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LIMITATIONS OF LOW-GRADE FUELS

Cheap fuels, and especially waste material used as fuel, may often be shown to evaporate water much more cheaply than coal of a higher grade at a considerably higher price per ton. Yet in the end it is quite possible that such conditions may result in a net loss owing to the indirect charges which enter into the economics of steam generation. As low-grade fuel invariably runs high in ash, the removal of refuse as well as the necessity for frequent cleaning of fires often amounts in the smaller plants to an item of no small cost, and this, together with the other incidental and perhaps somewhat obscure handling charges, may turn an apparent profit into a very decided loss. Any tests made to determine relative fuel values are far better when they are carried out under the simple but thoroughly practical plan of making a run extending over several weeks with each grade and then counting in the total cost of boiler-room operation.

YERKES' WORTHLESS BOND ISSUE

The recent decision in Chicago declaring worthless the \$6,750,000 of old bonds of the Consolidated Traction Company has succeeded in establishing after long litigation the exact liability of the Chicago Railways as regards this issue. The contention of the Chicago Railways that it could not, by any express or implied contract, be held responsible for these bonds has been sustained on the ground that the merger for whose formation they were issued was *ultra vires* and against public policy. Consequently the bonds are worthless. Of the \$4,494,000 originally held by the Yerkes estate, the Chicago Railways had bought in \$4,464,000 at 30, and now all of the total authorized issue of \$6,750,000 has been recovered except \$254,000, par value. This amount includes \$17,000 never issued and \$30,000 still held by the estate, so that the amount held by the public at the present time is \$207,000,

or less than 4 per cent of the total issue. It may be that the present holders will not suffer total loss, however, for it would appear that inasmuch as Mr. Yerkes overstepped legal bounds and the dictates of public policy in bringing about the enormous bond issue to form the merger, his estate may be compelled to make restitution of the moneys paid for the bonds, and such a step would seem to be a perfectly just one, even should it render the estate insolvent. At any rate, the elimination of the liability from the Chicago Railways will serve to relieve it of a menacing and depressing factor in its security market. The decision comes as a fitting climax to an example of the old-time financiering methods of which Yerkes was one, but only one, exponent. Fortunately those days and methods have passed, thanks to the code of modern financial ethics, which public service commissioners have done a great deal to bring about. Promoters and capitalists can no longer brazenly manipulate stock and bond issues as if the public utilities concerned were their individual properties. Unfortunately, however, we still have the heritage of these evil practices. Many of the present transit problems in our large cities can undoubtedly be traced back directly to the financial mismanagement, to use no stronger term, of the early days.

PUBLICITY BY THE ASSOCIATION

At the banquet of the New York Electric Railway Association held last week C. Loomis Allen referred to the fact that the American Electric Railway Association had recently begun the distribution to the member companies of sheets for newspaper use to help in counteracting popular erroneous impressions in regard to the condition of electric railway companies. He added that the method would be to send once a month to the member companies extracts from articles published in the official organ of the association. This is work which is much needed. The time has gone by when anyone can expect that the public as a whole will take the time to learn the real situation of the railway companies unless the companies themselves take the trouble to state their position and do something to help themselves. There are many ways in which this can be done, and the distribution of sheets for newspaper use is one method and should be adopted. But to confine the information to what is selected from a single publication is to reduce the effectiveness of the method to a minimum. It is much like using a tack-hammer where a sledge-hammer is needed. If the association is to do this work, the sheets which it sends out should contain the best matter, the most telling arguments and most cogent facts available. In his speech Mr. Allen said: "No man need fear the verdict of the American people if that people has before it all the facts in the case." To this sentiment we cordially subscribe. There are

hundreds of sources from which the facts may be obtained, such as judicial decisions, interstate commerce commission and other commission reports, interviews with prominent railway men, and the technical papers. But as a rule this matter is not in daily newspaper style. The information could be rewritten in a manner that would be acceptable to the newspapers. The facts are there, and in such shape that they can be readily appreciated by those who understand the value of news. Again, several public service commissioners individually have recently expressed themselves strongly in regard to the benefits which electric transportation provides and the underlying justice of the companies' contentions. These gentlemen occupy a quasi-judicial position, and their favorable opinions should be more widely circulated. In this battle against ignorance every means of help should be utilized, and each day, if possible, instead of once a month, some data, culled from every available source and so prepared that they can be easily used, should be put in the hands of the member companies.

**THE HUMAN
ELEMENT AND
ACCIDENT CLAIMS**

E. F. Schneider, general manager Cleveland, Columbus & Southwestern Railway, has been so prominent a leader and pioneer in the matter of safety talks to employees and to the public that special interest attaches to his paper on the claim department read at the last meeting of the Central Electric Railway Association. To many Mr. Schneider will appear an iconoclast when he classes as "bosh" such subjects as instruction for trainmen, the book of rules, card indexes for discovering fraudulent claims, expert testimony in accident suits, etc. We do not believe that Mr. Schneider means that these matters are useless and unworthy of consideration. He simply means that in the past too many managers have regarded them as marking the limit of their responsibility, and when an accident has occurred and they have added a few rules to guard against its repetition they have felt that they have done their full duty. It is absolutely necessary, of course, to instruct trainmen in their duties, to have a rule book kept up to date, to watch the payment for claims, and to do whatever else the usual best practice recommends to keep down accidents and the expenses from accidents. But the careful manager will not make a fetish of these purely mechanical or routine matters. Nor should he or his employees consider that if the road has a low damage expense account that fact marks the limit of their duty in regard to the safety of the public. Too much emphasis upon the size of the damage expense account means an attempt to express the extent of human suffering in dollars and cents. Translation of one of these matters into terms of the other is absolutely impossible. The paramount thought for both the manager and the trainmen to have in mind is the sacredness of human life. If they feel this, they will realize that one of the highest privileges which can be granted to any one is that of saving the life of another and that by their environment and position they can take advantage of this privilege to a greater extent and to a greater degree than those in most other employments and other walks of life. If this is their underlying thought in transportation, the accident question on electric railways is solved.

HOT JOURNALS AND BRAKESHOE PRESSURES

At the Master Car Builders' convention at Atlantic City the standing committee on car trucks took under consideration a query regarding the tendency of passenger car journals to roll out of their bearings under heavy applications of pressure from the brakeshoes. The question is of live interest to high-speed electric railways. Hot-journal-box troubles have by no means decreased in the proportion which might be expected from the comparatively recent improvements made in methods of applying and maintaining lubrication. Indeed, on many railways the problem of eliminating delays due to hot boxes has reached an importance by no means warranted by the apparent simplicity of the factors involved, and it is generally magnified by the exasperating fact that no remedy seems to be thoroughly effective.

The influence of the enormously high brakeshoe pressures used with modern equipment is apparently a factor which is almost invariably overlooked. On the Interborough Rapid Transit Company's subway lines, for instance, the difficulties with hot journal boxes were at one time a serious handicap to satisfactory operation. The trouble was finally traced to the frequent and necessarily heavy applications of brakeshoe pressure which were found actually to crush the babbitt lining at the edges of the standard M. C. B. journal brasses, and a new form of journal brass with a rectangular outside contour and a full semi-circular bearing on the journal was developed. This design was described in the *ELECTRIC RAILWAY JOURNAL* for July 27, 1912, page 121. As the new form of brass replaced the original standard, the hot-box trouble rapidly decreased until at the present time delays from this cause are practically unknown.

In the New York subway conditions, of course, are extreme, yet the standard automatic air-brake system is used without the high-pressure air and blow-down for brake cylinders introduced on a number of steam roads. Indeed, it is quite possible that crushed brasses are responsible in a modified degree for many of the inexplicable epidemics of hot journals on railroads whose traffic requirements involve but a moderate number and limited severity of brake applications.

Since the M.C.B. committee reported that it had discovered a tendency for journals to roll out of the brasses in steam railroad passenger coaches but not in freight cars, there is good reason to believe that it is present in all electric railway cars and it would be manifest wisdom to consider the factor as an important one. The only remedies suggested by the committee were the use of clasp brakes and lowering the position of the brakeshoe on the wheel.

The latter suggestion was based upon the theory that the trouble would be reduced if the resultant of the two forces imposed on the journal by the weight of the car and by the brakeshoe pressure was kept at least 10 deg. inside of a line through the center of the axle and the edge of the journal brass. The direction of this resultant would be obviously made more nearly vertical as the shoe was moved below the horizontal center line of the wheel, yet this in turn has been demonstrated in the past to increase the

tendency toward sliding on rough track by locking the wheel against vertical play. New journal brasses such as were forced by numerous hot journals upon the New York subway would undoubtedly be an expensive remedy, yet not so much so as the introduction of the clasp brake with one shoe on each side of the wheel, and it is certain that a full semi-circular cross-section for a brass would strike at the root of trouble once it was established as the prime reason for hot journals on any particular railway.

GAS-ELECTRIC CARS VERSUS BATTERY CARS IN CITY SERVICE

In its desire to eradicate horse traction completely, the London County Council Tramways is faced by a condition quite similar to that on the cross-town and ferry lines of New York. The East End of London has a number of horse-car routes for which conduit construction would not be justified but which the local authorities will not permit to be electrified with the overhead trolley. In New York the problem has been solved so satisfactorily by means of storage battery cars that the Third Avenue Railway will soon have a total of 160 in operation, while the New York Railways is making a beginning with forty-five equipments on stepless cars. For some reason or other, no storage battery car seems to have been offered to the London management. Yet the tests of both types of cars made by the Third Avenue Railway showed that the accumulator car was cheaper for low-speed city conditions, as set forth in detail in the article entitled "The Log of a Gasoline-Electric Car," published in the *ELECTRIC RAILWAY JOURNAL* for Sept. 23, 1911. The gas-electric car under test weighed 857 lb. per passenger compared with 557 lb. per passenger for the storage battery car, this difference being due largely to the fact that the stresses set up in operation required a heavy body despite the fact that the engine was carried on the truck. This car was in operation from November, 1909, to September, 1910, and during this time its cost of gasoline per revenue mile at 12 cents per gallon averaged 4.61 cents, or about four times the cost of electrical energy at 2 cents per kw-hr. The guaranteed cost of battery maintenance plus the cost of energy was practically equal to that for gasoline alone, aside from the fact that the first cost of the gas-electric car was much greater.

Like the first battery cars of the Third Avenue Railway, the three experimental gas-electric cars in London are reconstructed horse cars. It is clear, however, from the description published in this issue that the conversion called for more radical changes than was the case in New York, particularly as the greater part of the equipment is mounted on the platforms. In the Third Avenue battery cars the cells are placed under the seats, and the chain-driven motors are installed on the trucks, so that no platform space is required except for small standard railway controllers. On the other hand, the London double-deck cars have a platform space of 12 ft. 6 in., although the closed lower deck is only 14 ft. 6 in. long. This disproportionate platform space is accounted for in part by the stairways to the upper deck, but, in any event, it is not to the advantage of the car body or to the comfort of the passengers to place gas-electric equipment on the platforms instead of the truck. Since the operating conditions for

which these cars are designed are quite analogous to those in New York, it certainly will be a pity if a carefully designed storage battery car is not placed in competition with them for the proposed service.

A LARGER ARBITRATION BOARD

We are glad to notice that the act to enlarge the board of arbitration authorized under the Erdman act will probably pass Congress. On the initiative of the National Civic Federation, a number of representative railway presidents and labor leaders and the officials in charge of the administration of the Erdman law united in the support of the several proposed amendments. Among them one of the most important authorizes the appointment of six arbitrators instead of three, unless the parties to the dispute prefer the smaller number. Of these six arbitrators, two are to be appointed by each of the parties to the dispute, and two are to be chosen by these four, or, in case of their failure to agree, by the board of mediation and conciliation. This board, which is to be created by the proposed law, is to be composed of a commissioner and assistant commissioner and not more than two other officials to be appointed by the president. It is not asserted even by the advocates of these proposed amendments that they will make the law ideal. President Low on this point says that while, in the opinion of the signatories, three is a desirable number of arbitrators for a dispute involving a single railroad, the proposed measure represents a compromise on certain points, and it was impossible to secure unanimous consent to a larger number than six for a dispute affecting the interests of a whole section of the country. But it is interesting to note that the plan of six arbitrators in cases of this kind carries the indorsement of seven railroad presidents, the presidents of five brotherhoods, Judge Martin A. Knapp and ex-Commissioner of Labor Charles P. Neill.

Electric railways are only a little less concerned than the steam roads in securing the right solution of the problem of settling labor disputes equitably, and we hope that indorsement of the larger board under the Erdman act by those who have signed the petition mentioned will popularize the plan of having a larger board in electric railway disputes. As we have frequently pointed out, the so-called arbitration that is carried out by two partisans and one umpire is not arbitration; that is, it is impossible by this means to secure judicial adjustments of labor controversies, and for this reason such proceedings ought to be resisted to the last ditch. Only a few days ago the offer of the Jamestown Street Railway and the Chautauqua Traction Company to submit a labor dispute to a large representative board was rejected by the union for the reason that it was "unalterably opposed to a large number of members on a board of arbitration."

The reason for this is obvious. As a rule, the settlement of a dispute by a board of three arbitrators, formed as it usually is, is no arbitration in the sense that it is an impartial award on the merits of the case. The decision is merely a splitting of the difference between the extreme demands of the employees and the previous conditions of employment. The presence of six arbitrators, or two to represent each side, has another advantage than that of

merely bringing more minds to bear upon the question in dispute. It provides two men for each of the three interests represented, and one of these can give moral support to the other in justifying a conclusion which is based upon the evidence and yet is unfavorable to the side of which he is a representative.

ASSESSED DAMAGES IN ACCIDENT CASES

We believe that a very fruitful topic for discussion by the Claims Association at its next convention would be the amounts assessed as damages against railway companies for different kinds of personal injuries. No one can read the reports of such cases, as decided in different parts of the country, without being impressed with the great differences in amounts of damages awarded by the courts for similar injuries. In some sections precedents have been set for high payments, and these precedents are being used as arguments for even larger assessed damages. In other parts of the country the payments are more like those which generally have prevailed in the past, and it is well known that verdicts for personal injuries always have been much higher in this country than in the countries of Europe. An instance came to our attention recently where a claimant, a bartender, secured \$12,000 from an electric railway company because of an accident which resulted in three stiff fingers. We should hardly believe that such an accident would seriously impair his efficiency for his work, but in the part of the country where this case was tried large damages are not unusual, and it is not surprising to find that the company which was defendant in this case paid for its injuries and damages account last year 22 per cent of its gross receipts.

It is easier to suggest than to secure a remedy in a situation of this kind. Nevertheless, some things may be said. For instance, many states now have employers' liability acts which specify the amount to be paid in the case of certain accidents, and these amounts might fairly be used as a basis for the determination of railway damages. Certainly the railway company ought not to be held to a higher accountability than the state requires of others who cause accidents. The fact should also be generally recognized that no money payment for damages, no matter how large, can ever be full compensation for the accident. At least most victims of an accident, if they had their choice, would not undergo the pain and permanent injury which they suffer for any sum at all near the damages which they can collect on account of the accident. No ordinary amount of money, for instance, could, in the opinion of most of us, make up for the loss of a leg or an arm. Unfortunately, however, accidents do happen. They are one of the penalties paid by the community for the civilization which all of us enjoy. Partly to recompense those individuals who do meet with accidents custom has recognized a certain scale of payment for their misfortune, but at best this scale must be arbitrary. It is essentially a compromise between too large a sum, which would discourage all industrial effort by others for the benefit of the community, and too low a sum, which would make the individual victim the only person to suffer by the accident.

If this viewpoint is accepted, and it seems the only logical one, the question of the scale of damage payments

for injuries where liability is admitted becomes simpler. The amounts assessed should be proportioned according to some generally recognized scale not too great to discourage people from building factories and railways, and in no case should the impossible object be sought of fully recompensing the victim. Judged by these standards, an individual payment of \$12,000 for the accident mentioned above and an annual expense for damages of 22 per cent of a railway's gross income seem excessive.

PROPOSED BRITISH RULES FOR PLATFORM MEN

The Tramways & Light Railways Association of Great Britain has recently drawn up a collection of rules and regulations to aid in standardizing this feature of English tramway operation. While this work is admittedly a skeleton which can be clothed to meet local conditions of private or municipal systems, the rules are worth study as models of brevity and clearness. They apply only to city conditions, of course, as there are no interurban railways in the United Kingdom. The rules differ from those of the American Electric Railway Transportation & Traffic Association in quite a number of interesting particulars. In the first place, the British book is prefaced by an "agreement of employment" which sets forth the conditions of service, such as medical examinations, conformity to the rules, notice before quitting work, right of suspension and dismissal, liability for negligent damage to equipment, weekly payments of wages with one week's wages in hand, non-guarantee of continuous work, rates of wages, title of responsible governing officer, etc. The wording of the rules is notable for the use of the term "must" throughout. Bell signals, which have caused so much discussion in the preparation of the American code, are disposed of by the simple phrase: "Bell signals between conductors and motormen must be set out in accordance with the accepted practice of each company or corporation." Uniform bell signals are wanted in this country because of the operation of interurban cars on city tracks, whereas in England the operation of the cars of one system over that of another is much less frequent.

A remarkable omission from the English code is that of all reference to the responsibilities of the motorman and conductor except that they are equally responsible for replacing the trolley on the wire. The code also has no carhouse rules except those which instruct the motorman and conductor how to take the car in and out of the building. Furthermore, the crews are not instructed to warn passengers against danger in boarding or leaving cars, a condition which would indicate that the English passenger is not quite so reckless as the American and that the street pavements are kept in better condition. Among the instructions addressed only to motormen are those on the maintenance of a certain distance between cars, prohibition of passengers riding on the front platform, starting a car up a grade, operating a car through flooded track, proper operation of each class of brake and methods for minimizing the use of electrical energy. The rules for conductors differ very materially from the American code owing to the use of zone and ticket systems of fare collection. The conductor is not permitted to run the car in case the motor-

man is disabled, but is ordered simply to knock out the canopy switch and wait until help arrives. The rules, which comprise 103 in all, are supplemented by several appendices on how to deal with offenders against the by-laws or public ordinances, how to report street accidents, how to handle overhead line troubles, how to resuscitate people suffering from shock and, finally, how the trainmen are to deal with defective cars.

The last appendix gives a number of short practicable rules on what to do when the automatic switch blows, when the car will not start with lighted, unlighted or dim lamps respectively, when the controller is giving trouble, etc. On the whole, the English rules do not attempt to cover so many features of operation as our own, but they appear to embody some features in wording and practice which could profitably be studied in connection with their possible application to the American code.

MULTIPLE-UNIT TESTS IN NEWARK

In ordinary city service the short duration of the peak loads involves the establishment of a force of men and of an equipment of rolling stock which can be employed for only a few hours a day. The result, in many cases, is that the rush-hour traffic is the least profitable part of the business. Indeed, some managers estimate that it is conducted at an actual loss. This condition is being continually aggravated by the growing tendency for all labor to demand and receive an eight-hour workday, making office workers, artisans and laborers require transportation to and from their places of employment at practically the same times. It is even now not extraordinary for extra cars to be used for only one trip in the afternoon rush, and if the platform men have to be paid a minimum wage of \$1.50 each for the day's work, the platform expense alone for the single trip will amount to \$3—possibly more than the total receipts from the collection of fares.

Four means for meeting this condition have been suggested, namely: light, one-man cars for tripper service; double-deck cars with extra conductors at heavy loading points; trailers; and multiple-unit trains which are split up and run as single cars during the non-rush hours. The Public Service Railway of New Jersey, in considering the problem of rush-hour traffic, came to the conclusion that the last-named plan might possess more of the elements likely to produce practical success than the others. In consequence that company, during the past nine months, has been carrying on a series of elaborate tests to determine the practicability of train operation. The results are published elsewhere in this issue.

The tests have been carried out in a very thorough manner, and a vast number of observations have been made. For this reason the recorded results are of exceptional value not alone in their application to the conditions in Newark but even more through the light which has been thrown upon many of the questions arising in the consideration of the general problem. The work might be considered, in fact, supplementary to the work of the A. E. R. A. committee on train operation, and, as the cost of taking the observations has amounted to several thousand dollars, the spirit in which the tests were inaugurated and the generosity with which the company has made them

public are worthy of the most sincere commendation as a material benefit to the whole industry of electric railroading.

One of the points brought out by the tests is an indication that in order to attain the best results considerable time is required to familiarize both public and train crews with the new method of operation. During the tests it was not possible to furnish complete train service over any of the lines. In consequence it was necessary to run the test trains intermingled with the single cars which formed the normal service. For this reason the railway company considers that the actual figures applying to the relative performances of the trains and single cars should be used with caution and that they should be considered as indications rather than bases for final conclusions. Indeed, the operation of trains is being regularly continued in Newark so that the public may become thoroughly familiar with them before the commencement of further tests which are to be made in the near future. These will be carried out on lines which are fully equipped with multiple-unit cars so that complete train service may be given during the rush hours. Until these are completed the company will make no definite change in its practice.

Nevertheless, we believe that the observed results will receive careful scrutiny from everyone interested in the operation of street railways, because of the care with which they were made and because they are undoubtedly the most extensive of the kind ever conducted upon congested city traffic. In all previous investigations with which we are acquainted the observations have not been recorded in sufficient detail to make it possible to eliminate the numerous variables which enter into every traffic problem. The number of stops per mile, the number and extent of external delays, the number of passengers, the time of passenger interchange, all influence to a marked degree the schedule speed and produce variations from it. If these are not known, comparisons between two cars are based largely upon luck, because the car or train which gets few passengers makes few stops and has few delays and it naturally makes good time regardless of any advantages of design or equipment. But when all factors are recorded, as in this case, it is possible to draw comparisons which have a real meaning. It is, of course, true that all variables are liable to cancel out if a sufficient number of records are made, so that reasonably reliable averages may in many cases be obtained. Yet, in addition to the time required by such a procedure, it is easily possible for inherent qualities of different equipments to continue to affect results almost regardless of the number of trial runs. Such a condition will be found in the Newark tests, where it is shown that in practically no case was it possible to get the same load per car into the trains as was customary on single cars. The reason is, of course, obvious when the condition is actually pointed out by the results. A few train units in a line of single cars, running on about the same headway, are not likely to pick up any more passengers than the normal load for the single unit. Yet this light loading of the train would work to its advantage by enabling it to hold its place in the line, and if the absence of the theoretical train load amounting to twice that of the single car had not been recorded, absolutely erroneous conclusions might be drawn from the trials.

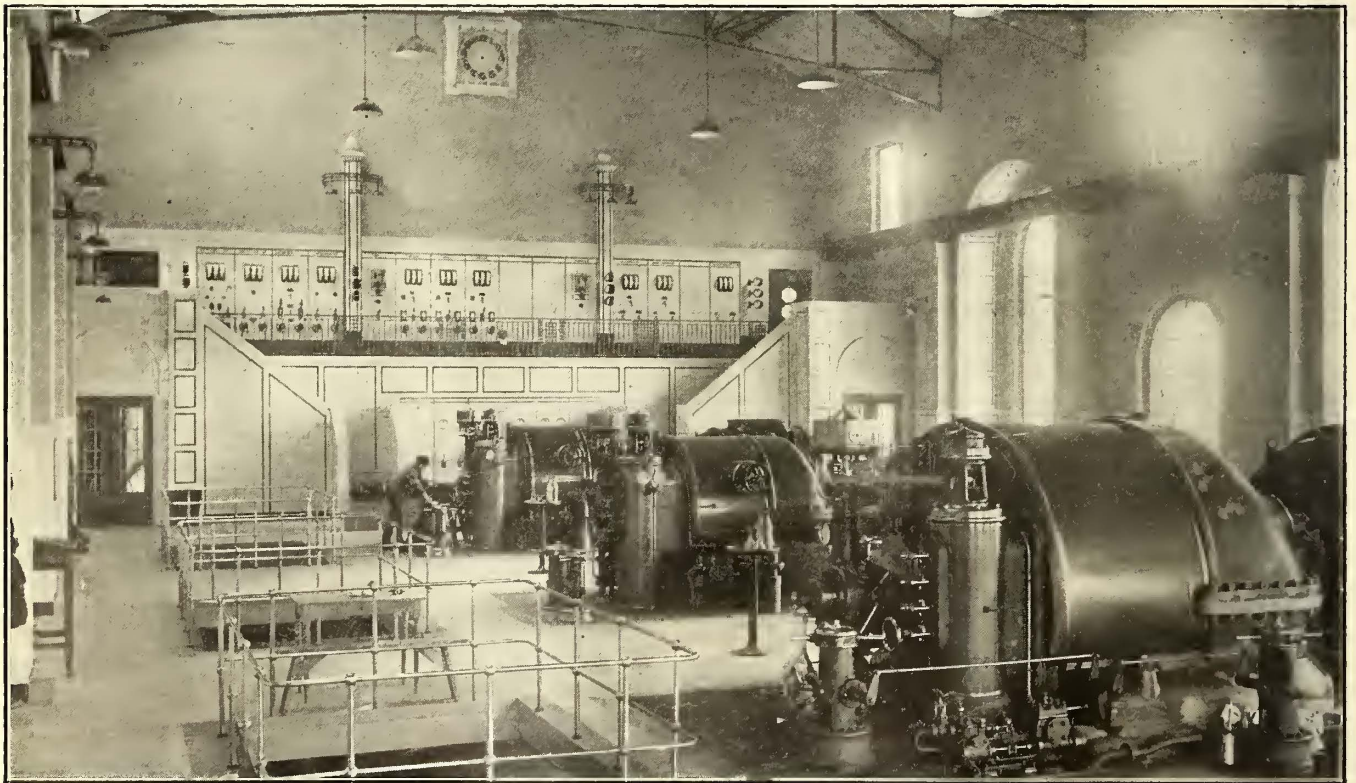
Power Equipment of the Hamburg Rapid Transit System

Power Station, Substations and Transmission for the 800-Volt Direct-Current Operation of This Elevated and Underground Railway

The power generating and distributing structures of the Hamburg Elevated & Underground Railway consist of the power station at Barmbeck, adjacent to the carhouse and shops described in the *ELECTRIC RAILWAY JOURNAL* for March 15, 1913, one substation at Hauptbahnhof (main steam railway station) built underground because no land was available, and a second substation near the Kellinghusenstrasse passenger station of the railway. The low-tension circuits of the right-of-way comprise the third-rail construction hereinafter described, two lighting circuits, which are independently connected to the storage batteries of the substation, as each of the two substations feeds only

room, machine shop, dining room, toilet, etc., are located in an extension of the boiler room. Many European power stations are famed for their architectural grace, but even among them the Hamburg installation is noteworthy for ornamental treatment both outside and in. The accompanying views can give only a faint idea of the attention lavished on this feature. The exterior decoration of the structure was compulsory owing to the proximity of the new Hamburg municipal park, and the operating company resolved voluntarily to make the interior of the structure equally ornate.

The building is of brick with a steel truss roof, the



Hamburg Power—View of Turbine Room at Barmbeck, Looking Toward the Switchboard Gallery

one lighting circuit for the whole belt line, and a two-wire circuit from the storage batteries for the operation of all safety mechanisms at 220 volts direct current.

POWER STATION CONSTRUCTION

The power house is favorably situated in the outskirts of the city with regard to both the most economical transmission of energy and the supply of material. It is but 1.6 miles and 4 miles respectively from the substations so that it was feasible to transmit the energy at the generating potential of 6000 volts, thus dispensing with transformers at the power station. The location of the building between the Barmbeck Canal and a spur of the Prussian State Railways insures ample facilities for getting coal and other supplies.

The accompanying plan shows the general arrangements and dimensions of the Barmbeck power station. The boiler room is 157 ft. 10 in. long x 117 ft. 5 in. wide and the corresponding dimensions of the turbine room are 159 ft. 10 in. x 58 ft. 8½ in. The plan shows that the store-

monotony of the outer wall surface being broken by small square figured panels and arched pilasters around the higher windows and doorways. The lower part of the stack, just above the roof line, has a temple effect brought about by the use of columns, while the remainder of this structure is made with narrow flutings interrupted by headers of brick at regular intervals. For the interior treatment tile was used in the turbine room and basement to a height of more than 6 ft., and it was also employed for the switchboard gallery and stairways. A view of the turbine room looking toward the switchboard gallery shows how the effect of the tile has been artistically enhanced by the use of decorative lines and patterns in the window arches and elsewhere. The lighting fixtures, railings and grill work on doors are also of artistic design. A leather-padded sound-proof telephone booth is installed near the switchboard to enable the operator to send and receive messages under ideal conditions of quiet and convenience.

The view of the boiler room shows that little inside bunker storage has been provided as dependence is placed on the open storage yard, which is of ample capacity for the ultimate installation of twelve boilers. Coal is distributed in the yard by means of a scoop which has a travel of 260 ft. from a bridge of 180-ft. span. This scoop can take coal at the rate of 40 tons an hour from either canal boats or railroad cars as the case may be. The coal is transported from the yard to the boiler room by means of two chain conveyors which are installed in reinforced concrete runways under the coal pile. The capacity of each conveyor, 20 tons an hour, is ample for all needs.

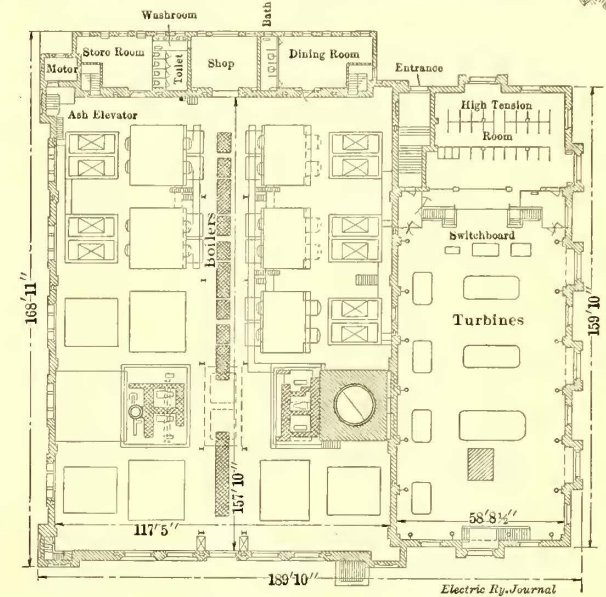
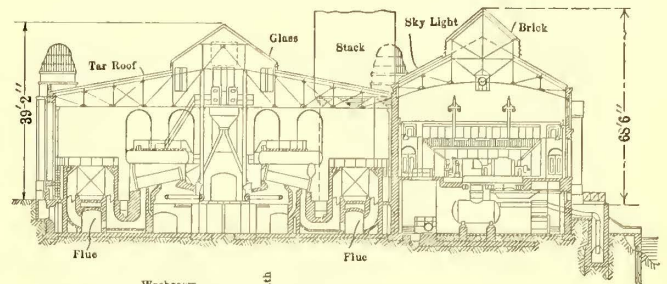
The boiler room is laid out for an ultimate equipment of eight units. The initial installation, however, consists of five units with a heating surface of 4520 sq. ft. each, all operated at 220 lb. pressure with 350 deg. C. superheat. The grate area is 130 sq. ft. Four of the boilers have chain-grate stokers, but the fifth is provided experimentally with an overfeed stoker. The superheaters which are placed between the piping and the upper boilers have a heating surface of 1184 sq. ft. each. The feed-water heater for each boiler has a heating surface of 3229 sq. ft. Another boiler of the same size is now on order and two more will soon follow. It will be noted from the cross-section of the station that the products of combustion are led through an arched duct of brick under the feed-water heaters directly to the base of two stacks located within the boiler house. As yet, however, only one stack has been built. The full height is 261 ft. and the inside top diameter is 13 ft.

The boiler-feed pumps are of the centrifugal type. One of them is rated at 276 gal. per minute and the other at 451 gal. per minute. Only one pump is required for continuous operation. The feed-water lines are composed of

tanks beneath the purifier in the basement and to the car-house and shops for car-washing and other purposes.

The steam pressure lines run directly from each pair of facing boilers to the nearest turbine, thereby insuring minimum transmission losses. Emergency cross-connections are provided to permit any boiler to feed any turbine.

The generating equipment consists of one 400-kw turbine operated at 1500 r.p.m. and two 2000-kw turbines



Hamburg Power—Cross-Section and Plan of Generating Station



Hamburg Power—Generating Plant at Barmbeck

two complete loops which may be used with or without the feed-water heaters. The exhaust of the feed-water pumps and that of a non-condensing turbine are utilized to heat the nearby carhouses and shops. Make-up water is taken from a well by two electrically operated pumps and carried to two cisterns in the roof framing of the boiler house. Part of it is treated by a purifier having a rated capacity of 20 gal. per minute and is transmitted to make-up water

operated at 3000 r.p.m., all generating 6000-volt, fifty-cycle, three-phase current for direct transmission to the substations. As shown on the plan, provision has been made for the installation of a fourth 6000-kw turbine, which is already required on account of the increasing traffic demands. The speed regulation of the turbines is 5 per cent above or below normal. Two Tirrill regulators are installed for voltage control. The electrical end of the turbine is cooled by filtering air under a draft of 0.39 in. of water. The average winter afternoon load during the Christmas shopping season last year was 4000 kw.

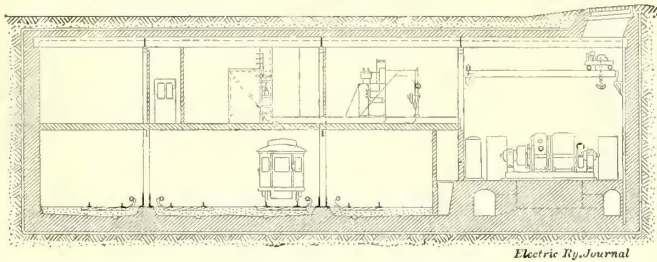
The condensers are of the surface type. The pumping outfit consists of a turbo-generator set, the exhaust of which is transmitted to the second stage of the main turbine or utilized for heating the car maintenance plant as previously noted. The extension of the small turbine shaft carries the wet-air pump, which consists of a centrifugal water pump and a centrifugal air pump, and the cooling-water pump. The condenser equipments are placed in the basement between the turbine piers, as is the Allgemeine company's usual practice.

POWER STATION CONTROL EQUIPMENT

The cables from the generators are carried through the basement to the switch room, whence they are continued as bare conductors to the high-tension compartments. Circuit-breakers are installed for these conductors at the inlets in the basement, at the remote-control oil switches and at the point where the lines branch off to the duplicate busbar system. The incoming high-tension cables are also sepa-

rately connected to the two sets of busbars, consequently one high-tension circuit can be operated while the other is out of service. The remote-control oil switches can be operated by hand when necessary, but ordinarily they are actuated from the main switchboard by relays on a 110-volt d.c. circuit.

The high-tension busbar compartments are placed in a two-level room behind the switchboard gallery in two rows



Hamburg Power—Cross-Section of Substation Built Along and Above Underground Railway

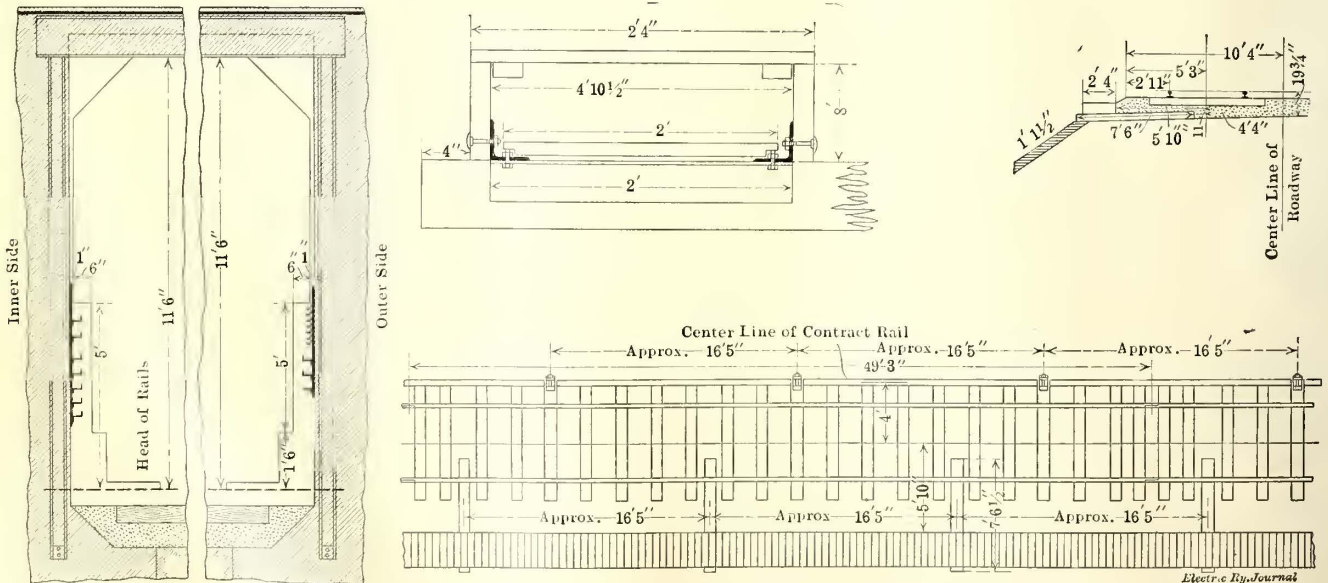
with an ample gangway between. The barriers are built up of Duro asbestos plates. A particularly interesting feature is that the base of each cell is finished in tile with a miniature dike at the front to prevent burning oil from flowing over into the aisle. The switchboard is also composed of Duro asbestos, but to give a better appearance this material is surfaced with Dutch tile.

In addition to the high-tension equipment the power station has two 40-kw synchronous motor-generator sets to generate 110 volts direct current for emergency lighting and remote-control operation. The secondaries of these sets are connected to two three-phase transformers which supply the carhouse and shops with power and lighting current at 220 volts. The d.c. supply at 110 volts is reinforced by a storage battery having 972 amp-hr. capacity on a three-hour discharge basis. A 5-kw asynchronous motor-generator set is also installed to deliver 220 volts d.c. for the block signals.

sion and battery compartments are above the subway. Ample natural illumination is received through roof lights, as is apparent from the accompanying halftone view of the interior. While the lighting, therefore, offered no particular trouble, careful attention had to be given toward obtaining ample ventilation by mechanical means. The suction and filtering ends of the ventilation ducts are placed on the tunnel side, while the tower through which the exhausted air passes leads to the street. Furthermore, the battery room can be separately exhausted so that no fumes can enter the converter room. The interior view of this station shows the same neat tiled-wall treatment as in the case of the generating station. The Heilwigstrasse station is of similar construction, but it was built somewhat like a private dwelling in order to provide living quarters for the substation operator. Both substations are equipped with a crane.

Each substation now contains three 6000-volt cascade motor-generator sets of 1000-kw capacity, with a fourth set for each substation already ordered; two Pirani sets, each consisting of a 185-hp asynchronous 6000-volt motor, a double-commutator interpole booster and a direct-current exciter with differential switching connections, and an accumulator of 386 cells with a capacity of 1258 amp-hr. on a one-hour discharge basis.

The choice of cascade sets was dictated largely by the consideration that they could be connected directly to the 6000-volt circuit. Their dimensions are smaller than equivalent motor-generators or rotary converters, because with a like number of poles one-half of the work is done by the asynchronous three-phase motor, which operates half as transformer and half as motor, and the other half of the work is done by the d.c. commutating-pole generator, which serves half as a rotary converter and half as a generator. The rotor of the motor has a twelve-phase winding and is mounted on the same shaft as the armature of the generator, which has only two bearings. The poles of the motor have a damper winding. The motor is started on the three-phase side by means of fixed rotor resistances which are automatically cut out at synchronism by means of



Hamburg Power—Cross-Section of Subway, Showing Wall Brackets for Cables, Location of Third-Rail and Walkway and Details of Conduit Trough

SUBSTATIONS

Energy is transmitted to two substations, one at Hauptbahnhof and the other at Heilwigstrasse. The first station is rather unique in that it is located below the street level alongside and also over the underground railway. The cross-section of the substation shows that the converter room is parallel to the right-of-way and that the high-ten-

a centrifugal switch and are then short-circuited by hand.

The load on the motor-generator sets is greatly equalized by the use of Pirani battery control so that the variations in voltage, even under the worst peak conditions, are very small. During the day the batteries are used merely to equalize loads but during the late night and early morning hours they are capable of handling the entire traction

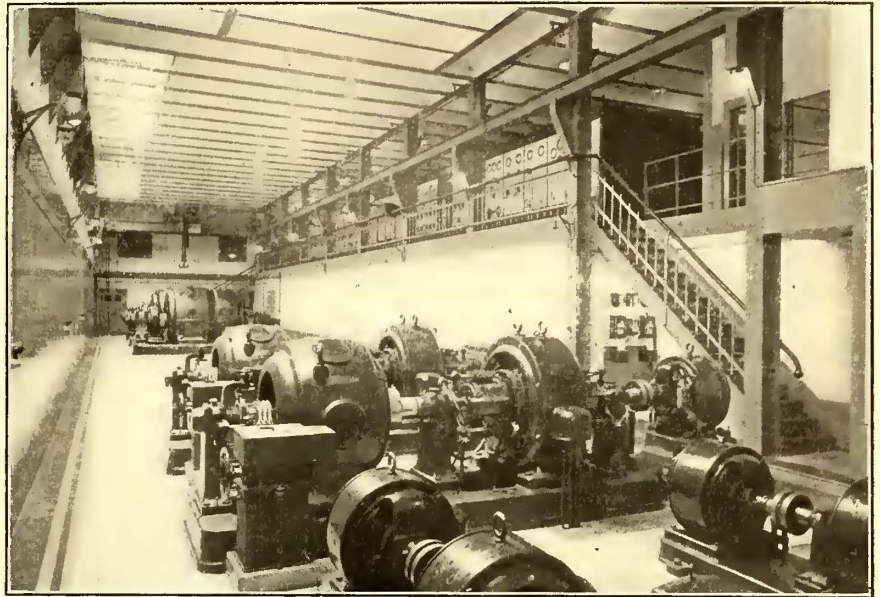
oad and of furnishing the necessary additional lighting. It is very simple to change to these different purposes merely by changing the regulation of the Pirani machines. Owing to their importance the Pirani sets were installed in duplicate.

The control gear of all high-tension equipments is mounted on trucks which are separated by concrete walls so that all apparatus can be safely inspected by moving the truck away from its fixed connections. Automatic oil switches are used both for the cascade sets and for the incoming high-tension lines.

A second battery with a capacity of 199 amp-hr. on the seven-hour discharge basis furnishes current at 220 volts for block signals, remote-control and emergency lighting. A novel feature of the battery equipments is the use of a portable charging equipment. This consists of a 220-volt, 4.5-volt motor-generator set with accompanying switching panel. At present all substation circuit-breakers are set for a maximum of 2500 amp.

The Hauptbahnhof substation is furnished with a portable air compressor and the Heilwigstrasse station with a stationary air compressor for blowing out machines, switches, etc. The Hauptbahnhof substation has room for three and the Heilwigstrasse station for two additional motor-generator sets.

was reserved under the walkways for the feeder cables, and in some cases the cables are carried in a boxlike structure. On stone viaducts the granite deck has been continued with metal to form a cable trench. The return circuit lines consist of bare copper cables.



Hamburg Power—Subterranean Substation Built Alongside and Over the Railway

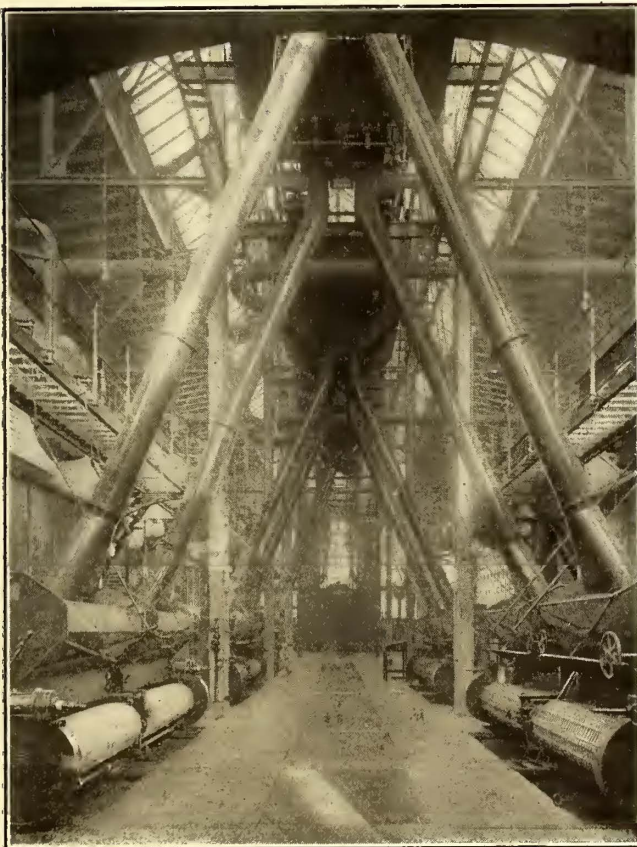
The third-rail is of the under-contact type similar to the Sprague-Wilgus design. It is carried from porcelain insulators at intervals of about 16 ft. and is protected with wooden boards. A leather washer is installed between the porcelain insulator and the rail to minimize vibrations. The contactor rail in the tunnel sections is about 2 in. lower than in the open sections, so that light is automatically cut in by the downward movement of the collector shoes. The rail consists of cast iron with 0.3 per cent manganese and 0.1 per cent carbon with a cross-section of 280 sq. in.

MOTOR INSPECTION AT MEMPHIS, TENN.

The Memphis Street Railway Company, Memphis, Tenn., has made an exceptional armature-winding record for the past four years. The company operates approximately 300 cars and found it necessary to wind only seventeen armatures in 1910, twenty-five in 1911, twenty-two in 1912 and none to June 1, 1913. In explanation of this record, A. B. McWhorter, master mechanic, states that it is due to cooperation between the mechanical department and the motormen, careful daily inspection and care in winding.

The company winds its own coils, dips and bakes them. After they are baked they are not allowed to harden before being used, but are placed in the armature core when the insulating paint is soft and pliable. After an armature is wound it is painted but not baked. Inspections of motors are made daily because the company's repair shop contains only two pits and it is not considered practicable to make inspections on a mileage basis. In consequence all cars are run over these two pits every night, and in case a defect is found which might result in armature trouble at any time, the car is taken out of service and repairs made immediately.

All inspections at the repair shops and the division car-houses are made by trained inspectors. These men are taken from the regular car crews, the transfer being in the form of a promotion. After a two weeks' course in the shops in armature inspection and repair, the student inspectors receive a written examination, and those passing the test are put to work as regular inspectors.



Hamburg Power—Boiler Room at Barmbeck

LOW-TENSION TRANSMISSION AND CURRENT COLLECTION

The locations for the low-tension d.c. cable runs from the substations to the third-rail were planned with great care. On viaducts and bridges particularly ample space

Train Operation for City Service

The Public Service Railway of New Jersey Has Been Conducting a Series of Tests for the Purpose of Determining Whether the Operation of Two-Car Trains in City Service Is Practicable and Desirable, and a Number of the Recorded Observations Are Published

As is well known, the conditions in the city of Newark are peculiarly severe in the limitations which they impose upon the local transportation system. They have, in fact, become so difficult to meet on account of the rapid growth of the surrounding communities that the rush-hour traffic upon some of the lines approaches the point where congestion prevents the operation of sufficient cars to meet the requirements, and as the use of two-car trains offered

all platforms and Tomlinson radial couplers. The motors were of the interpole type, with multiple-unit control. The air-brake equipment on all cars was of the General Electric straight-air type with emergency feature and quick service valves.

LINES ON WHICH TEST WAS CONDUCTED

The tests were carried out on the Central, Orange, South Orange, Bloomfield, Springfield and Broad Street lines.

TABLE I—CHARACTERISTICS OF LINES

Line	From	To	Miles	Average Grade per Cent	MAXIMUM ELEVATION		Miles From Starting Point	*Average Stops per Mile	*AVERAGE RIDE		*Average Schedule Speed, Miles per Hr.	**Pres-ent Minimum Head-way, Min.	**Head-way at 11 A.M., Min.
					Feet	Location			Per Cent	Miles			
Central.....	Penn. R. R.....	East Orange..	4.27	0.78	192	Munn Ave.....	3.37	11.53	44.3	1.89	7.36	2	5
Orange.....	Penn. R. R.....	West Orange..	6.57	0.68	250	Harrison Ave...	6.57	10.76	31.2	2.05	7.91	2	4
South Orange.....	Penn. R. R.....	City Line....	4.01	0.93	229	Seventh St.....	1.88	14.40	51.2	2.05	7.20	1	4
	E. Ferry St.....	South Orange	6.72	0.41	245	Center St.....	5.72	11.17	29.1	1.96	7.46		
	Magazine St....	South Orange	7.39	0.37	245	Center St.....	6.39	11.35	29.1	2.15	7.78		
	E. Ferry St.....	Maplewood....	8.82	0.19	245	Center St.....	5.72	10.11	24.1	2.12	7.90		
Bloomfield.....	Penn. R. R.....	Montclair....	7.00	0.83	320	Montclair C. H.	7.00	9.03	44.0	3.08	8.45	2	4
	E. Ferry St.....	Caldwell.....	10.73	0.67	510	Sunset Ave.....	7.55	7.69	38.4	4.12	9.20	1.5	5
Springfield.....	South St.....	Forty-third St.	5.90	0.61	215	Forty-second St.	5.63	10.45	31.9	1.88	7.43		
	South St.....	Maplewood....	7.75	0.22	215	Forty-second St.	5.63	9.77	32.9	2.55	8.20		
Broad.....	Irvington (In)...	Big Tree.....	9.43	-0.14	201	Nineteenth St..	1.23	8.23	28.9	2.73	9.38	1	2.5
	Big Tree (Out)..	Irvington....	9.20	0.17	201	Nineteenth St..	8.12	8.65	24.6	2.26	8.89		

*Rush hour. **Includes cars to all terminals.

a possible solution to a part of this problem, the Public Service Railway has conducted during the past nine months a series of tests to determine the possibilities in this method of operation.

EQUIPMENT TESTED

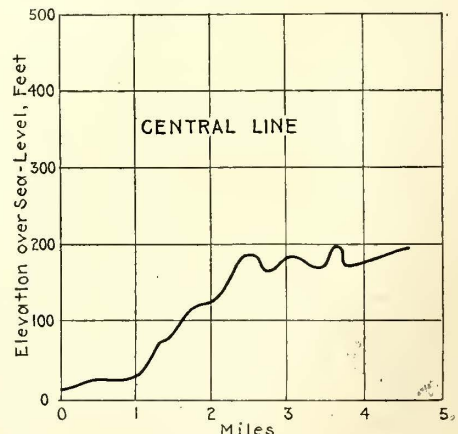
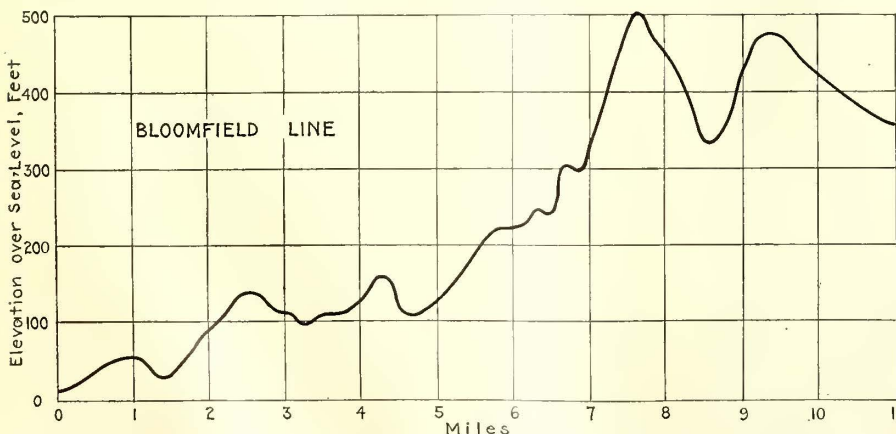
The following table shows the principal dimensions and equipment of the four-motor cars which were used in the test:

	Motor Cars	Trailer
Length over bumpers.....	46 ft. 4 in.	44 ft. 4 in.
Width over all.....	8 ft. 7 in.	8 ft. 1 in.
Seating capacity.....	44	35
Type of motors.....	West. 307 C-A	.....
Motor rating.....	40-50 hp.	.....
Gear ratio.....	18:66	.....
Type of control.....	West. H.L.	.....
Type of trucks.....	Stand. C-50-P	Peck'm 14 B-3
Total weight.....	48,700	32,800

All of the cars under test were of the double-end prepayment type and equipped with hand-operated doors on

For the benefit of those not familiar with these routes, a brief discussion of their characteristics is given in the following paragraphs:

The Central, Orange, South Orange and Springfield lines are more or less similar in that they all have rather heavy grades soon after leaving the business center of Newark, while beyond the city line the rise is gradual and is broken by down grades. The Bloomfield line has



Newark Tests—Profiles of Typical Lines

heavy up grades a large portion of the way to the Montclair carhouse and steep up grades and down grades from that point to the end of the line in Caldwell. The Broad Street line differs from the others in that it is a through route running beyond the city limits in both directions. The grades on the southerly end are more gradual than those on the other lines, while the north end is comparatively level. The short portions of the South Orange and Springfield lines east of the business district do not alter the character of these lines so much. Approximate profiles.

of the Central and Bloomfield lines are shown in the accompanying cuts.

The Central line, after leaving the business section of Newark, passes through a small factory district and then runs through a good residential section, well built up all of the way to the end of the line. The Orange line is simi-

tory beyond. The Bloomfield line, after leaving Newark, passes through the business centers and residential sections of Bloomfield and Montclair with transfer points in each. It also serves the small towns of Glen Ridge, Verona and Caldwell and has more or less free running territory between towns. The Broad Street line runs through

TABLE II—CENTRAL LINE

Trip	Mileage	Delays in Minutes	Net Time Gained (+) or Lost (-) in Minutes		Passengers Boarding		Total Time Stopped in Seconds (Exc. of Delays)	Stops per Mile	Power Consumption		Remarks		
			Terminal	Along Line	Terminal	Along Line			Kw-hr per Car Mile	Kw-hr per Ton Mile			
<i>Single Car:</i>													
Out.....	4.27	2.00	3.00	5	82	368	12.65	4.45	0.163	Weather—Cloudy Rail—Good	Oct. 22, 1912		
In.....	4.15	0.67	+4.66	7	34	193	8.68	5.06	0.197				
Out.....	4.27	0.00	-4.00	6	80	409	13.12	6.09	0.224				
Out.....	4.27	0.97	-2.03	9	78	344	12.88	4.22	0.155	Weather—Rain Rail—Wet	Oct. 23, 1912		
In.....	4.15	0.95	-2.05	10	111	378	12.77	3.85	0.136				
Out.....	4.27	0.00	-1.50	9	129	414	11.95	5.39	0.186				
In.....	4.15	0.20	-0.80	12	92	360	14.45	4.58	0.165	Weather—Fair Rail—Wet	Oct. 24, 1912		
In.....	4.15	0.75	+0.75	7	39	212	10.12	2.65	0.102				
In.....	4.15	0.25	+1.25	7	36	210	8.68	2.65	0.103				
Out.....	4.27	2.68	+2.69	3	44	247	10.30	3.98	0.154	Weather—Fair Rail—Wet	Oct. 24, 1912		
Out.....	4.27	2.75	+0.75	6	37	229	10.77	4.45	0.172				
In.....	4.15	0.32	+3.32	6	40	164	9.40	3.62	0.140				
Out.....	4.27	2.92	-1.09	14	60	262	10.54	4.21	0.157	Weather—Fair Rail—Wet	Oct. 24, 1912		
Out.....	4.27	3.48	-5.02	8	52	268	11.24	3.98	0.151				
In.....	4.15	0.20	-3.30	7	105	362	13.74	6.27	0.223				
Out.....	4.27	1.07	+5.07	9	86	325	10.54	5.85	0.213	Weather—Fair Rail—Wet	Oct. 24, 1912		
In.....	4.15	0.40	-1.60	4	78	325	13.49	4.10	0.152				
In.....	4.15	0.40	+4.40	7	37	181	9.64	3.62	0.140				
In.....	4.15	0.00	0.00	5	40	236	9.88	4.34	0.168	Weather—Fair Rail—Wet	Oct. 24, 1912		
Out.....	4.27	0.17	+1.16	7	47	272	9.61	4.69	0.179				
Out.....	4.27	1.27	+1.26	8	64	288	11.01	5.62	0.210				
Out.....	4.27	1.72	-3.29	10	33	221	10.07	4.22	0.163	Weather—Fair Rail—Wet	Oct. 24, 1912		
In.....	4.15	0.00	+4.00	11	38	176	9.16	3.62	0.139				
Out.....	4.27	0.68	-3.32	11	56	282	10.77	4.92	0.185				
Out.....	4.27	3.37	-8.03	7	63	286	11.95	4.92	0.185	Weather—Fair Rail—Wet	Oct. 24, 1912		
<i>Multiple-Unit Train:</i>													
In.....	4.15	2.72	-1.78	14	102	390	13.26	4.10	0.157			Weather—Fair Rail—Wet	Oct. 22, 1912
Out.....	4.27	0.17	-3.83	31	149	481	13.59	5.85	0.214				
Out.....	4.27	1.90	+0.40	21	79	352	13.12	7.15	0.275				
In.....	4.15	0.68	-2.82	16	162	449	13.25	5.66	0.207	Weather—Fair Rail—Wet	Oct. 23, 1912		
Out.....	4.27	0.30	-2.20	10	129	434	13.12	5.73	0.216				
<i>Multiple-Unit Train:</i>													
In.....	4.15	0.18	-1.32	15	143	401	14.45	5.66	0.210	Weather—Fair Rail—Wet	Oct. 24, 1912		
In.....	4.15	0.18	-1.82	6	77	325	13.25	5.18	0.202				
Out.....	4.27	0.15	-4.85	32	122	461	12.65	6.44	0.240				
Out.....	4.27	6.20	-4.55	16	115	375	12.18	5.74	0.217	Weather—Fair Rail—Wet	Oct. 24, 1912		

lar to the Central line in the city of Newark, but in addition to serving a residential section, it passes through the business centers of East Orange and Orange. There are three transfer points on this line in Orange and West Orange. These factors tend to increase the number of short riders.

good residential sections at both end and passes few stores outside of the center of Newark.

The passenger counts made on some of the heavier afternoon trips have been plotted in Tables II to VII, which will give an idea of the distribution of traffic on the different lines. The length, average grade and other character-

TABLE III—ORANGE LINE

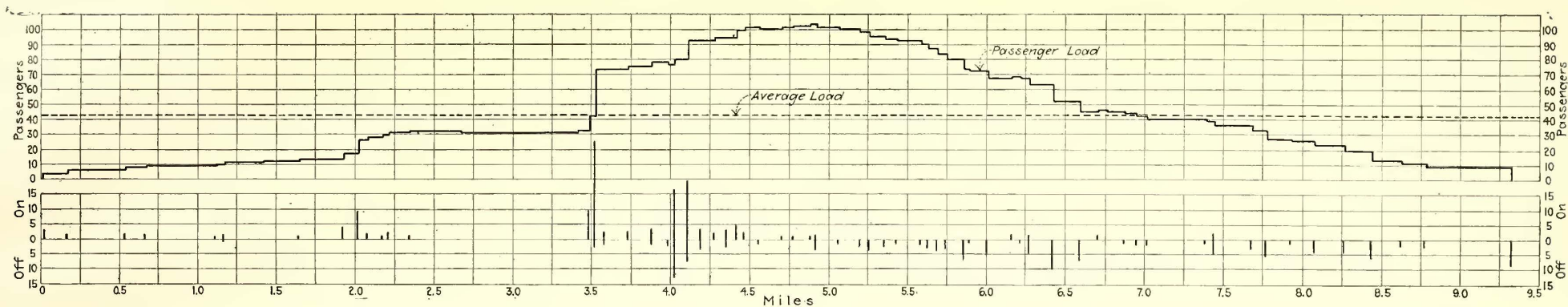
Trip	Mileage	Delays in Minutes	Net Time Gained (+) or Lost (-) in Minutes		Passengers Boarding		Total Time Stopped in Seconds (Exc. of Delays)	Stops per Mile	Power Consumption		Remarks
			Terminal	Along Line	Terminal	Along Line			Kw-hr per Car Mile	Kw-hr per Ton Mile	
<i>Single Car:</i>											
In.....	6.45	0.25	+0.50	8	54	264	9.46			Weather—Cloudy Rail—Good	Nov. 6, 1912
Out.....	6.57	2.02	+2.28	6	36	167	6.55				
In.....	6.45	0.38	+0.38	3	76	327	8.38				
In.....	6.45	1.20	+0.70	4	47	249	7.91			Weather—Fair Rail—Wet	Nov. 7, 1912
Out.....	6.57	0.49	-3.52	8	144	512	10.50	5.48	0.196		
In.....	6.45	0.00	-1.00	8	66	295	8.22	3.57	0.137		
Out.....	6.57	5.03	-5.97	9	90	387	9.59	5.03	0.189	Weather—Fair Rail—Wet	Nov. 7, 1912
In.....	6.45	0.00	-2.00	4	123	405	10.70	4.66	0.171		
Out.....	6.57	1.77	+2.77	3	55	243	8.06	3.65	0.142		
In.....	6.45	0.57	+0.57	2	75	344	8.99	1.71	0.065	Weather—Fair Rail—Wet	Nov. 7, 1912
Out.....	6.57	0.17	-0.33	4	58	294	8.53	4.57	0.177		
In.....	6.45	0.13	-0.87	4	66	322	9.14	2.95	0.113		
Out.....	6.57	0.97	-1.03	13	171	552	11.25	6.09	0.213	Weather—Fair Rail—Wet	Nov. 7, 1912
In.....	6.45	2.97	-1.03	7	119	412	9.14	3.26	0.119		
Out.....	6.57	4.63	-7.37	31	109	443	10.95	5.63	0.204		
<i>Multiple-Unit Train:</i>											
In.....	6.45	0.17	-2.83	9	195	591	11.32	4.88	0.183	Weather—Fair Rail—Wet	Nov. 6, 1912
In.....	6.45	0.37	+0.37	5	117	502	9.45	4.34	0.168		
Out.....	6.57	1.08	-1.42	20	160	639	11.42	5.85	0.222		
In.....	6.45	0.87	+1.62	15	81	395	8.84	2.95	0.116	Weather—Fair Rail—Wet	Nov. 7, 1912
Out.....	6.57	1.17	-1.35	7	76	342	8.52	4.26	0.168		
In.....	6.45	0.13	-1.62	9	131	466	9.93	3.18	0.122		
In.....	6.45	1.28	+0.03	6	106	486	10.70	4.19	0.163	Weather—Fair Rail—Wet	Nov. 7, 1912
In.....	6.45	0.22	+0.22	6	89	424	9.77	3.96	0.155		
Out.....	6.57	1.46	+2.27	10	89	429	9.28	4.57	0.179		
In.....	6.45	0.63	-1.37	20	159	570	10.85	4.43	0.169	Weather—Fair Rail—Wet	Nov. 7, 1912
Out.....	6.57	1.68	-2.32	18	159	617	11.10	5.71	0.216		

The Springfield and South Orange lines operate at their eastern ends through a level factory section. After leaving the business district of Market Street, both lines run through a mixed business and residential district to the western city line and through a less thickly settled terri-

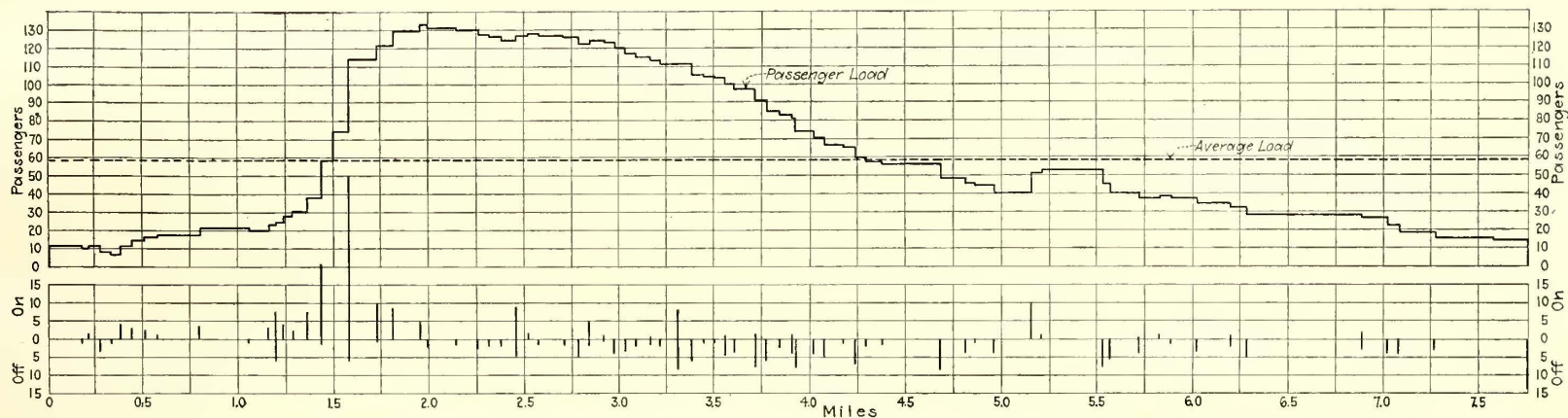
istics of the lines under rush-hour conditions, which were calculated from the data of the test, are shown in Table I.

DATA OBTAINED

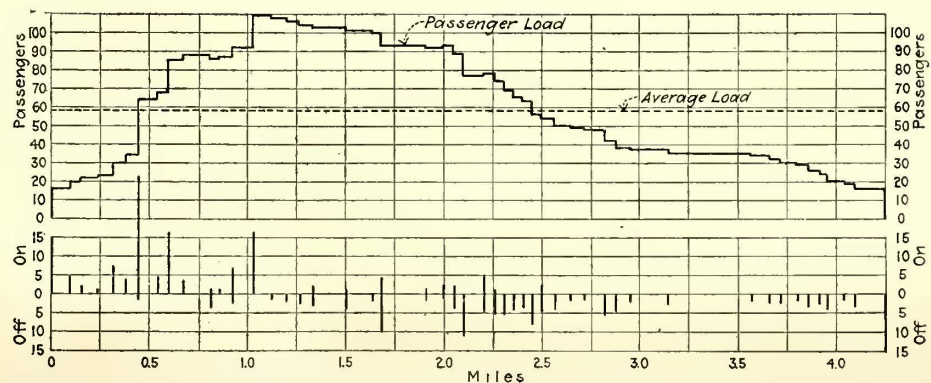
As it was desired to investigate the performances of the trains under the most severe conditions, most of the ob-



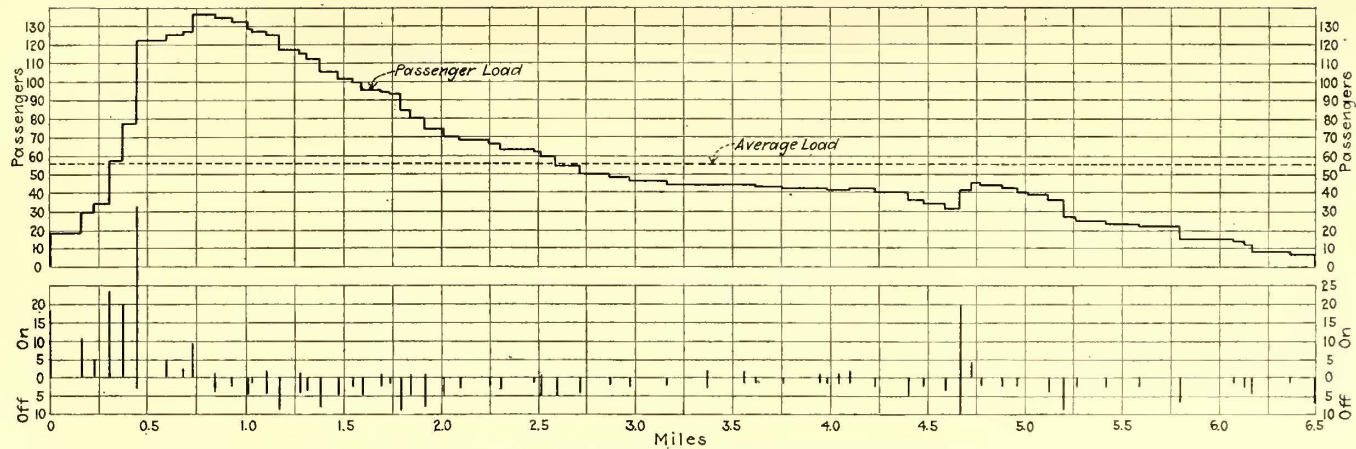
Newark Tests—Passenger Count for Train on Broad Street Line



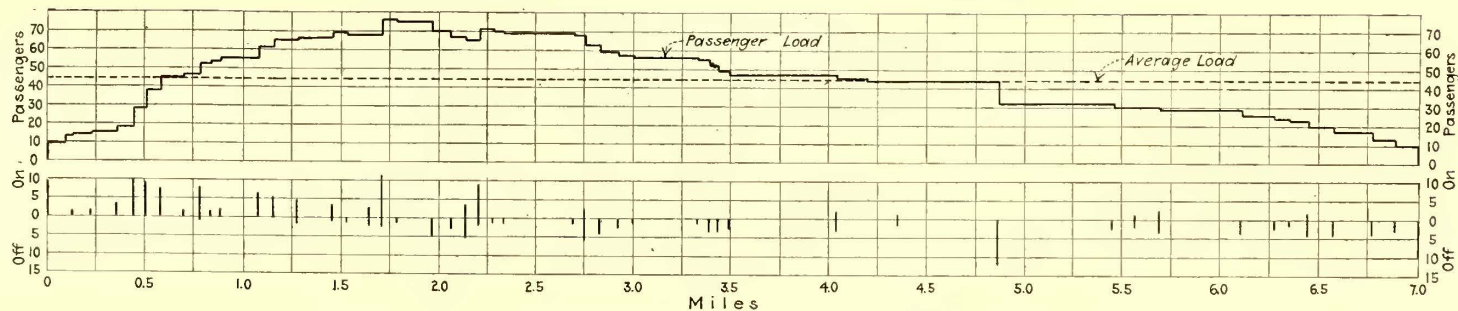
Newark Tests—Passenger Count for Train on Springfield Lines



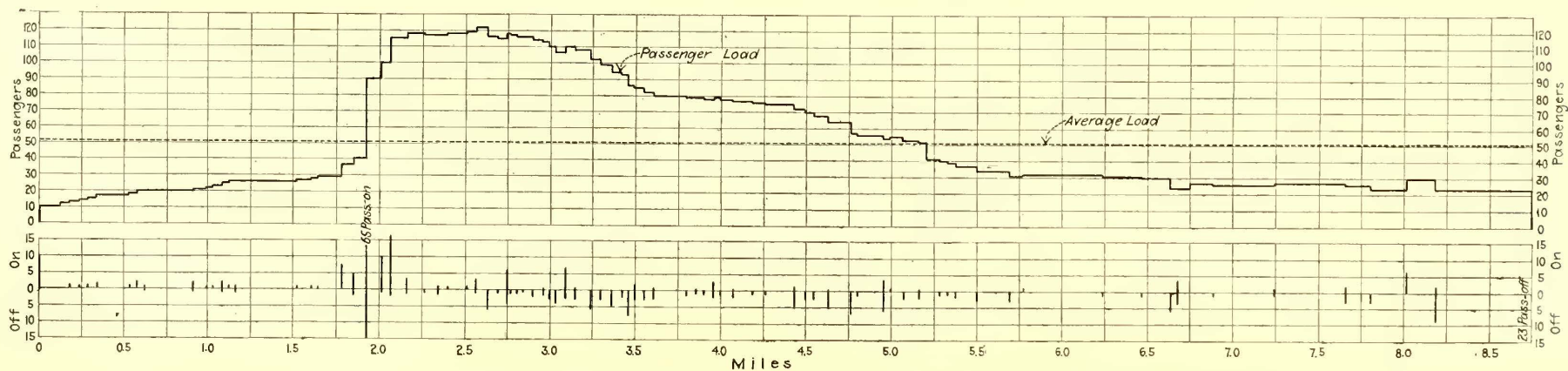
Newark Tests—Passenger Count, Central Line



Newark Tests—Passenger Count for Train on Orange Line



Newark Tests—Passenger Count for Train on Bloomfield Line



Newark Tests—Passenger Count for Train on South Orange Line

servations were made during the morning and evening rush hours. The average time of observation was two days for each combination of equipment per line. The largest number of observations was made on the Central line, as this line appeared to present the best field for purposes of comparison.

the rush hours. Considerable difficulty existed in filling the trains owing to their comparative novelty, and for this reason the summaries include only those trips where the loads were in excess of forty passengers per car.

RUNNING TIME

One of the first questions in the consideration of train

TABLE IV—SOUTH ORANGE LINE

Trip	Mileage	Delays in Minutes	Net Time Gained (+) or Lost (-) in Minutes		Passengers Boarding		Total Time Stopped in Seconds (Exc. of Delays)	Stops per Mile	Power Consumption		Remarks
			Terminal	Along Line	per Car Mile	Kw-hr per Ton Mile					
<i>Single Car:</i>											
In.....	5.46	0.25	-1.75	9	110	442	13.36	..	..	Weather—Clear Rail—O. K.
Out.....	8.82	6.30	+7.30	4	48	235	6.58	3.63	0.143		
In.....	8.78	3.45	+5.45	4	44	305	7.52	2.85	0.113	Weather—Clear Rail—O. K.	
Out.....	7.39	1.03	-10.47	3	111	482	11.76	4.74	0.176		
In.....	6.72	0.70	+5.20	6	43	251	7.44	3.28	0.129	Weather—Clear Rail—Good	
Out.....	5.03	0.22	+0.72	7	64	216	10.93	4.57	0.172		
In.....	5.48	0.29	-5.72	9	119	481	15.15	5.65	0.203	Weather—Clear Rail—Good	
Out.....	5.46	0.08	-0.42	4	62	352	11.17	3.66	0.140		
Out.....	5.48	0.73	-4.52	17	101	452	13.14	5.47	0.198	Weather—Clear Rail—O. K.	
In.....	6.13	0.38	+0.38	11	84	304	9.63	3.42	0.133		
Out.....	6.72	0.22	-7.78	12	144	582	12.49	5.43	0.208	Weather—Clear Rail—O. K.	
In.....	6.66	0.70	-3.30	12	87	422	10.05	3.98	0.157		
Out.....	6.66	1.25	-5.75	34	97	483	11.11	4.73	0.182	Weather—Fair Sanded, fair. P. M.—O. K.	
In.....	6.13	0.93	-1.07	5	84	368	10.76	3.67	0.143		
Out.....	7.39	1.40	-3.60	9	147	527	10.01	3.92	0.150	Weather—Fair Sanded, fair. P. M.—O. K.	
In.....	7.39	1.01	-3.98	11	194	592	11.63	5.42	0.204		
Out.....	8.82	4.60	-7.60	10	200	791	11.34	4.48	0.170	Weather—A. M.—Cloudy. —Cloudy, rain. Rail—A. M.— Wet sanded. P. M.—Bad.	
In.....	8.78	1.80	-3.20	21	135	606	9.11	3.76	0.146		
<i>Motor Car and Trailer:</i>											
Out.....	4.01	0.37	-12.13	12	92	490	13.20	5.35	0.239	Weather—Clear. Rail—O. K.	
Out.....	4.01	0.43	-15.07	27	176	530	15.70	6.35	0.261		

Among the observations taken, the term "external delays" covers the time stopped because of interference of other cars and vehicles and other unusual conditions. The time required for passenger movement at each platform was taken from the time the car came to a dead stop and the door was open until the last passenger boarding or

operation is whether trains will require a longer running time than single cars. In the tables will be found a column devoted to schedule adherence. For the sake of comparison all trips on these tables were checked against the normal running time outside of the rush hours, and the difference gave the time gained or lost on the trip as com-

TABLE V—BLOOMFIELD LINE

Trip	Mileage	Delays in Minutes	Net Time Gained (+) or Lost (-) in Minutes		Passengers Boarding		Total Time Stopped in Seconds (Exc. of Delays)	Stops per Mile	Power Consumption		Remarks
			Terminal	Along Line	per Car Mile	Kw-hr per Ton Mile					
<i>Single Car:</i>											
Out.....	7.00	0.33	-3.66	2	106	598	9.00	5.71	0.205	Weather—Clear Rail—O. K.	
In.....	6.88	0.60	-3.65	17	110	508	10.90	3.93	0.138		
Out.....	7.00	0.70	+0.20	3	45	251	7.29	4.29	0.165	Weather—Clear Rail—O. K.	
In.....	6.88	0.00	+0.75	4	79	402	7.27	2.47	0.091		
Out.....	7.00	1.28	-5.22	8	117	604	9.57	5.14	0.181	Weather—Clear Rail—O. K.	
In.....	6.88	0.93	-1.32	10	71	322	9.59	3.78	0.140		
Out.....	7.00	0.00	-1.25	7	78	339	9.00	4.85	0.179	Weather—Clear Rail—O. K.	
Out.....	7.00	0.00	-2.75	8	82	431	9.29	5.00	0.183		
In.....	6.88	0.49	-2.76	19	75	330	7.56	2.62	0.096	Weather—Clear Rail—O. K.	
Out.....	10.73	1.25	-7.00	28	94	659	6.71	5.50	0.198		
Out.....	10.73	0.88	+1.39	13	125	437	6.52	4.57	0.161	Weather—Clear Rail—O. K.	
In.....	10.68	0.00	-1.00	7	90	410	7.30	3.18	0.117		
Out.....	10.73	0.17	+1.90	6	45	385	6.24	3.73	0.144	Weather—Clear Rail—O. K.	
Out.....	10.73	4.70	-11.80	18	121	625	8.39	3.08	0.109		
<i>Multiple-Unit Train:</i>											
Out.....	7.00	1.32	-4.20	11	146	640	9.14	6.15	0.228	Weather—Clear Rail—O. K.	
In.....	6.88	0.65	+1.65	5	125	545	9.59	3.93	0.148		
In.....	6.88	0.27	+3.30	10	75	424	7.85	3.85	0.149	Weather—Clear Rail—O. K.	
Out.....	7.00	0.49	-7.01	13	122	740	9.00	5.21	0.196		
Out.....	7.00	2.32	-6.70	9	91	506	9.14	4.79	0.184	Weather—Clear Rail—O. K.	
In.....	10.68	1.10	+1.10	7	52	430	5.78	4.19	0.166		
Out.....	10.73	0.00	-14.50	23	229	1009	8.11	5.30	0.190	Weather—Clear Rail—O. K.	
In.....	6.88	2.73	-8.30	11	146	642	8.87	3.05	0.133		
Out.....	7.00	0.35	-25.15	54	176	825	10.00	5.07	0.210	Weather—Clear Rail—O. K.	
In.....	6.88	0.00	+0.50	20	75	276	8.28	...	...
Out.....	7.00	0.00	-4.50	10	83	348	8.29	3.64	0.166	Weather—Clear Rail—O. K.	
Out.....	7.00	2.69	-9.30	20	160	644	9.00	4.93	0.211		
Out.....	7.00	1.05	-3.70	43	38	...	6.86	3.65	0.168	Weather—Clear Rail—O. K.	
In.....	6.88	1.05	-0.95	52	32	...	7.56	2.47	0.114		

alighting was clear of the step. The word "trip" is used throughout to mean the run from one end of the line to the other, not a round trip. The total number of observations was in the neighborhood of 225,000, but, as before mentioned, only part of these are published, including, however, all data bearing directly upon train operation during

pared with this uniform running time. The time lost in extra stops or delays in starting, due to interference of wagons or other cars or other causes external to the regular operation of the car or train, was subtracted from time lost or added to time gained, and the final result for each trip appears under the heading "Net Time Gained or Lost."

RESULTS AT CONGESTED CORNERS

A number of observations were made at the corner of Broad and Market Streets, Newark, and these showed that the average time required for a train to pass across was twenty seconds, (i. e., from the time the front of the first car reached the crosswalk on the near side until the rear of the second car cleared the cross-walk on the far side).

sion meant a large percentage error in the result. The readings were necessarily hurried in many cases so as not to inconvenience passengers. It should also be remembered that the number of stops is a very large factor in the power consumption, while it depends a great deal also on the motorman. These factors all help to explain the wide variation in some of the results.

TABLE VII—BROAD STREET LINE

Trip	Mileage	Delays in Minutes	Net Time Gained (+) or Lost (-) in Minutes	Passengers Boarding Terminal	Passengers Along Line	Total Time Stopped in Seconds (Exc. of Delays)	Stops per Mile	Power Consumption Kw-hr per Car Mile	Power Consumption Kw-hr per Ton Mile	Remarks
<i>Single Car:</i>										
In.....	5.74	0.00	-4.60	3	136	673	11.32	3.36	0.137	Nov. 25, 1912 Weather—A. M.—Clear P. M.—Cloudy
Out.....	5.90	0.85	-0.90	..	42	372	8.65	4.75	0.186	
Out.....	5.90	0.00	-7.00	..	114	573	11.18	..	..
Out.....	4.77	0.00	-7.00	10	62	356	9.02	4.61	0.172	Rail—A. M.—Good. P. M.—Fair.
In.....	5.74	0.00	0.00	4	134	518	10.97	2.27	0.082	Nov. 26, 1912 Weather—Clear Rail—O. K.
Out.....	5.90	1.48	-5.52	..	101	516	10.68	5.43	0.202	
Out.....	4.77	0.23	-3.27	7	54	310	11.11	5.66	0.215	
<i>Multiple-Unit Train:</i>										
In.....	7.53	0.00	-5.25	14	138	421	10.08	..	..	Nov. 25, 1912 Weather—Clear Rail—A. M.—O. K.
Out.....	7.75	1.19	-3.32	..	103	412	9.55	..	..
Out.....	6.62	1.11	-8.13	6	131	478	11.17	4.83	0.181	
In.....	7.53	1.30	-0.20	41	52	294	7.44	2.93	0.115	Nov. 26, 1912 Weather—Clear Track—O. K.
Out.....	7.75	1.08	-0.92	..	177	612	11.09	4.32	0.162	
In.....	7.53	0.00	-1.00	6	216	601	10.88	3.99	0.147	
Out.....	6.62	0.35	-6.40	4	104	661	10.57	4.39	0.164	Jan. 4, 1913 Weather—Clear. Rail—Fair.
In.....	7.53	1.02	-2.48	48	47	393	8.10	3.39	0.133	
<i>Motor Car and Trailer:</i>										
Out.....	4.77	0.47	-3.53	6	118	425	11.90	3.88	0.173	Jan. 6, 1913 Weather—Cloudy Rail—Not good, sanded
Out.....	4.77	0.62	-5.13	6	73	329	10.07	4.61	0.213	
Out.....	4.77	0.27	-8.48	6	133	440	10.90	4.83	0.212	

Similar observations for two single cars crossing one after the other showed an average of 27.1 seconds, or a difference of 7.1 seconds. If this represented the time interval between two cars, and the same interval was allowed ahead of the first car in each case, the time for the trains would be 27.1 seconds, against 34.2 seconds for two single cars, or a saving of 20.8 per cent.

In computing the power consumption per ton mile the passenger load was taken into account as follows: For each line a heavy trip was selected and the passenger load plotted. From this plot the average load for the trip was determined and expressed in per cent of the total number of passengers carried. This factor was then used to calculate the average load for all trips between the same

TABLE VII—BROAD STREET LINE

Trip	Mileage	Delays in Minutes	Net Time Gained (+) or Lost (-) in Minutes	Passengers Boarding Terminal	Passengers Along Line	Total Time Stopped in Seconds (Exc. of Delays)	Stops per Mile	Power Consumption Kw-hr per Car Mile	Power Consumption Kw-hr per Ton Mile	Remarks
<i>Single Car:</i>										
Out.....	9.20	0.33	+0.33	4	86	326	8.26	4.46	0.171	Dec. 4, 1912 Weather—A. M.—Cloudy P. M.—Clear
In.....	9.43	0.50	+5.00	6	83	294	7.00	3.82	0.146	
Out.....	9.20	0.02	+1.52	3	47	245	5.98	3.48	0.137	
Out.....	9.20	0.00	-1.50	3	126	562	9.24	4.56	0.170	Nov. 29, 1912 Weather—Clear Rail—O. K.
In.....	9.43	0.33	-0.66	4	107	475	8.91	4.68	0.176	
Out.....	9.83	0.57	-7.43	5	144	525	8.14	4.38	0.160	
In.....	10.15	1.33	-0.66	6	179	552	9.65	4.63	0.165	Dec. 5, 1912 Weather—A. M.—Cloudy P. M.—Clear
Out.....	9.20	0.85	+2.85	5	36	221	5.98	3.91	0.156	
Out.....	7.36	0.00	+2.50	2	44	244	7.06	4.35	0.171	
In.....	11.95	0.00	-1.00	2	121	512	7.03	3.76	0.140	Nov. 27, 1912 Weather—Clear Rail—O. K.
Out.....	12.39	1.50	-3.00	6	163	623	7.42	4.28	0.154	
<i>Multiple-Unit Train:</i>										
In.....	9.43	0.00	+2.00	12	110	489	7.96	3.87	0.151	Nov. 29, 1912 Weather—Clear Rail—O. K.
In.....	9.43	0.42	-3.08	8	104	529	7.21	3.93	0.154	
Out.....	9.83	0.23	-14.27	4	146	732	8.34	—	—	
Out.....	9.20	0.00	-2.00	7	153	606	9.68	5.43	0.209	Nov. 30, 1912 Weather—Clear Rail—Good
In.....	9.43	0.00	+1.75	4	77	374	6.47	3.77	0.150	
In.....	9.43	0.00	-4.25	4	143	644	7.64	3.34	0.129	
Out.....	9.83	1.20	-12.80	3	325	1109	9.97	4.83	0.175	
In.....	8.25	0.00	-4.00	5	132	435	8.85	4.12	0.159	Dec. 7, 1912 Weather—Clear. Rail—O. K.
Out.....	7.99	0.58	+3.58	3	83	275	7.39	4.00	0.158	
Out.....	9.20	1.15	+1.12	6	142	546	8.16	4.68	0.181	
In.....	9.43	1.25	+1.25	4	85	406	6.36	4.03	0.160	Jan. 4, 1913 Weather—Clear. Rail—O. K.
Out.....	9.83	0.05	-2.45	5	163	636	7.94	3.87	0.148	
<i>Motor Car and Trailer:</i>										
In.....	9.43	4.40	-20.60	6	264	858	9.54	3.39	0.147	Jan. 8, 1913 Weather—Rain. Rail—Fair. Wet
Out.....	9.83	1.48	-3.02	6	127	586	8.04	3.67	0.169	
In.....	9.43	1.17	-2.83	6	114	454	7.74	3.24	0.150	
Out.....	9.83	1.55	+0.05	6	78	351	6.10	2.90	0.137	
Out.....	9.20	1.58	-0.42	6	92	489	7.94	4.07	0.191	
Out.....	9.83	0.22	-12.28	6	208	765	9.05	4.17	0.185	

POWER CONSUMPTION

For comparison of the power consumption of the different equipments, wattmeters were placed on the cars and readings taken at each terminal. The smallest division on the scale of the wattmeter dial was 5 kw-hr., while the difference between readings on some trips was little more than this. Hence a mistake in estimating parts of a divi-

terminals, the average weight per passenger being taken as 150 lb.

COUPLING OF TRAINS

The present method of coupling includes the following operations: removing fender, interlocking couplers, opening cut-out cocks in air pipes, pulling down trolleys, inserting cable jumpers, replacing trolley and fastening safety

chains. This was found to require as much as two minutes, but with practice and careful assignment of duties to each man it could probably be done in a shorter time, and if the necessity for removing fenders could be obviated by the use of wheel guards or some other device, this time would be materially reduced. If trains are to be made up on the road, however, a definite allowance for coupling must be made in the timetable.

DEMONSTRATED RESULTS

The results show that, aside from any question of operating cost, the use of trains is entirely practicable in congested city service such as obtains in Newark. That is to say, the tests demonstrated that the riding public accepted the arrangement at once without objection, and no difficulties were experienced through interference of the long two-car units with vehicular traffic. The observations as taken indicate that the train carrying a large number of passengers makes a greater number of stops per trip than a single car. For a given total number of passengers the number of stops is practically the same whether the load is carried by one car or two. This might be expected, as people will board and alight at the same points regardless of the method by which they are transported. The rate of increase in the number of stops is, however, by no means directly proportional to the number of passengers. Instead, it falls off rapidly as the loads become heavy. In other words the number of stops per trip tends to become constant or independent of the number of passengers provided the total number carried is sufficiently great. On none of the test lines in Newark is this point reached within the capacity of the two-car train, but the tendency was so strongly marked when both cars of the train were comfortably filled that the train made only about one more stop per mile than each car would have made had they been run singly.

The loading time per passenger will be found to be approximately the same on the train and on the single car, indicating that the time lost through the transmission of bell signals, through the unequal distribution of passengers between the two cars and through the necessity for the single exit of the rear car was just about offset by the fact that the train provided two entrances for the total number of passengers boarding as against the single entrance of the single car.

It is, however, a fact except on two of the lines tested, namely, Central and Orange, that both the public and train crews were unfamiliar with train operation. This, it is believed, influenced adversely the running time of the trains as compared with single cars.

Based upon equivalent passenger loads the observations show that the use of trailers causes a serious slowing down of schedule speeds—much more than enough, in fact, to offset the inherent savings. This is undoubtedly due to the fact that the four 40-50-hp motors geared 18:66 were not sufficient to haul a trailer weighing 32,800 lb. when both cars in the train were heavily loaded.

FRANK HEDLEY DISCUSSES NEW YORK TRANSPORTATION PROBLEMS

At a meeting of the Electric Club of Chicago on June 26, 1913, Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, New York City, discussed problems of transportation as found in New York. Before reading his paper Mr. Hedley said that between the attacks of the daily newspapers on public utilities and the efforts of politicians to regulate them street railway development in recent years has been stifled. Now, however, a turning point has been reached, for in New York by the aid of the Public Service Commission, which understands the problems, the city and the transportation lines have been brought into partnership. As a

solution of similar questions in other cities, the owners of the properties and the city officials should get together and deal fairly and frankly with each other, with the result that public utilities would obtain a fairer treatment.

In his paper Mr. Hedley reviewed the development of transportation in New York, making special reference to the New York Railways' street car parade, which gave publicity to the rapid advance in modes of transportation since 1860. He also briefly described the low-step, center-entrance car now in use in New York and made special mention of the fact that it had practically eliminated boarding and alighting accidents. In discussing the effect of the peculiar physical formation of Manhattan Island upon transportation thereon, he said that the New York Railways' lines carry about 1,200,000 passengers daily, the great majority of whom, particularly on weekdays, move in a southerly direction in the morning and in a northerly direction at night, and in each instance in about two hours time, which causes great congestion in lower Manhattan during these hours. Even with such congestion, however, his company has a record for the year ended June 30, 1912, of one collision to 7000 car miles operated. These figures include collisions of every character, and the total amount of money paid in claims represents approximately 3 per cent of the gross income. This excellent record is attributed to watchfulness on the part of the trainmen. Mr. Hedley emphasized the fact that the management of 21,000 employees required in the operation of the surface, subway and elevated lines, as well as properly maintaining 4500 cars, was no small task in itself.

The latter portion of Mr. Hedley's address dealt with facts concerning the elevated and subway lines of New York City. At the time the subway was opened in 1904 the interval run was two and one-half minutes with eight-car express trains, and now ten-car express trains are run on a minimum interval of a minute and forty-eight seconds, at a speed of 25 m.p.h., including stops, thus increasing the capacity over the initial operation about 72 per cent.

The movement to the outlying districts has greatly enhanced the value of real estate there. As an example Mr. Hedley cited Staten Island and the Bronx, one 5 miles and the other 15 miles from the lower business section of New York City. Since 1903, when the assessed valuation of real estate in the Bronx was \$226,596,647, there has been a gradual increase until in 1912 the realty was assessed at \$616,521,378. Realty values on Staten Island, however, have remained stationary for more than 100 years, owing to the fact that it has only ferry-boat transportation means, while the other has surface, elevated and subway lines.

In conclusion Mr. Hedley said that in many communities ill-advised legislation has done much to direct capital into other channels, and the public cannot expect public utilities to develop as they should until such time as they can be made attractive for the investment of private capital. In his eyes, one of the most important duties of railroad managers and owners to-day was to see to it that their side of the question is brought to the public's attention and to establish the fact in the public mind that investors who put their money in public service corporations are entitled to the same fair treatment that the investors in other legitimate business should and do receive.

On the subject of the Public Service Commission, First-District, Mr. Hedley made this interesting comment: "I have to admit that they have entertained me for the last six years, but in my opinion they have done a great deal in New York to bring about the solution of our rapid transit problem. After about six years of experience with the Public Service Commission in New York, I do not hesitate in stating my firm belief in a commission that has power to regulate in a manner to provide adequate, reasonable and proper operation, together with the control of issuing necessary and proper securities."

Proceedings of C. E. R. A. Convention

A Full Account of the Technical Sessions Held on the Steamer "St. Ignace" Last Week by the Central Electric Railway Association and the Central Electric Railway Accountants' Association

The meeting and trip of the Central Electric Railway Association on board the steamer *St. Ignace*, of the Detroit & Cleveland Navigation Company, were mentioned briefly in the telegraphic report published in last week's issue of the *ELECTRIC RAILWAY JOURNAL*. A more extended account of the proceedings of the two sessions of the Central Electric Railway Association and of the meeting of the Central Electric Railway Accountants' Association, which were held on the steamer, is published herewith.

President Arthur W. Brady called the meeting of the Railway Association to order in the main cabin at 9:30 o'clock on the morning of June 26. A. L. Neereamer, the secretary, read the minutes of the previous meeting, which were approved.

R. N. Hemming, Union Traction Company of Indiana, chairman of the standardization committee, presented the report of that committee, an abstract of which is published on another page in this issue.

After Mr. Hemming finished President Brady asked if the members had received blueprints of the designs recommended by the committee.

Mr. Hemming thought the members might like to vote separately on the questions considered in the report, particularly as the committee recommended controlling dimensions for trolley wheels as standard.

President Brady said that the report was a valuable one and he assumed that it would be wise to have it receive the careful consideration of the members with a view to definite action at a subsequent meeting.

E. F. Schneider, general manager Cleveland, Southwestern & Columbus Railway, moved that the report be accepted and a copy of the recommendations be sent to individual members for final action at the next meeting. This motion was adopted.

F. E. Wynne, engineering department Westinghouse Electric & Manufacturing Company, then read a paper on "Recent Development in Car Control." An abstract of this paper is published elsewhere in this issue.

Mr. Hemming said that the paper was a complete discussion of the subject and voiced the consensus of opinion of almost every man in the operating department concerning the desired effect.

Answering a question, Mr. Wynne said that at times it was possible to obtain lighter and cheaper equipment with field control because the next smaller size of motors could be used than the size that would be needed without field control.

DISCUSSION ON VALUATIONS

Robert B. Rifenberick, consulting engineer Detroit United Railway, then read a paper on "Something Along the Line of Physical and Intangible Valuation as Covered by Recent Legislation." An abstract of this paper was published in last week's issue, page 1163.

President Brady, in opening the discussion, said that the paper was very valuable and interesting.

Charles L. Henry, president Indianapolis & Cincinnati Traction Company, said he had been delighted with the paper and the treatment of the subject. How were the companies to meet the question before them? There was nothing more mysterious and troublesome to Mr. Henry's mind than this topic. There was more mud around the subject of valuation than any other thing that was ever seen. Referring to the Indiana bill, Mr. Henry said that he felt that the clause about the cost of bringing the properties to a state of efficiency was very important. The companies

were, as Mr. Rifenberick did, that that furnished an opportunity for means for determination of the actual values of properties. No limitation was imposed on the powers of the commission excepting the additional statement that that part of the valuation was to be taken into consideration.

Mr. Henry added that he had been disturbed on the question of depreciation, but the paper gave a good idea of that subject. If depreciation was to be taken into account on one side of the balance sheet, the causes of depreciation should be taken into account on the other side. The most important feature of the question of valuation to-day was that the companies must make up their minds that they had to face it. They might as well get ready to meet it. He regretted that the recent decision of the United States Supreme Court did not bear out the views of the author of the paper in all details, but if depreciation was considered as a factor the whole of the question must also be considered. Mr. Henry felt a little more favorable toward the bill passed by Congress than did the author of the paper. As the bill was passed by the House it contained provisions for physical valuation only. As amended in the Senate the bill provided for the determination of values other than physical and the title of the bill also had been changed. When the bill was taken as an entirety it was an admission, fact or argument that all these factors must be taken into consideration. When a valuation was made what was to be done with it? Some declared that in rate-making the question would be as to what rate would be low enough merely to avoid confiscation. It was not a question of how close it was possible to come to stealing and still not steal; there ought to be a reasonable compensation. This statement should be taken broadly. How could the country secure the construction of its needed utilities unless it did grant a reasonable compensation? Did it expect to induce men to put capital into the properties and then make the rate so low that it would just avoid confiscation? The money would never be forthcoming if the country forbade any margin above a confiscatory rate of return. People talked about the gifts of government land when the great transcontinental railroads were built. These great enterprises involved large risks in their inception and the public got more, tenfold, than was given away in land.

F. D. Carpenter, vice-president and general manager Western Ohio Railway, said that the companies should face the question of valuation. The paper had given more light on the subject than he had ever had before.

President Brady said that by reason of the action of Congress under the La Follette bill valuation was compulsory. It was important that provision was made in the bill for the consideration of various factors or elements of value.

Mr. Rifenberick said he thought that the decision of the United States Supreme Court in the Minnesota rate cases threw the burden of the entire subject on Congress rather than on the Interstate Commerce Commission.

Mr. Brady said that the subject was in such a misty and shadowy form that it was difficult to tell just what the courts would finally decide. There was still a hope in the situation. The subject was one of the live topics before the industry and one of the lines of work in which the Central Electric Railway Association could be of immense value to its members from time to time.

PAPER ON "THE CLAIMS DEPARTMENT"

E. F. Schneider, general manager Cleveland, Southwestern & Columbus Railway, then read a paper on "The

Claims Department." An abstract of this paper is published elsewhere in this issue.

Mr. Henry said that he had great faith in both attorneys and physicians. He thought that no class of business men in the country ranked higher in character than members of the legal profession. He felt that the physicians relieved suffering.

The meeting was then adjourned until the following morning.

CONCLUDING SESSION

E. F. Schneider, the vice-president, acted as chairman of the session held on the morning of June 27. President Brady expressed his regret that an unavoidable engagement made it imperative for him to return to his home before the conclusion of the trip.

James H. Drew, president of the Drew Electric & Manufacturing Company, of Indianapolis, Ind., read a paper on "The Manufacturer's Duty in the Electric Railway Field." An abstract of this paper is published elsewhere in this issue.

Mr. Schneider said that the railway men should recognize the work of the manufacturers and their representatives and the broad spirit which they held toward the industry.

CAR VENTILATION

H. E. Lavelle, Automatic Ventilator Company, presented a paper entitled "Ventilation of Electric Cars" along similar lines to one presented by William J. Fleming of the same company before the Scranton meeting of the Keystone Railway Club, Sept. 10, 1912, and published in the *ELECTRIC RAILWAY JOURNAL* for Sept. 14, 1912. Mr. Lavelle mentioned the ventilation requirements specified by various individuals and organizations and described the deck sash, exhaust ventilators, hot-air intake ventilation, floor-line intake roof exhaust and natural intake-and-exhaust ventilation. Referring to the last he said that the volume of air handled by this device depended largely on the speed of the car. At a speed of 5 m.p.h. to 15 m.p.h., anemometer tests had shown from 25 cu. ft. to 100 cu. ft. per minute (intake and exhaust) per ventilator. At high speeds readings of 300 cu. ft. per minute had been taken. In a car of 1800 cu. ft. capacity six sets of ventilators averaging 50 cu. ft. per minute per ventilator would be changing the car air every six minutes, or ten times per hour. In a high-speed car of, say, 2400 cu. ft. capacity, six sets averaging 100 cu. ft. per minute would be renewing the air about every four minutes. This could be, and had been, accomplished under severe winter conditions, without drafts and without reducing the car temperature below 50 deg. Fahr. In conclusion Mr. Lavelle referred to the necessity of proper ventilation for arch-roof cars.

Mr. Schneider said that one of the things to which the country was looking forward was the matter of having ideal ventilation of cars without drafts.

Mr. Carpenter said the problem of ventilation was important and the companies should face it. He had started the use of ventilators and they had proved satisfactory. He found that the air was very much improved by their use. For his personal satisfaction he tested the ventilators in a smoking compartment, filling this compartment with smoke and then opening two ventilators. In three minutes afterward the air was nice and clear. The paper was very interesting to the railway managers.

Mr. Rifenberck mentioned the use of old-type open cars in Cleveland during the receivership. The cars were labeled "fresh-air cars" and were operated as trailers when there was great need for equipment and service in Cleveland.

Mr. Hemming said that the great problem was to introduce fresh air, to be able to keep out the exhaust and to keep out rain. Sometimes during rainstorms ventilators leaked so badly that water fell into the interior of the car.

Types of ventilators with which this difficulty arose were in use on some of the steam railroads. It was manifest that steam railroad companies would not continue the use of these ventilators if they experienced the same trouble that had developed on interurban cars. It seemed, therefore, that there was a difference in the exhaust created by a single car operated on an interurban line and the exhaust created by a number of units operated in a train on a steam railroad. Perhaps the additional cars of the steam railroad train broke up the vacuum in such a way that moisture was not forced into the cars in case of rain, as he had found in the interurban cars. He thought that ventilator manufacturers had not gone into the subject deeply enough to meet the problem of ventilation of interurban cars.

Mr. Lavelle said that the problem had been a difficult one owing to the differences in car construction between interurban and steam cars. He said that there were great differences of opinion on the subject as evidenced by the views of Mr. Carpenter and Mr. Hemming.

Mr. Hemming said he was afraid that the plan to introduce air under the seats would bring too much cold air into the car.

Mr. Hemming said that he had raised the same question that Mr. Carpenter brought up in regard to the fresh-air intake. He was assured that there would not be too much air. He still feared, however, that too much cold air would be admitted.

TUNGSTEN LAMPS

Mr. Hemming then brought up for the consideration of the association the subject of tungsten lamps without commercial value. He said that everybody appreciated that tungsten lamps were becoming more valuable as illuminating factors in railway service. A number of different styles of lamps were in use on the various interurban roads. The number of wattages and voltages was enormous. The lamps had commercial value because they could be removed and used or sold. For that reason it had occurred to Mr. Hemming that a lamp of odd voltage not usable on any other circuit than an interurban car would be a great improvement. The association should produce some standard voltage lamps. This would make a reduction in the cost of lamps as every road now suited its own whims in the selection of types. There was also the problem of interchange in connection with lamps. One manager had put on special lamp sockets and these had been broken off in some cases. Fifty-watt lamps had been introduced on one road. It was a question whether that was what all of the companies wanted. At any rate what should be done was to develop and introduce a lamp without commercial value so far as the voltage was concerned.

Mr. Carpenter said that it seemed as if this condition could be overcome by an arrangement with the manufacturers to supply an odd-size thread on the socket so that the lamp could not be used in any other place than on the interurban cars.

Mr. Schneider said that the association had a splendid standardization committee, and he thought the subject should be taken up by that committee. A motion was offered and carried referring the matter to the standardization committee for action.

SUCCESS OF THE MEETING

Mr. Carpenter then said that he had been connected with the association since its inception and had witnessed its development to its present flourishing condition. There never had been a meeting in which the addresses were of more interest than at the present one, and never a meeting in which so much rest, comfort and pleasure had been afforded. He offered the following resolution, which was adopted:

"Whereas the members of the General Electric Railway Association, feeling that they have had one of the most

profitable and valuable meetings in their history, desire to place on their permanent records an appreciation of the untiring efforts of their representatives who were charged with the duty of carrying out the wish expressed by the executive committee to take this trip, therefore be it

"Resolved, that this association by formal vote express its sincere thanks to the members of the supply men's committee for their part in this successful meeting."

The next meeting will be held in Indianapolis on Nov. 20, provided satisfactory arrangements can be made there.

ROUTE OF TRIP AND SPECIAL CARS

The route of the steamer *City of St. Ignace*, the meeting place of the two associations, was from Toledo, past Put-in-Bay and across Lake Erie to the Detroit River and Detroit, where a stop was made late in the evening of June 26. The route then was up the Detroit River and through Lake St. Clair and the St. Clair River to Lake Huron. A stop was made at Harbor Beach, Mich., where the United States government life-saving corps gave an exhibition for the members. From this point the steamer went north and into Lake Huron to a point about opposite the middle of Saginaw Bay, where the return trip was begun. The same route was followed except that the only stop made on the way back to Toledo was at Detroit. Toledo was reached about 3 p. m. on June 27.

A special car was operated by the Union Traction Company of Indiana from Indianapolis to Toledo in connection with the trip of the Central Electric Railway Association.

MEETING OF THE ACCOUNTANTS' ASSOCIATION

Members of the Central Electric Railway Accountants' Association held their meeting on June 26. The president, E. L. Kasemeier, presided.

In the absence of any members of the standing freight committee the report prepared by this committee was read by the secretary, F. T. Loftus, auditor Indianapolis & Cincinnati Traction Company. An abstract of this report is published elsewhere in this issue. In the discussion on the report Mr. Kasemeier said that he had found it useful to use different colored inks in his records of cars. The report was accepted by the association and will be considered in detail at the next meeting.

The association instructed the secretary to confer with the secretary of the Central Electric Railway Association in reference to the question of the minimum charge per car. It was also recommended that a postal-card notice be sent to the auditor of a line owning a car when the car reached a foreign line.

Secretary Loftus read the report of the query box committee, which was published in last week's issue. Definite action on the report was deferred until the next meeting.

The question of forms in use by different members of the association was brought up, and it was decided that in order to be accessible for easy reference the forms kept by the association should be held in the office of A. L. Neereamer, secretary of the Central Electric Railway Association, at Indianapolis. The secretary will ask some of the members to assist this fall in the solicitation and classification of new forms that may have been introduced by members since the last collection was made up.

Mr. Loftus read the paper prepared by George L. Ford, auditor Evansville Railways, on "Voucher Indexing Simplified." This paper was published in last week's issue.

Mr. Kasemeier described his use of loose-leaf ledgers for indices of vouchers. He said the books were 14 in. x 14 in. and were indexed minutely. Three books were used having an aggregate of 1200 to 1500 pages. The records showed the month in which the voucher was recorded, the number and the amount. Vouchers were kept in boxes and it was possible to refer to them quickly.

P. E. Schilling, chief clerk Toledo Railways & Light Company, said the company had adopted the separate check

instead of the voucher check. He thought that this was easier to handle. When the check was returned from the bank it was pasted on the voucher.

J. N. Tabb, treasurer Parkersburg, Marietta & Interurban Railway, said that when he became connected with his company he found that a card index of vouchers had been maintained since the time the road started operation, but he did not find this entirely satisfactory.

Mr. Kasemeier, answering a question as to whether it was necessary to show the amount in the index record, said he found it a great advantage.

Walter Shroyer, auditor Union Traction Company of Indiana, advocated the use of a book index.

A. J. White, traveling auditor Ohio Electric Railway, read a paper on "Nuts to Crack." An abstract of this paper is published elsewhere in this issue.

Mr. Kasemeier said that on account of the danger of misunderstanding on the part of agents he was preparing a book of instructions to agents.

Walter Shroyer, chairman of the standing committee on passenger accounts, presented the report of that committee. An abstract of this report is published elsewhere in this issue. During the discussion the members present agreed with the committee in reference to the form for ticket orders. The practice outlined in regard to ticket requisitions was a regular practice. The form of the ticket stock ledger was approved except that in some cases it was shown that this record was kept directly by the auditor. All the members had about the same form for agents' daily records of sales. The report of the committee on agents' daily summaries of sales showed that nearly all the companies received the information mentioned, but they did not all use the same form. One member present said he had discontinued the compilation of daily earnings by operating divisions. All of the companies used practically the same form of agent's cash book. In the compilation of monthly reports of local sales practically all the roads required the same information, but followed forms differing a little. The monthly report of interline sales followed the practice of companies generally except that the Union Traction Company of Indiana showed the junction point at which tickets were sold. The forms of agent's balance sheet, auditor's corrections and auditor's credit advice were found to be about the same on all roads. Some of the roads did not have a regular printed form for the auditor's record of distribution of sales. All of the roads used the auditor's report of daily earnings, although one company did not compile earnings by operating divisions. A number of the companies reported that they did not use prepaid ticket orders because these did not amount to enough to pay for the trouble.

In the discussion on the subject of checking reports in the office of the auditor it was stated that the commencing and closing numbers on each page were added and the difference was the total number in the sold column. A tariff was compiled especially for clerks who audited reports. This gave both one-way and round-trip passenger rates, baggage rates and mileage from each station to every other station on the road, arranged alphabetically. Mention was also made of the book tickets which did not have the destination printed. The destination was filled in by the agent in ink. The books were checked against the tickets lifted by conductors.

The redemption of tickets was handled by the different companies in the manner outlined by the committee. The only road that used a form for tickets lifted was the Union Traction Company of Indiana. Mr. Shroyer submitted a form and said that it was an excellent one to use if the work could be done with a minimum of expense. Auditor's accounts were handled in about the same manner by the different roads. A grand recapitulation was made of all the monthly ticket reports of agents and these were then entered in the journal.

Central Electric Railway Convention Papers

Abstracts of Papers Not Published in the Last Issue Are Presented, Together with the Reports of Several Committees

RECENT DEVELOPMENTS IN RAILWAY CONTROL

BY F. E. WYNNE, WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY

During the last few years there has been a growing appreciation of the remote control and train control of cars in city service. The equipments for the first lot of the New York Railways stepless cars have been provided with a form of remote automatic train control which is one of the simplest and lightest yet devised. This system has been named the "PK" control, because practically all the main circuit connections are made in a pneumatically operated "K" controller. In designing this control the aim was to produce apparatus with the following features: Remote control, train control, simplicity, smoothness of operation, minimum weight and space, automatic or hand acceleration as desired, close adherence to existing standards and manual operation of single car in emergency.

APPARATUS

The principal pieces in a "PK" equipment are the line switch, commutating switch, master controller, control rheostat and limit switch.

The line switch is of the standard electro-pneumatically operated type. It is connected in the main circuit next to the line. Besides taking all the breaking of main circuit current, whenever power is cut off the car, it also acts as a circuit breaker in case of heavy overload or short circuit in the equipment. The New York stepless car equipments have one line switch in each side of the circuit, since both sides of the line are insulated from ground.

The commutating switch is essentially the same as a "K" controller, containing a drum-type reverser and a main drum for cutting out the resistances in the motor circuit and for changing the motor connections from series to parallel. It has a "PK" operating head mounted on a base casting which replaces the ordinary controller top. This operating head is the novel feature of "PK" control. Both the main and reverse drums are pneumatically operated. The off position of the commutating switch corresponds to the first notch of a "K" controller, so that no circuits are opened by the commutating switch. Whenever, for any reason, power is shut off, the current break is taken by the line switch.

In appearance the master controller is a miniature platform controller. It is provided with a notch for each main circuit position so that manual acceleration is secured. In addition to making the usual connections of the control circuits for operating the reverser and commutating switch, it includes the dead man's feature. The control rheostat is built up of heating elements such as are used in electric irons. It is connected across the line and taps are brought out at suitable points for operating the main control circuits, the compressor governor, signals and other auxiliary circuits. This permits the use of line current for the control and auxiliary circuits and provides a low voltage for the train line and control wiring.

The limit switch is of the standard type and is so connected in the control and main circuits that automatic acceleration is secured when the master controller is thrown more than one notch at a time. The rate of progression of the commutating switch is governed by the limit switch. When the master controller is in the off position the commutating switch is held positively in its off position.

OPERATION

In operation, starting with the master controller in the off position and the reverser in the forward position, the first

notch on the master controller closes the line switch and thus applies power through the commutating switch and resistance to the motors in series. The remaining notches cut out the resistance, change the motors from series to parallel, and cut out portions of the motor fields. An eight-notch master controller, therefore, gives series-parallel control with four resistance notches and four running positions, two of each being in series and two of each in parallel. Since every position of the commutating switch has a corresponding notch on the master controller, the control may be brought in one notch at a time, just as with an ordinary platform controller, and may be stopped at any notch. On the other hand, the limit switch provides for automatic acceleration.

All of the apparatus is arranged to permit the operation of two-car trains. Double-end control is secured with only one commutating switch. Most of the parts requiring repairs and renewal are already well known by the average carhouse force.

FIELD CONTROL

The New York stepless car control is used in connection with field-control motors. It may, therefore, be advantageous briefly to review this development also. In con-

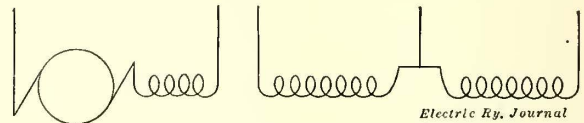


Fig. 1—Arrangement of Motor Leads in Field-Control Motors

struction, the field-control motor differs from the ordinary commutating-pole motor only in having the main field coils wound in two parts with a change in the wiring around frame and in having one more lead brought from the motor. The larger portions of all main field coils are connected in series to give normal field. The smaller portions also are all connected in series and form the extra field which is connected in series with the normal field winding to give full field in starting. The additional lead is brought out from the motor between the normal and full field windings and forms a point common to both. The smaller portion of the field coils, being in circuit only a part of the time, namely, when running on full field, is wound with a smaller section of copper than that used in the normal field, which is in circuit all the time that the motors are taking current. Fig. 1 shows the arrangement of motor leads for use with field-control motors.

Field-control motors are in service in connection with both unit-switch and drum-type controllers. With drum-type controllers modification of the contacts is required for field control. With unit-switch control a portion of the field may be cut out either by the use of a field change-over switch of the drum type, similar to an ordinary reverser, or it may be effected by using additional unit switches. In some instances the standard number of resistance notches for a given equipment capacity has been used and an additional notch provided for normal field in series and in parallel. In other cases the normal field point has taken the place of the last resistance step in series and in parallel. The latter scheme (cutting out one resistance notch in series and one in parallel) is possible because the speed of the motor on full field is much less than that of the corresponding motor without field control when developing the same tractive effort. The speed on normal field is somewhat higher than that of the corresponding motor without field control when

developing the same tractive effort. However, the manipulation of the controller by the motorman is the same as without field control.

The characteristic curves of typical 50-hp, 600-volt motors built on the same frame and geared the same are shown in comparison, with and without field control, in Fig. 2. Without field control the speed curve lies between the normal and full field speed curves with field control, and the tractive effort without field control is between the tractive effort curves on full and normal field with field control. The curves show that the field-control motor will develop a large tractive effort in starting on full field at a current much below that required without field control, because the corresponding speed with full field is lower. This produces economy in starting, and the more frequently stops are made the greater will be the benefit derived therefrom. At light loads also the field-control motor on normal field will develop a given tractive effort at a higher speed than without field control. This, of course, requires an increased current with normal field. However, it gives the field-control motor a greater opportunity for making up lost time.

The characteristic curves of typical 90-hp, 600-volt motors built on the same frame, with and without field control, and geared to operate a 35-ton car at the same free running

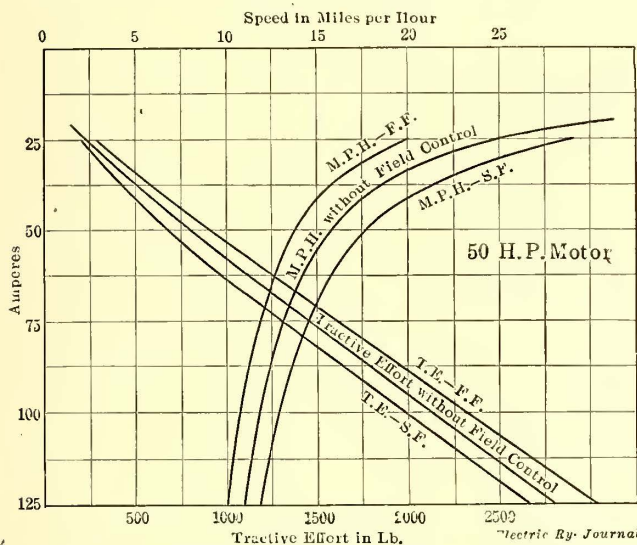


Fig. 2—Comparisons of 50-hp Motors With and Without Field Control

FIELD-CONTROL OPERATION
In operation series-parallel control with resistance is used. Starting from rest with the motors in series, the resistance is gradually cut out of circuit until the motors are running on full field without resistance. Then a portion of the field turns is cut out of circuit at a single step, thus weakening the field and increasing the car speed. The next point on the control connects the motors in parallel with full field and resistance. The resistance is gradually cut out until full voltage is applied to the motors with full field. Then a portion of the field turns is again cut out and the car runs on normal field. A portion of the field is cut out by disconnecting the lead at one end of the full field and connecting in the lead from the point common to the full and normal fields. That portion of the field which is to be cut out is temporarily short-circuited in passing from full to normal field.

The number of turns used on the motor field is for full field greater and for normal field less than is the case with the corresponding motor without field control. Therefore the field-control motor has on full field the lower and on normal field the higher speed. The result of the lower speed and higher tractive effort on full field is that the field-control equipment wastes less energy in heating the grids than

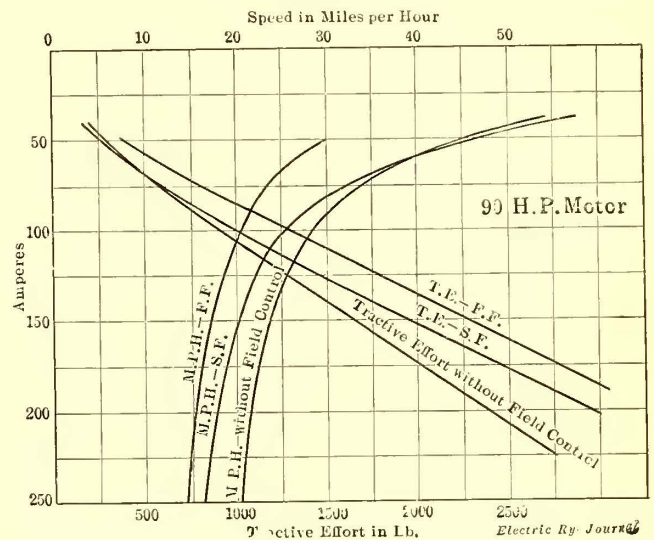


Fig. 3—Comparisons of 90-hp Motors With and Without Field Control

speed on 1.25 per cent grade, are presented in Fig. 3. These curves show that at all loads to which the motor is subjected in starting and getting up to the maximum speed a motor without field control takes as great a current, or a greater one, to produce a given tractive effort as does the field-control motor on either full or normal field. This indicates that a very great economy may be attained from the use of a field-control motor in frequent-stop service. At the same time, as the field-control motor is geared for the same or higher balancing speed on grades of 1.25 per cent or less, its suitability for maintaining fast limited schedules is at least equal to that of the motor without field control.

An alternate method of securing a part of the advantages accruing to equipments making use of the foregoing motor with fields wound in two parts is to use an ordinary commutating-pole motor and secure higher speed by weakening the field by connecting an inductive shunt in parallel with it. Several installations of this sort are now being made. While this scheme has an advantage in avoiding modification of existing commutating-pole motor field windings and wiring, yet it suffers from the disadvantage of extra weight (approximately 300 lb. for a 400-hp equipment) and, as will be shown later, loses a large part of the benefit of field control because it provides no means of securing speeds lower than with the same motor not shunted.

does the ordinary equipment, and this is accomplished by a reduction in both the amount and duration of peak currents. The result of the higher speed on normal field is that the field-control equipment may use a greater gear reduction with the same car speed and get the full benefit of field-control economy, or, with the same gear reduction, may attain a higher car speed and thus give up a portion of the field-control economy for the sake of more speed margin. It is also often feasible for a field-control equipment to perform a service which would require the next size larger equipment without field control.

Field control has been applied to many different sizes of equipments from the smallest railway motors to those used on the Pennsylvania Terminal locomotives. The limitations of space in a car truck largely determine the motor revolutions per minute for a desired horse-power and the gear-center distance. The minimum pinion is determined by considerations of mechanical strength. The maximum gear is fixed by the wheel diameter and the clearance which may safely be allowed between the gear case and the roadbed. In most cities the local schedules can be maintained with motors without field control having the minimum armature speed and the maximum gear reduction. For such applications field control offers the opportunity to give the same service with decreased energy consumption, an equal or greater mar-

gin of speed for making up lost time, and frequently a smaller and lighter equipment.

In combined city and interurban service motors worked at the proper load for the entire service may be overloaded on the city section and underloaded in the suburbs. Field control applied to such cases, without increasing the capacity of the equipment, often eliminates the overload in the city section, and at the same time, on account of the high speed on normal field, permits a faster suburban schedule to be inaugurated without overloading the equipment on that portion of the run.

In interurban service the use of field control is equivalent to providing two gear ratios on the same car. The full field connection corresponds to the low-speed gearing with its high tractive effort for starting with small current. The normal field corresponds to the high-speed gearing with its greater free running speed. Hence an equipment with field control is better adapted to operating interchangeably in local and limited service than is an equipment without field control. The high tractive effort on full field at starting improves the equipment for local service with frequent stops, and the high speed on normal field makes it more adaptable for limited service than it would be without field control if properly geared for local service.

The full field also gives efficient running points both in series and in multiple for hill climbing and operating interurban cars on the streets of towns and cities. This feature should be found particularly beneficial where severe grades occur on a road which is limited in capacity of substation and amount of trolley feeder and for high-speed interurban cars following slow-speed city cars through the streets.

To summarize, field-control equipments possess the following advantages: lower energy consumption, equal or greater ability to make up lost time, reduced peak loads, improved line-voltage regulation, better load factor, greater suitability for combined city and suburban service, wider range of local and limited schedules maintained with the same gearing, additional running speeds for use in towns and on grades, and smaller, lighter and cheaper equipment (at times).

All of these advantages may not be secured simultaneously in each individual application, but their variety shows that there is a wide field for the proper application of field-control equipments

THE CLAIMS DEPARTMENT

BY E. F. SCHNEIDER, GENERAL MANAGER CLEVELAND, SOUTH-
WESTERN & COLUMBUS RAILWAY

Among the Chinese there were those who plucked out their two eyes in order that they might have a thousand eyes of wisdom. We have greater need than the Chinese in the claims department for the thousand eyes of wisdom, so that we may solve the many problems encountered, which are so diversified and so difficult. We must not only analyze our immediate problems but we must have a clear insight into the future to be able to conduct our part of this thankless job understandingly and eventually do away with the enormous sacrifice of human life and human limb. We also need the thousand eyes of wisdom in the adjudication of claims in personal injury cases. No sentiment should be allowed to bias our judgment, but a purely scientific business principle should govern, and this principle at the outset can be practically summed up in the one word "settle."

We have frequently stood in our own light by allowing our judgment to be swayed by the effect our actions in the claims department might have upon the public. Theoretically, we ought to figure upon this, but prac-

tically there is no direct benefit resulting from a liberal policy. In recent years steam railroads have changed from the old policy of fighting all cases to the limit to that of settling all cases, but the settlements they make, from my viewpoint, are entirely out of proportion to the injuries received. The public, instead of appreciating the fact that steam railroads invariably settle passenger cases, use that fact to obtain large sums in settlement, so that to-day the prices paid in the adjustment of passenger cases are practically any sum that the injured party may ask. However, the other proposition stares you in the face, that if you do not settle the jury will undoubtedly "soak" you.

No general policy can be outlined in the claims department. Each case is its own problem, and the solution, so far as the company is concerned, is merely the question of getting rid of a most troublesome matter with the least amount of money and time.

If there is a question regarding the liability or of mixed liability, there is almost always a chance to cut down the figure to a comparatively reasonable amount.

A stock or other property damage can almost always be adjusted by dividing the appraisal value.

If there is no liability, then it is a question of paying approximately the amount of money it would cost to try the case, it being better to swallow the injustice in order to get the case off your books and off your mind; there is also always a chance of your case going wrong somewhere if you try it. Every one thinks his own method is the best, but the adjuster who actually does settle and keeps his company out of the courthouse is, in my estimation, the competent man.

WASTE IN THE CLAIMS DEPARTMENT

The average claims department is an expensive, inefficient, cumbersome, unscientific and much neglected and less understood department of railroad work.

You will all admit without much argument that the claims department is an expensive luxury. It is inefficient because time is not given to the close study of individual cases; hence the prices of settlements and adjustments are continuously on a higher basis. It is unscientific because the operating department does not give the same thought and study toward reducing the cost here which it does in the mechanical or power department. It is neglected because the management does not take the time to analyze the causes or the results of accidents, and it is not understood because it is looked upon as a necessary evil.

When a management does try to study the conditions it resolves itself into more rules for the rule book and recommendations for more safety devices and appliances.

We are being continuously dosed with such all-important questions as instruction for trainmen, a car fitted up in order to show the trainmen the mechanical and electrical arrangement of the car he operates so that he may understand the machinery and electrical appliances he is handling, examination on the book of rules, card indexes for discovering fraudulent claims, the subject of expert medical testimony and of expert electrical testimony, the ethical relation of the company surgeon, the ethical relation of the company to the attorney, the ethical relation of these two branches to each other, the duty we owe the public (never the duty the public owes us)!

To me this stuff is all bosh. I do not believe in trying to make mechanics, machinists or electricians out of trainmen. An intelligent motorman is a grand man, and he has all he can do, and it is all you ought to ask of him, to operate his car properly. The handling of a car is a science of itself. If your car doesn't run, it is up to your master mechanic and your shop force. If a lead should burn off or a controller finger get stuck or a trolley wheel need changing, your trainman can easily do that. But don't try to load him up with all the intricacies of the

machinery he is operating, because he will only get confused. Let him absorb what he naturally will, but be in position to change his car for him when he feels it is not acting right. You are filling this trainman's head with so much extraneous matter that he will be speculating upon how the current, after leaving the trolley wire, goes through the controller to the motor, and how the energy is used, instead of having his mind upon the operation of his car, which is his primary and only business.

BOOK OF RULES

How many accidents have happened upon your road because the trainman did not know the rules of the company? I am sure they are few and far between. Rules, of course, should be drilled into men, but men, thinking railroad men, naturally know what is the right thing to do, and if you have their actual co-operation from a humanitarian standpoint, you will have very few accidents traceable to the lack of knowledge regarding the book of rules.

You can find instances where card indexes on fraudulent cases have been of value, but in a comparative sense they are so relatively few, especially on interurban roads, that they are not worth the time, money or consideration which this matter is receiving.

SURGEONS AND ATTORNEYS

The question of surgeons is one that has had a great deal of thought and study from the claims department. I have simplified the matter a great deal on our road. Whenever an appointed surgeon dies or moves away from the town he is in, I do not reappoint one in that town, so that at the present time, out of twenty towns and villages, I have only six regularly appointed surgeons. I would abolish them were it not for the fact that it would undoubtedly react against us. I find I can do better to let the cases get into the hands of the regular surgeons or family physicians, and by then employing some surgeon who is friendly to, or acquainted with, the family physician or surgeon to make an examination for the company, I can get even better results than to have a regularly appointed surgeon who advertises himself as the company surgeon and displays the transportation he rides upon with a certain gratified superiority over his less fortunate colleagues.

The same is true of attorneys. We have the same policy regarding them. We do not reappoint when they drop out, and as a result we have, outside of our general counsel, only a very few attorneys whom we retain.

SELECTION OF TRAINMEN

The selection of trainmen is one of the most important items governing safety in railroad operation and one which at times receives very little consideration, while at other times great difficulty is experienced in obtaining good men at the established rate of wages. One of my superintendents employs only men as motormen who have had railroad experience, preferably steam railroad experience. There is a drawback in this method, however, and that is the liability of employing a man who is a "floater" or one who has been discharged from some other road on account of being careless. When impossible to find experienced men, he selects conductors who in his judgment are fitted for motormen and transfers them to the front end. We have less trouble in getting conductors than we do in getting motormen.

It is impossible for me to say that his method is correct, as some of our worst accidents have happened on account of the carelessness of experienced men. One man especially whom I have in mind was the cause of a wreck costing about \$75,000. His experience covered a period of over fourteen years on both steam and electric roads. He was an honest, sober and industrious man. On the other hand, some of our best trainmen are of those who never had railroad experience before we employed them.

My one idea is that a young man of from twenty-two to twenty-five years of age, if he has the right make-up, is preferable to an older man who has shifted several times and is set in his ways.

It is the opinion of some managers that the motorman should receive more money for his work than the conductor, and they believe that the promotion of conductors especially selected by the superintendent would not only be an encouragement to conductors to strive for this advancement, but would by this method produce better and more careful motormen. There is, of course, this feeling that one had better not spoil a good conductor in order to make a poor motorman. I can find no reason for this feeling, but I have myself been loath to change a conductor whom I knew to be honest and careful to the position of motorman. This is probably a narrow-minded viewpoint and one which we ought to get out of our system.

PREVENTION OF ACCIDENTS

What can railroad managers do to prevent the recurrence of disastrous accidents, such as we all know about? Are we entirely helpless? Is it right to feel that a certain percentage of the gross receipts set aside to take care of the injuries and damage account is the only method we have of conducting this branch of the business? Are we, who are individually responsible for the management of a road, compelled to shoulder the responsibility of those who err in judgment? It has been the custom to do away with the human element, the human agency, to the greatest extent possible and to rely to the greatest permissible extent upon all the safeguards which engineers and others have been able to contrive. Have you got relief from them? The experience of one road or the experience of a given road does not materially affect that road or any other road so far as the individual employee is concerned. He takes no lesson from it. This has often been illustrated by one disaster following another in rapid succession.

The greatest trouble, I think, is that railroad employees, after an accident has happened, have in mind only the commercial idea of the value to lives and limbs. This they have got largely from the management, or claims department, perhaps, who are wont to boast of the good settlements they have made, and the adjusters of these things are looked upon by the employees, and the public also, in the light of shrewd and unscrupulous shysters whose only thought is the conversion of human life and human limb and human suffering into the least possible number of dollars and cents. This conversion into dollars and cents of life and limb is naturally reflected in the percentage column, and as long as the percentage to gross receipts is kept reasonably low practically no attention is paid to the primary causes.

We do not stop long enough in our hasty search for more safety appliances and more discipline to consider the individual employee, the motorman, the conductor, the trainman, the employee. You can reach their hearts. Some naturally are harder to reach than others, but all of them are readily influenced when you appeal to the good and the true which is within them. Some have scoffed and made fun and tried hard to be smart and appear not to take the things presented to them in this line seriously, because they feared they might not appear of the old school of rough-and-ready railroad men and because they did not want to appear chicken-hearted. But their hearts are susceptible to the better things, the truer impulses, the loftier ideals of life.

Do not misunderstand me. I have not advocated doing away with discipline and safety devices but using them merely as necessary adjuncts. They do not lessen the percentage column. The main and the vital thing is so to educate and impress each employee that he will safeguard human life and human limb, not from any fear of

punishment, not from any hope of reward, but from the natural inherent, hitherto in him undeveloped, principle that it is a prerogative, it is a privilege, it is a duty to save human life and human limb and human suffering, and he by his environment can take advantage of this privilege to a greater extent and a greater degree than those in other employments and other walks of life.

I have wasted in years gone by all the time I am going to in considering the ethical relation of the surgeon to the attorney. I have had too many passengers butchered by so-called surgeons, and I have got to a point where I am willing that the professions themselves shall take care of their own ethics, either among themselves or in relation to one another. I am going to try to find the true ethical relation between the trainman and the public, and I am going to try to have the trainman understand this relation. I am going to try to have him cultivate this relation, and I am going to try to have him a bigger man and a truer man and a better man than the public he is thrown in contact with. I am going to hope that this honorable man, this true man, this safe man, this big-hearted man, will truly represent me and my road, and so forcibly that the public will take cognizance of him and credit him with the spirit of faithfulness, intelligence and carefulness.

"NUTS TO CRACK"

BY A. J. WHITE, TRAVELING AUDITOR OHIO ELECTRIC RAILWAY

As no subject was suggested to me when I was requested to prepare a paper for this conference, I concluded to present for your consideration a few of the nuts it is necessary for a traveling auditor to crack from time to time.

THE CORRESPONDENCE NUT

It is the rule and not the exception for those outside the pale of the accounting and treasurer's offices to think (sometimes with a great deal of reason) that accounting officers are "cranks," because many of the little things they have to dwell upon in correspondence often seem to others unnecessary. But for a complete espionage over the doings of those intrusted with different kinds of work at agencies, offices and storerooms, it is absolutely necessary to watch closely all payrolls, distributions, collection vouchers and every form of report to prevent leakage and to make accuracy the rule. Hence correspondence with those who are derelict is the only means the accounting officer has in most cases to get into line the halt, the maimed and the blind. I wish it was not so, but with the proper implements, suavity and kindness on the part of the auditor, the correspondence nut becomes so soft you can break it without trouble.

CLASSIFICATION NUTS

In agency work, especially on electric lines, the traveling auditor is expected to have a thorough knowledge of official classifications and tariffs, both freight and passenger, so as to be in a position to assist agents in their peculiar difficulties. Many times questions in classification are put up to me which require no little ingenuity to answer quickly.

MARKING OF PACKAGES

At one of my visits to one of our larger agencies I found some sacked flour on the floor of the freight house with no marks on any of the packages except one. The depot foreman told me he was having all kinds of trouble on this account, the flour being delivered to wrong consignees when there were shipments on the same day to different consignees. At once instructions were issued to accept no more flour unless each sack was plainly marked. I was questioned at once as to my authority, as the agent claimed that only one in every ten had to be marked—a simple error in reading Rule 3, Section 2, providing for articles not boxed, barreled or sacked and shipped loose.

DRESSED MEAT

At one of our agencies a shipment of dressed meat was made to Fort Wayne by a farmer, but inquiry of the agent developed that the certificate required by the act of Congress of June 30, 1906, in cases of this kind had not been filled out. This certificate calls for the name of common carrier, name of shipper, name of consignee, point of shipment, destination, and a statement that the meat was uninspected, was from an animal slaughtered by a farmer on the farm and was offered for transportation as exempted from inspection, that on date of shipment meat was sound, healthful, wholesome and fit for human food and that it contained no preservative, etc., prohibited by the Secretary of Agriculture, governing meat inspection. Later I found that many of the smaller agencies had no knowledge of the requirements of the law on this point.

LIQUOR SHIPMENT NUTS

The purpose of the bill known as the Webb law (effective March 3, 1912) is to withdraw all interstate shipments of liquors from federal jurisdiction and to place them under the jurisdiction of the states to which they are consigned immediately upon arrival within the boundary of such states.

The Webb law in substance puts the jurisdiction on liquor shipments squarely up to the states, and no shipment of liquor can be delivered in any state: (1) to any person other than a bona-fide consignee; (2) to minors, drunkards, incompetents or Indians; (3) on Sunday; (4) between 6 p. m. of any day preceding an election day and 6 a. m. of the day following an election day; (5) if the nature of the contents is not marked on package; (6) if shippers order "notify"; (7) if consigned to prohibition territory and intended to be received, possessed or sold in any manner in violation of law of the state in which the agency of destination is located.

Another thing I am impressing upon agents is that no orders by consignees to draymen who haul their freight will be permitted on liquor shipments. The consignee must sign for shipment, and it does not matter who drays it.

RECEIVING FREIGHT

The question frequently arises as to what is necessary where a consignment of freight is received at the warehouse and a part of the shipment is short from the shipper. I have always instructed our agents to compel the drayman delivering to "O K" the shortage, as it is sheer folly simply to draw a line through the article short and sign the original memorandum, because at any time the question may arise as to when the erasing line was drawn, and a claim will put the burden of proof on the railroad company.

TARIFF NUTS

There is not a day that questions do not arise as to the interpretation of tariffs, and some of them are knotty to the uninitiated, especially where the rates are published in connection with steam roads, where the proper routing to protect the published rates must be observed and the use of fast freight line guides, etc., is necessary. Some of these questions arise on routing, others on percentages, others on rates, and I need not enlarge by giving specific cases. You will understand that on the Ohio Electric Railway the traveling auditor checks all tariffs twice a year and sees that they are properly filed, so that he is in touch with all new issues of tariffs and the cancellation of others.

FIRE NUTS

While a railroad company is exempt from claim for value of property destroyed in a freight warehouse after forty-eight hours have elapsed from the date and hour of proper notification, I have seen cases where freight was destroyed by fire which had been in the freight house unclaimed for weeks and no unclaimed report had been made so that shipper would have no notice of same. I therefore impress on agents the importance of reporting on proper O. S. & D. form all freight unclaimed for any unreason-

able time so as properly to protect the company in every way.

FLOOD NUTS

We have recently experienced a flood in Ohio and elsewhere that found thousands of dollars of freight in transit and in warehouses of railroad companies, and there can be no reasonable doubt as to the liability of the companies where agents and employees, through neglect, failed to notify the consignees properly of the arrival of freight. This negligence will cost some companies considerable money.

THE MANUFACTURER'S DUTY IN THE ELECTRIC RAILWAY FIELD

BY JAMES H. DREW, PRESIDENT DREW ELECTRIC & MANUFACTURING COMPANY

By the very nature of his training and his business relations, the manufacturer has certain duties in the electric railway field. These duties embrace a twofold obligation to the electric railway: First, that definite contractual relation that is created and maintained between them as vendor and vendee; second, a broader and less defined but more binding union of sympathy and co-operation which should exist between those engaged in the same craft.

The electric railway is still in its adolescence, if not infancy. Many fields are yet untouched, and many are, for various reasons, inadequately served. Many more opportunities will come into existence with increasing density of population. The attendant problems of construction and operation concern the manufacturer as well as the operator. In design of construction and equipment he has a duty little less than the operator who directly undertakes the work, and, while it is quite probable that the operator and engineer, on account of familiarity with requirements, will solve most of the needs in construction, mechanical and transportation development, nevertheless, the manufacturer has an active part to perform. Better rails, bigger and stronger cars to be run entrained under one control, more stable line material and construction, more efficient and economical production and transmission of current, the appliances for safe operation of cars and trains—all of these and many other problems confront us now. The manufacturer should prepare to do his part in answering these questions.

Service is the test of efficiency and the measure for success. With exacting railways it must include safety, comfort and dispatch to traveler and shipper.

In his labors to serve satisfactorily and safely a more and more exacting public, the railway operator must necessarily rely on the manufacturer to furnish that design of material or equipment which at a fair price will give the best operating service. In other words, the manufacturer should deliver to his patron a truly serviceable article.

In his dealings with the electric railway, the vision of the manufacturer should extend beyond the railway to that field, the public, upon whose patronage public utilities depend. The manufacturer, by the grace of his customer, is a public servant once removed. The quality of his product should be the best he can produce and he is in duty bound to use every means and to take every precaution possible to make his product 100 per cent good.

Making allowance for possible abuse or misuse of an article by the purchaser, the responsibility of its performance rests on the head of the manufacturer. In many cases one small piece of car or line equipment, if defective or of inferior quality, may cause damages a thousand times its original cost or it may be the remote or proximate cause of loss of life. Of course the railway man has the right and usually the desire to know what he is buying, yet there comes to be in the course of continued business a feeling of trust and confidence; for this reason, in his contractual

relation the manufacturer should offer no article for use that is an untried or theoretical one, nor should he attempt to sell, without due notice that it is such, an article known to him to be imperfect in design, inferior in quality or faulty in operation.

If he does not deal with his customer on the dead level of truth, he not only fails to perform his duty, but is guilty of a breach of trust. On the other hand, if the service of his organization and the quality of his product is up to the highest attainable standard, he has discharged his obligation to his customer and his customer's customer, the public.

Since the manufacturer and the railways have a common purpose and serve, ultimately, a common patronage, there is a duty on the part of the manufacturers to extend their aid and co-operation along lines not strictly technical or commercial.

The manufacturers should be on the alert to aid in removing public or political prejudice and, wherever possible, to correct unfair or hostile impressions or attitudes in their respective communities.

While the public is coming to appreciate more clearly the true worth of public utilities, it is at the same time more critical of the service of these companies.

The manufacturer, as a lay member of the profession, with a well-directed argument here, or a suggestion there, can do much toward gaining favor for, and removing prejudice against, these companies.

Being, in a general sense, a fellow servant in a common calling, the manufacturer should do his utmost to provide that which is of the highest quality and therefore the most useful and serviceable to his customer to the end that his customer may supply a better and safer service, and, after doing his contracted duty, laying aside selfishness, he should take pains to continue the advancement and improvement of the industry, bearing in mind those broader principles that make for true progress. He should be ready to embrace every opportunity to promote the interests of the industry as a whole.

REPORT OF STANDING COMMITTEE ON PASSENGER ACCOUNTS, CENTRAL ELECTRIC RAILWAY ACCOUNTANTS' ASSOCIATION

BY WALTER SHROYER, CHAIRMAN; H. B. CAVANAUGH, E. O. REED, E. J. SKEHAN AND E. D. GAULT

Your committee held a meeting at Lima, Ohio, on June 4, 1913, and submits the following report:

HANDLING PASSENGER RECORDS AND ACCOUNTS AT AGENCIES AND AUDITOR'S OFFICE

The gross revenue from transportation of electric railways in the territory embraced by this association is derived principally from the passenger business, which averages approximately 85 per cent of the total. The major portion of this revenue finds its way to the treasury in the form of cash from ticket sales. It is important, therefore, that all tickets be audited carefully and systematically from the time the order is placed for their purchase until they are finally destroyed.

It is the consensus of opinion of your committee that a system of monthly accounts is preferable to a daily system regardless of the size of the road or the number of agencies. The handling of agent's daily ticket reports, checking opening numbers, rates, extensions, etc., creates a large volume of unnecessary work in the auditor's office and greatly increases the liability for mistakes. The ticket agent is able to keep a much better record and consequently a more accurate check on his station accounts under the monthly plan than it is possible for him to keep under the daily plan. We will, therefore, outline a method of handling passenger records and accounts at agencies and the auditor's office under the monthly plan.

FORMS NEEDED

Ticket orders on printer; ticket requisitions; ticket stock ledger; agent's daily record of ticket sales; agent's daily summary of sales; agent's cash book; agent's monthly report of local sales; agent's monthly report of interline sales; agent's balance sheet; auditor's correction on report of local sales; auditor's credit advice; auditor's record of distribution of sales; auditor's report of daily earnings; auditor's statement of interline ticket sales to foreign roads; auditor's statement of interline revenue, baggage checks to foreign roads; auditor's statement of interchangeable mileage lifted of foreign road's issue; auditor's correction on interline ticket and baggage reports; auditor's statement of interline account; auditor's form for checking tickets lifted; ticket redemptions.

TICKET ORDERS

Orders for tickets on forms furnished by printers are made by the department in whose custody the tickets are placed. This form is merely a request for certain consecutively numbered tickets, described according to stations, from and to, form, commencing number, closing number and quantity. Usually four copies are made; the original copy is sent to the purchasing agent and is subsequently forwarded by him to the printer, one copy is sent to the auditor and one is retained by the department making the order. It is the auditor's duty to check these orders against the ticket stock ledger in order to avoid duplication of tickets and against the printer's bills as rendered to make sure that the quantities ordered have been received.

TICKET REQUISITIONS

Agents are supplied with printed blank forms to be used for the purpose of ordering tickets as their requirements demand. It is the usual practice to require agents to keep at least one month's supply of each form of ticket on hand at all times. Requisitions must be made in ample time to reach the ticket stock department not later than the first and fifteenth of each month. Four copies of the requisition are made; the first three are forwarded to the ticket stock department and the fourth copy is retained by the agent as his record. In making up requisitions the agent is required to state, as provided by the blank, quantity required, commencing number on hand, closing number on hand, form and destination. The commencing and closing numbers of tickets in hands of the agent serve as a guide to the ticket stock department in supplying only such quantities as the sales of previous months indicate are needed. The tickets sent the agent, which in some cases may vary from the quantity ordered, are shown at the right-hand side of the blank in a space provided, the commencing number, closing number and number of tickets being filled in by the clerk who makes up the requisition. As the orders are filled, the tickets, accompanied by the original requisition, are forwarded to the agent by registered train mail. The second copy of the requisition is sent to the auditor's office as a notification of tickets supplied and is held on file until the original, which is receipted by the agent, has been received. The ticket stock department retains the third copy, from which postings are made to the stock ledger, and the fourth copy, as stated, is retained by the agent.

TICKET STOCK LEDGER

This record is usually loose-leaf form, so arranged that accurate account may be kept with each form of ticket according to the selling station. The account is subdivided under three heads, viz., "stock," "supplied to agent" and "sales." Under "stock" entries are made from the printer's invoices, as the tickets are received, of the date, from whom purchased, opening number, closing number and number of tickets received. As the tickets are sent out to agents on requisition, entries are made in the column headed "supplies to agent," of the date sent, opening number, closing number and number of tickets. This represents the charge against the agent at the selling station indicated in the heading of the sheet. The difference be-

tween the number of tickets in the stock column and the number supplied to the agent represents the tickets on hand in the ticket stock department. When the agent's monthly ticket reports have been examined, the sales for the month are posted to the ticket ledger in the space provided under heading of "sales." Entries are made of the date, opening number, closing number and number sold. The difference between the number of tickets shown as being supplied to the agent and the number shown as sold, represents the tickets in the hands of the agent. Book, inter-division, mileage and commuter tickets, baggage, parcel, storage checks, etc., are handled in different manner in order to maintain a consecutive record of stock. These tickets are skeleton form, not being printed for use at any particular agency. The entries for stock and tickets supplied to agents are the same as previously described, but the sales column in this instance is used for entry of the name of the station supplied. This serves as a stock record only; therefore, it is necessary to open an account with the various agencies for each form of this class of tickets, posting from the stock account the tickets supplied to the agent, followed by posting of sales at end of month. This record should be kept by the auditor, if possible to do so, but if not he should audit the same at frequent intervals.

AGENT'S DAILY RECORD OF SALES

At the close of each day's business the sales of all forms of tickets, as indicated by the highest numbers remaining on hand, are entered by the agent in a sales record. In opening this record and at the first of each month all forms of tickets in stock are entered according to form and destination. Card and other tickets having a printed destination are entered first by writing in the various destinations in station order, the form, tariff rate and commencing number. Book and miscellaneous tickets (without a printed destination), baggage checks, etc., are designated by form and are usually entered in order of their importance from a standpoint of sales. As sales are made each day, the closing numbers, number sold and the amount of sales of each form are entered under the proper date and a total made of the amount of all sales, which is used in balancing against cash on hand. Provision is made for balancing this record at the end of each week and at the end of the month, the latter figures forming a basis for the monthly report.

AGENT'S DAILY SUMMARY OF SALES

In compiling daily earnings by operating divisions from ticket sales, which is required by the majority of electric lines, it is necessary for the agent to furnish the auditor a daily summary of sales from the daily sales record. The sales of mileage and commutation tickets do not enter into the daily earnings on a sales basis, yet it is good practice to require the agent to make a full report of all sales and see that he makes his remittances accordingly. The sales of all single and round trip tickets are credited to the division on which the selling station is located, but the coupon card, interline, book and miscellaneous tickets must be reported in detail as to number sold and destination in order that each division may receive proper credit for its proportion of such sales. Distribution according to divisions is made on the face of this report and a final summary is then made of all the reports from the various agencies.

AGENT'S CASH BOOK

One entry each day in the cash book of the total amount of money taken in from the sale of tickets is all that is required of a ticket agent. Other cash items, however, such as receipts from vending machines, etc., must be written in the cash book with full explanation as to the source of such collections. If the agency handles both passenger and freight business, the cash book would show receipts from freight collections as well as ticket sales.

MONTHLY REPORT OF LOCAL SALES

Roads differ in respect to form of reports, but all require report from each station of ticket sales to all other stations on its own and foreign lines, by forms, commencing

and closing numbers, number sold, ticket rates and extensions into money. This report is made by the agent from his daily sales record, and from the audit stubs of books and miscellaneous tickets, baggage checks, etc. Tickets having audit stubs have no printed destination and it would not be practical to attempt to show the various destinations of such tickets in the daily sales record. When the details of sales of all forms of tickets have been written in the report, the agent makes a recapitulation of the total sales of the various forms, including collections from vending machines and other miscellaneous items, of which the grand total represents the charge against the agent's account. Items other than ticket sales are handled by some companies through "debit advices;" however, this is a mere matter of choice.

MONTHLY REPORT OF INTERLINE SALES

In addition to the monthly report of local sales, agents are required to furnish a separate report of interline sales. The information required in this report is the same as that required in the local report, except that the junction point via which the ticket is sold is shown in cases of more than one junction with foreign road. This information is necessary in verifying rates as the destination of two tickets may be the same but the route traveled by the passengers may be entirely different. Statements of interline sales to foreign roads are written up from this report.

AGENT'S BALANCE SHEET

After all reports have been made for the month, the agent prepares a monthly balance sheet, taking up all debits and credits appearing on the monthly ticket report; also all debit and credit advices through which all miscellaneous items are handled. If the agency handles both passenger and freight business, all debits and credits from the monthly freight reports are included in the same balance sheet. Roads making a daily distribution of their revenue from cash receipts usually require a separate balance sheet of passenger and freight accounts and a consolidated balance is made in the auditor's office, but your committee recommends a combined balance sheet made by the agent.

AUDITOR'S CORRECTIONS

In checking agents' reports, errors are quite frequently found, and in order to facilitate adjustment, the auditor advises the agent of the errors made through a correction statement. This statement shows the items in question "as reported" and as they "should be;" also the net debit or credit to the agent's account.

AUDITOR'S CREDIT ADVICE

There are numerous occasions for giving agents special credit in connection with their freight accounts, but it is seldom necessary in connection with passenger accounts. There are a few items, however, such as ticket refunds or exchange of tickets by agents, which are authorized in isolated cases, also government orders when accepted in large numbers, thereby eliminating the possibility of listing them in detail on the balance sheet, that can be most conveniently handled through the credit advice. These advices are numbered consecutively by the auditor as issued; a record is kept of the same and at the end of the month a journal is made covering all of those taken up by agents, debiting the general ledger accounts affected and crediting the agent's account.

AUDITOR'S RECORD OF DISTRIBUTION OF SALES

In order to arrive at a total of sales of all stations, the distribution appearing on the face of the daily summary is posted to a sales record which has all stations on the road printed on the left-hand side of the page and the various operating divisions across the top. Postings are made under the proper divisions opposite the selling station and the total sales are credited accordingly in compiling the daily earnings.

AUDITOR'S REPORT OF DAILY EARNINGS

It is the practice of electric railways to prepare daily

comparative statements of earnings, in order that the directors, managers and others may keep constantly informed of the volume of traffic. This report is more particularly a source of valuable information for those directly in charge of operation, as it often happens that a certain line will show a marked decrease in earnings for a given period, due to some disturbance of business conditions. This decrease, appearing daily, attracts attention of the manager, consequently the service is reduced and a saving in operating expenses effected. The earnings are made up of conductors' cash collections, agents' ticket sales, except mileage and commuter tickets, which are valued as lifted, the proportion of ticket sales on foreign lines, the proportion of tickets lifted sold by foreign lines and freight and express earnings computed from the auditor's copies of way bills. Comparisons are made of the earnings of the same day of the week last year, and the same number of days of the month and year. Increases and decreases are shown for each line or division, percentage of increase or decrease, cars in service, weather conditions, temperature and special events affecting traffic.

AUDITOR'S REPORTS TO FOREIGN ROADS

The association forms indicated under the heading of "Forms Needed" were adopted at the meeting of this association held in Toledo, Ohio, on Dec. 16, 1911. [Published in the ELECTRIC RAILWAY JOURNAL of Dec. 23, 1911.—ED.]

PREPAID TICKET ORDERS

Agents are supplied with prepaid ticket orders for the accommodation of anyone who wishes to buy a ticket for another at a distance. The money is paid to ticket agent of Road A, the ticket order with full specifications on the ticket agent of Road B is given to the payee, who sends it to the person at a distance proposing to make the journey. When the order is presented to the ticket agent of Road B, he issues an interline ticket to the person named in the order and takes a receipt therefor in the space provided. Settlement between the roads is made as follows: Road A reports in the interline ticket report to Road B the full amount of money received, and Road B, the actual seller of the ticket, apportions in its interline reports to the roads over which the ticket is sold their proportion of its value. Road A credits "passenger earnings" with the entire amount received by its agent and charges that account with the same amount reported to B in interline account. Road A afterwards receives and credits to "passenger earnings" its share of the through rate by way of the interline report of Road B. Road B credits "passenger earnings" with the entire amount received through A's interline report, and charges thereto all the other lines' proportions reported to them in the interline account, leaving in passenger earnings exactly its own share of the through rate. Prepaid orders are equally serviceable between local agents of the same line, in which case the agent issuing the order reports the same at the amount received and remits to the treasurer, but the agent issuing the ticket reports it without value, as issued on account of such a station's prepaid order.

CHECKING REPORTS IN AUDITOR'S OFFICE

The monthly report, accompanied by audit stubs of book and miscellaneous tickets, is usually received in the auditor's office on the second or third of the month following that in which the sales are made. A record is made of their receipt in order that missing reports may be traced for. The first operation in verifying the report is that of checking the commencing numbers against the closing numbers reported in the previous month. One road in particular checks against the closing numbers entered in the ticket ledger, which entries have been made from the previous month's report. The latter plan not only verifies the sales entries but it has a strong tendency toward keeping the sales record up to date. The checking of commencing and closing numbers is followed by verification of the number sold, rates and extensions into money. A further check

than that of making separate subtractions of the commencing from the closing numbers of each form in verifying the number sold can be had by adding the commencing and closing numbers of all forms and arriving at the difference, which will represent the total number sold. In checking rates it has been found advantageous in many respects to compile a tariff for the use of clerks, naming passenger rates, both one-way and round trip, baggage rate and mileage from each station to every other station on the road, arranged alphabetically, separate sheets being provided for each selling station. Book and miscellaneous tickets reported by the agent are checked as to destination by comparison with tickets lifted of the same number. This has proved to be the most reliable method of auditing this class of tickets as any attempt at manipulation can be readily detected. Too much stress cannot be placed upon the importance of accurate checking of agents' ticket reports, as it is through these reports that a large volume of revenue is accounted for. Reports of sales of foreign roads are checked against coupons of interline tickets and baggage checks lifted.

REDEMPTION OF TICKETS

It frequently occurs that the purchaser of a ticket is unable to use it as expected and wishes it redeemed. Agents are supplied with a printed form for this purpose, which the purchaser is required to fill out, certifying as to the genuineness of his claim and that he has received no service either in transportation or checking of baggage. This certificate, with the ticket, is forwarded to the general passenger agent for approval and he in turn forwards it to the auditor, who approves for the amount of the refund. A special form of check, printed so that its indorsement constitutes a receipt for the ticket in question, is then drawn by the treasurer upon his petty cash fund. A blanket voucher, reimbursing the treasurer for the amounts so expended, is drawn at the end of each month, charging the passenger revenue with the amount of redemptions of card and other tickets whose value has been included in the earnings account on a sales basis. The redemption value of unused mileage and commutation tickets is charged to their respective liability accounts.

TICKETS LIFTED

If it is desired to ascertain with what regularity tickets are sold by agents and lifted by conductors, it is necessary to keep a record of tickets lifted. A form has been tried out by the chairman of your committee and it is recommended to anyone who may desire to take up this phase of ticket auditing. The form is printed with ticket description at the top and with as many parallel columns of the numbers 1 to 50 as the width of the sheet will accommodate. Space is provided at the top of each column for entering the first number. For example, if the agent at Chester is at present selling tickets to York numbered 5000 to 6000 the first number will be entered at the top of the column and that column will then represent all the tickets numbered from 5000 to 5049 inclusive, and so on. Tickets must be sorted first according to form and selling station, then according to destination. It is not necessary, however, to sort tickets numerically, as the ticket numbers can be checked very readily without that extra work. The tickets being sorted, the record can now be made by entering the date opposite the various numbers lifted, in the column headed "G," indicating going portion, if a single trip or going portion of a round-trip ticket, and in column headed "R" if return portion of round trip. The result of the check is apparent at once. If a large number of tickets are found missing you will reach the conclusion that the agent is selling out of order or that some conductor is holding out from his collections for the purpose of manipulation. An unexpected visit of the traveling auditor to the agency in question and a secret inspection of train collections would naturally follow.

AUDITOR'S ACCOUNTS

As soon as the agent's monthly ticket reports are checked a grand recapitulation is made of all reports, which is journalized, as shown in the accompanying table:

RECAPITULATION OF AUDITOR'S ACCOUNTS	
<i>Debiting</i>	<i>Crediting</i>
Agents and conductors.	Revenue accounts.
Foreign roads (balance due this company).	Ticket liability accounts.
United States government (account transportation orders).	Foreign roads (balance due them).

Following the closing of accounts the compilation of statistics is taken up.

REPORT OF THE STANDING FREIGHT COMMITTEE, CENTRAL ELECTRIC RAILWAY ACCOUNTANTS' ASSOCIATION

BY L. T. HIXSON, CHAIRMAN; H. W. BRANDTMILLER, H. E. VORDERMARK, G. L. FORD AND C. B. BAKER

The committee recommends the following additions to the interline freight agreement:

BILLING AND REPORTING FREIGHT FOUND OVER WHICH IS MARKED TO STATION ON FOREIGN ROAD

Freight found astray in cars or warehouses of one road, showing destination marks to a point on the line of another company, will be billed out to the marked destination on an interline free-astray way bill and reported in the regular manner. The agent at destination, before delivering the shipment, will require the surrender of the bill of lading or original paid expense bill covering the bill on which the shortage is due, as evidence of ownership, and in case the shipment has been covered by a regular way bill, the destination agent will issue corrections, making the free-astray way bill void, and referring on the correction to revenue billing. In the absence of a revenue way bill, freight charges must be assessed on proper weight, based on published tariffs from point of origin to destination, a request being made on the originating agent for a way bill to cover, and after that is received, a correction will be issued to void the free-astray way bill, or if it is impossible to get a revenue way bill from the originating point, a correction should be made to change the free-astray way bill to a revenue bill.

We also desire to recommend the following plans and forms in connection with interchange of equipment and per diem accounts, inasmuch as several member companies now have use for a system to take care of this class of business.

REPORT MADE BY CONDUCTOR COVERING ALL CARS HANDLED

If the patented "Betz system" is used, it will be necessary for this form to be made in duplicate.

REPORT MADE BY JUNCTION AGENT COVERING CARS DELIVERED TO CONNECTING LINE

If the patented "Betz system" is used, five copies of the report must be made. One copy of each form will be furnished to the auditor of each line and the agent will retain the last copy for his file. If there are two agents (not joint agency), it will be necessary to make an additional copy in order that each agent may retain a copy for his file.

In the case of roads handling a great many cars, the patented system is very desirable for the reason that the short forms may be cut with a machine paper cutter along the heavy horizontal ruling and assorted in road order so that the ledger clerks may handle the posting with greater facility. Each clerk will have only such cars as he is required to look after.

The large sheets are filed in date order so as to furnish a chronological record of cars handled by conductors and delivered to and received from connecting lines. Small roads may use these sheets for posting directly to the ledger.

LEDGER RECORD OF MOVEMENT OF LOCAL CARS

This form is so arranged that each page will show a complete record of fifty cars. In posting, the reference used is the last two figures or "two terminals," and the figures 0 to 9 are printed on the outside margin, five times to the page to provide for the fifty numbers. The sheets are cut on the margin and indexed, showing the series. For example, 300 would indicate that cars 300 to 349 would be found on that page. Two sheets are required to make one page, or what is sometimes called a "double page." Days of the month are printed at both top and bottom of one portion of the page. On the other part of the page the initials of roads whose cars are handled are shown in the same manner and in the same relative position as the date figures.

The entries to this form are made from the assorted slips or from the large sheets. For convenience, all records may be made in pencil, using black only. All stations and sidings should be numbered. Junctions should have a distinguishing series when recording an exchange between the local road and a connecting line; also an odd number should be used to show "received from" and an even number for "delivered to" in connection with interchange reports from and to a foreign line. For example, local stations (including junction points for local business) should be numbered 1 to 500, and junction stations, in connection with interchange with foreign lines, 501 to 600. If there are two or more foreign line connections at one junction, use separate numbers to designate each road. By using separate series of numbers it is not necessary to use various colored inks or key letters. Empty cars are designated by a dash after station number. New books should be opened the first of each month.

At the close of each month, on the right side of the double sheet under the column "total days on line" a record of the total number of days on the local line is shown. The column opposite the car number is double-ruled for a portion of this space and just above the faint ruling is given the record under each foreign road initial of the number of days on that line during the current month. Discrepancies are recorded at the extreme right of the sheet. Such discrepancies are taken care of by a tracer.

A form is used for keeping a record of the movement of various foreign cars on a local line. In case there are a great many foreign cars on the line, it will be necessary to allot a number of sheets to a line and show the car numbers, using the last two figures, or indexing by terminals in the same manner as for local cars. However, if the business is light, a sheet may be shown for each road and cars entered as received. At the left of the sheet under a column "transferred" the location on this company's line and the date of the last movement will be shown as transferred from the last month's record. At the end of the month the per diem days will be shown under that heading in the column at the left. In entering the movement of the cars under the proper date, empty cars are designated by a dash after the station number. Entry should be made at the right under the heading "mileage," showing the mileage of loaded and empty cars.

From these records three forms are made and may be either carried into an analysis journal, showing the name of the company on the left and the various heads, subdivisions, etc., at the top, so as to get the total footings, or the various classes may be posted directly to the ledger. In the same manner, a record on these forms rendered by foreign lines for per diem and mileage to be paid to the local company will be set forth. It is well to have a journal form, showing headings and various roads to provide a summary of the monthly business of the various classes.

A postal card notice is mailed to private line companies and to roads not in the per diem agreement, showing the amount to which a company is entitled for the use of its cars.

In connection with accounting for local freight business, we desire to recommend that the association go on record as favoring the monthly plan in all reports except cash statements and such skeleton daily reports as may be necessary for compiling daily earning statements. Therefore, we would suggest that the report of this committee previously adopted be revised so as to eliminate daily report plan forms.

Two new loose-leaf forms were submitted for summarizing reports. These forms would take the place of some of the forms mentioned in the report of June 13, 1912.

RECAPITULATION OF ABSTRACTS—AGENCY ACCOUNTS

The totals as shown by agency abstracts are summarized on this form. The form is balanced as follows:

The total received, added to the total interline forwarded by a company, plus unadjusted or transit accounts, must equal the total forwarded, as shown by agency abstracts plus the interline received.

After this balance is proved the interline settlement sheet may be made up.

INTERLINE SETTLEMENT SHEET

All freight accounts from the various sources are entered on this sheet and the balances for all agents, as well as each company, are shown. The "unadjusted accounts" totals for the previous month are deducted and totals for the current month are added. If the proper figures have been taken into account the advances received and forwarded will also balance. The amount of the foreign roads' proportion of revenue deducted from the total revenue freight column will give the net freight earnings of the company, and this amount carried to the credit in the "balance" column will make the debit and credit footings equal.

There are several forms, among them balance sheet and debit or credit advice, which are used for both passenger and freight business. Therefore, it was thought advisable that such forms be submitted as the joint recommendation of the passenger and freight committees. These are set forth in the report submitted by the passenger committee and are concurred in by this committee.

REPORT OF STANDARDIZATION COMMITTEE

PRESENTED BY R. N. HEMMING, CHAIRMAN

A meeting of the standardization committee was held in the office of the secretary on May 31, 1913, the following members being present: R. N. Hemming, H. H. Buckman and L. M. Clark. There were also present the following representatives of manufacturers: H. S. Williams, Peter Smith Heater Company; B. M. Hartsock, Westinghouse Traction Brake Company; H. E. Lavelle, Automatic Ventilator Company.

CONTROLLING DIMENSIONS OF TROLLEY WHEELS

The first subject taken up was that of the controlling dimensions of trolley wheels. It was voted to recommend to the association that the dimensions shown on a diagram submitted by the committee be adopted as recommended practice.

STANDARD TRAIN SIGNAL SYSTEM

The next subject taken up was that of the standard train signal system, which was discussed at length, both the pneumatic and electro-pneumatic and the present hand-bell systems being considered.

In view of the added complications of the pneumatic system, the discussion was confined chiefly to the electro-pneumatic system, which appears to possess the necessary qualification to meet satisfactorily the requirements of inter-urban train operation.

As a result of the discussion, your committee submits the arrangement of the electro-pneumatic signal system shown in the accompanying illustration (Fig. 1). This arrangement does not go into detail regarding the location of certain accessory apparatus, which will necessarily have to

be determined by the local conditions, but does define the location of the signal whistles proper, which should be such that all signals can be readily heard by trainmen from any part of the car.

In accordance with the foregoing it was considered advisable to utilize a connector between cars for the signal

formulate a report, and therefore recommends that the subject be continued.

MOUNTING OF RADIAL COUPLERS

The last subject taken up was that of the paper entitled "Mounting of Radial Couplers," by A. L. Price, of the Ohio Brass Company, which was read before the association at a

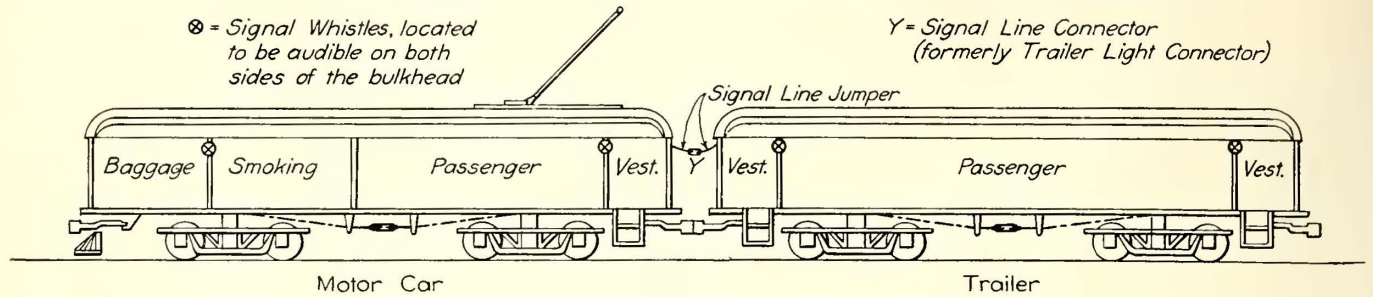


Fig. 1—C. E. R. A. Standards—Location of Signal Whistles

line, which would not inter-couple with the trailer light connector; and, furthermore, as the present standard trailer light connector has been found of insufficient current-carrying capacity, especially when electric heaters are employed, it is recommended that the present standard trailer light connector, as shown in the ELECTRIC RAILWAY JOURNAL, page 32, July 1, 1911, be adopted as a standard signal line connector, and that the connector, of which the details are illustrated in Fig. 2, be adopted as a standard trailer light connector.

The committee further recommends the adoption of the revision of the location of the signal line connector, as shown in Fig. 3, the illustration reproduced below giving the standard locations of signal, lighting circuit, and main motor control connectors at the ends of interurban cars.

HEATING AND VENTILATING OF CARS

The next subject taken up was that of the heating and ventilating of cars. Following a lengthy discussion of this

meeting held in Indianapolis Feb. 28, 1913, and was referred for consideration to the standardization committee of the association.

The discussion of the subject which followed brought to light the fact that not only should the present standard specifications for radial couplers be modified, but also the

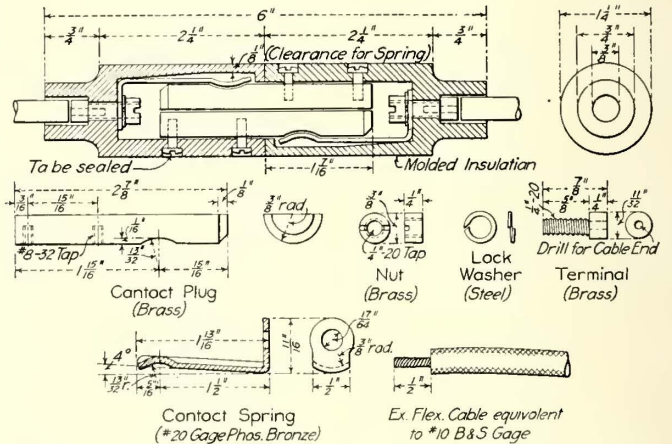


Fig. 2—C. E. R. A. Standards—Details of Construction of Standard Connector for Trailer Lights

necessity of establishing certain limitations for the controlling dimensions of cars, such as over-all lengths, truck centers, widths, steps, etc.

Your committee therefore recommends that the subject be continued to the end of revising the present coupler specifications and formulating limiting controlling dimensions for cars so as to permit of the satisfactory operation of radial couplers.

NAPLES ELEVATED AND UNDERGROUND RAILWAY

The concession for the proposed Naples underground and elevated system was granted early this year to a company starting with a capital of \$3,200,000. This project covers a city line with fifteen stations and a suburban line. The main suburban line will follow the coast to Camaldoli, and a second line will follow the Milano Agnano Road to the Agnano baths. All sections will be double-track. The line will be operated with trains of three cars each, the first and last motor cars and second-class, while the trailer will be a first-class car. The electric equipment of the motor cars will consist of four motors with multiple-unit control. Current is to be used at 1000 volts or more. The total outlay, not including administration expenses, directors, etc., is expected to reach a sum between five and six million dollars.

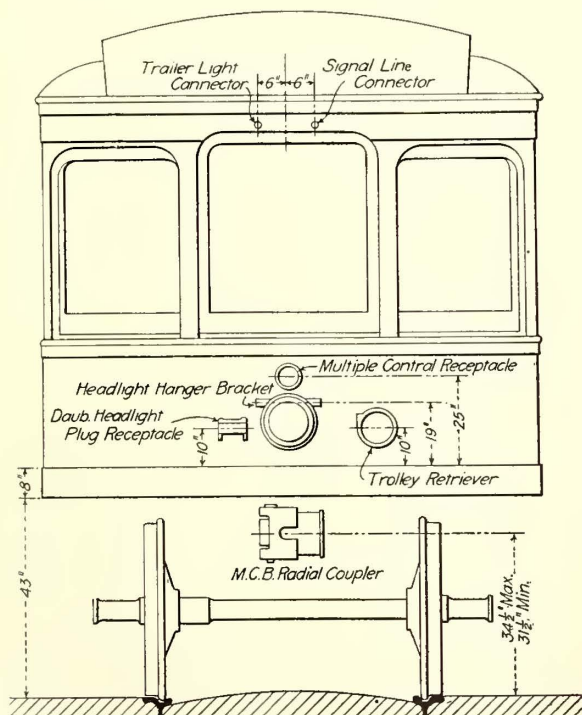


Fig. 3—C. E. R. A. Standards—Location of Signal, Light and Control Connectors

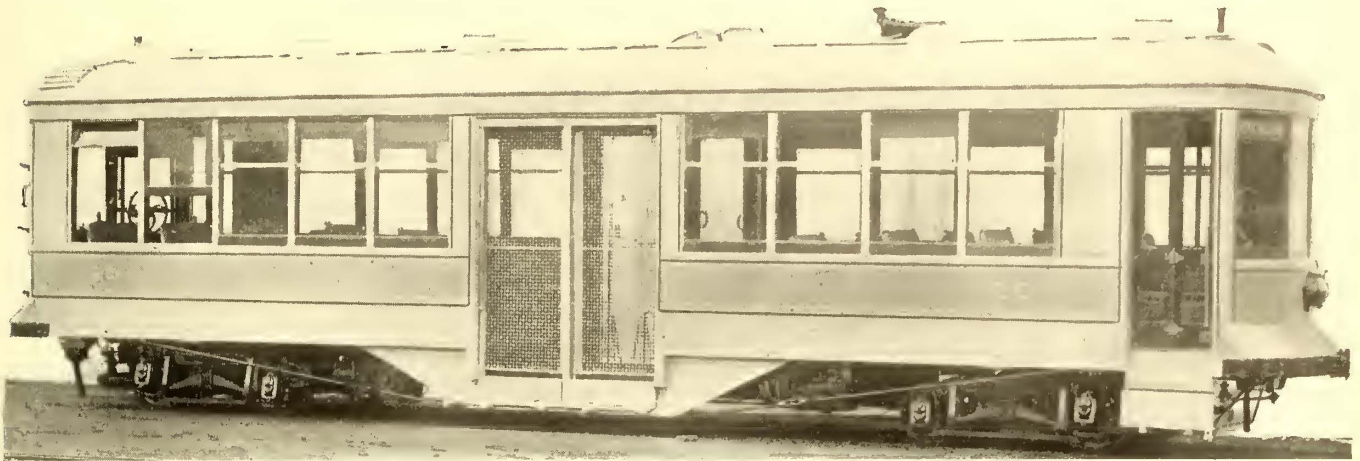
subject, your committee feels that the question of the heating and ventilating of cars involves car construction, radiating systems, heating units, fuels, etc., in connection with which some tangible data should be collected in order to

LOW-STEP, CENTER-ENTRANCE CARS FOR SANTA BARBARA, CAL.

The Santa Barbara & Suburban Railway has just been furnished by The J. G. Brill Company with five center-entrance cars of low-step design. This type has been adapted for the mild California climate by installing swing gates instead of doors at the center, while sliding doors are

provided to close one compartment. The car seats a total of forty-four passengers, cross seats being used except at doorways and sliding seats opposite the center door. The car seats a total of forty-four passengers, cross seats being used except at doorways and sliding seats opposite the center door. The car seats a total of forty-four passengers, cross seats being used except at doorways and sliding seats opposite the center door.

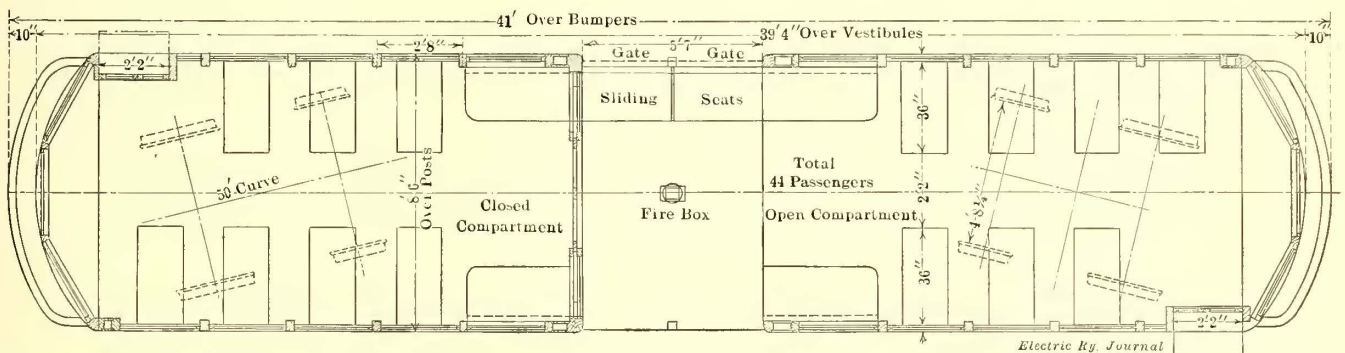
Each compartment has five windows on one side and



Santa Barbara Car—View Showing Low Center Entrance and Exit Door at End

provided to close one compartment. The car seats a total of forty-four passengers, cross seats being used except at doorways and sliding seats opposite the center door. The

four windows and a folding door on the other. The windows are of the double-sash type arranged to be raised into the roof. They have cherry sash with brass stiles.



Santa Barbara Car—Plan View Showing Arrangement of Seats and Entrance Well in the Center

accompanying plan shows that the car is 41 ft. long and 8 ft. 6 in. wide over the posts. The center platform is 5 ft. 7 in. wide. The cross seats are 36 in. wide, thus leaving a 26-in. aisle. There are no cabs or curved end seats.

The body is mounted on No. 62-E trucks with 30-in. driving wheels and 19-in. pony wheels. These wheel diameters and the ramps permit the following easy gradations: 9-in. rise from ground to folding step, 8-in. rise from step to edge of well, 2-in. ramp to center of well, 8-in. step to aisle of either compartment and 6-in. ramp from edge of well to bolster center line. The gates at the center platform are hinged to one stanchion and swing inwardly back to back when opened to form an exit and entrance. The gates are kept open by means of door locks. An additional exit for passengers is provided by a 26-in. door and folding step at diagonally opposite ends of the car. These doors, which are operated by the motorman, fold against the vestibule windows. All side doors operate in conjunction with the steps.

Each compartment has a 3 7/8-in. x 7 3/4-in. side sill, extending from the center platform to the end of the car body. At a point about 3 ft. from the center vestibule there is attached to the inner side of these side sills a 6-in. channel which extends across the center platform. It is reinforced with a 10-in. x 3/8-in. steel plate which is gusseted

The seats are made of cherry slats. Special seats are also provided for the motorman and the conductor.

EXTENT OF APPROVED STADTBahn ELECTRIFICATION

Following fourteen years' agitation, both houses of the Prussian Diet finally approved on April 22 and May 5 the electrification of the Berlin city and several suburban lines of the Prussian State Railways. The original project of the railway administration called also for the electrification of some of the longer suburban lines, which would have involved 268 miles of route or 592 miles of single track. The cost of way changes was placed at \$12,500,000 and of rolling stock (electric locomotives and modified steam trailers) at \$1,825,000. Power was to be purchased from a private plant. The electrification now approved covers 126 miles of route or 293 miles of single track. The initial appropriation of \$6,250,000 is accompanied by a request from the Diet for data on the results of future tests with different kinds of current and rolling stock, an estimate as to whether the electrification of additional lines would be profitable, and the preparation of a schedule of increased fares to cover fixed charges and amortization of the Berlin city, belt and suburban lines. The question of public or private ownership of power plants has been left in abeyance.

ANNUAL MEETING OF AMERICAN SOCIETY FOR TESTING MATERIALS

The sixteenth annual meeting of the American Society for Testing Materials was held on June 24-28 at Atlantic City. During the meeting several reports of committees on specifications of special interest to electric railways were presented, and these are given in abstract in the following paragraphs.

The specifications for splice bars were elaborated to cover three grades, namely low, medium and high carbon steel. The former grade makes the use of Bessemer or open-hearth steel optional with the purchaser, the carbon content with Bessemer steel being limited to 0.10 per cent and that with open-hearth steel to 0.05 per cent. Open-hearth steel only is permitted for both medium-carbon and high-carbon bars, the carbon content for the former being specified to be not under 0.30 per cent and the phosphorus content not over 0.04 per cent. For high-carbon bars the carbon must be at least 0.45 per cent and the phosphorus not over 0.04 per cent.

In manufacture, the medium-carbon bars are required to be annealed in case they are shaped when cold, but high-carbon bars must be worked at a temperature not less than 750 deg. C. In all cases analyses made from finished bars representing each melt are permitted to show phosphorus 25 per cent in excess of the limits specified for the test ingot. Variations of 1/32 in. from the specified size and location of holes and of 1/8 in. from the specified length are also permitted in all cases. The maximum camber must not exceed 1/16 in. in 24 in., and any variation from a straight line in the vertical plane must make the bars high in the center. Cold bending tests on the low-carbon splice bar require that the test specimen shall bend flat upon itself without fracture on the outside of the bent portion. The medium-carbon and high-carbon bars are required when cold to bend without cracking on the outside through 90 deg. around pins the diameters of which are respectively two and three times the thickness of the test specimen. Optional bend tests of less severity were included.

The specifications for carbon-steel car axles were changed in a number of instances, among which were the requirements as to chemical composition. These involved contents of carbon from 0.35 to 0.55 per cent, manganese not over 0.70 per cent, phosphorus not over 0.05 per cent and sulphur not over 0.06 per cent. The paragraph relating to tensile strength was omitted complete and the list of drop tests was expanded to include axles of 6 7/16-in. diameter.

The specifications for steel tires were changed to require that analyses made by the purchaser from the finished material should agree with the limits of 0.05 for phosphorus and 0.05 for sulphur as specified for the manufacturers' test, and not, as in the original specifications, be permitted to be 25 per cent in excess of those figures.

New specifications for cold-rolled steel axles were adopted which included the use of a process optional with the purchaser and cold-rolling to finished size from hot-rolled bars. The chemical composition limited carbon to 0.40 per cent and phosphorus and sulphur to not over 0.05 per cent. Manganese was called for to a percentage between 0.40 and 0.80. A tensile strength of 70,000 lb. per square inch and an elastic limit of 60,000 lb. per square inch were specified, together with an elongation of 18 per cent and a reduction of area of 35 per cent. Cold bending of a 1/2-in. square test specimen around a 1-in. pin was required. The allowable variation in finished size was limited to 0.002 in.

New specifications for wrought solid carbon-steel wheels for electric railway service were adopted substantially in accord with the recommendations of the American Electric Railway Engineering Association committee on equipment,

presented at the 1912 convention and published in the ELECTRIC RAILWAY JOURNAL for Oct. 12, 1912, page 851, but with the exceptions noted below.

The chemical composition involved the following requirements:

	Acid, per Cent	Basic, per Cent
Carbon	0.60—0.80	0.65—0.85
Manganese	0.55—0.80	0.55—0.80
Phosphorus	Not over 0.05	Not over 0.05
Sulphur	Not over 0.05	Not over 0.05
Silicon	0.15—0.35	0.10—0.30

Analyses by the manufacturer were required to be made on a test ingot from each melt, and a check analysis made by the purchaser was permitted from one wheel representing each melt, the sample to be taken from any point or from two diametrically opposite points in the plate but bored parallel to the axis completely through the sample in such a manner as not to impair the usefulness of the wheel.

The thickness of plate was permitted to vary not more than 1/4 in. over or not more than 1/8 in. under the thickness specified in the purchaser's drawing. The hub diameter was permitted to be 5/8 in. more than that specified, but not less, with a minimum wall thickness of 1 in. for bores 6 in. or less and 1 1/4 in. for bores over 6 in., the thickness of wall to vary not more than 3/8 in. on any one wheel. The variation found with the ring gage was limited to 1/16 in. with rolled and 1/32 in. with machined wheels. Mating was specified for size only and not for carbon. No consideration was given to weight. The matter of free replacement of delivered wheels which proved defective by reason of cracks, breaking or defective material or workmanship was replaced by a clause to the effect that the wheels should be free from injurious seams, cracks, laminations or other defects detrimental to their strength or service, and that wheels offered for inspection should not be painted or rusted or covered with any substance to such an extent as to hide defects.

During the discussion on splice bars Norman Litchfield presented the objections to the specifications which had been raised by the members of the American Electric Railway Engineering Association committee on way matters in regard to tolerances and camber. In the discussion it was brought out, however, that no objections had been received to the specifications in a canvass of the members of the A. S. T. M. committee on standard specifications for steel, and in the judgment of the convention the objections to the specifications were not vital enough to prevent it going forward. The resolution was therefore passed that the specifications should be submitted to letter ballot to the members of the American Society for Testing Materials.

Mr. Litchfield also presented the objections made by the committee on equipment of the A. E. R. A. to the proposed specifications for wrought-steel wheels for electric railway service, and to these very much the same objections were brought up by the members of A. S. T. M. committee as in the case of splice bars. It was stated that the matters which the A. E. R. A. committee on equipment wished to have put into the specifications were somewhat experimental and were being investigated at the present time by the committee of the A. S. T. M., and it was thought that it was desirable to adopt the specifications which would harmonize the existing discrepancies in the various specifications now in use. Mr. Litchfield pointed out that the American Electric Railway Engineering Association was not ready to adopt any specifications for wheels, as it had not approved those which were presented at its last convention. With a view to further investigation, more especially in connection with the A. S. T. M., he therefore requested that the proposed specifications be held up for another year. The matter was put to vote, and it was decided to submit the specifications to letter ballot of the members of the A. S. T. M.

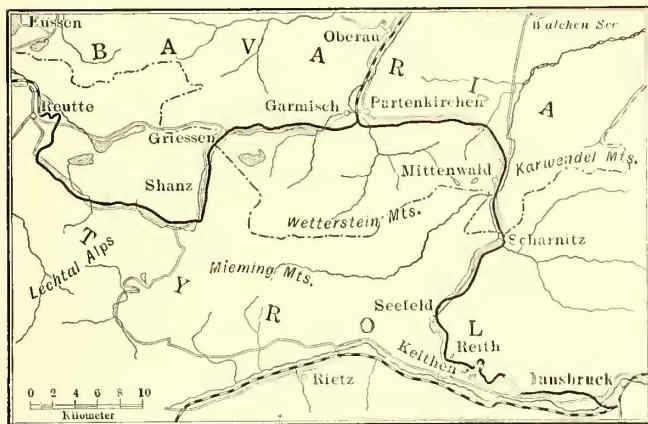
The Mittenwald Railway

A 15,000-Volt, Single-Phase Railway with a 50,000-Volt Transmission System from Hydroelectric Stations

Dr. E. E. Seefehlner has described in two recent issues of the *A. E. G. Journal* the Mittenwald Railway, a new line in the Austro-Bavarian Tyrol mountain region which was opened on Oct. 28, 1912. Under the collective name "Mittenwald Railway" all the railway connections between Innsbruck, Scharnitz, Garmisch, Partenkirchen, Griessen and Reutte are included, although this railway is subdivided

POWER SUPPLY

Part of the energy for operation is obtained from the Sill hydroelectric development at Innsbruck. This plant enjoys a peculiar record inasmuch as it also supplies the 2500-volt, forty-two-cycle Stubaital Railway, opened in 1904 as the first of single-phase lines, and the Innsbruck-Hall 1100-volt interurban railway, the first Austrian railway system to use high-tension direct current. The same station further



Mittenwald Railway—Map



Mittenwald Railway—Light Bridge Construction

into four lines. As shown in the accompanying map, the eastern line from Innsbruck to Scharnitz, which is 21 miles long, and the western line from Reutte to Griessen, which is 20½ miles long, pass through Austrian territory. The intermediate Scharnitz-Garmisch-Partenkirchen-Griessen section, which runs through Bavaria, is about 25 miles long.

The Alpine character of the territory is indicated by the fact that on the two Austrian sections there are eighteen tunnels with a length of 1412 ft., in addition to many bridges and viaducts. The difficulties offered by the nature of the ground formed one reason for selecting electric trac-

supplies energy to the 600-volt d.c. city lines of Innsbruck.

The Mittenwald Railway also has a power station of its own situated about 3.8 miles to the south of Innsbruck in the vicinity of the Sill works. This station contains two 3000-volt, single-phase, fifteen-cycle generators, having a continuous rating of 3000 kva and a maximum output of 4500 kva each. The energy from each generator is led to a 50,000-volt oil-and-water-cooled transformer which forms an inseparable unit with its generator. No 3000-volt busbars or switches are therefore needed, thus insuring extreme simplicity in all switching operations. The two



Mittenwald Railway—The Mittenwald Locomotive Drawing an 1100-Ton Train on the Dessau-Bitterfeld Section of the Prussian State Railways

tion because it permitted the most economical ruling grade, namely, 3.64 per cent. The railway reaches a height of 3786 ft. above sea level at Seefeld, a difference in level of 1968 ft. being overcome within 13.1 miles. The saving effected against steam by shortening the constructional length at least 2½ miles at the most difficult part, without losing possible traffic, amounts alone to more than the total cost of the electrical equipment.

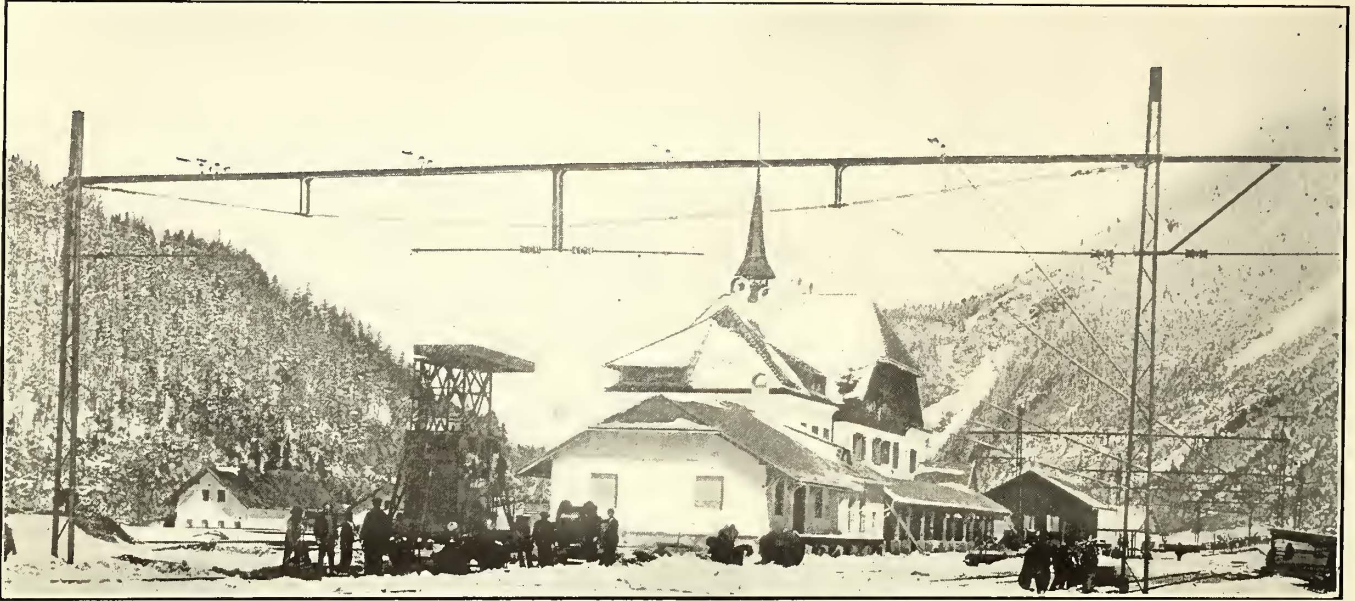
transformer stations, which will also supply current to the Bavarian lines until the completion of the Walchensee plant, are located at Reith, 12 miles from the eastern, and at Schanz, 2 miles from the western boundary of Austria.

TRANSMISSION LINE

The 50,000-volt transmission line is carried principally on the poles of the overhead contact line and consists of two wires each of 35 sq. mm (approximately No. 2 B. & S.)

section. As part of it is in a district which is difficult of access in winter, great care was necessary in design and construction. On this account a portion of the line consists of three wires, two of which are usually in service, the third serving as a reserve. The latter can be switched in as required to replace a defective wire. As a protection against

stresses caused by the rapid passage of the current collector. The Allgemeine company found that a special form of disk link suspension insulator was the only suitable type for these conditions. As is well known, porcelain can be regarded only as a perfect material for compression strains because it possesses little tensile strength and has



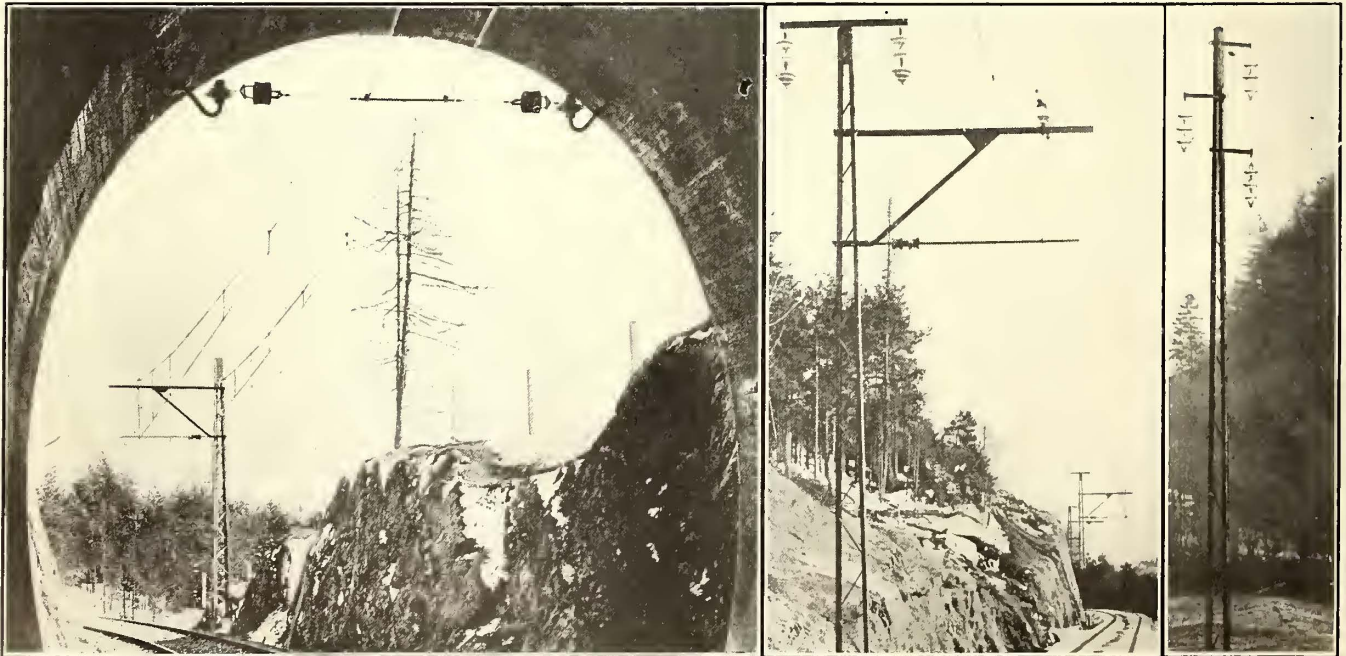
Mittenwald Railway—Plain Catenary Suspension and Bridge at the Scharnitz Station

atmospheric discharges a copper wire is mounted above the high-tension line on the tops of the poles and is grounded to the depth of ground water at each pole. The steel lattice poles employed exclusively for carrying the line are erected 262 ft. apart.

Insulators for transmission lines are as a rule subjected to comparatively little mechanical strain, since severe vibra-

no flexibility. These conditions can be met satisfactorily only by the link suspension insulator, which is not subjected to a tensile or bending strain in any part. The insulator selected is especially suitable for anchoring the contact line, and although it weighs only 6.2 lb., it possesses a breaking strength of 17,160 lb. to 17,600 lb.

A fundamental difference as compared with other sus-



Mittenwald Railway—Span and Bracket Construction for Tunnel and Open Line; Transmission Pole Construction

tions are no longer set up when the line is once completed, but when the transmission line is carried on railway poles the conditions are different. Then the direction of the line is determined by the situation of the railway, as in this case, it may have to follow an uninterrupted series of sharp curves. In addition, the poles are subjected to the

pension insulators, particularly the American types, is that the grooves have no round section; also, in place of the wire ropes which rust under exposure, steel bands, which lie with their entire surface flat on the porcelain and do not injure the glaze, are employed for attachment. When the work of erection is finished the grooves are filled up

in order to prevent the penetration of water and freezing. The insulators have jointed fittings which take up all movement and thus prevent the wear of the grooves and the injury of the glaze.

CONTACT LINE

The contact line is carried entirely on lattice poles which are placed 262 ft. apart on tangents. Catenary suspension is used but without automatic tension take-up devices, because the many sharp curves entail much friction and make it impossible for the customary tightening devices to work with reliability. Such arrangements are superfluous in this case as the poles are flexible and thus tighten the contact line themselves at the curves.

LOCOMOTIVES

The Mittenwald Railway has nine 800-hp locomotives for service on the Innsbruck-Landesgrenze and Bayern-Garmisch-Partenkirchen lines (35.3 miles). The maximum grade of 3.64 per cent occurs frequently. A locomotive can draw a gross car weight of 125 metric tons on this grade at a speed of about 18.6 m.p.h. This corresponds to a tractive effort of approximately 16,500 lb. The small train weight may give rise to the impression that large outputs do not come into question. Nevertheless, one of these locomotives was in service for trial purposes for several months on the Dessau-Bitterfeld line of the Prussian State Railroads, during which period it drew freight trains of 1100 metric tons in the regular scheduled service.

Each locomotive has a service weight of 53 tons. The current is taken from the contact line by means of two bow collectors with sliding contacts and is led through a bare high-tension conductor carried over the roof to a lightning arrester choke coil and then to the transformer compartment, where it is connected to a high-tension oil switch which is operated directly by means of a knife switch from the motorman's front cab. Between the lightning arrester choke coil and the oil switch a grounding switch is connected up to close automatically as soon as the protecting cover of the oil switch is removed. The current passes from the oil switch to the primary winding of the power transformer and flows thence through a high-tension current transformer connected in series directly to ground. The secondary winding of this current transformer feeds the maximum cut-out coil of the oil switch and two ammeters in the engineer's cab.

The traction motor is a twelve-pole single-phase commutator motor of the repulsion type, with a normal rating of 800 hp when running at a speed of 18.6 m.p.h. The motor is regulated by means of contactors which are connected to the taps of the power and exciter transformers and operated by the 300-volt control current.

Each of the two controllers has two separate drums, one to operate the contactors for the power transformer and thus regulate the output and the second to operate the exciter contactors for the control of the excitation. Each position of the output drum can be combined with all the positions of the exciter drum. Owing to this separate pressure and field regulation, the field can be adjusted for any speed with the lowest possible kva consumption of the motor. The locomotives can be run in pairs on the multiple-control system to draw train weights up to 250 tons.

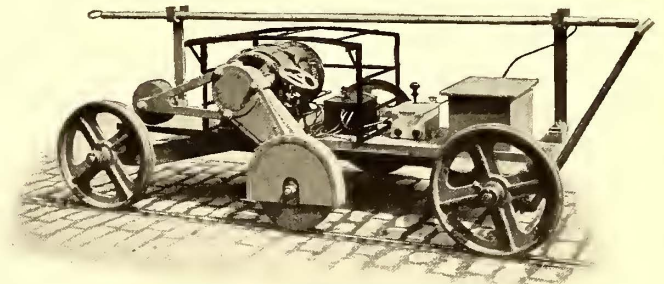
In honor of the visit made to Germany this summer by the American Society of Mechanical Engineers upon invitation of the Verein Deutscher Ingenieure, the latter organization has prepared a guide book of 171 pages. This book, which is printed in English and German on facing pages, describes the points of interest in each locality to be visited, laying particular stress, of course, on matters relating to engineering and technical education. The itinerary shows that the American delegates arrived at Hamburg on June 19 and that the official visits and receptions will terminate at Munich on July 8.

PORTABLE RAIL GRINDER WITH DRILL

The Consolidated Accessories Company, London, England, is building the "Norwich" grinder, shown in the accompanying cut. The grinder is light enough to permit two men to remove and replace it on lines with a five-minute headway, yet its weight of 1100 lb. is so distributed that practical freedom from vibration is assured. The truck of this grinder has two flanged wheels, which run on the rail 6 ft. apart at centers, and a third wheel which has no flange. This enables the machine to be moved more easily from the track and to run around curves with but little friction.

The 4-hp, 1500 r.p.m. motor used for the drive is furnished with a sleeved shaft bearing which carries a toothed quadrant. One end of the double cantilever arm bolted to the quadrant carries the grinding wheel and the other end a counterweight. The arm is swung into and held firmly in any required position by the rotation of a hand-wheel attached to a worm which engages with the teeth in the quadrant. The lowest end of the arm carries a spindle having a sprocket wheel at its inner end and a grinding disk at its outer end. This disk is driven at motor speed by means of an adjustable endless silent-chain drive between the sprocket wheel and a similar wheel on the armature shaft.

The 14-in. diameter grinding disk has a lead-bushed center and is clamped between thick rubber washers by two



Side View of Portable Rail Grinder with Wheel in Position for Grinding

steel flanges. The inner flange is fixed to the spindle, but the outer flange is detachable so that disks are easily exchanged. Smaller disks are used for deepening grooves in the rails and other special purposes. Cutters are so installed that the disk can be trued up while running in place.

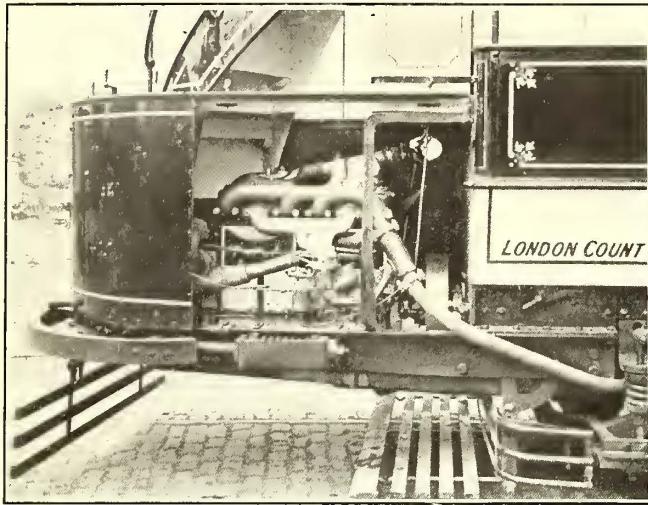
The drilling attachment enables holes to be drilled and reamed in rails, switches, etc., either when in position in the track or when lying in the yard. Holes may also be readily drilled in trucks, etc., without removing or dismantling them. Bevel gearing permits a drill speed of 775 r.p.m.

While the motor is running one operator moves the truck to and fro along the rails a distance of 6 ft. to 9 ft. at a speed not exceeding 6 ft. to 8 ft. per minute. The second operator walks by the side of the machine adjusting the feed until the surface of the rail reaches the required condition. It is not necessary to pour water on the grinding disk, but in dry weather it is considered advisable to water the rails in order to get a good ground return for the motor.

A passenger car may be allowed to approach within about 300 ft. of this grinder. The disk must then be raised, the motor stopped and the current collector pole laid in the crutches. One operator, by placing his arms under the T-handle and crossing his hands over the sloping part of it as low down as possible, can then lift the nearest flanged wheel out of the groove of the rail and slew the truck, after which it may be drawn to one side of the road in time to enable the car to pass without any interference with its schedules.

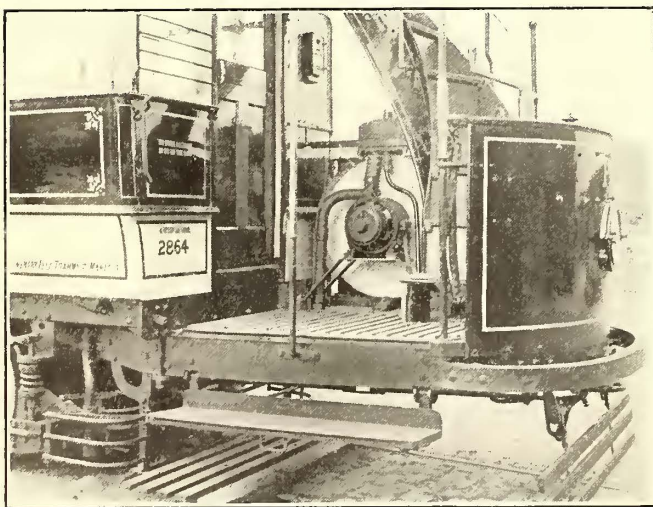
GAS-ELECTRIC CARS FOR LONDON COUNTY COUNCIL TRAMWAYS

The London County Council Tramways has recently placed in experimental operation three petrol or gas-electric double-deck cars for use on lines in the East End where overhead operation is not permitted and conduit construc-



London Gas-Electric Car—Part of Dash Removed to Show Generating Set

tion would be too costly. The car is 27 ft. long over all, the platforms alone requiring 6 ft. 3 in. each. The present equipments, according to A. L. C. Fell, chief officer of the tramways, are converted horse-car bodies which were used in order to save time. These cars were stripped to their wheels, platforms, staircases and canopies. They were mounted on new underframes and platforms, constructed of standard rail steel sections and arranged to take the engine, generator, radiator and other parts of the gas-electric equipment. The canopies were rebuilt as far as possible in line with the corporation's standard electric cars, and the upper deck seats were rearranged accordingly. The new stairways have removable bottom treads and risers to give access to the engine magneto. The car is carried



London Gas-Electric Car—Radiator

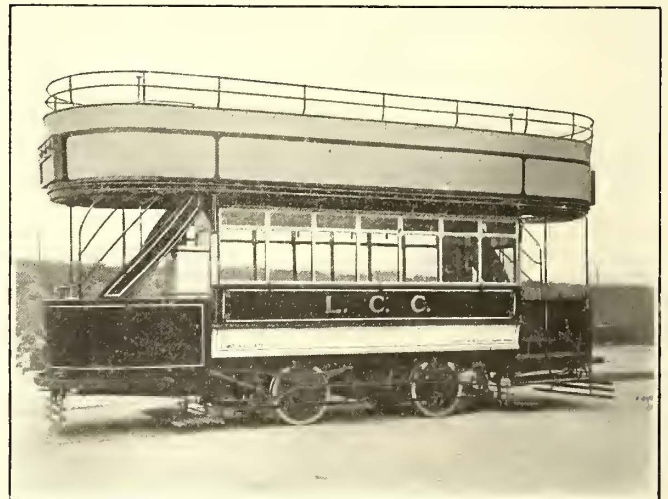
on two axles running in ball bearings through long laminated bearing springs which are fitted with auxiliary coil springs and rubber cushions. A light sub-truck supported directly from the journal boxes through the medium of rubber pads carries the brake rigging and other details which are required to maintain practically constant relationship

with the track level. The sub-truck, however, does not support any of the weight of the car body or passengers. The platforms have spring control fenders to protect the engine and equipment from shocks arising in the event of contact with other vehicles. Each car seats twenty passengers on the lower deck and twenty-eight on the upper deck.

GAS-ELECTRIC EQUIPMENT

The electrical equipment and 40-hp engine were designed and manufactured by W. A. Stevens, Ltd., at Maidstone. The two electric motors, geared 6:1, are of the series interpole type. The maximum load on each motor is 20 brake-hp, but each is capable of developing 40 hp sparklessly for a considerable time. Either motor can run the car on level roads. The generator is of the shunt-wound interpole type, with a maximum potential of 350 volts. The engine, which has a bore of $4\frac{3}{4}$ in. and a stroke of $5\frac{1}{2}$ in., develops well over 40 brake-hp at 1000 r.p.m. This speed is necessary only on the hills, and in ordinary service the average speed is about 700 r.p.m.

The engine and generator are mounted on a pressed steel frame which is suspended on the platform bearers in such a way that the power unit is easily removable for exchange in case of a breakdown. The water circulation is pump-driven. The radiator is on the end of the car opposite to the engine and generator but occupies the same relative position under the stairs. The radiator fan is



London Gas-Electric Car—Double-Deck Horse Car After Conversion

mounted directly on the shaft of a small series-wound motor, supplied from the terminals of the generator. The fan is in operation only when the generator is supplying energy to the motors, but as the engine is throttled down at all other times, the cooling is ample.

The control of the first three cars is effected by the engine throttle, a controller by which resistances are put in circuit with the shunt winding of the generator, or, alternatively, the fields of the motor can be shunted by successive resistances. In addition, a reversing switch for the motor armatures is provided. Double-end control is used.

It is possible to supply the motors from either the overhead or conduit supply as an alternative to the self-contained generator, so that cars can be run either purely electric or gas-electric. As no electrical circuits are made or broken in running, the acceleration is very smooth and rapid. The car is lighted by means of metallic-filament lamps from accumulators automatically charged by an independent dynamo, which is driven by means of a flexible belt from a pulley secured to one end of the motor armature shaft.

LONDON LETTER

(From Our Regular Correspondent)

The Brighton Town Council has decided to install a system of trolley omnibuses and adopt the "under-running" trolley. The first route will be from Preston village to New Road, a distance of about 2 miles. By utilizing the existing wires in London Road the cost will be £5,600, the overhead equipment costing £3,200, three cars £2,250, and miscellaneous items £150. The capital charges on this sum will be £486 a year, or 1.32d. per mile. The operating expenses are expected to be 6.50d. per car mile, making the total working cost 7.82d. per car mile. The average receipts will probably be at least 8d. per mile. Before the extension can be constructed along the main through route to the western boundary of the borough, an agreement will have to be made with the Hove authorities as to the type of equipment. If an agreement cannot be effected a Board of Trade arbitrator will specify the system to be adopted.

The question of preventing splashing by motor buses is being considered and a guard, the invention of H. V. N. Graveley, has recently been placed on a number of Messrs. Tilling's motor buses. The guard is placed at the side of the wheel near the ground. The guard itself is composed of rubber, and is supported from a central bearing in the form of a hanger block which surrounds the axle box or hub of the wheel. Side arms attached to the frame of the guard in turn support this hanger block. The hanger block is fitted with ball or roller bearings. Devices are also provided to keep the mudguard in a proper position, but allow for lateral motion.

The fifth annual congress of the Tramways & Light Railways Association was held on June 12 and 13 at Blackpool. After the usual reception by the Mayor and members of the Corporation and Boards of the Blackpool & Fleetwood and Blackpool St. Anne's Companies, a paper, "Possibilities for Increasing Profits on Interurban Lines," was read by E. H. Edwardes, general manager of the Lancashire United Tramways. This was followed by a paper, "Tramway Track, 1883 to 1913; a Résumé from a Manufacturer's Standpoint," by Fred Bland, of the firm of Edgar Allen & Company, Sheffield. After lunch, the delegates were taken to Lytham in special cars, and in the evening a banquet was tendered by the Mayor and Corporation of Blackpool. On the following day, a paper, "Railless Traction Legislation," was read by H. England, general manager of the Yorkshire (West Riding) Electric Tramways. This was followed by a paper, "Standard Rules for Motormen and Conductors," by A. V. Mason, general manager of the South Metropolitan Electric Tramways & Lighting Company. In the afternoon special cars were provided for a trip to Norbreck and Fleetwood, where a steamer was boarded for Barrow and Furness Abbey. In the evening the return was made to Blackpool, where the annual supper was served and the dance held.

The finance committee of the London County Council has reported that the surplus on the tramways undertaking as a whole for the year ended March, 1913, was £739,000, which is nearly £202,000 less than the original estimate, showing a serious falling off month by month. After the full statutory charges have been met there is a balance of only £500, to be transferred to the renewals fund instead of £150,000, the amount estimated to be necessary for this purpose. The average passenger receipts per car mile have fallen from nearly 1s. in 1901 to about 9.73d. this year, owing to the severe competition of the motor omnibuses and the underground lines.

The London County Council has been looking forward to the installation of trackless trolleys, four separate schemes being included in the recent bill in Parliament. This bill has passed its second reading, but a clause has been inserted stating that the overhead wires for the trackless trolleys can be erected only with the sanction of the borough councils in whose districts the lines are to be built. This means that the borough councils have received the power to veto, and the London County Council has decided to abandon the trackless trolley for the present.

The Council is still pursuing its experiments with petrol-electric tramcars, which will become more important than ever now that the use of the trolley omnibuses has been

barred. Some solution must be found for the problem of equipping districts where it would not pay to install the underground conduit system. These petrol-electric tramcars have been specially designed and manufactured by the engineering department of the London County Council. They were equipped with petrol engines, electric generators, electric motors and controllers, by W. A. Stevens, Ltd., London and Maidstone. The engine driving the electric generator is of the same type as that used on the Tilling-Stevens petrol-electric omnibus, and the experiments as applied to tramway work have been quite successful so far.

The Liverpool tramways committee, which has been experimenting with the plan which is in operation in London of numbering certain tramway routes, has decided to apply the scheme to all the routes in Liverpool.

The experiment of collecting certain fares on the platforms of the cars on a few of the routes in Leeds is to be extended over the whole of the system for a period of six months, at the end of which time the general manager is to report on the subject.

The London Suburban Traction Company, which has been formed to amalgamate the Metropolitan Electric Tramways, Ltd., and the London United Tramways, Ltd., has acquired a controlling interest in the South Metropolitan Electric Tramways & Lighting Company. Thus, with the exception of the London County Council Tramways, all the tramway and motor bus services in the Metropolitan area are under one control.

The London & Southwestern Railway has let the contract for motors and train equipment for the first portion of its electrification scheme to the British Westinghouse Electric & Manufacturing Company, Ltd., Manchester. It is purchasing the conductor rails from Bolckow, Vaughan & Company, Middlesbrough, and these will be laid under the supervision of J. W. Jacomb Hood. The high-tension cables are being obtained from Siemens Brothers & Company, Ltd., Woolwich. The contract for the power house has not yet been let, but it is understood that 10,000-kw and 5000-kw units will be installed, generating at a pressure of 11,000 volts. The order for substation equipments has been placed with the British Thomson-Houston Company, Ltd., Rugby. The first section to be completed will comprise two lines to Hampton Court. The electrical work is being carried out by Herbert Jones, the company's electrical engineer. The work in its entirety is under the supervision of Messrs. Kennedy and Jenkin.

In connection with the electrification of the London & Northwestern Railway between London and Watford, the Maschinenfabrik Oerlikon of Zurich has obtained a contract to supply the electrical equipment, including motors and control apparatus, for forty-three trains. Tenders for the power house equipment have been invited from a selected list of British and foreign manufacturers.

Encouraged by the success which Liverpool has achieved by adopting first-class cars on certain routes, the tramways committee of the Birmingham City Council has under consideration suggestions from a deputation of Birmingham citizens who desire to see first-class cars adopted on certain routes in that city. Many members of the deputation were in favor of single-deck cars only. The committee has promised to consider the proposal to adopt first-class cars and single-deck cars. The committee is also interested at present in the question of providing the necessary links to the various tramway terminals in the center of the city, it having been agreed that these terminals should be connected so as to provide for through-running. The committee is awaiting the opinion of the city surveyor, who has had to be consulted with reference to the widenings and difficulties which might arise in regard to the streets along which these connecting links should be constructed.

The Manchester tramways committee has decided to extend its policy of reducing passenger fares. The decision of the committee was influenced by a report of J. M. McElroy, the general manager. An experimental reduction of fares on certain routes during a period of three months showed a large increase in the number of passengers carried and a small increase in the total receipts, but a slight decrease in the average fare per passenger carried and the average receipts per car mile.

A. C. S.

News of Electric Railways

Kansas City Receivers' Report to the Court

The receivers of the Metropolitan Street Railway, Kansas City, Mo., have filed a report with Judge William C. Hook in the United States Court at Kansas City, Mo., in which they review the recent progress of the company in part as follows:

"On Jan. 2, 1912, an opinion was handed down by the court, suggesting to the receivers that they ascertain whether the cities were willing to enter into negotiations for a new franchise, and if so, whether they were authorized to act. Kansas City, Kan., has always expressed a willingness to negotiate, conceding that inasmuch as the larger portion of the property was in Kansas City, Mo., it was first necessary to make some arrangement with the latter, and that negotiations in Kansas should be suspended until some conclusion was reached in Missouri. Thereupon negotiations were begun with Kansas City, Mo., and continued without result during the administration of Mayor Brown. Upon change in the administration, negotiations were again opened with Mayor Jost.

"On Feb. 15, 1913, Bion J. Arnold filed his report, fixing a valuation of \$36,800,000, of which \$35,000,000 represented the value of the Metropolitan Street Railway and Kansas City Elevated Railway, and \$1,800,000 that of the Kansas City & Westport Belt Railway. This valuation subdivided consisted of \$23,335,034 for the cost of reproducing the physical property less depreciation, and \$13,491,541 representing intangible elements, such as going concern and earning power, which are part of the actual value.

"L. R. Ash, an expert, made a valuation for Kansas City, Mo., for so much of the property as was within that State. He has since estimated the value of the entire property, tangible and intangible, at not less than \$32,000,000, of which the depreciated cost of reconstruction is \$22,000,000, and the intangible elements \$10,000,000. However, the basis upon which this estimate proceeds is deemed to be clearly erroneous, because in calculating the present value of future earnings, there is charged interest at 6½ per cent on an assumed indebtedness of \$28,700,000. The difference between the experts, as to the cost of reproducing the physical property, less depreciation, is \$1,335,034. It would appear that the properties, at their lowest valuation, ought not to be estimated at a value of less than \$35,000,000.

"There have been repeated meetings between the receivers and Mayor Jost and his advisers, and so far it has been impossible to reach an agreement. Finally, however, both sides conceded that the basis upon which a new contract should rest should be this: There should be an agreed capital value, to which should be added from time to time all expenditures for new capital. Upon this capital value there should be a fixed cumulative interest return. The city should have reserved the right to purchase and acquire the property when half the capital had been paid, subject to an indebtedness for the other half. Under any such plan the city should have a substantial voice in the management of the property.

"In the meantime there matured, upon May 1 and May 15, 1913, street railway bonds aggregating \$12,242,000 and bondholders are demanding their money. It, therefore, has become necessary to make some kind of a contract, even if there should be a substantial loss in value. Bearing this in view and recognizing the claims of the city as to a lesser value, the receivers finally submitted two alternative propositions for a settlement, upon the basis of a 5-cent fare.

"The opinion of the receivers is that the \$30,000,000 valuation and the rate of interest to be received thereon are too low. The receivers think the city has recognized this to some extent. To ameliorate this situation, the first alternative proceeds upon the idea that the right to such higher rate and valuation is to be cared for by the right of immediate participation, thus making this wholly contingent. The second alternative fixes the present valuation of this contingency, lowering the rate of interest and adding to capital the sum of \$5,000,000.

"Mayor Jost, however, rejected both suggestions, and

presented a substitute. The receivers are not agreed as to whether an adjustment should be made upon the basis so suggested by the Mayor, in view of the fact that the right of participation is deferred. Many of the stockholders think the Mayor's plan is destructive of their interests. Many of the bondholders have expressed a determination that under no plan will they exchange their securities, but that any plan must provide for the actual payment of their claims in cash. In view of the situation, the matter is submitted to the court for its information and for such other and further orders as may be deemed proper."

The following statement was made recently by Judge Hook after listening for more than two hours to the presentation of statements in regard to the details of the negotiations between the receivers of the Metropolitan Street Railway and Mayor Jost for an extension of the franchises of the company:

"I am inclined to favor the Mayor's position. I will consider the matter further so as to make sure in my own mind. Then I shall write to Mayor Jost, the Mayor of Kansas City, Kan., and the receivers."

On opening the proceedings Judge Hook said that he wanted it understood that he did not propose to interfere with the powers of the two cities to make their own contracts with the company, and that he would not do more than assist in solving some of the fundamental points involved.

Proposed Detroit Ordinance.

As stated briefly in the *ELECTRIC RAILWAY JOURNAL* of June 28, 1913, Mayor Oscar B. Marx of Detroit, Mich., presented a draft of his proposed street railway ordinance to the Common Council on the evening of June 24 and it was referred to the franchise committee. The ordinance provides for straight 3-cent fare, universal transfers, extensions, payment of alleged back taxes and rentals, ultimate acquisition of the lines by the city, etc. Under the conditions laid down, the ordinance need not be submitted to a vote of the people, but Mayor Marx stated that he would not oppose this step. After the company has agreed to sell the property to the city, the question of paying the price which has been fixed will be submitted to a vote of the people. If a purchase price cannot be agreed upon, Mayor Marx expects to resort to condemnation proceedings. An abstract of the ordinance, omitting two of the sections, follows:

"Section 1. Said company shall upon the terms hereinafter set forth from day to day only, and at the city's will solely, operate on the streets where its franchises have expired or upon streets where it may build additional lines.

"Section 2. The fare for a single ride over any route in Detroit shall be 3 cents or a ticket which the railway shall sell on its cars in strips of packages of five tickets for 15 cents throughout the twenty-four hours of the day. A passenger upon the presentation of a fare may demand a non-transferable transfer slip good for a continuous ride over any other route. The company may adopt rules so that no transfer shall entitle a passenger to a return trip. The 3-cent fare shall apply to Palmer Park.

"Section 3. The company shall build or construct the foundations and maintain the same underneath its track, subject to the approval of the commissioner of public works, and shall pave between the tracks and for a distance of 12 in. from the outer rails of said tracks, and keep the same in repair with such material as shall be specified by the commissioner of the department of public works.

"Section 4. The railway shall in 1913 on streets to be designated by the Common Council construct, maintain and operate a crosstown line in the western part of the city on or near Junction Avenue and a line between Baggs and High Streets. The company shall construct, maintain and operate such lines of railway on other streets and such extensions as the Common Council shall on a two-thirds vote thereof

demand, provided the demand in miles shall not beyond the above named extensions exceed an average of 5 per cent per annum of the then and thereafter existing city street railway system excluding curves and switches. If the company fails to build such extensions within the time specified the city may build the same, and the company agree to operate thereon and pay the city a reasonable rental for the use of the extensions. For the recovery of such reasonable rentals in case the parties are not able to agree thereon suit may be instituted by the city in the Wayne Circuit Court. In the construction of lines and extensions the city shall appoint agents to supervise the work of construction and purchases of materials, and to audit all accounts and expenditures for materials and labor, and have the right to inspect and audit the books and accounts of the railway in connection with the cost of such works.

"Section 5. No permanent or continuous rights are given to the railway, but in case the city shall hereafter not elect to purchase and shall order the removal of the railway from the streets where franchises have expired or where no term franchises have been given, the city agrees that reasonable compensation shall be made for such new construction or extensions as are herein provided for and shall hereafter be made upon the order of the city, such compensation to be fixed by the Wayne Circuit Court in chancery before or after the removal of the railway at the option and will of the city; but in fixing such compensation due regard shall be had and due allowance made for depreciation and profits already received by the railway out or such extensions or new construction. Under no circumstances shall the construction of such cross-town lines or extension be construed or deemed to come under any existing or term franchise whatsoever, but only under this day to day arrangement.

"Section 6. It is agreed that all the franchises and all the franchise rights heretofore granted by the city or any other municipality to the company, where the streets are within the limits of the city, shall be revocable at the will and upon the option of said city, provided such franchises shall not be revoked (unless they expire by limitation) until the city is prepared by law to purchase and take over the said railway system as herein specified.

"Section 7. The chief purpose of the city in passing this ordinance (in addition to lower fares) is to enable the city to own and operate its own street railway system. To that end the company agrees to sell to the city at the option of the city, to be exercised at any time within _____ after this ordinance takes effect, all the railway property, etc., constituting its system at a fair and reasonable price. In case the company shall fail or neglect or refuse to sell said property at the option and on demand of the city, the sale may be specifically enforced in the Circuit Court for the County of Wayne, in chancery, in which the court may fix and establish the fair and reasonable price to be paid for said property and shall enforce the transfer and conveyance of said property free and clear as the court may determine. Before such option shall be exercised by the city, a referendum to the people as to the plan of purchase shall be taken on submission by the Common Council. This provision shall not be construed to bar the city from taking condemnation proceedings to acquire the street railway system or to take other steps to municipal ownership if it so elect.

"Section 8. The right is hereby reserved to the Common Council to make by ordinances such rules as may be deemed necessary in running cars.

"Section 9. All differences between the company and its employees shall be settled by arbitration, wherein the said railway selects one arbitrator, the employees another arbitrator, which two arbitrators shall choose a third arbitrator, and upon the failure of said two arbitrators to select a third, the Mayor of the city shall appoint such third member of said board of arbitrators.

"Section 10. As a condition precedent to this ordinance going into operation, it is hereby provided that the company shall pay to the treasurer of the city \$200 per day from July 24, 1910, up to and including the date when this shall become effective for rights and privileges exercised by it in the streets of Detroit heretofore without the consent of the city of Detroit, and also the city taxes on

the property of the Detroit railway for the years 1910, 1911 and 1912, as shown by the books in the city treasurer's office.

"Section 12. This ordinance shall not affect the liability of company and its property for future taxes, including all city, State and county taxes assessed during 1913.

"Section 13. All ordinances or parts of ordinances or resolutions contravening the provisions of this ordinance are hereby repealed and revoked.

"Section 15. This ordinance shall take effect five days after written acceptance thereof shall be filed by the company with the city clerk. And while this ordinance shall be in force, the enforcement of the decree in the case of the City of Detroit against the Detroit United Railway, No. 37,446, in the Circuit Court of the County of Wayne, in chancery, known as the Fort Street rental case, shall be suspended."

In a message which accompanied the ordinance, the Mayor said in part:

"In the preparation of this ordinance, extreme care has been exercised to guard against the insertion of language that might grant a new lease of life to the company or in any way impede the city's progress toward municipal ownership. I am firmly convinced that a just rate of fare, extensions necessary for the welfare of the city or comfortable and adequate service will never be obtained until the city owns and operates the system. Instead of retarding the progress of municipal ownership I believe the ordinance will hasten the day when the city will be possessor of the street railway property.

"The city, not the company, is the one to dictate on what terms the company shall occupy our streets, and I recommend, in case the company refuses to accept the terms of this ordinance with what changes your honorable body may deem advisable, that it shall be ordered from our streets."

At the regular monthly meeting of the board of directors of the Detroit United Railway, held on June 25, the ordinance presented to the Common Council by Mayor Marx was discussed, but no statement was made public as to what transpired at the meeting.

It is probable that the demand of the motormen and conductors for an increase in wages will be submitted to arbitration. The present scale is 25 cents for the first six months, 28 cents for the next five years and 30 cents thereafter. The men ask for 28 cents, 30 cents and 35 cents respectively, and also request that the time they shall be on call be reduced from thirteen hours to twelve hours. They further stipulate that they shall not work less than eight hours nor more than ten hours.

The Michigan Supreme Court has adjourned until October. The adjournment has the practical effect of delaying further steps toward municipal ownership until fall. When the Circuit Court declared illegal the \$250,000 appropriation for a motor bus line, the street railway commission was left dependent on its power to issue bonds for funds to proceed under the charter.

Rapid Transit Matters Acted Upon by the Massachusetts Legislature

The work of the Legislature of Massachusetts has been followed from week to week in the *ELECTRIC RAILWAY JOURNAL* since the opening of the session of 1913 in January, and the progress of the various measures through the houses has been noted. A feature of the work of the session was the passage of measures in regard to rapid transit in the Boston metropolitan district. Nothing has accomplished in regard to the electrification of the steam lines out of Boston, but a number of other measures were passed of considerable interest. One of the acts passed provides for the construction of a double-tracked subway in place of the authorized elevated railway contemplated for Malden and Everett, with a bridge and rapid transit connection between the Mystic River and Sullivan Square terminal station.

Another act provides for the removal of the existing elevated structure in Charlestown and the construction by the Boston Transit Commission of a subway for tunnel trains between the northerly end of the Washington Street tun-

nel, or City Square, Charlestown, and Sullivan Square. Upon acceptance of the act by the Boston Elevated Railway the subway is to be built upon the proceeds of bonds of not more than 4 per cent interest or fifty years' term, and a rental of 4½ per cent upon the net cost is to be paid by the leasing company. The existing elevated structure is to be removed as a part of the cost of the subway. In the case of the Everett-Malden subway, a provision is inserted for purchase by each city of that portion of the line within its boundaries, at any time after twenty years from opening, or before, on agreement with the railway, as in the case of the present Cambridge subway.

The Boston Transit Commission is ordered in another act to investigate the cost of locating the easterly terminus of the Boylston Street subway at Post Office Square instead of at Park Street, with detailed route recommendations to the next Legislature. The act provides for the temporary connection of the subway with the existing Tremont Street subway in a new incline near the Public Garden.

An act was passed designed to eliminate the penny toll collected by the city of Boston through the Boston Elevated Railway from each passenger in the East Boston tunnel, with a referendum to the voters at the next city election. The act provides that the city may appropriate from the tax levy annually until June 10, 1922, the sum of \$125,000 to be added to the rental received from the railway company, provided that the holders of the bonds issued to pay for the construction of the tunnel consent to a waiver of the pledge expressed on their face to the effect that the whole amount of tolls collected from passengers through the tunnel shall be used to meet the principal and interest of the bonds.

A resolve was also passed directing the Boston Transit Commission to estimate the cost of constructing a double-tracked tunnel under Boston Harbor for the use of electric railway cars operating on the Boston-Chelsea route, with a recommendation as to terminating on the Boston end at Haymarket Square or Scollay Square. The commission is to report to the next Legislature. A resolve also orders the commission to report upon the cost of removing the existing elevated structure from Washington Street, Boston, between the southerly end of the Washington Street tunnel and Dudley Street and to hand its findings to the next Legislature. Another report is required by the commission to the next General Court upon the advisability of connecting the Dorchester tunnel authorized by the acts of 1911 with the South Station. The commission and the Railroad Commission, sitting as a joint board, are required to investigate the service rendered by the Boston Elevated Railway and the Bay State Street Railway in the Boston metropolitan district and to report their recommendations, if any, to the next Legislature.

Acts were also passed authorizing the construction of the Boston & Western Electric Railroad, and extending the time for the compliance of the Boston & Eastern Electric Railroad and the Boston & Providence Electric Railroad with the statutes under which they were organized.

The Roanoke Strike

In commenting editorially in its issue of June 27 on the strike of the employees of the Roanoke Railway & Electric Company, Roanoke, Va., and its lessons the *Roanoke Times* said in part:

"Probably the departure of Organizer Colgan marks the end of the street railway strike in Roanoke. There is reason to believe that some of the most loyal of the strikers, after standing out fifty-seven days, have offered to return to work. We may regard the strike as ended and engage in some moralizing and thought over it. In the first place, the strike and its management and pretext were wrong. The one possible pretext was the discrimination in punishment between union and non-union employees offending against rules of discipline understood by everybody to be necessary for the conduct of every public service corporation or any concern dealing with the public. Everybody knows that certain standards of discipline must be maintained and that somebody must be the final and deciding judge. In matters of law and property rights we go before a judge or jury or both. When we accept employment with a corporation or person, we accept the rules and make ourselves

subject to somebody's decision. It is entirely right that we organize to protect ourselves against oppression, overwork, under-wages or manifest injustice. Making trivial points on doubtful issues is a different thing.

"The average union man does not attend a meeting of his union once in three months. He leaves a few professional union men to run the meetings. Half the time when he attends he is so afraid of being accused of being weak-kneed or of lacking backbone—two sins the average American man most earnestly hates and the two taunts he most bitterly fears—that he sits silent or votes with the man his sense tells him is talking flub-dub and hot air, just because he is afraid of being called a coward."

Subway Plans in Chicago

Mayor Harrison of Chicago sent to the City Council on June 30 the drafts of two subway ordinances which he wants to submit to the people for vote in April, 1914. He also sent a special message on the subject. One of the proposed ordinances relates to the subway in the central business district for the elevated lines and the other provides for an independent system of subways throughout the city, to be built by private capital and operated without reference to existing transportation lines.

The two ordinances and the message of Mayor Harrison were referred to the local transportation committee. Mayor Harrison said in part in his statement to the Council:

"There is serious and continuing criticism on the part of the public of the failure of the City Council and the administration to proceed constructively toward developing a policy of rapid transportation which may be made effective at an early date and thus bring relief to the public, now subjected to intolerable delays, inconveniences and discomforts because of the outgrown transportation facilities of the community."

The ordinance relating to the general system of subways outlines the routes recommended by the Harbor and Subway Commission. It provides for a board of control with jurisdiction over physical and financial matters. An amortization fund is to be created to amortize the entire capitalization during the life of the grant, or the city may acquire the system at any time on payment of the fair value.

Mayor Harrison proposed that bids be requested from private corporations and that the decision on the question of development by means of an independent subway or by a terminal subway for the elevated lines be left to the voters.

The committee on local transportation failed to reach a conclusion on the proposed terminal subway ordinances for the elevated lines which it has had under consideration in time to make a report to the City Council on June 30. In their negotiations with the sub-committee the elevated companies agreed to pay the city an average of 5 per cent on the actual cost of construction on a downtown subway for a period of twenty years, provided the cost should not exceed \$17,000,000. The scale of compensation offered was as follows: 1 per cent for the first five years; 2 per cent for the next two years; 3 per cent for the next two years; 5 per cent for the next two years; 7½ per cent for the next three years; 8½ per cent for the next three years, and 5 per cent for the last three years. If any arrangement is made to continue the lease until 1944, when the last of the present ordinances expires, the companies will pay 5 per cent for the remaining years.

The offer of the companies is based on the removal of the union loop, provided that change is ordered by the city, as soon as the terminal subway is ready for operation.

Conference on Standards in Indiana

The Public Service Commission of Indiana has instituted a series of important conferences with experts in the lines of the various public utilities which exist in Indiana, to obtain information on which to establish a set of standards of quality of service of these companies. The first of this series of conferences was held on June 25, 1913, and related to gas. Three scientists, R. S. McBride, assistant chemist of the Bureau of Standards, Washington, D. C.; Prof. F. C. Mathers, of Indiana University, and Prof. John

White of Rose Polytechnic Institute, Terre Haute, Ind., were present, and explained to the Public Service Commission the technical and scientific side of the gas question. Similar conferences will be held in regard to street railway, interurban railways, express companies, electricity, water, telephone, telegraph and heating. The dates for these conferences have not yet been fixed by the commission.

It is explained by the commission that whenever a complaint is made to it—that the service furnished by any utility is inadequate, that the quality of the product which it serves is poor—the commission will send an inspector to make an investigation as to the justness of the charges made against the company. In order that the inspectors may have a basis on which to work the commission proposes to establish a set of standards of service which the public service corporations will be required to meet.

List of Questions Sent to Indiana Companies by Commission

The Public Service Commission of Indiana has asked the companies which come under its jurisdiction to answer the following list of questions before July 18, 1913:

What is the exact name of the utility? If a corporation, give the name and address of each officer of the corporation, including its board of directors.

To whom and what address should mail be sent when intended for such utility?

What is the actual value of all property of such utility?

State the amount of stocks issued by said utility and now outstanding.

If the utility is bonded, state for what amount; when such bonds were issued; when they mature and what rate of interest such bonds bear.

What is the actual value of all property of such utility which property is in the State of Indiana and is used and useful for the convenience of the public?

In the answer you make to the last question, how much have you estimated for "going value"?

For what amount was the property of such utility assessed for taxation in the year 1912?

In the production of what service or product is such utility engaged?

Is such utility engaged in the production of any by-product? If so, what?

What was the gross revenue of such utility in the year 1912, or the last fiscal year of such utility?

What were the operating expenses of such utility during the period mentioned in the last question?

Have you established a depreciation fund for such utility?

If so, what per cent do you set aside for such fund?

If you have established no depreciation fund, what per cent of the fair value of the property of such utility used and useful for the convenience of the public do you think ought to be set aside for a depreciation fund?

What was the net income or "deficit" of such utility for its last fiscal year?

What is the date of the franchise under which you are operating and for what number of years was it granted?

If your franchise fixes any rate or rates which you may charge for the service or product produced by such utility, give the particulars thereof in full.

What was the total production of such utility for its last fiscal year?

What was the cost per unit of service for the production for the last fiscal year of such utility?

What amount does such utility pay its officers in salaries?

State the amount received by each officer as salary.

The Cleveland Operating Fund for May.

It was shown at the regular monthly meeting of the board of directors of the Cleveland (Ohio) Railway on June 28 that \$245.35 remained in the operating fund for May under the new allowance of 12.1 cents per car mile. This is the first time in the last eighteen months that the company has been able to operate the road within the allowance. Since March 1, when the new allowance became effective under the direction of the board of arbitration,

there has been an operating overdraft of \$29,000. In a letter which the directors decided to send to the City Council, the company will say that it hopes to make up this deficit, but that the Council will be informed of the fact if this is impossible. The May report, however, showed a maintenance overdraft of \$61,586. While the book surplus was shown to be \$46,029, the large amount of money spent for repairs during the month caused an actual deficit of \$15,311. The directors have decided to sell the \$189,000 of stock held by Horace E. Andrews as trustee and use the funds for improvements. This will dispose of one of the questions that were before the board of arbitration.

In an interview Mayor Baker said that the city would assume the ownership of the property just as soon as the company refused to abide by the award or desired to sell the property.

Although the award of the arbitrators did not make it impossible for the company to create necessary deficits in the allowances, the management has a difficult problem on its hands. The public expects good service, but the city has placed a rigid limitation upon the amount that may be expended to furnish the service. The company can go no further in the direction of good service than its funds will allow and the service will depend upon the attitude of the administration and not upon the company or its officials.

Henry J. Davies, secretary of the Cleveland Railway, and Frank J. Kilfoyl, auditor, appeared before the State Tax Commission on June 27 and argued against a tax value of \$22,000,000 which has been fixed on the property. They asserted that the commission should adhere to the valuation placed upon the property by the appraisers when the Tayler franchise was drawn. While additional money has been put into the property, it was largely for the purpose of keeping it up to the standard fixed at that time. The company paid taxes on a value of \$19,854,850 last year.

Rapid Transit Construction Progress in New York

Counting in the Steinway tunnel, title for which will soon be transferred to the city for a consideration of \$3,000,000, and the contract for Section No. 4 of the Broadway subway, which will probably be awarded soon at a figure between \$2,500,000 and \$3,000,000, the city of New York will have under construction shortly new subway and elevated lines for the dual system of rapid transit to cost upward of \$81,000,000. The report of the division engineers of the Public Service Commission for the First District for the month ended June 15, 1913, shows that this work covers about 27 miles of new rapid transit railroad with probably nearly 100 miles of single track, as almost all of the work now under way is four-track construction.

Of the total mileage under construction about 21 miles are underground and 6 miles elevated railroad. About 9 miles of subway and all of the elevated railroad is for operation by the Interborough Rapid Transit Company, and about 12 miles, all subway, for operation by the New York Municipal Railway Corporation (Brooklyn Rapid Transit). The Interborough Company work includes nearly 6 miles of subway on the Lexington Avenue line between Fifty-third Street and 157th Street, four tracks from Fifty-third to 135th Street, just north of the Harlem River, and three tracks from that point to 157th Street; about 1½ miles of three-track subway in 138th Street and Southern Boulevard on the Pelham Bay Park branch of the Lexington Avenue line between Alexander Avenue and 117th Street; about 6 miles of elevated railroad on the Queens rapid transit lines, of which the line to Astoria takes about 2 miles and the line to Corona about 4 miles, and about 1½ miles of subway in the Steinway Tunnel between Park Avenue and Forty-second Street, Manhattan, and Jackson Avenue and Van Alst Avenue, in Long Island City, all two-track construction. While the Queens lines are being built for operation by the Interborough Rapid Transit Company, the Brooklyn company also will have trackage rights over them.

The 12 miles under construction for operation by the New York Municipal Railway Corporation include 4 miles of four and six-track subway on the Fourth Avenue line, running from the Brooklyn end of the Manhattan Bridge through Flatbush Avenue Extension, Fulton Street, Ashland

Place and Fourth Avenue to Forty-third Street; $2\frac{1}{2}$ miles of subway on extensions of the Fourth Avenue line between Forty-third and Eighty-ninth Streets, which will be four-tracked from Forty-third to Sixty-fifth Street and two-tracked from Sixty-fifth to Eighty-ninth Street. The first part of the work, namely, from the Manhattan Bridge to Forty-third Street, is about completed, and the extension from Forty-third to Eighty-ninth Street should be completed by a year from next January. The Brooklyn work also includes about $1\frac{1}{2}$ miles of four-track subway in the Centre Street Loop line, running from the Brooklyn Bridge to the Williamsburg Bridge, with a two-track spur to the Manhattan Bridge, now completed and about ready for temporary operation; also a little more than 2 miles of subway on the Broadway line in Manhattan, running from Trinity Place and Morris Street north through Trinity Place and Church Street and thence through Vesey Street and Broadway as far as Fourteenth Street, four tracks north of Park Place and two tracks south of there.

The work is being done by fourteen different contracting firms, who employed during the month a daily average of about 6400 men.

The commission opened bids on June 24 for the construction of Section No. 4 of the Broadway subway in Manhattan. This section lies in Broadway between Bleecker Street and Fourteenth Street. It will embrace a local station at Eighth Street and half of the express station at Union Square. Eleven bids were received, ranging from about \$2,600,000 to \$3,300,000. The commission has not yet awarded the contract.

Illinois Utility Bill Signed

Governor Dunne of Illinois has signed the public utilities bill. Under the provisions of the bill any city can construct, acquire and operate any public utility within its borders, use the product or service of utilities, or sell them to private citizens or corporations. "Public utility" means and includes any plant, equipment or property, and any franchise, license or permit used or to be used for or in connection with the transportation of persons or property or messages or the production, storage, transmission, sales, delivery or furnishing of cold, heat, light and power, the conveyance of oil and gas by pipe line, or the storage or warehousing of goods, or wharfing.

To Abolish Commerce Court.—The House rules committee agreed on June 27 on a rule by which the deficiency appropriation bill, to be reported early in July, will carry a specific provision to abolish the Commerce Court and vest its jurisdiction in the United States District Courts.

Terms of Purchase of Toronto Companies Submitted.—The terms of purchase of the property of the Toronto Railway and the Toronto Electric Light Company have been given to the Mayor of Toronto by Sir William MacKenzie, president of the companies, but are not yet public.

Ornamenting Trolley Poles in Chicago.—The Chicago Association of Commerce, through its committee on downtown streets, has undertaken the adornment of the streets in the Loop and has utilized trolley poles in carrying out its plan. It is proposed to make these poles a means of beautifying the city by hanging gardens from them. A pole at South State Street and Jackson Boulevard is the first one to be used in the beautification plan.

Merchants' Association of New York Opposed to New York Central Re-location.—The plan proposed by a committee of the Board of Estimate and Apportionment of New York City for the re-location of the tracks of the New York Central & Hudson River Railroad on the west side of Manhattan has been disapproved by the special committee appointed by the Merchants' Association of New York to consider the proposals.

Electrification of Spanish Road Proposed.—The Valencia Economic Tramway & Railroad Company, Valencia, Spain, is preparing to change the motive power from steam to electricity on its 12-mile narrow-gauge line from Valencia to Betera. The contract to be awarded will probably embrace car equipment, line material, electrical supplies and such auxiliary power equipment as may be required in connection with purchased power.

Pennsylvania Full Crew Law Valid.—The Supreme Court of Pennsylvania in an opinion by Justice Brown affirms the decision of the Dauphin County Court upholding the constitutionality of the act of June 19, 1911, known as the full crew law. The law is similar to those of Arkansas and Indiana which have been passed upon by the United States Supreme Court. It requires an extra brakeman on all passenger trains of more than three cars and on all freight trains with more than thirty cars.

Iowa Interurban Roads Report for 1912.—The fourteen interurban electric railways in Iowa which reported their earnings to the State for 1912, showed gross revenue of \$2,255,163, as compared with \$1,991,331 the year before. Expenses were \$1,486,503, and a year previous, \$1,409,764. The net profits aggregated \$768,659, while for the year 1911 the profits totaled \$581,567. Only one road, the Charles City Western Railway, reported net loss on business, and this was \$1,111.

Power Contracts of the Utah Securities Corporation.—The properties acquired by the Utah Securities Corporation have been merged into the Utah Power & Light Company. The territory served covers southeastern Idaho, northern Utah and a section of western Colorado. The company has closed long-term contracts with many of the large power consumers in the territory, including the Utah Copper Company, Salt Lake & Ogden Railway and the Utah Light & Railway Company. By the end of 1914 the installed capacity of the Utah Power & Light Company will probably be 131,000 hp.

Governor Eberhart on Utility Commission Appointments.—In his first public expression in regard to public utility regulation since he sent his veto message to the Legislature on the Nolan and Minnette bills Governor Eberhart of Minnesota said at Austin on June 18: "Minnesota had a railroad commission, a board of control, a tax commission and a highway commission long before Wisconsin did. If Minnesota cannot find as good men at home as the Wisconsin commissioners, it can go abroad and get them. If I appoint unworthy men, I should be one of the first to be recalled."

Amendments to Erdman Act Approved by Senate.—The Senate on June 26 approved the passage of amendments to the Erdman mediation act, sought by the railways and the railway employees, as affording suitable machinery for the settlement of disagreements. The amendments enlarge the board of arbitration provided under the Erdman act from three to six. The railways have declined to submit the present disputes to a board of only three. The appointment by the President of an official mediator, independent of all government bureaus, at a salary of \$7,500, is also provided for.

Projected Subway for Genoa.—The Superior Council of Public Works of Italy has approved the project for a 6 1-3 mile subway for Genoa from Sampierdarena to Genoa, and thence to Quarto dei Mille along the coast. Estimates of cost of the work and materials have not been definitely adopted, but the original estimate contemplated expending at least \$3,667,000, which will no doubt be increased. The subway will have fourteen stations, four above and ten underground, three of these latter having two or three passenger elevators each. Continuous current, third-rail electric traction, will be used. About twenty-two cars with motors and twenty-two trail cars will be required.

Referendum Petition on Maine Utility Act.—More than 10,000 names have been secured asking for a referendum on the Maine public utilities act, which is to go into effect on July 12. Opposition to the act developed soon after the Legislature adjourned. One of the principal grievances of those who oppose the measure is that Governor Haines appointed three lawyers to the board, instead of at least one engineer. It is said that the petition for the referendum will be filed with the Secretary of State on July 12, the day that the Governor and Council meet to arrange to put the act into effect. If the petition is presented the next legal step will be for the Governor to name a date for a special election to decide on the matter, which cannot be sooner than four months after the notification, or November. A digest of the provisions of the new act was published in the ELECTRIC RAILWAY JOURNAL of April 12, 1913.

Financial and Corporate

Stock and Money Markets

July 1, 1913.

Summer dullness prevailed in the New York Stock Exchange to-day, business being marked by listlessness. Many important variations in prices took place, however, and the closing figures ranged materially above the final figures of the day before. Most importance was attached to Union Pacific tradings, and other active railroad issues followed the declines and advances in this. Rates on the money market to-day were: Call, $1\frac{3}{4}$ @2 per cent; sixty days, $3\frac{1}{4}$ @ $3\frac{1}{2}$ per cent; ninety days, $3\frac{3}{4}$ @ $4\frac{1}{4}$ per cent; four months, $4\frac{1}{2}$ @5 per cent; five months, $4\frac{3}{4}$ @ $5\frac{1}{4}$ per cent.

Influenced by New York, the Philadelphia market to-day was stronger. Philadelphia Electric was quoted at $21\frac{1}{2}$ @ $21\frac{5}{8}$ and Rapid Transit $21\frac{1}{2}$ @ $21\frac{3}{4}$.

Business was very small in the Chicago Stock Exchange to-day, but the tone was fairly steady. Bonds were dull the entire day.

The tone in the Boston stock market to-day was strong, but the transactions were small.

The stock market in Baltimore to-day was concerned mostly with small transactions.

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

	June 25	July 1
American Brake Shoe & Foundry (common).....	87½	90
American Brake Shoe & Foundry (preferred).....	126½	126½
American Cities Company (common).....	36¾	33¾
American Cities Company (preferred).....	69½	63
American Light & Traction Company (common).....	*365	*365
American Light & Traction Company (preferred).....	*106	*106
American Railways Company.....	38	38
Aurora, Elgin & Chicago Railroad (common).....	42	40
Aurora, Elgin & Chicago Railroad (preferred).....	*82	83
Boston Elevated Railway.....	86¾	84
Boston Suburban Electric Companies (common).....	7½	7½
Boston Suburban Electric Companies (preferred).....	*66	*66
Boston & Worcester Electric Companies (common).....	a8	a8
Boston & Worcester Electric Companies (preferred).....	42	42
Brooklyn Rapid Transit Company.....	87¾	87
Capital Traction Company, Washington.....	117	115¾
Chicago City Railway.....	*150	*150
Chicago Elevated Railways (common).....	*24½	*24½
Chicago Elevated Railways (preferred).....	*75	*75
Chicago Railways, pteptg., ctf. 1.....	100¼	*100
Chicago Railways, pteptg., ctf. 2.....	22¾	24¼
Chicago Railways, pteptg., ctf. 3.....	6¾	7½
Chicago Railways, pteptg., ctf. 4.....	2¾	*2¾
Cincinnati Street Railway.....	106	110
Cleveland Railway.....	102¾	102½
Cleveland, Southwestern & Columbus Ry. (common).....	6	*6
Cleveland, Southwestern & Columbus Ry. (preferred).....	29	*29
Columbus Railway & Light Company.....	18	18
Columbus Railway (common).....	69½	69½
Columbus Railway (preferred).....	88	88
Denver & Northwestern Railway.....	*107	*107
Detroit United Railway.....	70¼	70
General Electric Company.....	136½	135½
Georgia Railway & Electric Company (common).....	115¾	115
Georgia Railway & Electric Company (preferred).....	83¾	84
Interborough Metropolitan Company (common).....	15¼	15
Interborough Metropolitan Company (preferred).....	55¾	55¾
International Traction Company (common).....	30	*30
International Traction Company (preferred).....	95	*95
Kansas City Railway & Light Company (common).....	18	*18
Kansas City Railway & Light Company (preferred).....	36	*36
Lake Shore Electric Railway (common).....	6	*6
Lake Shore Electric Railway (1st preferred).....	92	*92
Lake Shore Electric Railway (2d preferred).....	25	*25
Manhattan Railway.....	127	125
Massachusetts Electric Companies (common).....	12¾	13
Massachusetts Electric Companies (preferred).....	67	66
Milwaukee Electric Railway & Light Co. (preferred).....	100	*100
Norfolk Railway & Light Company.....	25	25
North American Company.....	66	65
Northern Ohio Light & Traction Company (common).....	80	80
Northern Ohio Light & Traction Company (preferred).....	105	105
Philadelphia Company, Pittsburgh (common).....	405¾	40½
Philadelphia Company, Pittsburgh (preferred).....	39	39
Philadelphia Rapid Transit Company.....	22½	21½
Portland Railway, Light & Power Company.....	62	*62
Public Service Corporation.....	111	110
Third Avenue Railway, New York.....	31½	31¼
Toledo Railways & Light Company.....	2	2
Twin City Rapid Transit Co., Minneapolis (common).....	102¾	102
Union Traction Company of Indiana (common).....	4½	*4½
Union Traction Company of Indiana (1st preferred).....	80	*80
Union Traction Company of Indiana (2d preferred).....	30	*30
United Rys. & Electric Company (Baltimore).....	25¾	26
United Rys. Inv. Company (common).....	20½	19
United Rys. Inv. Company (preferred).....	7½	7
Virginia Railway & Power Company (common).....	56	52
Virginia Railway & Power Company (preferred).....	87½	87½
Washington Ry. & Electric Company (common).....	90¼	89½
Washington Ry. & Electric Company (preferred).....	88¾	87¾
West End Street Railway, Boston (common).....	71	71
West End Street Railway, Boston (preferred).....	87½	87
Westinghouse Elec. & Mfg. Company.....	59½	58¾
Westinghouse Elec. & Mfg. Company (1st preferred).....	106	105

*Last sale. a Asked.

Questions and Answers Under Uniform System of Accounts

Another series of tentative answers to questions raised in connection with the uniform system of accounts established by the Interstate Commerce Commission is published below. Agreement on these answers, as on those published in the issues of May 17, 1913, and June 7, 1913, has been reached by members of the committee on a standard classification of accounts of the American Electric Railway Accountants' Association and representatives of the commission. As these answers have not yet received the formal approval of the commission, however, it should be understood that the decisions do not represent its final conclusions and that they are subject to such revision as may be thought proper before final promulgation in the accounting bulletins of the commission.

Q. What account should be charged with the cost of new copper trolley wire stolen from the storehouse, but recovered after being cut into short lengths?

A. The cost of the wire, less the value of scrap recovered, should be charged to Operating Expense Account No. 89, "Store Expenses."

Q. What account should be charged with the cost of repairs and replacements of watchmen's portable clocks used in a carhouse and the cost of paper dials used in them?

A. The cost of repairs and replacements of such clocks should be included in Operating Expense Account No. 67, "Carhouse Expenses," and the cost of the paper dials in account No. 84, "Stationery and Printing."

Q. To what account should be charged the amount assessed against an electric railway company for dredging a stream so as to drain towns and lands along said stream?

A. Road and Equipment Account No. 2, "Right of Way." (See case 161 of Accounting Bulletin No. 7.)

Q. What account is chargeable with the amount of donations to charitable organizations or institutions?

A. Account No. 79, "Miscellaneous General Expenses," in the classification of Operating Expenses.

Q. What account should be charged with the cost of oil cans and such devices for use by employees of various departments?

A. The cost of oil cans and such devices should be charged to Operating Expense Account No. 54, "Miscellaneous Power Plant Expenses"; No. 55, "Substation Expenses"; No. 67, "Carhouse Expenses"; No. 39, "Shop Expenses"; No. 24, "Miscellaneous Electric Line Expenses"; No. 63, "Miscellaneous Car-Service Expenses," or No. 65, "Station Expenses," according to the use for which they are intended.

Q. What accounts should be charged with the first cost and the cost of repairs and renewals of trolley retrievers and catchers?

A. The first cost should be charged to Road and Equipment Account No. 35, "Cars"; No. 36, "Locomotives," or No. 38, "Other Rail Equipment," according to the equipment fitted with the devices. The cost of repairs and renewals should be charged to Operating Expense Account No. 32, "Passenger and Combination Cars"; No. 33, "Freight, Express and Mail Cars"; No. 34, "Locomotives," or No. 35, "Service Cars."

Q. To what account should the cost of transformer oil for use in power stations or substations be charged?

A. The first cost should be charged to Road and Equipment Account No. 30, "Power Plant Equipment," if the oil is for use in a power plant, or to Account No. 31, "Substation Equipment," if for use in a substation. The cost of renewals should be charged to the corresponding maintenance account in operating expenses.

Q. What account should be charged with the cost of mowing lawns about carhouses, power plants, substations or stations?

A. Operating Expense Account No. 25, "Buildings and Structures," unless the amounts involved are small and the work is done by employees of the company as incidental to their regular duties, in which case it will not be necessary to subdivide their time.

Q. What account should be charged with the cost of flowers and shrubs and the labor of planting them about various buildings?

A. Operating Expense Account No. 25, "Buildings and Structures."

Q. To what account should a license fee paid in accordance with the State law relating to inspection be charged?

A. Operating Expense Account No. 79, "Miscellaneous General Expenses."

Q. To what account should be charged the cost of renewals of lamp cord, sockets, lamps and switches used in carhouses, shops, power plants, substations and freight and passenger stations?

A. Operating Expense Account No. 67, "Carhouse Expenses"; No. 39, "Shop Expenses"; No. 54, "Miscellaneous Power Plant Supplies and Expenses"; No. 55, "Substation Supplies and Expenses," or No. 65, "Station Supplies and Expenses," according to where the articles are used.

Q. Is it proper to charge the various operating expense accounts for the transportation of employees of the different operating departments?

A. No charge should be made against a company's operating expenses on account of the free transportation over its own lines of men (on or off duty) employed in maintenance or operation. (See case 201, Accounting Bulletin No. 7.)

Decision in Chicago Consolidated Traction Case

Chief Justice Harry Olson of the Municipal Court at Chicago has declared void and illegal the bond issue of \$6,750,000 of the Chicago Consolidated Traction Company. These bonds were issued during the régime of Charles T. Yerkes in 1899, and while the suit involved only \$149,000 worth of them, the issue now outstanding is affected by the decision. The suit was brought by a New York committee composed of Rafael R. Govin, George W. Young and Archibald White against the Chicago Railways and was taken under advisement by Chief Justice Olson eighteen months ago. The bonds were issued in return for the stock of the eight underlying companies which formed the Consolidated Traction Company, so as to give Mr. Yerkes control of all the companies through voting their stock. This prevented the underlying companies from becoming competitors of the Union Traction Company. Justice Olson held it was contrary to the law and to public policy for a corporation to buy the stock of competing corporations for the purpose of acquiring a monopoly. An appeal will be taken by the committee of Consolidated bondholders. Aside from the \$149,000 worth of bonds held by the Govin committee there are still \$105,000 of bonds authorized, all of which are outstanding except \$17,000 and \$30,000 of which are in the hands of the Yerkes estate. The Chicago Railways bought all the rest, paying 30 cents on the dollar for about \$4,450,000 held by the Yerkes estate.

In commenting on the decision, W. W. Gurley, chief counsel for the Chicago Railways, said:

"The management of the Chicago Railways is naturally much pleased with Judge Olson's decision. It sustains in full the contention always made in behalf of the company that it was in no wise liable for the debts or obligations of the Chicago Union Traction Company or the predecessor companies, beyond the extent specified in the modified plan of reorganization of Oct. 15, 1907. The decision means that the claims asserted against the company, which, if well founded, menaced its very existence, and which at all times depressed the market value of all its securities, have received their quietus. The counsel for the company is confident that no court will disturb the findings and conclusion of Judge Olson, and the management feels that it can devote its time and attention to the operation of the property for the benefit of the public and the participation certificate holders, free from the continual apprehension of a calamitous court decision impairing their usefulness, if not ruining the property."

Buffalo, Lockport & Rochester Railway, Rochester, N. Y.—It is reported that the Buffalo, Lockport & Rochester Railway may be included in a merger with the International Railway and the Buffalo & Lake Erie Traction Company, the plan being to provide a through trunk line between Rochester, Buffalo and Erie. Clifford D. Beebe, president of the Buffalo, Lockport & Rochester Railway,

is quoted as follows in this connection: "There is nothing definite to the plans. In fact, no plans worthy of the name have been made."

Chicago (Ill.) Railways.—Back dividends due on the Chicago Railways Series 1 participation certificates on Aug. 1, 1912, aggregated 24 per cent, dividends having been suspended since Aug. 1, 1910. The company paid 6 per cent on Oct. 1, 1912, 6 per cent on Feb. 1, 1913, and 6 per cent on March 15, 1913. The 6 per cent to be paid on July 1 will leave no accumulated dividends unpaid, but the payment of 4 per cent on Aug. 1 will leave one-half of the full dividend of 8 per cent for this year unpaid.

Cincinnati, Dayton & Toledo Traction Company, Hamilton, Ohio.—At the special meeting of stockholders of the Cincinnati, Dayton & Toledo Traction Company on June 23, 1913, the lease of that company to the Ohio Electric Railway was modified in accordance with the recommendations of the board of directors, noted at length in the *ELECTRIC RAILWAY JOURNAL* of June 7, 1913, page 1038. The new agreement fixed the rent of the Cincinnati, Dayton & Toledo Traction Company at \$266,500 a year for 1913 and 1914, and thereafter it is increased at the rate of \$10,000 a year, making the rental for 1912 and thereafter \$366,500 a year. Under the amended lease the common stock of the Cincinnati, Dayton & Toledo Traction Company, on which 2 per cent a year has been paid, will be reduced from \$5,000,000 to \$2,000,000 and no dividends will be paid on this stock until the year beginning July 1, 1915, when one-half of 1 per cent will be paid, and this will be increased each year until 1922, when 5 per cent will be paid. The preferred stock will be increased from \$250,000 to \$1,250,000, the new stock to be sold from time to time to provide funds for betterments and extensions. The Ohio Electric Railway will provide the financing for maturing bonds and other obligations of the leased road.

Eastern Texas Electric Company, Beaumont, Tex.—Stone & Webster, Boston, Mass., are offering for subscription at 98½ and interest \$500,000 of three-year 6 per cent gold notes of the Eastern Texas Electric Company, which owns all the stocks and bonds of the companies which do the entire electric light and power business at Port Arthur, Tex., and the company constructing an interurban electric railway between Beaumont and Port Arthur, a distance of about 20 miles. It is also about to acquire all the stock and \$200,000 of the \$600,000 bonds of the Beaumont Traction Company, which does the entire electric railway business in Beaumont. The notes are dated July 1, 1913, and are due July 1, 1916. They are in the denominations of \$500 and \$1,000 and are callable as a whole at 100 and accrued interest on thirty days' notice. The interest is payable at the office of the State Street Trust Company, Boston, trustee of the issue.

Hudson & Manhattan Railroad, New York, N. Y.—The Public Service Commission of the First District of New York has approved the plan for the readjustment of the finances of the Hudson & Manhattan Railroad in accordance with the proposal made by the syndicate composed of Kuhn, Loeb & Company, Robert Fleming & Company and Harvey Fisk & Sons. References to the proposed re-financing were made in the *ELECTRIC RAILWAY JOURNAL* of Jan. 18, March 1, May 17 and June 21, 1913.

Indianapolis & Louisville Traction Company, Scottsburg, Ind.—The Indianapolis & Louisville Traction Company has elected new officers, as follows: John E. Greeley, Scottsburg, Ind., president and general manager; Mark Storen, Scottsburg, vice-president; Earl S. Gwin, New Albany, treasurer, and Walter A. Gadiant, New Albany, secretary; E. H. Jennings, James C. Chaplin and Jerome Hill, Pittsburgh, Pa.; Samuel D. Miller, Indianapolis, Ind.; Mark Storen, Earl S. Gwin and John E. Greeley, directors.

Loramie & Minster Electric Railroad, Minster, Ohio.—Julius Boescl, president of the First National Bank, Minster, and W. J. Sheriden, president of the Loramie Banking Company, Loramie, have been appointed receivers of the Loramie & Minster Railroad, as a result of a suit on a note instituted by the First National Bank. The road was built in 1910 and the liabilities are placed at \$50,000. It is said that the Western Ohio Railway may take over the line, which is a short one.

Omaha, Lincoln & Beatrice Railway, Omaha, Neb.—The Nebraska State Railway Commission has modified its former order so as to allow the Omaha, Lincoln & Beatrice Railway to issue \$2,250,000 of bonds and \$850,000 of stock upon the completion of its interurban line between Lincoln and Omaha. The Lincoln terminals of the company and the line eastward into Bethany Heights, a suburb, have been in operation for some time. The Northern Construction Company, Detroit, Mich., is completing the line from Lincoln to Omaha.

Nevada County Narrow-Gage Railroad, Grass Valley, Cal.—The Nevada County Narrow-Gage Railroad has been authorized by the Railroad Commission of California to issue \$500,000 of 5 per cent. bonds. The proceeds will be used to retire existing bonds and to standardize the present narrow-gage line from Colfax to Nevada City.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—The Oakland, Antioch & Eastern Railway has applied to the Railroad Commission of California for authority to issue \$1,000,000 of 5 per cent bonds to provide funds to complete its road from Bay Point to Sacramento.

Ohio Traction Company, Cincinnati, Ohio.—The directors of the Ohio Traction Company, at a meeting on June 27, decided to pass the dividend on the common stock due on July 1, 1913. The last disbursement was made on April 1, 1913, at the rate of 4 per cent for the year. The dividend was passed on account of the damage done to the property of the company by the recent floods.

Philadelphia & West Chester Traction Company, Upper Darby, Pa.—John P. Crozier, Upland, Pa., has been elected a director of the Philadelphia & West Chester Traction Company to fill a vacancy in the board.

South Bend & Logansport Traction Company, South Bend, Ind.—The property and franchises of the South Bend & Logansport Traction Company will be offered for sale by the receiver of the company at South Bend on July 5. The company was promoted originally in 1908 as the South Bend & Logansport Railway and offices were established in the American Trust Building, South Bend. It was proposed to obtain power from the Indiana & Michigan Electric Company.

United Railways & Electric Company, Baltimore, Md.—At the regular meeting of the directors of the United Railways & Electric Company the payment of dividends on the stock of the company was changed from semi-annually to quarterly, a quarterly dividend of 1 per cent being declared on the common stock, payable on July 15 to stock of record of July 7.

United Railways, St. Louis, Mo.—The United Railways arranged to extend for ten years the \$1,000,000 of 6 per cent bonds of the Compton Heights, Union Depot & Merchants' Terminal Railroad due on July 1, 1913.

Dividends Declared

Athens Railway & Electric Company, Athens, Ga., quarterly, 1¼ per cent, preferred.

Bay State Street Railway, Boston, Mass., 3 per cent, first preferred.

Boston (Mass.) Suburban Electric Companies, quarterly, \$1, preferred.

Cincinnati, Dayton & Toledo Traction Company, Hamilton, Ohio, 2½ per cent, preferred.

Cincinnati, Newport & Covington Light & Traction Company, Covington, Ky., quarterly, 1⅓ per cent, preferred; quarterly, 1½ per cent, common.

Citizens' Traction Company, Oil City, Pa., \$1, preferred.

City Railway, Dayton, Ohio, quarterly, 1½ per cent, preferred; quarterly, 2 per cent, common.

Columbus, Newark & Zanesville Electric Railway, Newark, Ohio, quarterly, 1½ per cent, preferred.

Denver & Northwestern Railway, Denver, Col., quarterly, 2 per cent.

Holyoke (Mass.) Street Railway, 4 per cent.

International Traction Company, Buffalo, N. Y., 2 per cent, preferred.

Manchester Traction, Light & Power Company, Manchester, N. H., quarterly, 2 per cent.

Memphis (Tenn.) Street Railway, quarterly, 1½ per cent, preferred.

Metropolitan West Side Elevated Railway, Chicago, Ill., 1¼ per cent.

Monongahela Valley Traction Company, Fairmont, W. Va., 1½ per cent, common.

Montreal (Que.) Tramways, 2½ per cent.

Nashville Railway & Light Company, Nashville, Tenn., quarterly, 1¼ per cent, preferred.

Ottawa (Que.) Electric Railway, quarterly, 3 per cent.

Public Service Investment Company, Boston, Mass., quarterly, \$1.50, preferred; \$2, common.

Rome Railway & Light Company, Rome, Ga., quarterly, 1¼ per cent.

South Side Elevated Railroad, Chicago, Ill., 1½ per cent.

Springfield & Xenia Railway, Springfield, Ohio, quarterly, 1½ per cent, preferred.

Thirtieth & Fifteenth Streets Passenger Railway, Philadelphia, Pa., \$6.

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

Winnipeg (Man.) Electric Railway, quarterly, \$3.

ELECTRIC RAILWAY MONTHLY EARNINGS

FEDERAL LIGHT & TRACTION COMPANY, NEW YORK, N. Y.						
Period		Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
Im.,	May, '13	\$184,051	\$108,728	\$75,323	.....	.....
1 "	" '12	164,534	99,487	65,047	.....	.....
5 "	" '13	1,000,597	566,905	433,692	.....	.....
5 "	" '12	875,445	503,615	371,830	.....	.....
GALVESTON-HOUSTON ELECTRIC COMPANY, HOUSTON, TEX.						
Im.,	April, '13	\$185,508	*\$109,574	\$75,934	\$34,755	\$41,179
1 "	" '12	151,604	*94,102	57,502	33,815	23,687
12 "	" '13	2,147,047	*1,242,851	904,197	408,752	495,445
12 "	" '12	1,658,113	*1,032,171	625,942	288,566	337,376
HOUGHTON (MICH.) COUNTY TRACTION COMPANY						
Im.,	April, '13	\$25,699	*\$14,764	\$10,934	\$5,464	\$5,470
1 "	" '12	24,567	*13,416	11,151	5,112	6,038
12 "	" '13	312,187	*177,340	134,847	69,040	65,807
12 "	" '12	300,688	*177,996	122,692	62,605	60,087
JACKSONVILLE (FLA.) TRACTION COMPANY						
Im.,	April, '13	\$56,364	*\$36,633	\$19,731	\$11,118	\$8,613
1 "	" '12	51,284	*32,382	18,901	9,643	9,258
12 "	" '13	579,168	*391,136	188,032	124,948	63,084
12 "	" '12	568,075	*353,074	215,001	109,025	105,976
JOPLIN & PITTSBURG RAILWAY, PITTSBURG, KAN.						
Im.,	May, '13	\$49,466	*\$29,018	\$20,448	\$12,542	\$7,906
1 "	" '12	44,156	*27,835	16,321	12,924	3,397
12 "	" '13	557,467	*326,096	231,372	150,881	80,491
12 "	" '12	491,924	*291,675	200,249	154,611	45,638
LEHIGH VALLEY TRANSIT COMPANY, ALLENTOWN, PA.						
Im.,	May, '13	\$147,652	\$64,652	\$83,129	\$45,889	\$37,240
1 "	" '12	123,326	55,538	67,788	42,513	25,275
12 "	" '13	1,643,722	701,093	942,629	530,281	412,348
12 "	" '12	1,423,763	628,411	795,352	478,137	317,215
NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.						
Im.,	April, '13	\$164,684	*\$91,341	\$73,342	\$24,551	\$48,791
1 "	" '12	134,936	*73,200	61,736	20,846	40,890
12 "	" '13	1,939,862	*1,028,051	911,811	281,683	630,128
12 "	" '12	1,622,470	*888,282	734,188	251,441	482,747
PENSACOLA (FLA.) ELECTRIC COMPANY.						
Im.,	April, '13	\$21,156	*\$15,328	\$5,828	\$6,404	\$575
1 "	" '12	22,491	*14,759	7,732	6,377	1,355
12 "	" '13	287,099	*178,445	108,655	76,427	32,228
12 "	" '12	286,528	*180,738	105,789	66,831	38,958

*Includes taxes.

Jamestown Strike Collapses

The strike of the employees of the Jamestown (N. Y.) Street Railway and the Chautauqua Traction Company, which was begun on May 1, 1913, has collapsed and was formally declared off on June 29 at a meeting of the men who were out on strike. The company has decided to take back into its employ about twenty-five of the men who were out and reinstate them at their former rate of wages but at the bottom of the extra list. The men who remained faithful to the company and all the men who were engaged by the company during the strike will be retained in their positions. The strike was productive of considerable disorder and twenty-five former employees of the company and their sympathizers are under indictment for cutting wires and rioting in the city. The proposition of A. N. Broadhead, president of the companies, for a settlement of the differences between the officers of the companies and the employees was summarized in the ELECTRIC RAILWAY JOURNAL of June 14, 1913, page 1081. This proposition the employees rejected through their representatives. They characterized it as annihilation, not arbitration.

Traffic and Transportation

New Rules Governing Conduct of Passengers in Hamilton, Ont.

The Dominion Power & Transmission Company, Hamilton, Ont., has amended its by-law regulating travel on its cars by adding a clause prohibiting the drinking of intoxicating liquors. The by-law, as amended and approved by the Board of Railway Commissioners and the Ontario Railway & Municipal Board, follows:

"1. (a) Smoking tobacco or carrying a lighted pipe, cigar or cigarette, except while in smoking compartments provided for that purpose or except on the three rear seats of open cars only, or expectorating, except in proper receptacles, or the commission of any nuisance in or upon the trains or cars, passenger stations or other premises used or occupied by the company, is hereby forbidden and declared unlawful, and any person found guilty of a violation of this rule shall be liable to a penalty not exceeding \$5.

"(b) Drinking intoxicating liquors or offering intoxicating liquors to others in or upon the trains or cars of this company is hereby forbidden and declared unlawful, and any person found guilty of a violation of this rule shall be liable to a penalty not exceeding \$10.

"2. Passengers other than policemen in uniform, city detectives and company officials shall not be allowed to ride on the front platform of any closed car nor to ride on the rear platform of any closed car when there is room or space which may be occupied by them inside the car, and women or children shall not ride on the front platform or seat of any open car, and passengers refusing to comply with this rule shall be considered disorderly persons and subject to a penalty for the violation of this rule not exceeding \$10, and may also, on such refusal, be ejected from or put off the car.

"3. The conductor must politely call the attention of passengers violating, or who appear to intend to violate, the last two rules herein set forth to the provisions of the said rules and firmly request observance thereof before taking any further or other action."

Free Transportation for Harrisburg Employees.—The Harrisburg (Pa.) Railway has granted free transportation to employees while off duty. They will wear a badge inscribed "Employee of the Harrisburg Railways Company."

Opinion in Regard to Passes on Electric Railways in Pennsylvania.—In answer to the inquiry of the Gettysburg (Pa.) Railway the Railroad Commission of Pennsylvania says that it knows of no law prohibiting the granting of free passes by electric railways.

Increase in Wages in Grand Rapids.—On July 1, 1913, the Grand Rapids (Mich.) Street Railway increased the wages of the motormen and conductors in its employ. The new scale of wages follows: First six months, 23 cents an hour; second six months, 24 cents an hour; second year, 25 cents an hour; third year and thereafter, 26 cents an hour.

Special Cars for Miners Not Justified.—The State Railroad Commission of Pennsylvania has dismissed the complaint filed by J. G. Eckert, Drifton, against the Lehigh Valley Traction Company, asking that cars exclusively for miners be operated between Hazleton and Freeland. The commission holds that the traffic does not justify special cars as the men quit work at different hours.

Increase in Wages in Saginaw.—The Saginaw-Bay City Railway, Saginaw, Mich., posted a notice recently in the car house at Saginaw of a voluntary increase of wages of 1 cent an hour for the motormen and conductors of the local and interurban lines and from 1 cent to 2 cents on the Saginaw and Flint line. The increase, affecting about 350 men, went into effect on July 1.

Traffic Agreement Between the Illinois Traction System and East St. Louis System.—An agreement has been entered into whereby special passenger movements from any point on the Illinois Traction System or the East St. Louis & Suburban Railway, East St. Louis, Ill., will be handled in the equipment of the company with which the

movements originate, but by the operating force of each company over its own lines.

Jamaica Bay Trestle Damaged by Fire.—Normal train service to Rockaway Beach, Long Island, via the Jamaica Bay trestle was resumed on June 30 by the Long Island Railroad following the fire which interrupted traffic Sunday night, June 29. The company issued a statement saying that 80 ft. of the trestle had been destroyed. It gave the cause of the fire as a short-circuit, which communicated flames to a wooden trailer car.

Successful Outing of Employees at Washington.—A very successful outing of the employees of the Washington Railway & Electric Company, Washington, D. C., was held at Chesapeake Beach on June 26. The attendance was very large and a great deal of interest was manifested in the athletic contests which had been arranged by the special committee of the outing having the games in charge. One of the features of the athletic program was a foot race for the directors.

Reduction in Fare Ordered Out of Syracuse.—The Public Service Commission has authorized the Syracuse & South Bay Railway, Syracuse, N. Y., to reduce its fare between Syracuse and South Bay, 5 cents each way. The low fare went into effect immediately and will continue until Sept. 1. In the future when coupon ticket books are used for transportation five 5-cent coupons will be detached for one fare. Four coupons will be detached if the trip starts or ends at the Syracuse city line.

Decision in Regard to Responsibility for Shipments.—The Northwestern Pennsylvania Railways, Meadville, Pa., has been informed by the Railroad Commission of Pennsylvania that it is not justified in requiring an insurance fee in order to make the company responsible for safe transportation of packages confided to its care. The commission says that the company is required to deliver packages according to contract and the responsibility for the shipment cannot be avoided by any insurance requirement.

Question of Abolishing Strip Tickets in Trenton Under Consideration.—City Clerk Thompson, of Trenton, N. J., has received a letter from Rankin Johnson, vice-president of the Trenton & Mercer County Traction Corporation, to the effect that the directors of the company had taken no action to abolish the selling of strip tickets in Trenton and that whenever the company decided to eliminate the selling of tickets the officers of the company would convey that information formally to the city commission direct.

Service Order in Washington, D. C., Suspended During Summer.—The Public Utilities Commission of Washington, D. C., has directed that all orders relating to schedules issued by that body or the District Electric Railway Commission, which the utilities commission succeeded, be suspended from July 1 to Sept. 15. The action of the utilities commission was taken at the request of the Capital Traction Company and is revokable at any time the commission deems advisable. The company stated that a service sufficient to meet traffic demands during the period the schedules are suspended will be maintained.

Chicago Near-Side Car Accident Record.—A reduction of approximately 91 per cent in platform accidents and 37 per cent in all classes of accidents on the Cottage Grove line of the Chicago City Railway is attributed to the operation of the 125 near-side cars that are now running on this line. These percentages are computed in a comparison of all accidents for April, 1912, and April, 1913, and this reduction in accidents is shown in spite of the fact that the total passenger business increased approximately 6 per cent. During April the platform accidents represented 53.7 per cent of all accidents, and in April, 1913, this class of accidents was only 7.1 per cent of all accidents.

Strike Threatened in Boston.—On July 3 a strike was threatened on the Boston (Mass.) Elevated Railway. Up to that day the carmen's union had refused to select the third arbitrator in accordance with the agreement of last summer. The company was willing that the third arbitrator should be named by the chief justice of the Supreme Court or the Superior Court of Massachusetts. The men demand a large increase in wages, namely, \$2.70 per day for the first year and \$3.15 thereafter. The present maximum wage is \$2.61 a day. The company has appealed to the officers of the union not to violate the agreement. At

noon on Thursday, July 3, voting on the question of a strike was in progress.

St. Louis Ventilation Ordinance Reported Unfavorably.—The committee on sanitary affairs of the City Council of St. Louis, Mo., has decided to report unfavorably the bill to regulate the heating and ventilation of street cars operated in the city. The bill was drafted by officers of the board of health. Robert McCulloch, president and general manager of the United Railways, in opposing the ordinance said: "The company is spending all the money it possibly can for the convenience and accommodation of passengers. If you pass this bill you will be handicapping us with a lot of technical provisions. You will tie us down in our effort to heat and ventilate all our cars properly. We must ask that the bill be not passed."

Standing on Rear Platforms in New York City.—On June 26 the Public Service Commission of the First District of New York conducted a hearing in regard to passengers standing on the rear platforms of the cars of the companies which operate the subway and elevated lines in Greater New York. Evidence submitted tended to show that the practice originated on the old steam lines and with the riding of newspaper carriers there. Now loading efficiency at Brooklyn Bridge, which has become of even more importance since the capacity of the terminal has been cut 12 per cent by the reduction of speed on the bridge to 15 m.p.h., demands the use of both ends of the rear car during rush hours and the use of the back platform is practicably unavoidable.

Near-Side Stop in Detroit.—On June 29 the Detroit (Mich.) United Railway began stopping its cars on the near side in accordance with the following resolution passed recently by the City Council: "All cars carrying passengers operated upon any line of street railway in the city of Detroit shall come to a full stop immediately before crossing any street or avenue in said city whenever signaled to stop by any person desiring to take passage thereon or to alight therefrom; and all cars operated on any such line or lines shall be brought to a full stop before crossing any street or avenue at which any two lines of street railway intersect." To avoid confusion the new regulation has been extended to all the lines including Woodward Avenue as far as Palmer Park.

Conference in Regard to Akron Agreement.—At a meeting of the committee on bridges and railroads of the City Council of Akron on June 28, representatives of the Northern Ohio Traction & Light Company objected to the method of determining gain or loss on extended lines, as proposed in the agreement drawn by A. B. du Pont for the settlement of disputed points between the city and the company. Charles Currie, general manager; James T. Ross, consulting engineer, and A. J. Rowley, attorney, represented the company at the meeting. The committee will report this objection to Council, as well as the question as to whether the city can legally enter into such a contract as is proposed. The proposed franchise agreement as presented to the company was published in full in the *ELECTRIC RAILWAY JOURNAL* of June 21, 1913, page 1117. It is in the nature of a guarantee to the company.

Further Reduction in Running Time Between Allentown and Philadelphia.—Fifteen minutes, it is expected, will be cut from the running time of the Lehigh Valley Transit Company's limited car service between Allentown and Philadelphia beginning next October, when 9 miles of cut-offs and the new high-level reinforced concrete bridge in Allentown will be completed. The Quakertown cut-off will run from Zion Hill to Quakertown, a distance of practically 4 miles, being a straight track and cutting out twenty-one curves and several grades. The Sellersville cut-off is about 1 mile long and will eliminate four curves and two bad grades. The Hatfield cut-off is about 4 miles long and will eliminate twenty-two curves and one heavy grade, placing this section of the road on private right-of-way. The new cut-offs are rock-ballasted, standard steam railroad construction, and wide enough for double tracks. The large reinforced concrete bridge between Allentown and South Allentown is nearing completion. This bridge is about one-half mile in length. It is owned by the Lehigh Valley Transit Company, and will eliminate two heavy grades and several grade crossings.

Personal Mention

Mr. Leo Sartwell has been appointed assistant carhouse foreman of the Detroit (Mich.) United Lines at Flint to succeed Mr. J. H. Raby, promoted.

Mr. J. E. Meddaugh has been appointed roadmaster of the Pontiac division of the Detroit (Mich.) United Lines, vice Mr. J. C. Bourke, resigned.

Mr. Thomas Green has resigned from the operating engineering department of the Illinois Traction System, Peoria, Ill., to accept a position in the Chicago office of the Westinghouse Electric & Manufacturing Company.

Mr. T. E. Leland, for several years connected with the Metropolitan Street Railway, Kansas City, Mo., in the capacity of chief clerk in the auditing department, has resigned to accept a position with the Bay State Railway Company, Boston.

Mr. A. J. Ostendorf, at present assistant general superintendent of the Cincinnati (Ohio) Traction Company, has been appointed superintendent of transportation of the company to succeed Mr. Robert E. Lee, general superintendent of the company.

Mr. Robert E. Lee resigned as general superintendent of the Cincinnati (Ohio) Traction Company, to take effect on July 15. He will become identified with the Firestone Rubber Tire Company, Akron, Ohio. Mr. Lee's connection with the Cincinnati Traction Company dates back twelve years to the time when the Schoepf interests took over the local lines in Cincinnati under lease.

Mr. Martin S. Decker has been designated as chairman of the Public Service Commission of the Second District of New York by Governor Sulzer. Mr. Decker is a Republican and has been a member of the commission since the law creating that body was enacted under Governor Hughes. As chairman Mr. Decker succeeds Mr. Frank W. Stevens, Jamestown, who resigned recently.

Dean W. F. M. Goss, of the College of Engineering, University of Illinois, has been elected chief engineer of the committee on smoke abatement and electrification of railway terminals of the Chicago Association of Commerce. Dean Goss was elected unanimously and will succeed Horace G. Burt, who died recently. In order that Dean Goss may take up the work without interruption, he has had granted to him by the University of Illinois a leave of absence for a year.

Mr. J. C. McPherson, who has been division superintendent of the Pacific Electric Railway at Pasadena, Cal., has resigned that office to accept the position of general superintendent of the Oakland, Alameda and Berkeley Electric lines of the Southern Pacific Company. Prior to his departure for the north Mr. McPherson had a farewell reception tendered to him by about 150 employees of the Pacific Electric Railway at Los Angeles and a similar number of the employees in Pasadena.

Mr. John F. Wallace, president of Westinghouse, Church, Kerr & Company, New York, N. Y., was selected as the expert adviser of the committee on railway terminals of the City Council of Chicago on July 1. Mr. Wallace said it would require from sixty to ninety days to prepare a report on the terminal situation. For that reason no action will be taken on the Pennsylvania ordinances until the report is presented. The sub-committee decided to appoint a single engineer rather than a board of three engineers as suggested at first.

Mr. W. O. Holton, formerly assistant claims agent of the Chicago (Ill.) City Railway, has been appointed claims agent of litigated cases to succeed Mr. B. M. Troxell, whose death was announced in the *ELECTRIC RAILWAY JOURNAL* for Jan. 27, 1913. Mr. Holton was born in Mason County, Kentucky, in 1867. After attending public school and night school he studied law and in 1898 entered the service of the Chicago City Railway as a conductor. He served in this position for two years, after which he entered the claims department of the company as an investigator. In 1902 he was made assistant to the claims attorney in which position he had charge of all investigations. In 1909 he was appointed assistant claims agent, which position he has held until his recent promotion to claims agent of litigated cases.

Mr. B. S. Josselyn, who retired as president of the Portland Railway, Light & Power Company, Portland, Ore., on July 1, 1913, had a farewell banquet tendered to him at the Arington Club in Portland recently by the other officers of the company and a number of his business associates outside of the company. Mr. Josselyn expressed his regret at leaving the company and commended the qualifications of his successor, Mr. Franklin T. Griffith. Eleven pieces of silver, comprising a Paul Revere set, were presented to Mr. Josselyn by the officers and employees of the company, Mr. F. I. Fuller making the presentation speech. The set consists of one very large tray upon which was engraved, "Presented to B. S. Josselyn, president of the Portland Railway, Light & Power Company, by the officers and employees upon his resignation as president, July 1, 1913." The other pieces consisted of a creamer, two sugar bowls, coffee and tea urns, meat platter, a meat fork and fish spoon. Upon each of the large pieces is engraved the letter "J."

Mr. J. W. Brown, who has been assistant superintendent of transportation of the Public Service Railway, Newark, N. J., has been appointed assistant general superintendent of the company, a newly created position. Mr. Brown has been connected with the Public Service Railway since April, 1911. Before that he was with the Aurora, Elgin & Chicago Railroad and prior to that time was superintendent of transportation of the West Penn Railways, Connellsville, Pa. He entered the service of the McKeesport, Wilmerding & Duquesne Railway, McKeesport, Pa., about fourteen years ago as night car dispatcher. He also served as electrician and later as power station engineer of this company. When the Pittsburgh, McKeesport & Connellsville Railway was formed Mr. Brown was made master mechanic of the McKeesport division of that road and later was promoted to division superintendent. When the transportation department of the company was organized in 1903 he was appointed superintendent of transportation of the company. He resigned from the West Penn Railways, Connellsville, in August, 1910, to become connected with the Aurora, Elgin & Chicago Railroad.

Mr. Newton W. Bolen, superintendent of transportation of the Public Service Railway, Newark, N. J., has been appointed general superintendent of the company, a newly created office. Mr. Bolen has been connected with the railway department of the Public Service Corporation of New Jersey, of which the Public Service Railway is a subsidiary, continuously since 1903 except for a short term of service with the Mexico City Tramway. The first few months of his service with the company were devoted to a study of the traffic problems of the separate systems then recently consolidated, with a view to the operation of the lines as a unit. He was subsequently made district superintendent of the lines of the company in Hudson, Bergen and Passaic Counties, and when the scheme of organization of the company was changed and the position of superintendent of transportation was created Mr. Bolen was appointed to that post. All the lines in the State owned by the company were thus brought under his jurisdiction and all the division superintendents report to him. Before becoming connected with the Public Service Railway Mr. Bolen was in the employ of the Brooklyn (N. Y.) Rapid Transit Company, the service of which he entered when a boy. He was advanced in Brooklyn until at the time of his leaving the company to become connected with the Public Service Corporation he was superintendent of the Flatbush and the Bergen Street divisions of the company, two of the most important on the system. Mr. Bolen is a member of the American Electric Railway Transportation & Traffic Association.

OBITUARY

George Townsend, president of the Wyandotte Construction Company, Kansas City, Mo., which built the Kansas City, Clay County & St. Joseph Railway, is dead. It is supposed that Mr. Townsend, who was a victim of melancholia, committed suicide. Mr. Townsend disappeared from the Hotel Baltimore, Kansas City, on June 24 and on June 29 his body was discovered in the Missouri River 6 miles west of Kansas City, Kan. Mr. Townsend was sixty-two years old. He was well known in the West, particularly in Chicago. He is survived by a widow and two sons.

Construction News

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

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

RECENT INCORPORATIONS

Rome & Gadsden Railroad, Gadsden, Ala.—Application for a charter will be made by this company to build a 60-mile line between Rome, Cave Springs, Center, Forney Key, Rock Run and Gadsden. Capital stock authorized, \$5,000 to \$5,000,000. J. B. Wadsworth, Gadsden, president. [E. R. J., June 7, '13.]

***Circuit Terminal Railroad, Indianapolis, Ind.**—Application for a charter has been made by this company to take over the rights and franchises of the old Circuit Terminal Railway, sold under order of the Marion Circuit Court, to C. E. Worth and John W. Trotter, and to build electric railways and other public utilities between Greenfield, Noblesville, Lebanon, Danville, Martinsville, Franklin, Shelbyville and other intermediate points. Capital stock, \$10,000. Directors: C. Eugene Worth, Indianapolis; John W. Trotter, Danville, and Oliver W. Johnson, Cleveland, Ohio.

FRANCHISES

Sylacauga, Ala.—M. B. Lewis and T. B. Perry, Sylacauga, have received a franchise from the Council to build an electric railway in Sylacauga. The terms of the franchise state that this line must be in operation within three years. The proposed line will extend from the new Eva Jane Mills just north of Sylacauga to Gant's quarry, 2 miles from the town south. Later it is stated that other lines will be built in the residential section of Sylacauga. It is stated that the new company will be organized with a capital stock of \$150,000.

Little Rock, Ark.—The Little Rock & Hot Springs Electric Railway has accepted the franchise granted it by the Council in Little Rock.

Los Angeles, Cal.—The Pacific Electric Railway has received authority to build at grade across fourteen public highways in Orange County for the purpose of double-tracking a portion of its Santa Ana line.

Belleville, Ill.—The Southern Traction Company of Illinois has asked the City Council for a franchise in Belleville. The line will be a part of a railway to Freeburg, which is a continuation of the East St. Louis-Belleveue line.

Morris, Ill.—The Fox & Illinois Union Railway, Aurora, has received an extension of ninety days on its franchise in which to complete its entrance into Morris. This 20-mile railway will connect Yorkville, Morris, Dwight and Sandwich. H. H. Evans, president. [E. R. J., April 26, '13.]

Springfield, Ill.—The Springfield & Central Illinois Railway has received a twenty-year franchise from the City Council to build a line from Springfield to Duquoin to connect with a line between St. Louis and Terre Haute. Voters will ratify the proposition July 15. [E. R. J., June 14, '13.]

Terre Haute, Ind.—The Springfield & Central Illinois Traction Company, which was recently granted a franchise by the County Commissioners to extend its lines from the Illinois State line to the west bank of the river, has notified the commissioners of the acceptance of the franchise. Work is scheduled to begin in a short time. The company will ask the City Board of Public Works to grant a like franchise through the city to a terminal station yet to be selected. The company will probably change its corporate name to the Springfield, Central Illinois & Terre Haute Traction Company. [E. R. J., June 28, '13.]

Portland, Maine.—The Portland Railroad has received a franchise to double-track its lines from a point near Martyr Street to a point near Kennebec Street in Portland.

Baltimore, Md.—The United Railways & Electric Company has asked the Council for a franchise to extend its lines on Callow Avenue to Park Terrace and the west side of Park Avenue in Baltimore.

Melita, Man.—R. E. Denny & Company, 32 Ninth Street, Brandon, have received a franchise to build an electric railway and install waterworks in Melita.

Jefferson City, Mo.—The Jefferson City Bridge & Transit Company has received a twenty-five-year franchise from the Council in Jefferson City. The company plans to build a 1-mile extension and double-track some of its lines.

Grand Rapids, Mich.—The Grand Rapids Street Railway has asked for a franchise to extend its tracks on Campau Avenue to Louis Street in Grand Rapids.

Summit, N. J.—The Tri-County Power & Traction Company has asked for a fifty-year franchise from the Council to operate a trackless trolley line in Summit.

Morrisburg, Ont.—The ratepayers of Morrisburg have indorsed a by-law for the granting of right-of-way over certain streets to the Ottawa & St. Lawrence Electric Railway. The franchise is for a period of twenty-five years, and to be effective the company must practically complete its line by the fall of 1914.

York, Ont.—The first draft of the proposed agreement between the township of York and the Forest Hill Electric Railway was submitted to the Council recently. The agreement provides for a single-track railway from a point on Forest Hill Road near the north limit of York to a point 2½ miles north of Eglinton Avenue. It is stipulated that no work shall be done until plans have been submitted to the township, also that the company will commence construction at once and during the year will spend not less than \$50,000.

York, Pa.—The York Railways will ask the Council for a franchise to extend its lines on Jackson Street in York. The company plans to build a loop going out George Street and circling the Country Club.

Seattle, Wash.—At the request of Mayor George F. Cotterill, Assistant Corporation Counsel Howard M. Findley and Assistant City Engineer D. W. McMorris, a bill has been introduced in the Council to repeal the franchise of the Seattle, Renton & Southern Railway.

Wenatchee, Wash.—The request of the Wenatchee Valley Electric Railway that it be allowed a four months' extension of the time limit of the franchise for an electric railway in Wenatchee, has been denied by the City Council.

Madison, Wis.—The Chicago & Wisconsin Valley Railway, Madison, has asked the Common Council for a franchise over certain streets in Madison. This line will connect Portage, Prairie du Sac, Madison, Merrill, Janesville, Friendship and Easton. J. E. Jones, Portage, general manager. [E. R. J., May 31, '13.]

TRACK AND ROADWAY

Los Angeles (Cal.) Railway.—Plans are being made by this company to double-track its Western Avenue line west of Hobart Boulevard at once. The company is asked to extend its lines to Hollywood and other sections of the northwestern part of Los Angeles. The work includes the extension of the Vermont Avenue crosstown line as far north as Los Feliz road, and the extension of the Western Avenue line to Hollywood Boulevard and into Hollywood. The proposal to install a third "L" rail on Hollywood Boulevard is also made to connect the Vermont Avenue lines and the Western Avenue lines in Los Angeles.

Pacific Electric Railway, Los Angeles, Cal.—Work will be begun at once by this company on its line between San Bernardino and Rialto. The steel for the concrete culverts and bridges has been received and bridge construction will be begun at once.

Geary Street Municipal Railway, San Francisco, Cal.—This company has placed in operation its line to the ocean beach in San Francisco.

Northwestern Elevated Railway, Chicago, Ill.—This company, through its president, B. I. Budd, has agreed to submit the question of extending the line into Wilmette, a suburb to the north of Chicago, to a referendum vote. The village board has been authorized to draft an ordinance subject to the approval of the railway company, and it will be submitted in the referendum.

Iowa Railway & Light Company, Cedar Rapids, Ia.—This company, which has announced plans for the construction of an interurban railway between Muscatine and Iowa City, is now promoting an electric line to be extended from Cedar Rapids to Davenport, via Tipton.

Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan.—This company, which plans to build an interurban railway from Kansas City to Bonner Springs and later to Lawrence and Topeka, may enter Kansas City by way of the Kansas City Outer Belt Railroad. The plan is to use about 2 miles of the belt line from Indian Creek to Eighteenth Street and Minnesota Avenue in Kansas City, there to connect with the Metropolitan Street Railway. A. L. Berger, attorney for Thomas A. Bigger, receiver for the Kansas City-Outer Belt Railroad, asked Judge Pollock to approve a lease whereby the interurban electric line was to use the north side of the right-of-way. Judge Pollock indicated that he favored granting the lease because those acquainted with the physical conditions said the use of a part of the outer belt, which has room for six parallel tracks, by an interurban line would benefit the property instead of injuring it. [E. R. J., May 10, '13.]

Orleans-Kenner Electric Railway, New Orleans, La.—Right-of-way is being secured and construction will be begun within the next sixty days by this company on its 15-mile line to connect New Orleans, Kenner, Hanson City, Harrihan and Shrewsbury. A tax of \$77,500 has just been voted by Jefferson Parish to assist in the construction of the line. Officers: A. Smith Bowman, Wilcox, president; Andrew Fitzpatrick, New Orleans, vice-president, and Peter Stiffs, New Orleans, secretary. [E. R. J., June 14, '13.]

Texas-Louisiana Traction Company, Shreveport, La.—Right-of-way is secured and surveys are completed for the construction of this line, which will connect Shreveport, La., and Jefferson and Longview, Tex. The financing is said to have been arranged. A. B. Blevins, Jefferson, is interested. [E. R. J., Jan. 11, '13.]

Bangor Railway & Electric Company, Bangor, Maine.—This company will extend the Hampden branch track 1 mile this summer, but the proposed extension to Winterport will not be built this year. The work of connecting the Bangor and Brewer lines of the company on the new steel bridge over the Penobscot River will begin soon. A hearing will be held before the Railroad Commission in regard to the grade crossing which will be necessary at the Brewer end of the bridge, as the tracks of the Maine Central Railroad must be crossed there. The Bangor Power Company, a subsidiary of the Bangor Railway & Electric Company, has resumed work on the dam at Veazie, which will furnish increased power for the company.

Brandon, Man.—The citizens of Brandon have voted in favor of a by-law appropriating \$150,000 for electric railway construction and equipment in Brandon. R. E. Speakman, city engineer.

Michigan & Chicago Railway, Grand Rapids, Mich.—Contracts for the third-rail equipment of the Michigan Central Railroad's branch from Montith to Battle Creek have been awarded by this company, which recently brought the line from Battle Creek to Allegan. It is expected the line from Montith, which will be the junction point, to Battle Creek will be completed as soon as the main line of the interurban from Grand Rapids to Kalamazoo. [E. R. J., May 24, '13.]

***Lakewood, Mich.**—Work has been begun on the new electric line between the railroad station and the club house at Lakewood, Mich.

Muskegon-Casnovia Land & Development Company, Muskegon, Mich.—The citizens of Casnovia are raising \$10,000 to be used toward the construction of this railway between Muskegon, Casnovia and Saginaw. John O. Fraligh, Casnovia, is interested. [E. R. J., June 21, '13.]

Minneapolis (Minn.) Street Railway.—This company plans to build soon 15 miles of new track in Minneapolis.

***Biloxi, Miss.**—Plans are being considered to build an electric railway between Mobile and Biloxi. Among those interested are W. H. Bouslog, J. J. McIntosh, G. W. Grayson and E. B. Dunton.

Kingston & Excelsior Springs Electric Railroad, Kingston, Mo.—Surveys have been completed and right-of-way is being secured by this company for its 25-mile line between Kingston, Lawson and Excelsior Springs. Arrangements are being made to award the contracts for the construction of the line as soon as the right-of-way has been

secured. Plans are being considered to build a line between Richmond and Excelsior Springs. B. Boner, Kingston, president. [E. R. J., May 31, '13.]

Moberly, Huntsville & Randolph Springs Railway, Moberly, Mo.—Grading has been begun by this company at Randolph Springs, the western terminal. This 12-mile line will connect Moberly and Randolph Springs. Charles H. Dameron, president. [E. R. J., June 21, '13.]

Billings (Mont.) Traction Company.—During the summer this company plans to extend its line to Polytechnic.

Fallon (Nev.) Electric Railroad.—Rapid progress is being made on the electric railroad being built from the Harrigan ranch to Fallon. Rails now are laid within 1 mile of Fallon. It is proposed to extend the line to Dixie Valley, in Nye County. A. E. Wilson, Fallon, secretary. [E. R. J., June 21, '13.]

***Dayton, Ohio.**—Plans are being considered to build an electric line between Dayton and Cincinnati, via Reading, Carlisle and Germantown. Among those interested are: J. G. Miller and L. T. Palmer, Middletown, and F. J. Ferneiding and O. L. Mead, Dayton.

Springfield (Ohio) Railway.—Work will soon be begun by this company on its new line on Clinton Street to its proposed new carhouse in Springfield.

Tri-State Traction Company, Steubenville, Ohio.—It is reported that this company plans to build an electric and steam line between Quincy and Burlington.

Poland Street Railway, Youngstown, Ohio.—Surveys have been completed and grading is under way along the entire 16-mile between Poland and Youngstown, via Lansingville, Pine Hollow and Poland Heights. [E. R. J., June 14, '13.]

Lake Erie & Northern Railway, Brantford, Ont.—Grading has been completed by this company between Waterford and Bloomsburg. Work has been begun on the Waterford bridge. The structure will cost \$65,000. The route through Simcoe has been approved by the Board of Dominion Railway Commissioners.

Morrisburg & Ottawa Electric Railway, Ottawa, Ont.—This company has called for bids for the construction of 10 miles of its line of railway, from Ottawa, extending in the direction of Morrisburg, such bids to be based on the company's plans and specifications. Bids will be received up to July 8, 1913, and the plans and specifications for proposed work can be inspected at any time at the head office of the company in Ottawa, Ont.

Toronto, Ont.—The proposed electric railway between Toronto and Port Perry is now under consideration by the engineering staff appointed by the Hydroelectric Power Commission of Ontario.

Toronto Suburban Railway, Toronto Junction, Ont.—This company has been asked to remove its tracks from the west side of the road to the center on Main Street from Church Street to the northern boundaries of Weston.

Harrisburg, Pa.—Surveys are being made for a new electric line between Hershey and Elizabethtown, via Campbelltown, a distance of about 9 miles. It will be a feeder for the Hershey-Lebanon system, owned by the Hershey chocolate interests. Work on the construction of the new line is to be started soon.

Montreal (Que.) Tramways.—This company is relaying tracks in different parts of Montreal, this forming part of an extensive programme which will be carried out during the next few months. The old rails of 96 lb. weight are being replaced with rails of 116 lb., the guard rails being increased to 132 lb., which will be standard for the future. In certain sections special cedar ties are being laid down, the length being increased from 7 ft. to 8 ft., while they are put 2 ft. apart instead of 2 ft. 6 in. The roadbed has been greatly strengthened.

Middle Tennessee Traction Company, Franklin, Tenn.—This company has increased its capital stock from \$10,000 to \$250,000. This railway will connect Franklin, Eagleville, Shelbyville and Fayetteville. Grading has been completed from Franklin to Eagleville. The Interurban Construction Company, which has been organized to build this line, has elected the following officers: R. H. Crockett, president; P. E. Cox, vice-president and general manager; E. E.

Green, secretary and treasurer, and G. B. Howard, chief engineer. [E. R. J., June 7, '13.]

Guadalupe Valley Traction Company, Seguin, Tex.—Grading has begun by this company on its 92½-mile line to connect Austin, Lockhart, Seguin and San Antonio. The company has not yet decided whether the motive power will be gasoline or electricity. Capital stock authorized, \$100,000. Capital stock issued, \$75,000. Officers: W. B. Dunlap, Seguin, president; E. W. Brown, Orange, vice-president; W. J. Crawford, Beaumont, secretary and treasurer; J. M. Abbott, Seguin, general manager, and Guy M. Simpson, Seguin, chief engineer. [E. R. J., June 28, '13.]

Salt Lake & Utah Railroad, Salt Lake City, Utah.—This company has awarded a contract to S. L. Chipman, American Fork, for grading 10 miles of its line south from Jordan Narrows. The company will soon award other contracts for construction of its line which will connect Salt Lake City, Provo, American Fork, Pleasant Grove, Springfield, Spanish Fork and Payson. W. C. Orem, Salt Lake City, president. [E. R. J., Feb. 22, '13.]

SHOPS AND BUILDINGS

Northern Electric Railway, Chico, Cal.—This company has completed its new freight depot in Oroville. It is reported that the company plans to build a new passenger depot in Oroville.

Northwestern Elevated Railroad, Chicago, Ill.—This company is considering plans to build a new terminal station in Wilmette. The cost is estimated to be about \$12,000.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—This company has taken out a building permit for an addition to its Spy Run Avenue power house, which it is estimated will cost approximately \$300,000.

Cedar Rapids & Marion City Railway, Cedar Rapids, Ia.—This company plans to build a new two-story carhouse and workshop at Cedar Rapids in the near future. The cost is estimated to be about \$55,000.

Holyoke (Mass.) Street Railway.—Among the improvements planned by this company will be the construction of new carhouses on the Hadley lot in Ward 1 in Holyoke.

Charlotte (N. C.) Electric Railway.—This company's paint shop and machine shops in Dilworth were destroyed by fire on June 14. The equipment, consisting of lathes, air compressors, etc., four cars and accessories, besides stores, were also destroyed. The loss is estimated to be about \$50,000.

Oregon Electric Railway, Portland, Ore.—Plans and specifications have been received by this company for its new passenger station in Eugene. Bids are being asked for the construction of the building, which will be of brick. The express rooms will be located in the western end of the structure and the baggage rooms will be in the east end.

POWER HOUSES AND SUBSTATIONS

Georgia Railway & Electric Company, Atlanta, Ga.—This company has installed three transformers at its Dunlap power plant.

Union Traction Company, Independence, Kan.—This company is installing a new 750-hp engine and has received other machinery for installation at its power plant in Independence.

South Covington & Cincinnati Street Railway, Covington, Ky.—This company has placed an order with the Westinghouse Electric & Manufacturing Company for one 300-kw portable substation in which is installed one 300-kw, 600-volt d.c., three-phase, 60-cycle, 1200-r.p.m. self-starting rotary converter and one 330-kva, 4400-volt, three-phase outdoor-type O.I.S.C. transformer complete with one two-panel switchboard.

Holyoke (Mass.) Street Railway.—This company plans to bring its power plant in Holyoke up to date and will install new turbine engines.

Rio Grande Valley Traction Company, El Paso, Tex.—This company has placed an order with the Westinghouse Electric & Manufacturing Company for three 250-kva, 2200-6600-volt, single-phase, 60-cycle O.I.S.C. transformers and one switchboard.

Manufactures and Supplies

ROLLING STOCK

Savannah (Ga.) Electric Company is in the market for three cars.

Maryland Electric Railway, Annapolis, Md., is reported as expecting to purchase a number of cars.

St. Joseph Valley Traction Company, Elkhart, Ind., will purchase three or four new cars.

Cape Breton Electric Company, Sydney, N. S., is reported as expecting to purchase a number of cars in the near future.

Washington, Baltimore & Annapolis Electric Railway, Baltimore, Md., is in the market for twelve all-steel inter-urban cars.

Genoa, Italy, will require twenty-two motor cars and a similar number of trail cars for the proposed 6-mile subway in that city. S. Cattaneo Adorno, Genoa, may be addressed.

Mobile & Baldwin County Railroad, Volanta, Ala., is in the market for two combination passenger and baggage gasoline cars that will seat from twenty to thirty-five persons.

Chicago (Ill.) Railways, noted in the ELECTRIC RAILWAY JOURNAL of June 14, 1913, as expecting to purchase 100 cars, has ordered these cars from the Southern Car Company, High Point, N. C.

South Covington & Cincinnati Street Railway, Covington, Ky., noted in the ELECTRIC RAILWAY JOURNAL of May 17, 1913, as having ordered twenty semi-convertible cars from the Cincinnati Car Company, has specified the following details:

Seating capacity.....32	Underframe .....composite
Length of body...21 ft 0 in.	Car trimmings .....Dayton
Length over vestibule,	Couplers .....Van Dorn
30 ft. 9 in.	Curtain fixtures ...Forsyth
Width over sills.7 ft. 11 3/4 in.	Curtain material...Pantasote
Width over all....8 ft. 2 in.	Destination signs ...Hunter
Height, rail to sills....28 in.	Fenders or wheel guards,
Sill to trolley base,	Hunter
9 ft. 3 3/4 in.	Gongs .....12 in.
Body .....wood	Hand brakes .....Peacock
Interior trim ....mahogany	Headlights .....U. S.
Headlining...poplar veneer	Trolley base .....U. S.
Roof .....monitor	Varnish .....Murphy

United Traction Company, Albany, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of June 14, 1913, as having ordered twelve semi-convertible pay-within cars through W. R. Kerschner, from the Cincinnati Car Company, has specified the following details for these cars:

Seating capacity .....44	Fare boxes.....New Haven
Weight (car body only),	Wheel guards....Rochester
18,000	Gears and pinions....West.
Bolster centers, length,	Gongs .....Standard
18 ft. 11 in.	Hand brakes.....Peacock
Length of body...30 ft. 11 in.	Heaters .....Cons.
Length over vestibule,	Headlights ...Crouse-Hinds
44 ft. 11 in.	Journal boxes...Symington
Width over all....8 ft. 4 in.	Motors.....W. H. 101 B2
Height, rail to top of	outside-hung
floor .....39 in.	Paint....Devoe & Reynolds
Sill to trolley base, 8 ft. 9 in.	Registers.....New Haven
Body .....metal	Sanders .....Dewitt
Interior trim ....mahogany	Sash fixtures...Cin. Car Co.
Headlining .....Agasote	Seats, style.....H. & K.
Roof, type .....arch	Seating material...Pantasote
Underframe .....metal	Step treads.....Mason
Air brakes .....G. E.	Trolley catchers...Keystone
Axles .....Carnegie	Trolley base....Ohio Brass
Bumpers .....Hedley	Trucks, type.....Taylor
Car trimmings..Cin. Car Co.	Varnish,
Conduits and junction	Beckwith & Chandler
boxes ....Elec. S. Sup. Co.	Ventilators...Aut. Vent. Co.
Couplers .....Standard	Wheels.....forged steel
Curtain fixtures ..Cur. S. Co.	Door and step device,
Curtain material...Pantasote	Cin. Car Co.

TRADE NOTES

Tilsonburg Electric Car Company, Ltd., Tilsonburg, Ont., has been organized to manufacture electric street cars, snow sweepers, etc.

Protectus Paint Company, Philadelphia, Pa., has been appointed railway selling agent for the products of the Barber Asphalt Paving Company.

Fred Gardner Company, Chicago, Ill., has been incorporated with capital stock of \$2,500 to buy, sell and deal in railway supplies, etc. The incorporators are Fred Gardner, Charles B. Moore, J. L. Nicholson.

Canadian Foundry Company, Ltd., Toronto, Ont., has appointed J. G. Seyfried engineer for the bridge department of the company. Mr. Seyfried was formerly connected with the Grand Trunk Railway at Montreal, Que.

S. F. Bowser & Company, New York, N. Y., have appointed W. E. Jenkinson railway representative, covering the territory vacated by E. F. G. Meisinger. In addition Mr. Jenkinson will take over the Southwestern and Pacific Coast territory.

Pyrene Manufacturing Company, New York, N. Y., has received recent orders for its fire extinguishers from the Allen Street Railway, the Standard Steel Car Company, and a repeat order from the Interborough Rapid Transit Company for fifty extinguishers.

Curtain Supply Company, Chicago, Ill., has received recent curtain orders from the following railways: New York State Railways, Rochester, N. Y.; Washington Railway & Electric Company, Washington, D. C.; Holyoke (Mass.) Street Railway, and the Manhattan Bridge Three-Cent Fare Line, Brooklyn, N. Y.

Pantasote Company, New York, N. Y., has elected E. H. Outerbridge vice-president and managing director of the company. Raymond Harvey, who has been associated with Mr. Outerbridge for more than ten years, has been elected secretary and treasurer to fill the vacancy caused by Mr. Outerbridge's recent appointment.

Union Switch & Signal Company, Swisvale, Pa., has recently received a contract from the Ohio Electric Railway for signaling its line between Fort Wayne and New Haven, Ind., a distance of 4.2 miles. This division, which has the first track circuit signaling on the system, contains two blocks, using four type B semaphore signals and four light signals.

Electric Service Supplies Company, Philadelphia, Pa., has recently received large orders for automotoneers from the Philadelphia (Pa.) Rapid Transit Company. These are placed on the trolley car controllers to compel the motorman to stop for a short interval of time on every point in throwing power from "off" to full "on." It is claimed by the manufacturer of this device that it substantially reduces the cost of controller and motor maintenance.

Anger Manufacturing & Supply Company, Ltd., Preston, England, manufacturer of the Anger improved automatic brake adjuster, reports a large increase in its business. The company has received recent large orders from the Sheffield Corporation Tramways, the Birmingham Corporation Tramways, the Cardiff Corporation Tramways, the Santos (Brazil) Tramways, and many others. The company has recently made arrangements with another factory to manufacture the various parts of this device at Hapton, which makes four factories that this company is now operating in Europe. The company has also closed an agreement with the Ackley Brake & Supply Company, New York, N. Y., to manufacture and sell its device in the United States, Mexico, Cuba, Porto Rico, Central America and the Philippine Islands.

Van Dorn Electric Tool Company, Chicago, Ill., has been formed to take over the portable tool department of the Van Dorn & Dutton Company. This latter company has for nearly eighteen years specialized in the production of gears and gear cutting. Some seven years ago it took up as a side line the design and production of portable electrically operated drilling and reaming machines, to which have since been added electric grinders and portable

tools and within the past two and one-half years the products have been materially improved and widened in scope. For some time past it has seemed to the company that the portable tool operations had grown to such an extent that this branch and that of the gear operations would be best served by operating each as a separate and distinct company, particularly by reason of the fact that the original interests were expanding to an extent equal to the other operations. As a result the above company was formed, taking over the portable tool operations. The gear interests, as during the past eighteen years, continue under the old company, the officials of which all remain the same. The officials of the new company are W. P. Johnston, president and treasurer; F. G. Hodell, vice-president, and H. A. Rock, secretary. Franklin Schneider will continue to supervise the manufacture and design of these portable electrically operated tools.

Pierson, Roeding & Company, San Francisco, Cal., announce a reorganization of the personnel of their organization as a result of the resignation of S. K. Colby, vice-president, and the appointment to this position of Thomas Finigan, as recently mentioned in this paper. The rapid development of the company's business during the past ten years has led to the establishment of a number of branch offices on the Pacific Coast, and it now is able to serve promptly and has a large business in all of the states west of the Rocky Mountains as well as in British Columbia and the Hawaiian Islands. H. R. Noack, who retains the position of president in the reorganization, has been actively connected with the company since 1898 and during this time has been a large instrument in its success. Thomas Finigan, the new vice-president, brings to the firm the strength of a wide acquaintance, made while associated with the United Railroads of San Francisco and with the Consolidated Traction Company of New Jersey. The treasurer of the company, George R. Murphy, who is in charge of the storage battery department, is also originally from the East, having been connected with the Metropolitan Street Railway of New York and later with the Electric Storage Battery Company. He joined the forces of Pierson, Roeding & Company in 1909. The financial department of the company is in charge of the secretary, George P. Dahle, who has been associated with the company and its predecessors for the past twelve years. The Los Angeles branch of the company is in charge of A. L. Havens, who has been with electrical interests since 1895. The Portland office is in charge of S. Herbert Lanyon and the Seattle office of N. H. Silver, both with long experience in the design and construction of electrical plants and the manufacture of electrical apparatus. The business of the company is also divided into departments, and each is in charge of a specialist. The president of the company, Mr. Noack, cares for the transmission projects, and the railway department is managed by Vice-president Finigan. The car and truck department, an important one because the company represents The J. G. Brill Company on the Pacific Coast, is managed by Ford A. Richards, for many years with the Peckham Manufacturing Company and later with the J. A. Hanna Company. The underground conduit department is directed by C. G. Gauntlett, formerly with Siemens Brothers & Company of London and later with the Pacific Coast Electric Corporation at San Francisco. The sale of poles and cross arms is in charge of F. L. McGillan, at one time general superintendent of the pole yards of the Valentine Clark Company in Chicago and later vice-president and general manager of the California Pole & Piling Company of San Francisco. Finally the hydraulic department is under the direction of E. G. Dewald. While S. K. Colby will no longer be actively identified with the company, he will retain his interest in it and is still a director.

ADVERTISING LITERATURE

Condensite Company of America, Glen Ridge, N. J., has issued a folder describing its synthetic oil and waxes for all uses.

Dossert & Company, New York, N. Y., have issued a very attractive catalog illustrating and describing all types of "Dossert" solderless connectors for solid and stranded wire.

Walter A. Zelnicker Supply Company, St. Louis, Mo., has issued Bulletin No. 139, illustrating and describing the rails, equipment, heavy machinery, etc., it now has on hand.

Thayer & Company, New York, N. Y., sole American agents for the Chillingworth one-piece seamless gear case, have issued a folder describing their gear cases and containing several illustrations of them and the firm's Jersey City plant.

Van Dorn & Dutton Company, Cleveland, Ohio, have issued a catalog illustrating and describing their different types of gears. The catalog also contains a set of rules on gearing and tables of diametral pitch, circular pitch, and a great deal of other valuable information.

Electric Controller & Manufacturing Company, Cleveland, Ohio, has issued very a attractive catalog entitled "More Chips." The catalog contains an article by H. F. Stratton, on "Automatic Control of Machine Tools," with a great many illustrations, of all types of machines, using this automatic control.

Protective Signal Manufacturing Company, Denver, Col., has just issued an eight-page circular describing the "railway crossing protector." Several notable improvements have been made in this highway crossing signal, which are said to have decreased its cost of installation and maintenance, and to have increased its reliability.

California Corrugated Culvert Company, Los Angeles, Cal., has issued a very attractive catalog describing its culverts and containing many illustrations of work that is under construction and completed. The catalog also contains the official report of test made by Prof. A. N. Talbot, of the University of Illinois, on its culvert.

Nachod Signal Company, Philadelphia, Pa., has issued an attractive catalog in three colors entitled "Merit Tells," which is generously illustrated with interurban views. It describes the Nachod products, including automatic signals for single and double track electric railways controlled by trolley contactors, crossing bells and automatic headway recorders.

The J. G. Brill Company, Philadelphia, Pa., prints in its June, 1913, issue of the *Brill Magazine* an illustrated biography of John Frank Calderwood, vice-president and general manager of the Brooklyn (N. Y.) Rapid Transit Company. Among the feature articles are the following: "Conditions Which Govern the Type of Car for City Service, Seattle, Wash.," "Radiax Trucks in New Bedford, Mass.," "Changes in Platform Arrangement and Ventilators on the Near-Side Car," "Convertible Prepayment Car for the Slate Belt Electric Railway," "San Diego Center Entrance Car" and the "Storage Battery Cars for the Heaviest Traffic Street in the World." The magazine this month contains a new feature under the heading "Addressed to Men," which contains good advice to men who have a purpose to rise in rank and who would regard their calling in electric railway work as something more than a mere means of livelihood.

Locke Insulator Manufacturing Company, Victor, N. Y., has just issued "The Insulator Book." This work is an excellent example of the tendency of manufacturing companies to have catalogs carry valuable general technical data on their specialty in addition to the customary descriptions of the firm's products. The present publication contains an interesting essay on insulating materials, leading to the extremely important matter of preparing general insulator specifications with explanations of the purpose of each kind of test. The discussion is followed by notes on the construction and application of suspension insulators, now so prominent in high-tension work, sherdardizing, etc. The apparatus described covers the company's porcelain insulators of pin and suspension types, glass insulators, porcelain bushings and tubes, arcing rings, brackets, pins and other fittings. All items may be economically ordered by telegraph through the use of code words. The book is prepared in loose-leaf form so that changes in patterns can readily be noted by the user without the nuisance of keeping a number of more or less obsolete publications.