company	146	144½
Georgia Railway & Electric Company (com.)	120¼	120
Georgia Railway & Electric Company (pref.)	88	86½
Interborough-Metropolitan Company (com.)..	15¼	14½
Interborough-Metropolitan Company (pref.)..	61½	60½
International Traction Company (com.).....	80	*80
International Traction Company (pref.).....	a85	a85
Kansas City Railway & Light Company (com.)	15	*15
Kansas City Railway & Light Company (pref.)	35	*35
Lake Shore Electric Railway (com.).....	5	5
Lake Shore Electric Railway (1st pref.).....	92	92
Lake Shore Electric Railway (2d pref.).....	22	22
Manhattan Railway	130	131¾
Massachusetts Electric Companies (com.)....	11	10½
Massachusetts Electric Companies (pref.)....	61	59½
Milwaukee Electric Ry. & Light Co. (pref.)..	95	*95
Norfolk Railway & Light Company.....	25¾	25¾
North American Company	76¾	75
Northern Ohio Traction & Light Co. (com.)..	58	60¾
Northern Ohio Traction & Light Co. (pref.)..	101	a101
Philadelphia Company, Pittsburgh (com.)....	41¾	41
Philadelphia Company, Pittsburgh (pref.)....	40	40
Philadelphia Rapid Transit Company.....	16½	16½
Portland Railway, Light & Power Company..	51	51
Public Service Corporation	13	11
Third Avenue Railway, New York.....	43½	42½
Toledo Traction, Light & Power Co. (com.)..	20	20
Toledo Traction, Light & Power Co. (pref.)..	70	70
Twin City Rapid Transit Co., Minneapolis (com.)	104	104
Union Traction Company of Indiana (com.)..	11½	11½
Union Traction Company of Indiana (1st pref.)	75	75
Union Traction Company of Indiana (2d pref.)	14	14
United Rys. & Electric Company (Baltimore)	27	27
United Rys. Inv. Company (com.).....	18	17
United Rys. Inv. Company (pref.).....	44	42
Virginia Railway & Power Company (com.)..	51¾	51
Virginia Railway & Power Company (pref.)..	96	96
Washington Ry. & Electric Company (com.)..	88½	87¾
Washington Ry. & Electric Company (pref.)..	86½	85½
West End Street Railway, Boston (com.)....	70	a70
West End Street Railway, Boston (pref.)....	91	90¼
Westinghouse Elec. & Mfg. Company.....	74¾	72¼
Westinghouse Elec. & Mfg. Co. (1st pref.)....	118	117½

* Last sale. a Asked.

ANNUAL REPORTS

West Jersey & Seashore Railroad

The eighteenth annual report of the West Jersey & Seashore Railroad, Camden, N. J., for the fiscal year ended Dec. 31, 1913, contains the following statement of income, profit and loss:

Railway Operating Income:	
Rail revenues:	
Freight	\$1,814,636
Passenger	4,199,901
Mail	37,209
Express	192,818
Other transportation	107,308
Non-transportation	53,915
	<hr/>
	\$6,405,787
Rail expenses:	
Maintenance of way and structures	\$1,043,324
Maintenance of equipment	1,024,181
Traffic	199,579
Transportation	2,746,119
General	167,092
	<hr/>
	\$5,180,293
Net revenue—rail operations	\$1,225,492
Auxiliary operations:	
Revenue	\$175,960
Expenses	219,581
Deficit	\$43,621
Net railway operating revenue	\$1,181,871
Railway tax accruals	318,965
	<hr/>
Railway operating income	\$862,906
Other income	\$197,162
	<hr/>
Gross income	\$1,060,068
Deductions from gross income	586,674
Net income	\$473,394
Appropriations to sinking and other reserve funds	81,231
Balance transferred to profit and loss	\$392,163
Surplus, Dec. 31, 1912	922,507
	<hr/>
	\$1,314,670
Dividends on common stock, aggregating five per cent	\$482,080
Sundry net debits during the year	12,950
	<hr/>
	\$495,030
Surplus, Dec. 31, 1913	\$819,640

The total rail operating revenues of the company increased only \$10,531 as compared with the year 1912. Passenger revenue increased \$102,152 and there were slight increases in other incomes, but the merchandise freight receipts alone decreased \$102,246. The rail operating expenses increased \$319,149, or 6.57 per cent. Of this increase, maintenance of way and structures required \$115,115 more than in 1912 on account of heavier outlays and increased cost of repairs and renewals, while the maintenance of equipment expenses increased \$54,942, chiefly on account of the increased cost of repairs and depreciation charges. Transportation expenses exceeded those of 1912 by \$111,359, principally because of increased wages, increased consumption of fuel and extension of the block signal system to branch lines.

Other income decreased \$57,043, principally on account of heavier replacements and depreciation charges for the equipment of the Atlantic City and Longport Electric Line, which is leased to the Atlantic City & Shore Railroad. Deductions from gross income increased \$25,583, due to larger amounts paid for the ferries and to increased joint facility rent deductions. The net income for the year showed a decrease of \$414,485, against which was charged appropriations to sinking and other reserve funds amounting to \$81,231. The balance of \$392,363 was transferred to the profit and loss account and 5 per cent, aggregating \$482,080, was paid therefrom for dividends.

The expenditures during the year for the road and equipment aggregated \$464,138, which was divided \$163,838 to capital account and \$300,300 to reserve for additions and betterments.

The number of pensioners on the rolls of the company was forty-four and the pensions paid during the year amounted to \$21,672, which required an increase of \$3,672 in the pension appropriation authorized by the board of directors.

The report mentions the fact that the lease of the property of the company to the Pennsylvania Railroad for 999 years, upon the basis of a guaranteed rental of 6 per cent on the common stock, was authorized by both companies

during the year, but did not receive the approval of the Board of Public Utility Commissioners of New Jersey. Upon the institution of legal proceedings to test the finding of the commission the Supreme Court declined to set aside the decision, and announcement is made that consideration is now being given as to the possibility of carrying the case to the Court of Errors and Appeals.

The West India Electric Company, Ltd.

The statement of earnings and operating expenses of the West India Electric Company, Ltd., Kingston, Jamaica, for the years ended Dec. 31, 1912 and 1913, follows:

Earnings:	1913	1912
Railway	\$212,157	\$192,193
Electric light	56,864	52,908
Power	9,611	10,741
Miscellaneous	6,209	5,238
Total	<hr/>	<hr/>
	\$284,841	\$261,080
Expenses:		
Transportation	\$54,957	\$61,616
Maintenance	29,138	23,104
General	63,645	57,711
Total	<hr/>	<hr/>
	\$147,740	\$136,431
Net earnings	\$137,101	\$124,649
Fixed charges:		
Interest on bonds	\$30,000	\$30,000
Tax on railway earnings	8,517	7,692
Rental	12,000	12,000
Total	<hr/>	<hr/>
	\$50,517	\$49,692
Net income—surplus for period	\$86,584	\$74,957

The gross receipts during 1913 showed an increase of 9.1 per cent over 1912, the railway department alone carrying most of this increase. Operating expenses increased 8.29 per cent during 1913, although the operating ratio was lowered from 52.25 per cent to 51.86 per cent during the year. According to the report this decrease was somewhat attributable to the well distributed rainfall and consequent dependable supply of water power, resulting in economy of coal consumption.

The net earnings showed an increase of 9.98 per cent in 1913. The number of passengers carried increased 10.49 per cent. During the year the sum of \$16,741 was expended on capital account. Four dividends of 1¼ per cent were paid, and the amount of \$42,584 carried to the surplus account increased this to \$402,205 as of Dec. 31, 1913.

Honolulu Rapid Transit & Land Company

The condensed income statement of the Honolulu Rapid Transit & Land Company, Honolulu, Hawaii, for the year ended Dec. 31, 1913, follows:

Gross earnings from operation	\$618,144
Operating expenses	371,242
Net earnings from operation	\$246,902
Income from other sources	7,578
Gross income	<hr/>
	\$254,480
Interest on funded debt	\$33,960
Taxes—	
Conservation	\$2,153
Corporation	1,829
Property and income	23,819
Public Utilities Commission	520
Specific	82
Car licenses	550
	<hr/>
Total	28,955
Gross income, less interest and taxes	<hr/>
	\$225,525
Bond sinking fund reserve 1913	\$25,000
Depreciation of plant 1913	28,697
Loss and gain account 1913	196
	<hr/>
	53,893
Net income	\$171,632
Dividends on common stock	96,600
Balance net income 1913	<hr/>
Surplus 1912	\$41,072
	223,435
Transferred from bond sinking fund reserve 1913	25,000
	<hr/>
	\$264,507
Transferred to reserve stock sinking fund	\$58,000
Transferred to dividend suspense account	31,400
	<hr/>
	\$89,400
Balance carried to 1914	<hr/>
	\$200,107

The gross earnings from car operations and attractions increased from \$564,472 in 1912 to \$618,144, 1913, or \$43,672, and other income increased from \$5,796 to \$7,578, or \$1,782. On the other hand, there was a material increase in the operating expenses over 1912. For 1913 these were \$80,677 in excess of 1912, being chargeable 85.2 per cent to maintenance of way and structures, 2.3 per cent to maintenance of cars, trucks and motors, 6.1 per cent to operation of cars and 6.4 per cent to general expenses. Although there was an increase in the car mileage of 17,897 miles and in the number of passengers transported of 983,037, the power plant expenses decreased about \$17.

There was expended on track maintenance, macadamizing and rehabilitation the sum of \$92,016. Betterments were made to the extent of \$54,989. Fare passengers per car mile increased from 470,889 in 1912 to 510,698 in 1913. Earnings per fare passenger remained the same at 0.0488 cent, while expenses per fare passenger increased from 0.0256 cent in 1912 to 0.0298 cent in 1913. The operating ratio increased from 51.47 per cent in 1912 to 60.06 per cent in 1913.

Indianapolis Street Railway

At the annual meeting of the stockholders of the Indianapolis (Ind.) Street Railway held at Indianapolis on April 8 the following directors were re-elected: Henry Jameson, Harry S. New, Harold B. Hibben, Ferdinand Winter and Joseph A. McGowan, Indianapolis; Marshall S. Morgan, Philadelphia, Pa., and Charles M. Murdock, Lafayette, Ind.

The directors reported to the stockholders that notwithstanding the adverse conditions which prevailed during 1913, on account of the flood in the spring of the year and the strike which occurred in November, the Indianapolis Traction & Terminal Company, as lessee, had expended \$602,083 for the maintenance of the property of the Indianapolis Street Railway. A comparison of expenditures for maintenance for 1913 and 1912 follows:

	1913	1912
Maintenance of way and structures.....	\$379,086	\$366,240
Maintenance of equipment.....	222,997	217,228
Total	\$602,083	\$583,468
Per cent of maintenance to gross earnings....	18.15	17.45

The gross earnings of the Indianapolis Traction & Terminal Company (lessee) for 1913 amounted to \$3,321,088, as compared with \$3,343,640 for 1912, a decrease of \$22,551.

A description of the reconstruction work on tracks of the Indianapolis Street Railway during 1913 was placed before the stockholders, and data presented showing that since Dec. 29, 1902, the date of the lease of the street railway to the Indianapolis Traction & Terminal Company, about 50 per cent of the track has been entirely rebuilt by the lessee company, using the latest types of heavy rails on concrete foundation with brick and granite block paving, and that extensive repairs have been made on 20 per cent additional track.

The following officials were elected for 1914: Henry Jameson, president; Harry S. New, first vice-president; Harold B. Hibben, second vice-president; Joseph A. McGowan, secretary and treasurer; W. F. Milholland, assistant secretary and treasurer.

Change in Control of the Lackawanna & Wyoming Valley Railroad

The controlling interest in the Scranton & Wilkes-Barre Traction Corporation, which is the holding company for the Lackawanna & Wyoming Valley Railroad, the third-rail system between Wilkes-Barre and Scranton, Pa., has been purchased by a syndicate composed principally of Senator William C. Sproul, Bioren & Company, Philadelphia, and Ford, Bacon & Davis, New York, all of whom will be represented in the management. Ford, Bacon & Davis, New York, will have general oversight of the management of the company's affairs and will be represented on the board of directors by F. R. Ford and C. F. Ueberlacker. Mr. Sproul will be elected to the presidency of the company.

The Lackawanna & Wyoming Valley Railroad is stated to be doing about 95 per cent of the entire passenger business

between Wilkes-Barre and Scranton. Since its financial reorganization about a year ago it has shown substantial progress and is paying dividends on its preferred stock now at the rate of 6 per cent per year. Beginning with 1917 this stock will be entitled to 7 per cent. The capitalization is \$3,000,000 of 5 per cent bonds, \$1,000,000 of 6 per cent bonds, \$700,000 of preferred stock and \$1,500,000 of common stock.

The earnings of the Lackawanna & Wyoming Valley Railroad for the calendar year 1913 were \$650,330 as compared with \$607,271 in 1912, an increase of 7.09 per cent, while the net earnings increased 12.84 per cent during the year. The revenue received for passengers increased 6.32 per cent and that from freight 10.04 per cent, while the express revenue increased 19.89 per cent owing to higher rates. The net income after deductions, including taxes, was \$296,676 as compared with \$264,245 in 1912. The final surplus, after providing for bond interest and charges against income, including dividends, was \$34,856.

American Water Works & Guarantee Company, Pittsburgh, Pa.—The property of the American Water Works & Guarantee Company was sold at Pittsburgh on April 15 for \$1,250,000 to H. H. Pierce, New York, N. Y., representing the bondholders' protective committee. The reorganization of the company will be carried out in accordance with the plan reviewed at length in the ELECTRIC RAILWAY JOURNAL of April 4, 1914, page 794.

Commonwealth Power, Railway & Light Company, Grand Rapids, Mich.—Hodenpyl, Hardy & Company, New York, N. Y., are offering for subscription five-year 6 per cent convertible gold bonds of the Commonwealth Power, Railway & Light Company, dated May 1, 1913, and due May 1, 1918. The authorized issue is \$10,000,000, all of which is outstanding. The bonds are in denominations of \$1,000, \$500 and \$100. They are coupon bonds with the privilege of registration as to principal only and are convertible at the option of the holder in amounts of \$1,000 after May 1, 1916, and before maturity into an equal amount of 6 per cent cumulative preferred stock of the company at par. In addition, upon such conversion the bondholder will receive common stock of the Commonwealth Power, Railway & Light Company at par value equal to 30 per cent of the face amount of the bonds so converted. The properties are under the supervision and management of Hodenpyl, Hardy & Company, New York, N. Y., E. W. Clark & Company, Philadelphia, Pa., and W. A. Foote, Michigan.

Gallipolis & Northern Traction Company, Gallipolis, Ohio.—The Gallipolis & Northern Traction Company has been authorized by the Public Utilities Commission of Ohio to issue its common stock of the par value of \$35,000 and its twenty-year 6 per cent mortgage bonds of the total sum of \$35,000 to be sold at not less than par, the proceeds arising from the sale of the stock and the bonds to be devoted to pay the full purchase price for the property formerly known as the Kanauga Traction Company. The company has in addition been authorized to issue common stock of the par value of \$15,000 and its twenty-year 6 per cent mortgage bonds of the total principal sum of \$15,000.

Los Angeles & San Diego Beach Railway, San Diego, Cal.—The Los Angeles & San Diego Beach Railway has applied to the Railroad Commission of California for authority to issue notes in the sum of \$19,000 to refund indebtedness incurred for construction work in 1911 and 1912.

Manchester (N. H.) Street Railway.—Philip L. Saltonstall and Frank S. Streeter have been elected directors of the Manchester Street Railway, succeeding J. B. Smith, resigned, and S. Reed Anthony, deceased. Mr. Smith continues as general manager of the company.

Northern Electric Railway, Chico, Cal.—The Northern Electric Railway has applied to the Railroad Commission of California, for authority to refund existing note indebtedness in the sum of \$2,161,575.

Philadelphia Company, Pittsburgh, Pa.—A special meeting of the stockholders of the Philadelphia Company will be held on June 15, 1914, to vote on the plan to reduce the authorized capital stock of the company in connection with the exchange of 5 per cent preferred stock for 6 per cent preferred stock.

Portland Railway, Light & Power Company, Portland, Ore.—E. W. Clark & Company, Philadelphia, Pa., announce the sale of an issue of \$5,000,000 one year 5 per cent gold notes of the Portland Railway, Light & Power Company. This issue of notes is dated May 1, 1914, and is due May 1, 1915. They were sold at 99½ and interest to yield about 5½ per cent. The notes are secured by deposit of the entire issue of \$5,000,000 of the first mortgage sinking fund thirty year gold bonds of the Mount Hood Railway & Power Company, due in 1937; and of the entire capital stock (excepting only directors' shares) of the Mount Hood Company. The bonds of the Mount Hood Railway & Power Company constitute a first lien on the water power, electric light, power and street railway properties formerly owned by the Mount Hood Railway & Power Company, which are situated in the territory adjacent to Portland.

Portsmouth Street Railroad & Light Company, Portsmouth, Ohio.—The Public Utilities Commission of Ohio has authorized the Portsmouth Street Railroad & Light Company to issue its 6 per cent preferred capital stock of the total par value of \$250,000 and its 6 per cent twenty-year mortgage bonds of the total principal sum of \$500,000 at the highest price obtainable, but for not less than par. The proceeds arising from the sale of the preferred stock are to be devoted by the company to reimburse its income for expenditures therefrom for the construction of additions, extensions, improvements and betterments and the proceeds arising from the sale of the first mortgage bonds are to be devoted as follows: To extend and equip the Ohio Valley Traction Company's line from Sciotoville to Ironton, Ohio, a distance of about 22 miles, \$400,000; to pay and discharge present bonds of the Portsmouth Street Railroad & Light Company, \$75,000; to double-track and change 2½ miles of its line, \$50,000; to repay borrowed money, \$18,000; to construct a subway in Portsmouth under the tracks of the Norfolk & Western Railway, \$175,000; and to erect a new carhouse, \$25,000.

Rockland, Thomaston & Camden Street Railway, Rockland, Maine.—Maynard S. Bird & Company, Portland, Maine, have secured control of the Rockland, Thomaston & Camden Street Railway through the purchase of the holdings of George E. Macomber and Percy V. Hill in the company. Hugh J. Chisholm and N. J. Neal have been elected to the board of directors to fill vacancies. W. T. Cobb has been elected president of the company to succeed Mr. Macomber.

Sacramento Valley West Side Electric Railway, Willows, Cal.—The Sacramento Valley West Side Electric Railway has applied to the Railroad Commission of California for an order authorizing the execution of a promissory note in the sum of \$16,856.70 to the Oakland, Antioch & Eastern Railway with the privilege of pledging certain promissory notes as collateral security.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—The stockholders of the San Francisco-Oakland Terminal Railways on April 7 voted to increase the bonded indebtedness of the company from \$20,000,000 to \$35,000,000, subject to the approval of the State Railroad Commission. Of the \$35,000,000, it is announced that \$20,000,000 will be set aside to retire securities now outstanding. The new bond issue will be known as "first and refunding thirty-year 5 per cent gold bonds." Part of the \$15,000,000 remaining will be used "to acquire property within the purpose of the corporation and for the extension and improvement of its facilities and the improvement and maintenance of its service."

Springfield (Ohio) Railway.—The Springfield Railway has been authorized by the Public Utilities Commission of Ohio to issue its first mortgage 5 per cent bonds of the total principal sum of \$1,244,000, and its 6 per cent cumulative preferred capital stock of the total par value of \$143,200, the preferred stock to be sold for the highest price obtainable but for not less than par. The first mortgage bonds are to be issued in exchange for the petitioner's present outstanding bonds of the same principal amount. The proceeds arising from the sale of the 6 per cent cumulative preferred stock are to be devoted to, and used in accordance with, the purposes prescribed by the regulating commission.

Southern Iowa Railway & Light Company, Albia, Ia.—The Southern Iowa Railway & Light Company has been incorporated as a consolidation of the Albia Interurban Railway and the Albia Gas Company. The authorized capital stock of the company is \$500,000. Of this amount \$120,000 has been issued. The officers of the company are C. B. Judd, president; E. C. Manning, secretary, treasurer and general manager; W. J. Read, superintendent and purchasing agent.

Terre Haute Traction & Light Company, Terre Haute, Ind.—The Public Service Commission of Indiana on April 13 granted the petition of the Terre Haute Traction & Light Company for permission to issue \$106,000 of bonds on account of improvements and betterments to the property during 1913. A clause in the mortgage of the Terre Haute Traction & Light Company provides that for each \$1,250 actually expended there may be issued a bond for \$1,000. This issue of \$106,000 completes the total authorized bond issue of \$5,000,000, of which \$1,500,000 is reserved to retire underlying bonds of the Terre Haute Electric Company.

United Railroads, San Francisco, Cal.—The United Railroads, E. H. Rollins and Sons, Boston, and the Union Trust Company, San Francisco, have applied to the Railroad Commission of California for authority to execute a car equipment trust agreement. Under the proposed agreement the United Railroads will purchase sixty-five cars for use in San Francisco at an aggregate sum of \$365,000.

Dividends Declared

Aurora, Elgin & Chicago Railroad, Wheaton, Ill., quarterly, 1½ per cent, preferred; quarterly, three-quarters of 1 per cent, common.

Brooklyn (N. Y.) City Railroad, quarterly, 2 per cent.
Green & Coates Street Passenger Railway, Philadelphia, Pa., quarterly, \$1.50.

Havana Electric Railway, Light & Power Company, Havana, Cuba, 3 per cent, preferred; 2½ per cent, common.

United Railways & Electric Company, Baltimore, Md., quarterly, 50 cents, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.						
Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus	
1m., Feb., '14	\$127,623	*\$91,616	\$36,007	\$35,131	\$876	
1 " " '13	123,383	*82,599	40,784	32,454	8,330	
8 " " '14	1,372,187	*868,505	503,682	273,327	230,355	
8 " " '13	1,314,447	*768,212	546,235	256,985	289,250	
DETROIT (MICH.) UNITED RAILWAY						
1m., Feb., '14	\$871,824	*613,000	\$258,823	\$184,128	\$74,695	
1 " " '13	920,166	623,520	296,647	178,603	118,044	
2 " " '14	1,844,199	1,295,844	548,255	360,892	187,362	
2 " " '13	1,925,512	1,301,296	624,217	357,104	267,113	
FORT WAYNE & NORTHERN INDIANA TRACTION COMPANY, FORT WAYNE, IND.						
1m., Jan., '14	\$160,119	*\$86,632	\$73,487	\$52,260	\$21,227	
1 " " '13	151,645	77,627	74,016	49,091	24,925	
KENTUCKY TRACTION & TERMINAL COMPANY, LEXINGTON, KY.						
1m., Jan., '14	\$66,174	\$32,168	\$30,493	\$17,103	\$13,390	
1 " " '13	61,252	30,897	27,618	16,628	10,990	
7 " " '14	701,269	240,019	212,220	117,318	94,902	
7 " " '13	453,888	246,696	189,276	111,334	77,942	
PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.						
1m., Jan., '14	\$25,670	*\$18,157	\$7,513	\$7,679	†\$166	
1 " " '13	26,666	*17,227	9,439	7,335	2,104	
12 " " '14	295,570	*195,024	100,546	90,306	10,240	
12 " " '13	288,509	*191,589	96,921	86,615	10,306	
PENSACOLA (FLA.) ELECTRIC COMPANY						
1m., Jan., '14	\$23,701	*\$14,937	\$8,764	\$7,268	\$1,496	
1 " " '13	26,317	*16,480	9,838	6,301	3,537	
12 " " '14	283,141	*181,195	101,946	82,068	19,878	
12 " " '13	289,485	*177,521	111,965	76,393	35,572	
SAVANNAH (GA.) ELECTRIC COMPANY						
1m., Jan., '14	\$72,461	*\$49,038	\$23,423	\$23,016	\$407	
1 " " '13	67,792	*50,077	17,715	17,709	6	
12 " " '14	832,449	*556,883	275,566	267,570	7,996	
12 " " '13	756,491	*558,730	197,762	196,548	1,214	
VIRGINIA RAILWAY & POWER COMPANY, RICHMOND, VA.						
1m., Jan., '14	\$448,415	*\$212,807	\$235,608	\$135,409	\$100,199	
1 " " '13	416,858	213,053	203,806	124,857	78,949	
7 " " '14	3,114,660	1,525,962	1,588,697	938,227	650,470	
7 " " '13	2,905,300	1,421,030	1,484,270	866,650	617,620	

*Includes taxes.
†Deficit.

Traffic and Transportation

Traffic Problem Between Minneapolis and St. Paul

There has been considerable agitation of late in the Twin Cities in regard to the possibility of reducing the running time over the lines of the Twin City Rapid Transit Company between Minneapolis and St. Paul. The present running time from Rice and University Streets, St. Paul, to Seven Corners in Minneapolis is thirty-two minutes. The distance in this intermediate territory is 7.3 miles and the present average speed for this distance is 13.7 m.p.h., and by reducing this time by five minutes in this territory it would increase the speed to 16.2 m.p.h. This is assuming that all cars would have to make all of the intermediate stops on each trip, which would have to be assumed in making schedules. The company estimates that by applying the skip-stop plan this reduction of five minutes in running time could be accomplished. In a statement which it has issued in regard to the proposal to reduce the time between the cities the company says:

"With the growth of the Twin Cities the time will probably come when there will be a sufficient amount of business to warrant the construction of an elevated line, which might make the run in thirty to thirty-five minutes, but the amount of travel at this time is such that it would be impossible to make any return on the large amount of money which would be necessary to finance such a project. The company is in sympathy with any movement which will result in reducing the running time between the two cities, but in the judgment of this company the only practical plan is the 'third stop' method, and the consent of the cities to this action must be obtained by the patrons of the line and not on the company's initiative."

Interurban Railway Development in Iowa

L. S. Cass, president of the Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia., made a very interesting speech before the Des Moines Press Club recently in which he reviewed the past, present and future of interurban electric railways in Iowa, advocating important changes in the law to encourage their promotion and indorsing the proposed general increase in steam railroad rates as essential for the betterment of conditions in all lines of railroad business. In opening his remarks Mr. Cass reviewed briefly the conditions which governed the construction of electric railways in the East as contrasted with those in the West. Speaking more particularly in regard to electric railway development in Iowa Mr. Cass said in part:

"There are a great many reasons why Iowa has not developed a large interurban railway mileage. In the first place Iowa is largely an agricultural state and has no large cities. Its rural population matures and cashes one crop each year, whereas in the states with the large interurban mileage the rural population is devoted largely to mining and manufacturing and depends upon the electric lines for transportation to and from the markets. This statement is supported by statistics showing the average number of rides per inhabitant per annum in various states.

"With a population riding only twenty-eight times per annum it is self-evident that the Iowa electric railroads must be constructed along lines different from the electric railways in New York, in which State the rides per capita per annum total 198. In other words, while the New York electric railroad was built for passenger business almost exclusively, the Iowa interurban railway had to be so constructed as to transact a general railroad business. On this account but few interurbans could be built in Iowa with any prospect of success.

"The principal interurban mileage in Iowa is largely connected with the Chicago Great Western Railroad. I think credit is due A. B. Stickney, builder and formerly president of the Chicago Great Western Railroad, for the interurban railways Iowa now enjoys. When asked if he would make connections with electric lines, Mr. Stickney's answer was: 'I will make connections, form through routes and publish joint tariffs with anyone who will establish any form of continued transportation for the delivery of

freight, even though the motive power be only an ox team.' The wisdom of this policy cannot now be questioned. Since the passage in 1910 of the amendment to the Sherman anti-trust law, known as the Wickersham rail rate law, the managements of the trunk lines have come to recognize the electric railroad as an important feeder to their systems as well as a necessity to the best development of a large part of the territory served by their lines and I think it is only fair to say that even though this bill had not become a law the trunk lines would now be forming through routes and publishing joint rates with all the electric lines.

"Another reason why interurban railroads have not been built more largely in Iowa is the fact that our laws have not permitted returns to the promoter as large as have been possible to him elsewhere. It would seem, however, that with the low capitalization of Iowa electric railroads and the possibility of doing a general railroad business the people of the State would be attracted to the securities of the electric railroads within the State. Our funds are, however, used principally in the pursuits of agriculture and in the manufacturing industries of our State. Our people understand perfectly a mortgage on property, but a railroad bond secured by a mortgage is entirely outside of their scope of education and is not looked upon with favor, consequently the money that has gone into the Iowa electric railways has come mostly from outside the State. Some of the people in our own State are commencing to understand the great value of the interurban to their property and are expressing a willingness to invest some of their earnings in electric railroads. This is evidenced by the fact that the people of Cedar Rapids and Waterloo and the country between these two cities have invested nearly \$700,000 in the preferred stock of the Waterloo, Cedar Falls & Northern Railway to assist in the building of 60 miles of electric railroad that will be completed this year.

"Franchises limiting the life of the electric railroads upon the streets of municipalities to twenty-five years have been another great drawback to the building of electric railroads in Iowa. We should reserve the right to regulate in our franchises, but should not restrict the life of the corporation, as it is a great handicap to procuring outside funds for the development in which we are all so much interested. Still another reason why Iowa has not enjoyed better growth in interurban railways is the fact that the Iowa distance tariff is made up on a basis of rates too low for the short haul. For instance, it costs just as much to solicit, receive, load, bill, unload, deliver and collect the charges on a piece of freight traveling a short distance that it does a long distance, and the electric railroad being a short railroad, it never has the benefit of the average earnings between long and short hauls in the State. Therefore its costs of operating freight business is too great to admit of a profit sufficient to interest capital in extensions, except in isolated cases. The people of the State are not interested nearly so much in what the rate is as they are in knowing that the rates do not discriminate between competing communities.

"I want to say that I believe one of the strongest agencies in the interest of interurban development in Iowa is the treatment to be accorded trunk lines in the matter of legislation and freight rates. Iowa has just scored a victory in the attempt to adjust rates throughout the State. This attempt at adjustment has brought about the lowering of rates throughout the State on interstate business to a very marked degree. I think this attempted readjustment of interstate rates for Iowa is fair and right. What Iowa was contending for, however, was not the results to be obtained from reductions in rates so much as it was equalization between important commercial centers. Just as soon as this equalization has taken place I believe every commercial body in the State of Iowa should ask the Interstate Commerce Commission to grant the trunk lines a universal horizontal increase in railroad rates to strengthen the credit of the trunk lines in the financial centers. Not only must we assist the credit of the trunk lines by granting them the increase in rates they ask, but we must call a halt on the adverse legislation against the trunk lines. This appeal for advance in rates in the interests of the trunk lines is equally in the interest of the electric lines. If the trunk lines are prosperous confidence will be placed in the elec-

tric lines by the investors and funds will be forthcoming for building more electric lines in the State. The trunk lines will find it possible to deal more liberally with the electric lines, thereby adding to the profits of the latter, and furthermore the trunk lines will be in a position to secure funds with which to electrify branches throughout the State that are now of little value to the public.

"An amendment to the constitution of Iowa would aid also materially in the construction of electric railroads. Land for the construction of electric railroads cannot be taken in Iowa without paying the value of the property and any damage accruing to the property, excluding any benefits received by the property. In Nebraska and some other states the value of the land which is taken must be paid, but against the damages one may show the benefits. Therefore if the benefits you bring to the party owning the property which has been condemned and paid for are equal to the damages you do to the property, there is no damage and you are merely obliged to pay for the land.

"The future interurban railways in Iowa will come from electrified steam lines and will be built by the various communities becoming interested and putting in large sums of their own money, and I must say that there are a great many communities in the State of Iowa than can well afford to invest their own money in interurban railroads. With some changes in our present laws, those who do invest in the electric railways can hope for a reasonable if not a large profit, to say nothing of the profit in the collateral interests that the road will benefit."

Reduction in Fare Ordered.—The Railroad Commission of California has directed the Los Angeles Railway to reduce its thirty-ride family commutation rate for the transportation of passengers between Lennox and Los Angeles from \$3.30 to \$2.25.

Complaint Against Service in St. Louis.—The West End Business Men's Association of St. Louis on April 9 filed a complaint against the United Railways, St. Louis, with the Missouri Public Utilities Commission alleging general inefficiency. The railway was cited to file a response within ten days.

Crusade Against Boys Who "Flip" Cars.—The police of St. Louis, Mo., are co-operating with the officers of the United Railways in an effort to stamp out the practice which has increased considerably of late among boys in that city of "flipping" cars while they are in motion. The police are arresting all offenders. Twenty-three arrests were made one day recently.

Ruling in Regard to Free Transportation.—It is the opinion of the Public Service Commission of Pennsylvania that the according to ministers of religion of free intrastate transportation, or such transportation at reduced rates, is discriminatory and illegal, and that the commission is without warrant to otherwise regard it, under the present public policy of Pennsylvania as fixed by law.

Accidents on Maine Railways.—According to the report of the Railroad Commission of Maine for the year ended June 30, 1913, there were four passengers killed and seventy-nine injured, eight employees injured, eight other persons killed and twenty-eight injured, making a total of twelve persons killed and 115 injured. These figures were increases of four in the number killed and nineteen in the number injured over the previous year.

Reduction in Local One-Way Fares.—Effective on May 6, 1914, the New York, Westchester & Boston Railway, New York, N. Y., will establish local one-way fares in both directions between Wykagyl and East Third Street, Columbus Avenue, and East Lincoln Avenue at 5 cents; between Wykagyl and Westchester Avenue (White Plains) at 10 cents; between Quaker Ridge and East Third Street, Columbus Avenue, and East Lincoln Avenue at 10 cents. The reduction in each case is 5 cents.

Trade Trips Near Kansas City.—The Kansas City Commercial Club will utilize the interurban railways running into Kansas City in making short trade extension trips into adjacent territory. The long trip usually made by the commercial organization in the spring has been postponed until fall. Short journeys, however, will be made to encourage residents of near-by territory to take advantage of the

interurban and other facilities to trade in Kansas City. The electric railways will place special cars at the service of the junketers.

Special Convention Rates Stimulate Traffic.—The lines of the Louisville & Northern Railway & Lighting Company and the Louisville & Southern Indiana Traction Company carried many visitors from various points in southern Indiana into Louisville during the sessions of the Conference for Education in the South, which were participated in by national authorities on the numerous matters discussed of interest to the farmer and manufacturer. A rate of one fare for the round trip into Louisville and return was offered by the companies, and stimulated passenger traffic during the conference.

Interurban Railway Industrial Pamphlet.—The Chicago, Ottawa & Peoria Railway, Ottawa, Ill., has issued an industrial pamphlet dealing with the famous Illinois Valley. The pamphlet has to do particularly with the possibilities of the territory through which the company operates from an agricultural standpoint. It is profusely illustrated with half-tone reproductions of the products of the territory and the facilities which are afforded by the company for handling passenger traffic and freight. There is a complete time-table of both west-bound and east-bound trains, a map of the line and a list of the steam and electric railroad connections.

The Theoretical Nickel Analyzed.—The Brooklyn (N. Y.) Rapid Transit Company recently published as a paid advertisement in the Brooklyn newspapers chapter six of its continued story "Why We Need the Nickels," to which reference has been made previously in the *ELECTRIC RAILWAY JOURNAL*. The company analyzed the theoretical nickel, with its depreciation, as received by the company, down to 3.745 cents per passenger. In its conclusion the company said: "The ability to ride is more important to the public than the price paid for that ride. The company's ability to furnish the ride depends upon receiving enough for it to pay the cost of supplying the service."

Two Billion Carried Safely.—The New York Evening Sun, commenting editorially on the record of safety of the Interborough Rapid Transit Company, operating the New York subway, said recently: "According to President Shonts of the Interborough the subway has transported in the last nine years, without a single passenger fatality, the astonishing total of 2,198,000,000 individuals. Such a record in transportation, considering speed, regularity and relative efficiency, is undoubtedly not to be excelled anywhere; and the wonder might well be that this enormous number has been handled with comparatively as little inconvenience as they really have suffered. The Interborough Company is certainly to be congratulated for carrying a third more persons than make up the entire population of the earth without the loss of a single life. In no other respect could they have made so commendable a showing. And if the straphanger still feels that he has something coming to him he should remember that his grievances go to make up the reasons why they are building more subways."

Effort to Secure Track Elevation in Suburban Chicago.—A number of complaints have been filed with the Illinois Public Utilities Commission in regard to the condition of certain crossings of the Chicago & Oak Park Elevated Railroad in the suburban territory west of Chicago. It is contended that the crossings are dangerous and that the only way to improve them is to compel the road to elevate its tracks. At the present time the Oak Park Elevated is in the hands of Samuel Insull, receiver. Mr. Insull has expressed a willingness to elevate, but says that funds for the purpose are not available. In anticipation of possible action by the commission to compel the elevation of these tracks, counsel for the receiver presented a petition for an injunction in the United States District Court. This petition was withdrawn temporarily, but will again be filed if an order is issued by the Public Utilities Commission. B. I. Budd, president of the Chicago Elevated Railways, has announced that the Northwestern Elevated Railroad will elevate its tracks between Wilson and Howard Avenues, a distance of approximately 4 miles. When this elevation is completed it is expected that the running time between the Chicago loop and Evanston will be reduced approximately 10 minutes.

Personal Mention

Mr. W. T. Cobb, Rockland, Maine, formerly Governor of that State, has been elected president of the Rockland, Thomaston & Camden Street Railway, Rockland, Maine, to succeed Mr. G. E. Macomber.

Mr. N. J. Neall, consulting engineer, Boston, Mass., has been appointed managing engineer of the Rockland, Thomaston & Camden Street Railway, Rockland, Maine, which has been taken over by a syndicate headed by Mr. Hugh J. Chisholm, Portland, Maine.

Gen. William A. Bancroft, president of the Boston (Mass.) Elevated Railway, was the subject of the fourth interview in the series of the Boston *Post* entitled "Business Builders of New England." General Bancroft reviewed briefly his own experience in business and ventured advice to seekers for jobs. In this connection he is quoted as follows: "While I do not feel capable of offering advice to young men, I have often thought when people applied for employment how many more would get employment if they had some concrete proposition to offer which would be reciprocally advantageous to both employer and the person seeking employment. Ordinarily a man seeking employment has nothing to offer except an intention to serve his employer faithfully and capably. Not always does he have that."

Mr. Newton W. Bolen, general superintendent of the Public Service Railway, Newark, N. J., was tendered a testimonial dinner at Paterson on March 24 by the platform men of the Passaic Division in honor of the tenth anniversary of his connection with the company. Practically all the men who could be spared, 145 in number, attended. The speaker of the evening was Mr. John Bimson, chief of police of Paterson. Other municipal officers were also in attendance. The dinner was in addition to the annual dinners of the Passaic Division which have been an important local event for six years past. A paper-weight with mirror on one side and Mr. Bolen's photograph on the other, inscribed "To Our Friend," was the souvenir of the occasion. The employees of Greenville and Montgomery carhouses propose to tender a dinner to Mr. Bolen on April 20 in the assembly room at the Montgomery carhouse in Jersey City.

Mr. William C. Sproul will be elected president of the Scranton & Wilkes-Barre Traction Corporation, which is the holding company for the Lackawanna & Wyoming Valley Railroad, operating between Wilkes-Barre and Scranton, Pa. Mr. Sproul and a syndicate have purchased control of the company and he will succeed Mr. James C. Bennett as president. Mr. Sproul was born in Octoraro, Pa., in 1870 and was graduated from Swarthmore College in 1891. He purchased an interest in the Chester *Daily Times* in 1892, and in 1898 was elected vice-president of Roach's Ship Yard. In 1900 he organized the Seaboard Steel Casting Company, Chester, of which he is president. He also organized the Chester Shipping Company and is president of that company. He became interested in coal and timber properties in West Virginia in 1901 and is president of the Coal River Railway of West Virginia, the Ohio Valley Electric Railway operating in West Virginia, Kentucky and Ohio, Kanawha Valley Traction Company and the Coal River Land Company. He is also a director of a number of other companies, among them the Commercial Trust Company, Philadelphia, and the Delaware County Trust Company, First National Bank and Delaware County National Bank, all of Chester. Mr. Sproul was elected to the Senate of Pennsylvania in 1896 by the Republicans of the Ninth Senatorial District and was re-elected in 1900, 1904 and 1908.

OBITUARY

DeLancy H. Louderback, formerly associated with Charles T. Yerkes in street railway enterprises, died on April 9, 1914, at his home in Chicago. Mr. Louderback was born in Davenport, Ia., in 1848. He began his railway experience as a telegraph operator and later became a train dispatcher for the New York Central Lines at Buffalo, N. Y. He opened a line of telegraph offices in Philadelphia and other cities in opposition to the Western Union, and in 1873 went to Chi-

cago as receiver of the old Western Union Company. He entered the street railway transportation field in 1890 in Chicago as an associate of Mr. Yerkes. Mr. Louderback was formerly general manager of the Chicago Union Loop and the Chicago & Oak Park Elevated Railroad, and was president of the Northwestern Elevated Railroad. The surface railways in Chicago in which he was interested have since become a part of the Chicago Surface Lines.

David Robison, Jr., chairman of the board of directors of the Ohio Savings Bank & Trust Company, died at Toledo on April 15. Mr. Robison was active in the commercial and financial development of Toledo for forty-three years. He was born at Wooster, Ohio, on Jan. 22, 1830. In 1889, in partnership with his sons, he began to build what was known at the time as the Robison street railway lines. These lines are now part of the system of the Toledo Railways & Light Company. Mr. Robison also organized and assisted in building the Toledo Terminal Railroad.

NEW PUBLICATION

Regulation of Public Service Companies in Great Britain.

By Robert H. Whitten, Librarian-Statistician, Public Service Commission for the First District, New York, 1914, 231 pages. (Reprint of appendix G of the annual report of the Public Service Commission for the First District for the year ended Dec. 31, 1913.)

This report is the result of some six months' special investigation and study undertaken by Dr. Robert H. Whitten in behalf of the department on regulation of municipal utilities of the National Civic Federation. The material having served the purposes of the federation, it is now published by the New York Public Service Commission in the hope that it may prove suggestive in the study of a number of the problems in public service regulation. In this report Dr. Whitten has treated phases of the regulation of public service companies in Great Britain that seem to offer most in the way of suggestion in the solution of American problems. In the case of such important questions as the sliding scale of rates and dividends, the sale of premium shares at auction or by public tender and the audit of company accounts, his report presents the general principles underlying these methods of control and of their applicability to American conditions. In connection with the British sliding scale system for the automatic regulation of the rates of charge and dividends of gas companies Dr. Whitten recommends certain changes in the sliding scale system as applied in England and Boston, but on the whole considers that it has important advantages over the American system of occasional rate regulation. He, however, favors "the merit rating method," as superior to either of the above. Under the merit rating method the state commission "will periodically rate the companies on the basis of comparative efficiency in serving the public and allow them to earn dividends varying with such efficiency." Dr. Whitten states that in England the services of the financial middleman are in large measure dispensed with through the sale of new securities at auction or by public tender. Under this method a premium stock is sold at its actual market value and all premium realized is used for betterments and additions to plant. The author discusses at length the advantages and reputed disadvantages of this system of financing.

Dr. Whitten notes the general absence among English public service companies of the holding company and of the intertwining and interlocking of directorships for the purpose of common control. He suggests that the limited voting power of the large shareholder may be responsible for this condition. According to the author effective supervision of public service companies has been promoted more by the enforcement of uniform accounting than by any other single factor. In England the practice has developed of having public service company accounts audited each year by an outside public accountant, elected either by the shareholders or by the Board of Trade. In this country the public service laws often give the state commission authority to audit accounts. The author suggests the advisability of requiring each company to have its accounts audited by a qualified outside accountant. The publication is supplemented with chapters on the Boston sliding scale, Toronto auction sale and maximum dividend plans.

Construction News

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

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

RECENT INCORPORATIONS

*Moultrie & Pelham Railway, Moultrie, Ga.—Application for a charter has been made by this company to build an electric or steam railway between Moultrie to Pelham, 50 miles. J. L. Hand, Pelham, is interested.

*La Salle (Ill.) Terminal Railway.—Incorporated in Illinois to build an electric or steam railway from La Salle to Oglesby, Cedar Point and Standard. J. B. McCaffrey, incorporator.

*Southern Iowa Railway & Light Company, Albia, Iowa.—Incorporated in Iowa as a consolidation of the Albia Interurban Railway and the Albia Gas Company. Capital stock, authorized, \$500,000. Capital stock, issued, \$120,000. Officers: C. B. Judd, Albia, president; E. W. Manning, Albia, secretary, treasurer and general manager, and W. J. Read, Albia, superintendent and purchasing agent.

Caldwell County & Southern Railway, Kingston, Mo.—Chartered in Kansas to build an electric railway between Hamilton and Kingston, 9½ miles. Capital stock, \$100,000. Incorporators: D. Miller, Kansas City; F. L. Bowman, H. C. Shively and S. C. Rogers, Kingston, Mo. [E. R. J., March 7, '14.]

FRANCHISES

*El Centro, Cal.—Lewis R. Kirby, San Diego, and associates have asked the Council and County Commissioners for two forty-year franchises, one along Main Street to the city limits in El Centro and one over the Dahlia road highway between El Centro and Imperial. This is part of a plan to build an electric line between El Centro, Imperial and Calexico.

Mill Valley, Cal.—The Marin County Electric Railway has received authority from the Railroad Commission to exercise franchise rights in the town of Mill Valley, Marin County, which franchise was granted to the company Jan. 26, 1914, by the local authorities.—[E. R. J., Apr. 11, '14.]

San José, Cal.—The City Council has granted to the San José Terminal Railroad an extension of old franchises made void by failure to complete construction. The extension holds good until Jan. 1, 1915, and the officers of the company, represented by Lee H. Landis of the Tidewater & Southern Railroad, expect to complete construction on schedule time. The company plans to extend the railroad south from San José through the orchard country, giving orchardists shipping facilities to San Francisco.

St. Petersburg, Fla.—C. J. Morrow, St. Petersburg, and associates have asked the Council for a franchise in St. Petersburg. This is part of a plan to build an electric railway between St. Petersburg and Tarpon Springs.

Independence, Kan.—The Independence, Neodesha & Topeka Traction Company has received an extension of time on its franchise until Oct. 1, 1914, in which to begin the construction of its line in Independence. This 17-mile railway will connect Independence, Neodesha, Altoona and Topeka. T. J. Booth, president. [E. R. J., Feb. 14, '14.]

Schenectady, N. Y.—The Schenectady Railway has received a franchise from the Council in Schenectady for an extension of its lines.

Elizabeth City, N. C.—The Council will receive proposals on April 27 for an electric railway franchise in Elizabeth City. D. Guy Brockett, City Clerk.

Portland, Ore.—The Portland Railway, Light & Power Company has asked the Council for a franchise to cross the bridges over the Willamette River.

Elwood City, Pa.—The Mahoning & Shenango Railway & Light Company has asked the Council for a franchise on Cedar Street and Todd Avenue in Elwood City so that the line may reach the bridge to be built over the Connoquenessing River to connect Elwood City with Hazel Dell.

*Williamsport, Pa.—The Muncy Borough Council has granted a franchise to the Trolley Construction Company,

Harrisburg, for a trackless trolley line through its streets as a link in a railway to be built between Muncy and Montgomery, 4 miles away.

*Seattle, Wash.—Stephen A. Carver has asked the Council for a franchise over certain streets in Seattle.

Seattle, Wash.—The Puget Sound Traction, Light & Power Company has received a franchise from the County Commissioners along the county roads north of Seattle and east and north of Lake Washington.

Seattle, Wash.—The Washington-Oregon Corporation, Vancouver, has asked the Council for a fifty-year franchise over the interstate bridge to be built between Portland and Vancouver.

*Seattle, Wash.—The Vashon Electric Company has asked the County Commissioners for a franchise for an electric railway over fifty-eight county roads and twenty-seven plats, covering the entire territory of Vashon and Maury Islands.

La Crosse, Wis.—The Wisconsin Railway, Light & Power Company has asked the Council for a franchise to extend its double tracks on North Third Street from Grove Street to the La Crosse River bridge in La Crosse.

TRACK AND ROADWAY

Birmingham (Ala.) Interurban Railway.—Work will not be begun on the construction of this 14-mile electric line to connect Birmingham, Hale Springs and the coal mines until the fall. Daniel P. Hale, Birmingham, is interested. [E. R. J., Feb. 14, '14.]

Tucson (Ariz.) Rapid Transit Company.—During the next few weeks this company plans to build 1 mile of new track with steel ties and concrete blocks.

Northwest Arkansas Railway, Bentonville, Ark.—Surveys have been completed by this company between Bentonville and Rogers, 8½ miles, and are now being made between Bentonville and Cave Springs, 10 miles. They will then be made to Springtown and Pea Ridge, a total of 38½ miles. Grading has been begun from the depot to the Park Springs Hotel in Bentonville. Contracts for grading and equipment have been awarded. H. L. Cross, Bentonville, secretary. [E. R. J., March 28, '14.]

Pacific Electric Railway, Los Angeles, Cal.—A contract has been awarded by this company for an extension of the Fifth Street line in San Pedro from Bandini Street and La Alameda Street to Santa Cruz Street and Bandini Street. The plans are, it is said, to ultimately extend the line through the property of the Harbor View Land Company and the Palos Verdes ranch to Redondo Beach, paralleling the Western Avenue Boulevard to Lomita.

Fresno (Cal.) Traction Company.—Negotiations are under way between property owners southeast of Fresno and this company for a 3-mile extension to Calwa.

San José (Cal.) Terminal Railway.—A new independent electrical railroad making direct connection between San José and the Panama-Pacific Exposition grounds is promised by Lee H. Landis, the new president of the San José Terminal Railroad Company if the Common Council of San José will grant the renewal of franchises given the company in 1912, when it was controlled by local capital. The company plans to extend the line from its present terminal at First and St. James Street to the country south of San José.

Geary Street Municipal Railway, San Francisco, Cal.—Work has been begun by the Mahoney Brothers on the construction of this railway on Van Ness Avenue in San Francisco.

Connecticut Company, New Haven, Conn.—This company has awarded the contract to install double tracking on some of its lines in Ansonia to the F. T. Ley Company, Springfield, Mass. In connection with the installation of the two-track system the O'Neill Brothers, Hartford, Conn., have the contract for the repaving work for the company.

Deep Lake Company, Fort Myers, Fla.—This company has completed its 14-mile line between Deep Lake and the Everglades. Gasoline motor cars will be used. Henry McCormack, 535 Stock Exchange Building, Chicago, Ill., president. [E. R. J., Nov. 29, '13.]

*Clarkston, Idaho.—Citizens of Clarkston and Vineland have endorsed the plan to build a 4½-mile electric railway. A committee of members of the Industrial Club and Chamber of Commerce has been named to direct the organization of plans and secure the subscription necessary to build the line. J. E. Doyle, W. O. Bond and J. E. Hoobler, members of the Chamber of Commerce, are interested.

*Wallace, Idaho.—The Snowstorm Mining Company, Wallace, has surveyed and located a line to build an electric railway from No. 3 tunnel to lower tunnel of Missoula Copper.

Freeport Railway & Light Company, Freeport, Ill.—During the next few weeks this company will award contracts to relay its tracks on Carroll Street between Empire Street and Williams Street in Freeport.

Indianapolis, Linton & Vincennes Traction Company, Linton, Ind.—Surveys have been begun by this company on its line between Indianapolis, Linton, Vincennes, Mooresville, Bicknell, Patoka, Tell City and Jasonville. John A. Schaffer, Indianapolis, chief engineer. [E. R. J., Oct. 25, '13.]

Winona Interurban Railway, Warsaw, Ind.—During the next two months this company will award contracts to build a new steel bridge.

Kansas City, Kan.—The Kansas City Board of Public Works recently adopted a resolution recommending that a temporary viaduct to serve as a connecting link with the high power line bridge south of Nineteenth Street be constructed. The structure will cost \$40,000 and will be utilized only until a permanent viaduct, to cost \$600,000 is erected. The expense of the latter will be shared by the Metropolitan Street Railway, by the municipality and by the Kansas City Terminal Railway. A public hearing on the proposition will be held on April 24. The temporary structure will be of plank floor, 42 ft. wide, and will extend from the Missouri and Kansas State line to a point 359 ft. south of Nineteenth Street. The construction of the viaduct would mean the elimination of grade crossings.

Manhattan City & Interurban Railway, Manhattan, Kan.—About 10 miles of new track is being built by this company to Fort Riley. Three deck girder steel bridges on the Fort Riley Reservation will also be built. All necessary requirements have been purchased.

Topeka (Kan.) Railway.—This company has replaced the wood poles which formerly supported the trolley wires on Kansas Avenue between Railroad Street and the Melan Bridge by steel posts. The latter are placed between the two tracks, instead of along the side of the street as were the wood supporters.

Maysville Street Railroad & Transfer Company, Maysville, Ky.—During the next few weeks this company expects to complete the construction of an extension and loop at the terminal of its line in Maysville. All material has been ordered, the Lorain Steel Company furnishing the rails and special work.

*Paducah, Ky.—It is reported that an interurban electric line will be constructed from Mayfield, Ky., to Humboldt, Tenn. R. H. McNeely, Paducah, is at the head of the project, and is said to have brought the matter to a point where actual construction work will begin shortly.

New Orleans Railway & Light Company, New Orleans, La.—It is reported that plans are being made for an extension to Milneburg. An extension of the Claiborne Avenue line in New Orleans is also contemplated.

Eastern & Western Shore Railroad, Annapolis, Md.—This company plans to construct an electric line from Annapolis to Fair Haven on the bay shore of Anne Arundel. From there a ferry will operate across the bay to a point in the Southern part of Dorchester county. An electric railroad will be constructed through Dorchester county to Cambridge, thence eastward to Vienna and southerly to Sharptown, Salisbury and Ocean City, Md., and to Franklin City, Va. From Salisbury or a point near by, a branch line will extend to Crisfield. On the western shore a line will be constructed from Fair Haven to Washington. The line from Fair Haven to Baltimore will connect at Annapolis with the Annapolis Short Line. It is stated that Washington capitalists are largely interested

in the enterprise and are ready to undertake financing it. It is provided, however, that the next Legislature must approve the plans. Counties through which the line is to be run may subscribe to the extent of \$200,000 each, provided such action is approved by the voters at a referendum. [E. R. J., April 4, '14.]

Holyoke (Mass.) Street Railway.—Plans are being made to begin work at once on the Sheridan Street extension.

Mankato (Minn.) Electric Traction Company.—An extension on Front Street in Mankato to the Mankato Fair grounds is being considered by this company.

Minnesota Northwestern Electric Railway, Minneapolis, Minn.—Surveys have been completed and grading has been begun by this company on its 20-mile line between Thief River Falls and Goodridge. Right-of-way has been secured, all bridges completed, ties, rails, culverts, etc., have been purchased and equipment ordered from the General Electric Company. Contracts call for the completion of this line the later part of August. Daniel Shaw, Thief River Falls, Minn., president. [E. R. J., Nov. 1, '13.]

Minnesota Union Electric Railway, Minneapolis, Minn.—No definite plans have yet been decided upon by this company as to when it will begin the construction of its line between Minneapolis and St. Cloud, via Brooklyn, Corcoran, Burschville, South Haven, Maine Prairie and Luxemburg. Achille D. Pouliot, 302 Plymouth Building, Minneapolis, secretary. [E. R. J., Dec. 27, '13.]

International Traction Company, Buffalo, N. Y.—This company has placed on order with the Carnegie Steel Company for 20,000 steel ties. The company is double tracking its line between North Tonawanda and Rockport.

New York State Railways, Rochester, N. Y.—This company is asked to double track and extend its Euclid Avenue line in Syracuse.

Black River Traction Company, Watertown, N. Y.—This company is asked to extend its lines from the present terminus on State Street to Gifford Street in Watertown.

*Lenoir, N. C.—Plans are being considered to build an electric railway from Lenoir to Blowing Rock and Boone. It is proposed to use the Lenoir and Blowing Rock turnpike as the roadbed and the development of the waterpower of the Yadkin River, near the foot of the mountains, for securing the necessary electric power. T. H. Coffey, Blowing Rock, is interested.

Goldsboro (N. C.) Street Railway.—During the next few weeks this company will award contracts to build 1 mile of new track through the center of Goldsboro.

Portsmouth Street Railway & Light Company, Portsmouth, Ohio.—This company plans to spend about \$250,000 on improvements of its lines. Among the improvements will be the extension and equipment of the line of the Ohio Valley Traction Company, subsidiary of the company, from Sciotoville to Ironton, Ohio, a distance of 22 miles. The double-tracking and changing of that part of the line of the Portsmouth Street Railroad & Light Company from Young Street in Portsmouth to New Boston, a distance of 2½ miles, and the construction of a subway at Kondall Avenue, Portsmouth, under the tracks of the Norfolk & Western Railway and other railroad tracks.

*Joiner City, Okla.—Surveys are being made to build an electric railway between Joiner City and the Haldton oil fields. F. B. McElroy Ardmore is interested.

Ottawa, Rideau Lakes & Kingston Railway, Ottawa, Ont.—Surveys have been completed by this company for its 134-mile electric line from Ottawa to Kingston, with a branch to Lanark. Headquarters: Ottawa. N. M. Clougher, Ottawa, president. [E. R. J., March 21, '14.]

West Side Electric Street Railway, Charleroi, Pa.—Plans are being made by this company to place its 11-mile extension between Charleroi and Ellsworth in operation on or about June 1.

Chambersburg & Shippensburg Railway, Shippensburg, Pa.—Work has been resumed by this company on its line between Chambersburg and Shippensburg. Grading has been completed and tracks laid from Chambersburg to the southern approach of the overhead bridge west of Chambersburg. T. M. Mahon, Chambersburg, president. [E. R. J., Nov. 8, '13.]

Montreal & Southern Counties Railway, Montreal, Que.—Plans are being made by this company to begin work soon on the extension from St. Cesaire to Granby, a distance of 15 miles.

Regina (Sask.) Municipal Railway.—Bids will be received by this company until April 27 for various supplies and materials to build several extensions of its lines in Regina. Plans and specifications may be obtained from H. Doughty, Regina, superintendent.

Austin (Tex.) Street Railway.—During the next few weeks this company will award a contract to build about 1 mile of new track in Austin.

Eastern Texas Traction Company, Dallas, Tex.—This company has completed 52 out of a total of 53½ miles of grade work, 90 per cent of the concrete work, all of the culverts and about 40 per cent of the bridge work on its line between Greenville and Dallas. It has on hand all the necessary bridge materials for the completion of the line, 140,000 hard oak cross-ties, 2000 40-ft. poles, in addition to other construction material. Present indications are that track laying will not be begun for several months. J. W. Crotty, Greenville, general manager. [E. R. J., March 21, '14.]

Dallas (Tex.) Street Railway.—The double-tracking of this company's line between Cole Avenue and Euclid Avenue in Dallas has been completed and cars will now be run over the double track to the Country Club.

Gainesville, Whitesboro & Sherman Railway, Dallas, Tex.—Surveys have been completed, right-of-way secured and 12 miles graded on this line, but because of inability to secure financial backing it is uncertain when the construction of the line will be begun. J. W. Blanton, Gainesville, attorney. [E. R. J., Sept. 20, '13.]

Fort Worth & Denton Interurban Railway, Fort Worth, Tex.—Grading has been begun by this company at Denton and also at Fort Worth for this 35-mile line to connect Fort Worth, Keller, Roanoke and Denton. A branch line from Fort Worth to Mineral Wells and Springtown is contemplated. E. E. Baldridge, Fort Worth, president. [E. R. J., April 11, '14.]

Northern Texas Traction Company, Fort Worth, Tex.—Work has been begun by this company in Arlington double-tracking its 35-mile line between Dallas and Fort Worth.

Laredo Electric & Railway Company, Laredo, Tex.—During the next eight weeks this company will award contracts to build 3.5 miles of new track with 60-lb. rails, ties and special work in Laredo.

Janesville & Madison Traction Company, Madison, Wis.—This company will be ready with plans and specifications by May 1 to award contracts to build its 40-mile line to connect Janesville, Indian Ford, Edgerton, Albion, Stoughton, Beloit, Whitewater and Madison. Conditions on application will be forwarded on receipt of contractor's check for \$50 for plans, etc., company reserving the right to refuse undesirable bidders, same to be returned to all unsuccessful bidders after letting of contract or contracts. Address all communications to G. Pickhardt, 409 Washington Building, Madison, president.—[E. R. J., Mar. 28, '14.]

Manitowoc & Northern Traction Company, Manitowoc, Wis.—Surveys have been made by this company for an extension north of Two Rivers to and beyond Mishicot. It is reported that this line will be extended north to meet the lines of the Granite City Railway south of Sturgeon Bay. This is part of a plan to build a line through the Green Bay Peninsula.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—Plans are being made by this company for an extension in Kenosha, to connect with the Chicago, Milwaukee & St. Paul Railroad lines at the west city limits of Kenosha and also to build a line south from Kenosha.

SHOPS AND BUILDINGS

British Columbia Electric Railway, Vancouver, B. C.—This company has awarded a contract to Westinghouse, Church, Kerr & Company, New York, to build its new carhouse in Vancouver. The structure will be 128 ft. x 350 ft. and of reinforced concrete construction. The cost is estimated to be about \$450,000. [E. R. J., Dec. 6, '13.]

Champaign Railway, Gas & Electric Company, Champaign, Ill.—This company has installed a new coal elevator at its plant in Urbana. The elevator conveys twenty-eight tons of coal an hour to the bunkers, which have a capacity of 210 tons.

Decatur Railway & Light Company, Decatur, Ill.—This company's office and storeroom in Decatur was completely destroyed by fire recently.

Springfield (Mass.) Street Railway.—This company contemplates the removal of its carhouses from North Main Street and Carew Street, Springfield, to the company's property in Elm Street, West Springfield. Alterations are being made at the company's carhouse in West Springfield.

Worcester (Mass.) Consolidated Street Railway.—This company is asked to consider plans to build a new passenger station in Webster.

Carbon & Stillwater Electric Railway, Red Lodge, Mont.—Plans being considered by this company to build a line of passenger stations between its two terminals, Red Lodge and Columbus. Machine shops will also be built. O. O. Anderson, Absarokee, is interested. [E. R. J., March 28, '14.]

St. John (N. B.) Railway.—Bids are being asked by this company to build an addition to its carhouse on Wentworth Street in St. John.

Goldsboro (N. C.) Street Railway.—During the next few weeks this company will award contracts to build a repair shop and tracks at its carhouse in Goldsboro.

Portsmouth Street Railway & Light Company, Portsmouth, Ohio.—Among the improvements planned by this company in the near future will be the construction of a new carhouse in Portsmouth. The cost is estimated to be about \$25,000.

Nashville (Tenn.) Traction Company.—This company, which plans the construction of an electric railway in and around Nashville, and the Detroit-Nashville Construction Company, a subsidiary corporation which will do the construction work, have leased offices in the building formerly occupied by the Nashville *Democrat*. G. B. Howard, of G. B. Howard & Company, the engineers in charge of the work, is the head of the offices at present.

Dallas (Tex.) Consolidated Electric Street Railway.—This company has completed its new carhouses at Elm and Peak Streets in Dallas. The old carhouses on the opposite side of the street from the new buildings will be used as quarters for the train men.

POWER HOUSES AND SUBSTATIONS

Tucson (Ariz.) Rapid Transit Company.—This company has purchased two 300-kw Fulton Iron Works oil engine generating sets for its power house in Tucson.

Pacific Gas & Electric Company, San Francisco, Cal.—This company has awarded to the Westinghouse Electric & Manufacturing Company the contracts for motor generator sets of an aggregate capacity of 6000-kw to be delivered in San Francisco before July 15, 1914, and to be installed for the operation of new municipal street railway lines now under construction. The Pacific Gas & Electric Company is already supplying electric power to the Geary Street Municipal Railway.

Winona Interurban Railway, Warsaw, Ind.—During the next two months this company expects to purchase new stoker equipment and four 300-hp Babcock & Wilcox boilers for its power house in Winona.

Manhattan City & Interurban Railway, Manhattan, Kan.—During the next few weeks this company plans to build a new power house at Ogden, Kan.

Spokane & Inland Empire Railroad, Spokane, Wash.—During the next few months this company will award contracts to build a new substation at McGuire's, Wash. The structure will be 24 ft. x 45 ft. and of brick and concrete construction. The company has contracted with the General Electric Company for the purchase of one rotary converter to be installed in this new substation.

Charleston (W. Va.) Interurban Railway.—This company has purchased a Westinghouse 300-kw rotary converter and transformers for its power house in Charleston.

Manufactures and Supplies

ROLLING STOCK

Goldsboro (N. C.) Traction Company has recently purchased two cars.

United Traction Company, Albany, N. Y., expects to purchase several new cars.

Topeka (Kan.) Railway has purchased six new cars for use on the Vinewood line.

Shore Line Electric Railway, Saybrook, Conn., expects to purchase five or six cars.

San Angelo (Tex.) Street Car Company may purchase two or three small closed cars.

Salina Street & Interurban Railway, Salina, Kan., expects to purchase one open car.

Tucson (Ariz.) Rapid Transit Company expects to purchase two 30-ft. single-truck cars.

Jersey Central Traction Company, Keyport, N. J., is reported as expecting to purchase five cars.

Empire United Railways, Syracuse, N. Y., is reported as expecting to purchase six interurban cars.

Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., expects to purchase shortly two or three new cars.

Tri-State Railway & Electric Company, East Liverpool, Ohio, is expecting to purchase twenty-one interurban passenger cars.

Dayton & Troy Electric Railway, Dayton, Ohio, is reported as expecting to purchase six passenger and baggage cars.

Lackawanna & Wyoming Valley Railroad, Scranton, Pa., has ordered fifteen steel hopper cars from the Pressed Steel Car Company.

Southern Public Utilities Company, Charlotte, N. C., expects to purchase in four weeks six 38-ft. passenger cars, complete for city service.

United Railroads of San Francisco, San Francisco, Cal., expects to purchase within the next eight weeks sixty-five California-type four-motor cars.

Freeport Railway & Light Company, Freeport, Ill., has ordered one single-truck closed city car from the McGuire-Cummings Manufacturing Company.

Wellsburg, Bethany & Washington Railroad, Wellsburg, W. Va., expects to purchase during the next few weeks one coal car of about 10 to 12 tons capacity, also one truck and wheels.

Jacksonville (Fla.) Traction Company, noted in the *ELECTRIC RAILWAY JOURNAL* of Jan. 24, 1914, as being in the market for passenger cars, has ordered fifteen double-truck cars from the American Car Company.

Northwestern Pacific Railroad, San Francisco, Cal., has ordered eight GE motors which are to be installed on some of its trailers which are already in operation, and which are to be used on the Sausalito-San Rafael-San Anselmo lines of the company.

Laredo Electric & Railway Company, Laredo, Tex., expects to purchase within the next eight weeks three semi-steel storage-battery type cars, about 24-ft. over all, not to weigh over 12,000 lb. complete, each car to be equipped with one 20-hp motor.

Third Avenue Railway, New York, N. Y., has ordered twenty-three single-truck, low-level, end-entrance pay-within cars from The J. G. Brill Company, of the same type as the sample car which was described in an article in the *ELECTRIC RAILWAY JOURNAL* of March 28, 1914.

Waterville, Fairfield & Oakland Railway, Oakland, Maine, is thinking of building a work car in its own shops. This company has been investigating center-entrance cars with a view of purchasing, but is not building any in its own shops, as reported in the *ELECTRIC RAILWAY JOURNAL* of April 11.

Puget Sound Traction, Light & Power Company, Seattle, Wash., noted in the *ELECTRIC RAILWAY JOURNAL* of Feb. 21, 1914, as having ordered twelve single-end closed passenger cars from the St. Louis Car Company, has specified the following details for this equipment:

Seating capacity.....60	Curtain fixtures,	National L. W. Co.
Bolster centers, length.29 ft.		
Length of body...38 ft. 4 in.	Curtain material..Pantasote	
Length over vestibule,	Destination signs....Hunter	
48 ft. 4 in.	Gongs.....St. Louis	
Width over sills...8 ft. 4 in.	Hand brakes...Peacock and	
Width over all...8 ft. 7 3/4 in.	St. Louis vertical	
Height, rails to sills,	hand brake	
33 3/16 in.	HeatersConsol.	
Height, sill to trolley base,	HeadlightsCrouse-Hinds	
8 ft. 8 9/16 in.	SandersSt. Louis	
Bodycomposite	Sash fixtures.O. M. Edwards	
Headliningcarline finish	Seats, style..Heywood Bros.	
Roof..arched,	Seating material,	
detachable hoods	wood backs and seats	
Underframemetal	Step treadszeralun	
Bumpers,	Trolley catchers.....Ideal	
Hedley anti-climber	Trucks.....O-36, Std. Motor	
Car trimmings....St. Louis	Truck Co.	
Conduits and junction boxes,	Ventilators..... St. Louis	
St. Louis	Special devices, etc.,	
Couplers.....St. Louis	Root snow scraper, Consol.	
	buzzer system	

TRADE NOTES

Wendell & MacDuffie Company, New York, N. Y., on May 1 will remove its New York offices to 61 Broadway.

Railway Improvement Company, New York, N. Y., on May 1 will remove its New York offices to 61 Broadway.

Westinghouse, Church, Kerr & Company, New York, N. Y., has elected James C. Boyd, formerly with the United States Engineering Corps, vice-president.

Union Switch & Signal Company, Swissvale, Pa., has appointed Walter D. Upgraff as vice-president in place of Colonel H. G. Prout, who succeeded the late George Westinghouse as president of the company.

Link-Belt Company, Chicago, Ill., has opened an office in Detroit, Mich., room 911, Dime Bank Building. L. W. Longan, formerly connected with the Chicago and Indianapolis works of the company, has been placed in charge.

Carbon Steel Company, Pittsburgh, Pa., has appointed Frederick T. Connor as western railway sales agent, with offices at 819 Railway Exchange Building, Chicago, Ill. Mr. Connor was formerly with the Joliet Railway Supply Company, Chicago, Ill.

National Graphite Lubricator Company, Scranton, Pa., has appointed E. L. Pollock as sales manager. Mr. Pollock was formerly vice-president of the Chicago, Rock Island & Pacific Railroad. He will have offices in the McCormick Building, Chicago, Ill.

Dearborn Chemical Company, Chicago, Ill., has transferred its southeastern branch office from Birmingham, Ala., to Atlanta, Ga., 1407 Candler Building, where C. H. Everett and J. F. Boutelle, representing the company in that territory, will have their headquarters.

Asbestos Protected Metal Company, Beaver Falls, Pa., has removed its Pittsburgh offices to 1611 Bennedum-Trees Building, with H. E. Marks continuing as district manager. Besides its asbestos protected metal for roofing and siding, this company now manufactures a complete line of prepared roofing and shingles to meet the requirements of all kinds of buildings.

Stephen L. Coles has resigned the secretary-treasurership of the Society for Electrical Development, effective April 15. As of the same date he has joined the engineering staff of M. W. Thompson, 111 Broadway, New York City, specialist in litigated engineering matters and in reports on railroad and other large properties. Mr. Coles will devote his attention principally to electrical public utilities having problems of service, policy and competition to solve.

H. W. Johns-Manville Company, New York, N. Y., recently held its annual meeting of the managers of its forty-seven branch electrical departments distributed throughout the United States and Canada. At the close of the meeting a banquet was given by the management of I. P. Frink, for whom the above company is selling agent. G. F. Spencer, manager of I. P. Frink, acted as toastmaster. Speeches were made by J. W. Perry, W. H. Spencer, S. G. Meek, Bassett Jones and others.

American Safety Fender Company, Seattle, Wash., on April 4 held a successful test of its Nelson automatic safety fender on the tracks of the Idaho Traction Company, Boise, Idaho. In the test a stuffed dummy was used, and it was placed in every position a human being could assume when run into by a street car. In practically every instance the fender made a complete and clean pick-up. In no case did any part of the dummy get underneath the fender. The dummy was also tested with a runaway car. In striking it the fender dropped instantly, picked up the dummy and set the brakes, which operate automatically with the movement of the fender.

Sidney Diamant, New York, N. Y., consulting engineer, has opened an office at 15 East Fortieth Street. Mr. Diamant was graduated from Columbia University in 1902. Since that time he has been engaged in the design and erection of steel, timber and reinforced concrete structures, comprising office and loft buildings, warehouses, schools, public buildings, railway structures, carhouses and power plants. He was connected with the Metropolitan Street Railway, New York City, N. Y., and designed for that company carhouses at Sixty-fifth Street and Third Avenue and at Ninety-sixth Street at Second Avenue. He also designed a substation at West Farms, N. Y., and a combined substation and carhouse at Yonkers, N. Y. He was connected with the Pearson interests on the work at the power plant at Necaxa, near Mexico City, Mexico, and was active in the construction of the Canadian power plant at Niagara Falls.

Ford, Bacon & Davis, New York, N. Y., have been engaged as engineers to prepare the design and superintend the construction of the warehouses, terminal trackage and wharves for the proposed system of handling and storing cotton in New Orleans. The object is ultimately to make New Orleans the greatest exporting point for cotton in the world. The Board of Port Commissioners has authorized an issue of \$3,000,000 of bonds, to be used in financing the enterprise. This is one of the largest engineering projects undertaken anywhere in the South and involves as a preliminary step a complete study of the existing freight-handling terminal facilities in the important shipping centers of the United States as well as in Europe, based upon which there will be a complete report made to the Board of Port Commissioners setting forth the results of such study. At the time the study of the various terminals is being made, coincidentally there will be begun preparation of the actual preliminary plans and studies for the determination of the capacity, type, design and construction of the terminal plant for New Orleans.

ADVERTISING LITERATURE

Samson Cordage Works, Boston, Mass., have issued a folder describing their trolley cord.

Chicago Pneumatic Tool Company, Chicago, Ill., has issued Bulletins Nos. 152, 153, 154 and 172 describing and illustrating, respectively, its gatling, sinker, stopper and plug and feather drills.

Archer & Baldwin, New York, N. Y., have issued a catalog listing their electrical and steam machinery for power-house and car equipment, and also a special stock list of their dynamos and motors.

Macallen Company, Boston, Mass., has issued catalog No. 13, which describes in detail its canopy insulators, bodies and fittings for gas, combination and electric fixtures, electric railway material and electrical specialties.

Tool Steel Gear & Pinion Company, Cincinnati, Ohio, has issued a folder which describes the quality of its gears and pinions, and which shows illustrations of gears and pinions that have given service for an unusual mileage without having been worn out.

Federal Motor Truck Company, Detroit, Mich., has issued a folder describing its motor trucks for use in repair or trouble service. The folder includes a letter from the Portland Railway, Light & Power Company, Portland, Ore., testifying to the efficiency of one of these trucks in its service.

Trolley Supply Company, Canton, Ohio, has issued a catalog describing and illustrating its Knutson No. 5 and Ideal trolley catchers, Simplex trolley base, pressed steel dash headlights and Peerless check valve, and containing

testimonial letters, from electric railways regarding the operation of this equipment.

Thew Automatic Shovel Company, Lorain, Ohio, has issued Catalog No. 9, describing and illustrating its full circle swing shovels with horizontal crowding motion. A special design shovel is adapted for city and interurban electric lines, owing to its ability to handle very shallow trench work encountered in track construction and reconstruction.

Mica Insulator Company, New York, N. Y., has issued a catalog containing a series of its bulletins listing its insulating material. Bulletin No. 78 covers micanite sheets, plates, paper, cloth, washers, discs, spools, tubes, segments, rings and rheostat and commutator insulation. Bulletin No. 79 covers rings and segments for railway and air brake motors and washers and tubes for grid resistances. Bulletin No. 80 describes Empire and linotape insulating materials. Bulletin No. 82 contains a complete list of the insulating products.

McGraw-Hill Book Company, Inc., New York, N. Y., has issued its *Engineering Book Notes* for April, 1914. In the descriptive list of the latest technical books published by this company since November, 1913, those on electrical engineering subjects include "Electrical Engineering Problems," by F. C. Caldwell; "Electrical Engineering," by Clarence V. Christie; "American Electrician's Handbook," by Terrell Croft; "Electric Light Accounts and Their Significance," by H. M. Edwards; "Economics of Interurban Railways," by Louis E. Fischer; "Hand-Book of Electrical Methods," compiled from the *Electrical World*; "Electric Car Maintenance," by Walter Jackson; "Elementary Magnetism and Electricity," by Cyril M. Jansky; "Problems in Alternating Current Machinery," by Lyon V. Waldo, and "Electric Discharges, Waves and Impulses," by Charles P. Steinmetz.

Sangamo Electric Company, Springfield, Ill., has issued an attractive catalog describing and illustrating its Type D-5 mercury motor d.c. watt-hour meters for two or three wire systems. The mercury-motor consists essentially of a copper disc floated in mercury between the poles of a magnet and provided with leads to and from the mercury at diametrically opposite points. The magnetic field of the motor is excited by a winding connected across the circuit in which energy is to be measured; that is, the magnetic field is proportional to the voltage. When connected to an eddy-current damper or generator which requires a driving force directly proportional to the speed of rotation, the mercury motor-generator becomes a meter. The speed of such a meter is a measure of the power or rate of flow of the energy through the motor element, and each revolution of the motor corresponds to a given quantity of energy. By connecting a revolution counter to this motor-generator the total quantity of energy in watt-hours is recorded.

Ohmer Fair Register Company, Dayton, Ohio, has issued a bound, sixty-seven-page booklet, written by John F. Ohmer, president of the company, and entitled "Fare Accounting," which reviews this subject in an unusually comprehensive and interesting manner. The book is divided into five parts and is a compilation of five addresses delivered before various electric railway associations. Part I—"Fares and Fare Protection," an address delivered before the Pennsylvania State Railway Association, calls attention to the increasing importance of the fare collecting problem due to the rapid growth of the electric railway industry, and describes in detail the operation of the Ohmer register in this connection. Part II, an address delivered before the Iowa Street & Interurban Railway Association, analyzes carefully the uses and abuses of transfers and discusses the use of the Ohmergraph as a remedy for transfer abuses. Part III, "Tickets as a Fare Medium for Street and Interurban Railway Traffic," an address delivered before the Central Electric Railway Association, discusses the merits of all kinds and systems of electric railway tickets. Part IV is entitled "The Human Factor in Fare Collection Service." Part V, "Fare Accounting," contains extracts from the symposium on "Fare Accounting" which appeared in the Souvenir Edition of the *ELECTRIC RAILWAY JOURNAL* of Oct. 4, 1913. This part has already been issued separately in booklet form and was described in the issue of Dec. 27, 1913.