Electric Railway Journal

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THE "JOURNAL" IN 1914 AND 1915

In this issue we present statistical tables showing the number of cars ordered, the miles of track built, block signal systems installed, receivers appointed and foreclosure sales effected during the year. We comment at length in our editorial pages this week upon the salient facts disclosed by these statistics, as well as upon the general business situation and the technical progress made during the year in the electric railway industry. It will be seen from these editorial reviews that while gross receipts of a great many electric railway companies have shown a decrease as compared with last year, or have failed to maintain the usual annual increase, notable progress has been made which promises improved conditions within the near future in the technical, business and legal status of electric railways. The JOURNAL will attempt to report and interpret these events as they occur during the coming year as in the past, as well as carry out special lines of investigation and effort which will be of assistance to electric railway companies. A review of the pages of this paper during 1914 will indicate the class of articles we have in mind. We refer, for example, to the study by this paper of special work track problems in Chicago and elsewhere printed during the year by which new light was thrown upon this important subject; to the direction of attention to the importance of a change from the long-standing M.C.B. brass to a design more suitable to the needs of rapid braking on high-speed trains; to various articles on steel car design and modern methods of signaling, and to the public relations convention number, which presented the views of a large number of railway men, representatives of commissions and publicists on various phases of this important question. The JOURNAL realizes the generous support and assistance which it has received from electric railway companies and their officials during the past year and hopes to merit a continuation of this assistance and approval in the future by even more energetic efforts in behalf of the industry.

A BRIEF FOR THE RAILWAYS

One of the several curious phases of the attitude of a large section of the public toward the railways is the objection that is made if the roads speak out in their own defense. A city official recently wrote to the ELECTRIC RAILWAY JOURNAL advising it to abandon its "partisan attitude in favor of street railroads." "I very frequently get the impression," said this correspondent, "that you are holding a brief for the public utilities in striving to impress their viewpoint." The impression is justified, we hope, and if it amounts to an impeachment we plead guilty. But why should it be considered a fault to speak in defense of electric railways, to state their side of the case, to defend them against attack? No one would propose that the most despicable criminal should be deprived of advocate and counsel. Yet objection is frequently made when railways presume to speak in their own behalf. Nothing could bring into stronger relief the evil that has come upon us by reason of long silence under misrepresentation and abuse. Instead of allowing the fact noted to turn us from the effort to establish the electric railway industry in the esteem of the public, it should revive and renew effort in this direction. After so long and so heavy a list composed almost entirely of railway wrongs, railway rights may seem unpalatable at first. But they must be served as regularly and systematically as the wrongs have been. In the United States we have built up the greatest mileage of the best operated and equipped electric railways in the world. As to speed, comfort, service and cost of transportation they are the envy of every people but our own. How much do we hear about this; how much in volume as compared to criticisms? Yes, this journal does "hold a brief" for the electric railways and is proud of its clients. It will continue to express and impress their viewpoint, and in this effort it hopes to be joined actively by the privates as well as the leaders of the industry. Evidently we must all hang together, or, as an early American statesman remarked, we shall hang separately—and if some present-day patriots have their way, without opportunity for defense.

COMPANY SECTION PROGRAMS

Success in sectional association work, as elsewhere, depends upon the efforts of the program committee in providing what the men need and want. This self-evident truth was suggested again by the announcement of the plans for the winter's work made at the November Public Service Railway Company Section meeting and noted in a recent issue of this paper. There are so many organizations to which a man must or would like to belong that each must prove to him that he cannot get along without it; otherwise he cannot afford to join it. The company section idea appeals to the average railway man as a good proposition. He feels also that loyalty to his employer compels his enthusiastic support when a section is started, on the assumption that he will be benefited in one way or another. For a year or so his enthusiasm carries him along, but a time will usually come when he will strike

a balance between cost and profit. A cold, rainy meeting night tests his loyalty. A warm fireside looks good to him. Here is the test of the real value of this section work. In order that a section may be continuingly and increasingly successful certain features of the program appear to us to be essential. In the first place it must be continuous from meeting to meeting so far as fundamental purpose is concerned. Casual speakers, if invited to participate, should be expected to conform to this purpose. While occasional inspirational addresses lend interest invitation to make such should be extended sparingly and cautiously. Second, the topics discussed should be of local interest, dealing primarily with the local property. They should grip the audience by their homely character. The questions following the papers will always show whether or not speakers have found a point of contact with the audience. In the third place the treatment of topics should be elementary and well illustrated. Men are tired at night and no matter how well qualified they are, they do not want to exert any unnecessary effort. The Newark plan appears to meet these requirements. The men there are to be instructed in an interesting way in Public Service problems. Needless to say, they are enthused over the prospect.

ADVANCES IN CAR EQUIPMENT

With the introduction and acceptance of the commutating pole motor for every class of service and the development of master control for city surface cars no further advance in electric railway equipment appeared imminent. The past year, however, has been marked by orders which are more than large enough to indicate that the tapped-field-control motor has also become a fixture. The last cry is the pressed-steel motor which holds forth promise to those who are looking for the ultimate in weight reduction, while the baby motor previously developed is meeting with favor on such large and widely separated properties as the Third Avenue Railway System, New York, and the United Railroads of San Francisco. The cars of the New York Municipal Railway Corporation are being equipped with a system of multiple-unit control, soon to be described in these columns, in which all the usual under-car apparatus, except the resistors, has been placed under one cover to facilitate inspection and maintenance. At the same time the manipulation of the controller effects several train make-up functions which have hitherto been performed separately and at an appreciable loss in time.

An excellent guide to other car improvements, under way, or proposed, is found in the prospectus which W. G. Gove, chairman, has prepared on the work before the 1915 committee on equipment of the American Electric Railway Engineering Association. Perhaps one of the most interesting subjects, because it points to a parting of the ways from steam railroad standards, is that of remodeling the M.C.B. brass. Such heavy electric traction operators as the New York, Westchester & Boston Railway, the West Jersey & Seashore Railway, the Interborough Rapid Transit Company and the New York Municipal Railway Corporation have already adopted modified brasses so that the committee will have a sound basis from which to work out a standard design. Two other subjects which will call for much pioneer work by the committee are specifications for air-brake hose with oil-resisting inner tube, and lighter conduit for car wires and cables. The committee will also continue the work on gears and pinions and review all existing standards and recommendations originating with the committee on equipment. Of all its revisional duties that of steel wheel design promises to prove the most important because the low-floor car has given the small-diameter wheel a degree of prominence that was quite unlooked for two or three years ago.

POSSIBILITIES OF ELECTRIC FREIGHT SERVICE

Several factors in connection with interurban railway operation have forced renewed interest in the development of a wholesale freight business. Paradoxical as it may seem, the freight business on interurban lines has shown little or no decrease during the past six months, and with some companies a handsome increase has been recorded, despite the general business depression and its effect on the freight business of the steam railroads. This difference may be attributed in part to the fact that package freight business as a rule is more stable than bulk freight business, because it consists of foodstuffs and other prime necessities. Another reason undoubtedly is that farm products this year, especially in the Central States where most of the interurban freight lines are, have broken all records of quantity and price, so that these sections have not greatly felt the business depression. The passenger traffic on the interurban lines has decreased to a considerable extent, although proportionately not as much as that of their steam road competitors. The automobile has been a factor in the decrease in passenger traffic on the electric lines, but it has not perceptibly affected the freight business.

Believing that the automobile will become a more and more important competitor for passenger traffic, many electric railway managers are looking with much favor on the development of a wholesale freight business for relief. Interest in this topic was most marked in the discussion of the report of the committee on express and freight traffic at the last Atlantic City convention. Some managers have given the possibilities of development along this line such extended consideration that they have about decided to make an effort to secure franchise amendments in cities where the amount and character of freight traffic which they can now do is restricted. Unquestionably electric interurban roads must seek other fields of endeavor if they want to show increases in their earnings in excess of those made possible by the normal growth of the population in the communities they serve. There is no more desirable business than short-haul freight and express when conducted on a profitable basis. When it is once established, the convenience of the frequent service to the public or community it serves will keep public sentiment in its favor.

DISCRIMINATION AGAINST ELECTRIC FREIGHT

Soon after electric interurban lines came into existence they prepared to handle freight on a large scale. But the steam roads, realizing the danger to them of this popular competition, made it as difficult as possible, by the denial of switching connections and in other ways, for the electric roads to expand their freight business. Since that time, which was more than a decade ago, this attitude has materially changed, particularly toward those roads which have requested privileges from non-competing steam lines. As a rule, however, steam railroad organizations still offer certain barriers which are important, in fact, vital, to the complete development of general freight business. While some electric lines have been admitted to the steam railroad associations and have received the same privileges as a steam railroad member, others have found it impossible to obtain free interchange relations without the aid of state utility commissions or the Interstate Commerce Commission.

Probably the most important stumbling block put in the way of a wholesale electric freight business is that electric lines have been prohibited from becoming members of the per diem agreement. Long electric lines engaged in handling any great amount of freight business cannot interchange equipment profitably on a demurrage basis, since their haul is short, hence their proportion of a through-rate is small. To an unbiased observer it seems strange that the difference in motive power should make any difference in the privileges granted to a common carrier. In some states electric interurban lines have been built under a steam railroad act, while in others they are built under a special interurban act, but in either case they are common carriers so far as their lines run. Under these conditions, nothing less than "rankest discrimination" can be the term applied to the methods employed or the excuses offered by steam railroads in not granting the electric lines free interchange of freight of all classes.

The recent increase in freight rates on practically all commodities in the Eastern district would afford the electric lines financial relief if there were no barriers in the way to limit the handling of freight. Moreover, that fact that electric freight, notwithstanding the present business depression, has demonstrated its stability, attracts the favorable attention of managers more than ever toward a more intensive cultivation. The close friendly relations between the electric line and the public it serves should be a great inducement to steam railroads to grant free interchange of freight. Electric lines not only have additional non-competitive territory to offer to their steam railroad allies, but their intensive cultivation of passenger traffic has placed them in a position practically to glean the territory they serve so far as freight is concerned. To sum up, both the steam and electric roads are in the transportation business for profit. For either of them to assume a myopic policy which results in one or the other not becoming as efficient a machine as it should be, is not only economic waste, but the height of folly, from a standpoint of good management.

THE ALL-STEEL CAR

That the construction of wooden passenger cars has practically ceased during the past year was one of the most striking statements made before the Association of Railway Commissioners a month ago. Of course, this applied only to steam railroads, as the use of steel may be said to be only just beginning on electric railways. Nevertheless, the year 1914 has seen the introduction of the all-steel car on a surprising number of electric lines, of which at least one, the Michigan United Traction Company, has been so enterprising as to have dropped wooden construction altogether and adopted steel exclusively for all of its new equipment. In fact, the steel car for electric railway service has, at last, fully emerged from the experimental stage, this being exemplified by the recently-adopted policy of one electric railway carbuilder who has abandoned his wood mill and now refuses to accept orders for wooden cars of any kind.

New interurban lines like the Kansas City, Clay County & St. Joseph Railway and the Salt Lake & Utah Railroad, have, in general, standardized largely on all-steel equipment, and in elevated and subway service nothing but steel has even been considered during the year just past. In city service the number of all-steel cars has been greatly augmented by the completion of the large orders that had been placed in 1913 for cars of the Brooklyn and New York stepless types, wooden construction, as a matter of fact, being a practical impossibility for the latter design.

The reasons for this rapid growth in the use of steel are by no means obscure. The price of wood, due to the limited supply, is advancing rapidly. That of steel is just as rapidly becoming less with the increased experience of the builders and users of steel cars. Even at this time the matter of first cost seems to favor steel, several prominent builders having stated during the past twelvemonth that, generally speaking, the steel car should cost some 5 per cent less than an equivalent one made of wood. With this, also, go the exceedingly important advantages of light weight, great strength and insignificant maintenance expense, so that it appears not unreasonable to prophesy still further extension of the all-steel idea for every class of service during the coming year. Even in the Southern states, where high-grade wood is plentiful and inexpensive, the use of steel is already making headway—possibly not to the extent of all-steel construction, but at least as regards steel side-sheathing and (perhaps unfortunately) steel underframes as well.

Of course, such substitutions of steel for wood are due to other causes than the inherent strength of the metal. Weight for weight, there is nothing to choose between the two materials. A block of steel, as a matter of fact, has actually less ability to resist force, either tensile or compressive, than a block of wood of equal weight and proportioned accordingly. The qualities that place steel in the van are uniformity and an ability to be worked into irregular shapes in which the strength can be placed where it is needed. Thus the steel car is superior to the wooden car only because it

provides an opportunity for improved design, and if this fact is neglected the advantages of steel construction largely disappear. The mere substitution of steel members for wooden ones accomplishes nothing, and it is quite likely that a steel car that is built in accordance with the old "underframe" principle inherent in wooden car design will cost more, weigh more, and involve more repairs than a similar car built throughout of wood. This, at least, has been the experience with most of the early steel cars, and that fact, in turn, has no doubt retarded the use of steel to some extent. On the other hand, when advantage has been taken of the experience already gained in steel car construction, the results have been so thoroughly satisfactory that the possibility of a return to the wooden car has been quite as remote as would be a return to the wooden highway bridge that once was practically universal in rural districts.

POWER GENERATION AND DISTRIBUTION

A review of the situation in regard to power generation, as evidenced in power plant changes and by papers and reports on the subject presented before technical societies, indicates that refinement is the order of the day. Such topics as smoke prevention, improvements in condenser design, the use of more scientific boiler-room practice, cooling and washing of ventilating air for generators and protection of apparatus from the effects of short-circuit occupy attention. These improvements do not effect sensational increases in operating economy but they improve reliability of operation and cut down the unit cost of energy somewhat. Power plant bookkeeping has now developed to a point at which it is possible to calculate this cost more closely, as has been rendered necessary by the wholesale purchase of energy, particularly by electric railways. The topics mentioned are of importance principally in the large plant which has continued more and more to specialize in generating electrical energy on a large scale and in a.c. form, obtaining a high load factor through the diversity of customers' requirements.

As this issue of the paper goes to press the first of the 30,000-kw steam turbine units, mentioned in the issue of Aug. 23, 1913, is undergoing a test in the Seventy-fourth Street power plant of the Interborough Rapid Transit Company in New York. This installation is of particular interest, aside from the large size of the unit, from the fact that the latter is built in two sections, one operating at 750 and the other at 1500 r.p.m. The use of such large units is practicable only in extremely large plants. It is comforting to the operator of the smaller plant to note, however, that the 5000-kw turbine consumes but about 14 lb. of steam per kilowatt-hour as compared with 13 lb. in the 30,000-kw machine.

In boiler room practice the use of the large boiler is still urged and W. L. Abbott, chief operating engineer of the Commonwealth Edison Company, recommends that the boiler be made shorter. High combustion efficiency of these large units is shown in the Detroit Edison plant where the flue gases average 13½ per cent CO_2, reaching 16 per cent at times. The old-fashioned horse-power rating of boilers is becoming more anomalous as stokers employing forced draft become more popular and this same forced draft practice is bringing the economizer back. All of this is forcing the use of a higher grade of fireman who takes a personal pride in delivering steam to the turbine room at the lowest possible rate of cost.

While electric railway engineers are still interested in power generation their attention is being concentrated on distribution, as they are relieved from responsibility in the power plant. They are taking up the making of concrete poles among other things and these poles are standing up well. The committee on power distribution of the Engineering Association considered the matter important enough to go again into design details in its report and the assignments for this year include further study of it. The Toronto Hydro-Electric Commission has made 25,000 poles at about the same cost as wooden ones.

In high-tension transmission the insulator still furnishes interesting problems for designer and manufacturer as was explained by A. O. Austin in the A. I. E. E. paper abstracted in our issue for Dec. 19. As he pointed out, however, progress in the making of better insulators is encouraging and the "chunky" string of suspension insulator units can be made almost lightning proof by forcing lightning, as it does, to "spill over" rather than puncture the porcelain.

Following the prevailing "get-together" tendency a joint rubber insulation committee was formed some time ago and last year presented a report on a standard specification for 30 per cent Para rubber insulation. This was adopted by the Engineering Association in October and constitutes a real advance through co-operation. Within a few weeks past a joint committee on overhead and underground line construction has been inaugurated with excellent prospects for securing plenty of work.

The joint national committee on electrolysis has its first report in process of editing, indicating that much work has been done during 1914. These joint committees, of which there is a constantly increasing number, are evidences of a constantly growing spirit of co-operation.

A glance backward would be incomplete unless it included a glimpse of the revised A. I. E. E. standardization rules just published. These suggest the significant changes which have occurred in electrical machinery design particularly in regard to improvement in heat-resisting properties of insulation. The rules recognize the fact that temperatures can run higher than the traditional limits set to protect earlier and less durable insulation. The rules include for the first time a section on standards for wires and cables. They are also richer in definitions than the old ones, practice now being sufficiently standardized to justify more careful attention to standardization of phraseology. All of the Railway Association committees to whose work these rules relate have undertaken to apply them to electric railway conditions.

ELECTRIC RAILWAY SIGNALING

Events in the field of signaling have moved during 1914 with all of the rapidity characteristic of previous years. Notwithstanding the hard times, the number of installations, as shown by the list on another page of this issue, is surprisingly large. This is due, no doubt, to the growing realization that signals are no longer a luxury, as exemplified by the willingness of the industry to accept refinements that must, of necessity, involve a somewhat increased cost. Such an attitude is shown by the prompt commercial development, during the year, of the American Electric Railway Association's standard aspect for contact signals, which requires one more light than the number used in any of the previous all-light signals, but which thus assures a definiteness of indication that previously had been lacking.

In track-circuit signaling for high-speed, single-track lines the year has been notable for the apparent supercession of the preliminary by the intermediate signal. The former device, involving the extension of the insulated track beyond the signal at one end of each block, was developed for the early single-track installations to prevent simultaneous entrance of trains at opposite ends of a block. The beginning of its end came in 1912 when self-contained blocks with intermediate signals were introduced on the Washington, Baltimore & Annapolis Electric Railroad, and, among the new signal installations ordered since the latter part of 1913, all have used the intermediate signal in some form. Indeed, it seems hardly likely that the preliminary will be used for any future systems, for the self-contained block offers the great advantage of simplicity as well as the ready opportunity to accelerate traffic by operating under signals alone and without train orders.

Recognition of the possibilities of the latter procedure has been, perhaps, the most important feature of the year's progress in signaling. Strange to say, it has been the steam railroads that have first seized upon its opportunities. F. P. Patenall, president of the Railway Signal Association, stated at the convention last fall that, to be up to date, the signal engineer must now meet successfully the widespread demand for the operation of single-track railroads by signal indications alone, and this assertion, coming as it does from the field wherein the train order has been supreme for half a century cannot fail to have deep significance for electric railways.

During the year, however, operation without train orders has been introduced successfully on one interurban electric line, the Scranton & Binghamton Railway, and other roads are reported to be considering it, so that there is reason to believe that the electric railways will not fail to play a significant part in the future development of this important and far-reaching improvement. Certainly the interurban lines with their short trains and frequent service have far more to gain by such a time-saving scheme than have the steam roads, whose real profits come from freight trains of such enormous length and such inherent slowness of movement that the time lost in taking orders is not of so great importance.

THE WORK OF THE COMMISSIONS

It was not to be expected, of course, that the year 1914 would show much progress in the way of new public service commission laws, for at the beginning of the period all states except Delaware, Utah and Wyoming already possessed regulatory bodies of some kind. The work of the last year has been rather that of perfecting the operations of the organizations already existing and of formulating standards and systems for the guidance of new commissions. Yet just before the bells began ringing out the old year there came proposals for bills to create in Texas and Alabama bodies separate from the railroad commissions for the regulation of public utilities, and an intimated intention on the part of the administration to divide the Interstate Commerce Commission into three divisions controlling rates, valuation and security issues. There can assuredly be expansion in the commission organization of some states to bring all public utilities under uniform control, and the leaders at Washington may find it expedient to divide the Interstate Commerce Commission as suggested. To our mind, however, such structural changes are less important than the future choosing of commission personnel and utilizing of commission powers so that there can be not even a breath of suspicion or disfavor against this most modern branch of our government.

Public utility regulation is of value in proportion to its fairness and impartiality, and the influence of commission personnel on these points is too generally recognized in theory if not always in practice to need emphasis by expansion. In properly carrying out their delegated powers, however, public service commissions are constantly opposed by advocates of local regulation or federal regulation. We believe that state regulation offers the only sane solution of public utility problems. Just as our government is founded on a proper and successful division of authority between Congress for interstate questions, state legislatures for intrastate affairs and the exercise of the police power, and municipal councils for matters exclusively local, so the power of regulation should be used by the federal commission for purely interstate transportation, by state commissions for controlling the state-wide important subjects of public utility competition, capitalization, accounts, rates and municipal operation, and by municipalities for police regulation and a right to forbid the use of particular streets. We have no patience with those who advocate local regulation, a system which results only in poorer service, discriminatory rates and expenses concealed in tax levies. State regulation has proved successful, and the only problem to be solved as regards jurisdiction is the drawing of a clear-cut line between interstate and intrastate cases. On this point we hope the recent hearing in Washington before the Interstate Commerce Commission will result in a simple separation satisfactory to state commissions and public utilities.

In the exercise of state regulatory powers, the cloud on the horizon in previous years has been the evident attempt to give excessive weight to the reproduction-cost-new theory of valuation with too limited allowance for intangible values in rate-making cases. Yet several decisions have been handed down during the last year which lead us to hope that this cloud may not be entirely without its silver lining. First we have the enlightened view of the New York up-State commission in the Schenectady Railway case, leading to the affirmation that commissions were not intended to restrict utilities to such scanty earnings as would keep them out of bankruptcy but rather to allow them under good management to attain a portion of reasonably assured prosperity. Then we have the Manchester Street Railway decision of the New Hampshire commission, recognizing the impossibility of taking care of past depreciation and adding this amount as cost of progress to the depreciated value in order to determine the present fair value. A decision reaching a similar result, although by a different principle, is that in the Middlesex & Boston rate case, where as a result of the strict Massachusetts capitalization laws the company was allowed to earn a return on its actual investment instead of on reproduction cost. It is interesting to note that as an outcome of this decision the commission decided that the patrons had fared better than the investors and that the bugaboo of a maximum 5-cent fare should be banished in favor of a 6-cent rate.

For the last examples, we have the more recent rate decision of the Interstate Commerce Commission giving consideration to the increasing hire of capital as well as other increased costs, and the opinion of the New Jersey Court of Errors and Appeals in the Public Service Gas Company case, stating that when the market value of stock added to indebtedness shows an excess over the physical valuation and development cost, there is evidence of special franchise values that should be included in the basis for rate-making. The capacity for forceful and sound thinking exhibited in all these cases leads us to feel that all commissions will eventually realize that they are as responsible for the equitable treatment of public utility capital as for prompt attention to any complaining citizen.

We hope that the doctrine of the above decisions will be spread far and wide. In this connection, we take delight in referring to one specific outcome of the year's progress, the definite plans to publish annotated commission reports. While commissions must be guided by the empowering laws, most problems cannot be solved by reference to the statutes but require careful personal consideration and the exercise of good judgment on all the factors concerned. Identical facts have often appealed to various commissioners in different ways, but the annotated reports that are to begin with Jan. 1, 1915, should do much to clear up the lack of harmony that has previously existed. Such a system has long been needed to provide the commissioners and the public at large with material for a systematic development and wider recognition of the doctrines and principles underlying public utility regulation.

INCREASING THE CAPACITY OF THE LINE

The problem of the operating department to increase the capacity of the line or, reciprocally considered, to decrease the congestion of the line, has been in the foreground during the past year. The measures for relief, if not for cure, naturally fall into two classes, those which can be applied to the car and those which can be applied to the line. Palliative measures on or at the car lie almost solely in the hands of the railway itself, but those relating to the line require a large degree of co-operation from the public and the municipality. It is clear that the first step in increasing line capacity is to speed up car movement at terminals or other heavy loading points. Here the facilities for the entrance of passengers to the car and the ease of fare collection are prime requisites at all locations where ticket booth operation is impracticable. The speed of passenger handling at the car is being promoted by a low-level drop platform like those of the Third Avenue Railway System, New York, by a separate front exit as on the Pittsburgh Railway's latest type, and by an emergency rear exit as used on the Philadelphia near-side cars. So far as fare collection is concerned, the Kansas City plan of front-end fare collectors has been adopted also at San Francisco, Detroit, and one or two other cities. By this plan of simultaneous prepayment collection at both ends the loading time is cut almost in half. At Brooklyn no attempt is made to get fares in advance on the center-entrance prepayment cars during the rush hour at heavy terminal points like the Atlantic Avenue loop and the New York end of the Brooklyn Bridge. At these points the triple aisle (two exits and one entrance) permits the car to be filled directly in very quick time and with better distribution of passengers than in end-entrance cars. The non-stop run over the Brooklyn Bridge and other local conditions favor this plan of collecting the fares after the passengers have boarded the car, but before the prepayment zone is reached.

Increase in the capacity of the line is largely a matter of the number of stops, the stop spacing and traffic regulations. The question of stops lies largely with the public and that of regulation with the municipality and police. To lengthen the distance between stops and have the cars halt at fixed intervals regardless of crossings, as in Europe, seems a hopeless task here because of paving conditions and reckless drivers. American city railways are therefore working along the more promising lines of educating the public to accept the plan of stopping at every other crossing, and at Cleveland it has been proposed to be fair to all riders by having the car, when outward bound, stop at those streets which it is privileged to skip when inward bound. Express or non-stop runs in the outer zones have also found acceptance in a few places. Wider than either of these movements has been the adoption of the near-side stop in scores of cities, sometimes eliminating thereby two or three stops per mile.

The more stringent traffic regulations which have been a feature of the past year, even in the smaller cities like Canton, Ohio, and Louisville, Ky., are directed

primarily against the ubiquitous, self-propelled vehicle. In Cleveland and San Francisco semaphore and lighting devices are giving most effective results in promoting safe traffic movement. The electric railway can only benefit from this tendency toward better traffic regulation, for it will insure a less obstructed track accompanied by greater safety to those who want to ride.

DEVELOPMENTS IN TRACK CONSTRUCTION

Interest in track construction during the year just passed has been almost wholly confined to that in paved streets, although the increasing demand for better special work to withstand the heavy service incident to closer headways, higher speeds and heavier rolling stock has extended into all fields. Track and roadway engineers generally are anxious to see solid and insert manganese steel pass through the development stage to a point where a more uniform product can be assured. While rapid strides have been made by the manufacturers, many of whom now believe they have approximated perfection, sufficient time has not elapsed to demonstrate that convincing service results have been obtained. On the other hand, the various steps taken to obtain a more uniform product indicate that marked progress has been made.

Probably during no other similar period has so much interest been aroused in all classes of track special work as during the past year. The fact that there was little or no available literature on this subject aided largely in intensifying interest in the discussions and articles. No doubt these contributions will ultimately be crystallized in the form of specifications governing the manufacture and installation of the various types of track special work.

Along this same line much attention has been directed toward the refinement of electric welding processes in track repairs. But few other pieces of track and roadway equipment have grown so rapidly in popularity or have been the center of so much attention as the welder in its application to track repairs. It has made possible economies which have been of vital importance during the present period of retrenchment. In addition to its adaptability to track repairs the electric welder has also introduced new types of welded joints, welded special work, tie plates, etc. In fact, completely welded all-steel track, including the ties, has been successfully laid.

The report of the 1914 committee on way matters regarding proper foundations for tracks in paved streets was one of the most important contributions to the electric railway industry that this committee has ever made. Although the four types of foundation construction submitted for adoption as recommended designs were not accepted in detail, it was generally conceded that they were representative of the best practice at this time. The committee's treatment of this subject in such a comprehensive and scientific manner makes the report valuable as a guide in the selection of track foundation construction for both large and small companies. As indicated in another part of this report, there is but little to be added to the information already available regarding use of T-rails in paved streets. The facts that there are approximately 2250 miles of T-rail track in use in the paved streets of this country furnishes some light on its popularity. It is also probably safe to predict that the future will see a still larger percentage of the total miles of track in paved streets laid with T-rails. There has also been increased interest in the so-called "alloy steel" rail for other than special conditions.

Evidence that carefully maintained, permanent track construction is all that the name indicates was probably never more forcibly exemplified than in the track rehabilitation undertaken in Detroit during the past summer. The fact that this company found that its concrete-slab, sand-cushion track construction, which had been under extremely heavy service for twelve years could be rehabilitated by simply renewing the rail and pavement demonstrated what may be obtained from work well done. The Detroit experience also indicates that there is much to be accomplished by the adoption of tie plates and screw spikes toward prolonging the mechanical life of wooden ties. The conditions of the white oak ties after twelve years of service in Detroit indicate that unless they fail mechanically at least twelve years more may be expected of them.

In general, our observation leads us to believe that track and roadway engineers are working along the right lines at the present time. Many of them have adopted the policy of attaining true economy by the employment of the best materials in conjunction with the most practical workmanship consistent with the class of service to be rendered.

THE BUSINESS SITUATION

It is difficult to form an opinion acceptable to all in regard to the electric railway business situation. Like any subject of great enough importance to be widely discussed, it is kaleidoscopic, and observers divergently located secure different views according to their peculiar combination of the factors involved. By factors we mean such items as the following: rates; gross earnings; maintenance, depreciation, transportation and traffic expenses; federal, state and local taxation; rentals, leases and other cantractual obligations; holding company administration versus local management; federal and state regulations; causes of receiverships; rights of stockholders; financing; accounting; labor legislation; politics, and changing economic and social conditions. All these and others may be blended into innumerable combinations before the financial results of the year are complete. In order, then, for a man to reach a sound conclusion as to electric railway prosperity, it is necessary for him not to judge the question from his own limited sphere of action or be guided by such a familiarity with a particular factor as precludes a general knowledge of all, but rather to look at all factors without prejudice so that accurate deductions may be made. It is of no avail to live in the past days of railroading or to measure past morality by present standards. Railway conditions to-day are a product of the present and should be so judged, for only in this way can the factors of railway economics be analyzed and properly correlated.

We should like to make here such a composite analysis of all the factors involved in the present business situation, but space forbids anything more than a summary of what is treated more in detail in other editorials of this issue. The characteristic tone is that of optimism. This in a way may seem surprising. For many months a large number of industries have been prostrated and most have suffered curtailment of business, a condition not caused entirely by the European war but also by a steadily increasing depression in this country from the middle of 1913. The effect of this prostration has been clear for months to railways, industrials, banks, shippers and the general public. In view of the effects upon general business, it is not surprising that many electric railways have shown decreased returns or have not maintained the normal rate of increase. We do not look for a business "boom," but the opening of the New York Stock Exchange, the favorable settlement of the steam railroad rate case, the new banking law and the increasing adjustment of other factors upset by political disturbances and war conditions seem now really to justify the expectations of an era of improving general business conditions during the new year. In these improved conditions the electric railways should share, as greater industrial activity will mean greater demands for transportation for both passengers and light freight.

It might be well to dwell for a moment on one or two factors that pertain particularly to the electric railway field and therefore are not usually mentioned in any general discussion of business prospects. One of the most interesting of these is the comparatively small number of receiverships and foreclosure sales in 1914. In spite of the depression, only one-half as many companies were forced to go under receivers as in 1913, while the foreclosure sales in 1914 were only eleven as compared to eighteen in 1913. It is true that the tightness of money was a direct preventive of three sales, but even with these included the last year's showing would be better. These results speak well for the economy and the financing ability of electric railway officials, for they were obtained in a period that was a more severe drain on electric railway earnings than on those of other utilities. Other favorable signs are the evidences that a more rational view of the urgency of some form of relief to the railways is being taken by the courts, by the commissions and by the general public.

In the equipment field there ought to be a corresponding or even greater improvement. The times themselves should encourage purchases. As long as we remain in the shadow of a receding business depression prices will be low, labor plentiful and deliveries from underworked manufacturers amazingly prompt. Building operations, such as shops, etc., begun at this time, should show a much lower cost than if postponed until prices are higher. We believe that electric railways will have no difficulty in floating long-time loans in the coming business revival at fairly moderate rates, although all interest rates will be higher for a long time to come, owing to the destruction of capital in the war.

STANDARDS IN THE OPERATING DEPARTMENT

Tangible evidence of the value of standards in the transportation department can be found by studying progressively the reports of the several committees of the American Electric Railway Transportation & Traffic Association since it was organized in 1907, but during the past year a really definite step forward has been taken by the formation of a permanent transportation and traffic standards committee, whose first duty will be to co-ordinate and classify for ready reference the work already accomplished. As a matter of fact, it is somewhat surprising that such a committee has not been organized before this, because it is obvious that, through co-operation between the new committee and the committee on standards of the Engineering Association, valuable results may be expected in the many cases where the scope of engineering work overlaps the field peculiar to the transportation branch of the electric railway industry.

Aside from matters allied with engineering, however, much can be accomplished by the development of standard units of comparison as well as of standard practices, because the possibility of their adoption cannot fail to define more clearly the objects of association work. With the opportunity for stamping any practice with the formal approval of the Transportation & Traffic Association, there will be not only an increased incentive for the investigations of committees, but also a definite aim toward which the committees' efforts may be directed—a condition which has not always obtained in the past.

Certainly this difficulty has been patent in the actual operating methods existing at present. While the electrical, mechanical and way departments of electric railways have evolved carefully elaborated standards for their own use, the transportation side of the railway organization has been handicapped because working largely without the assistance of standardized operation. Of course, no one doubts that time and effort are being intelligently put forth by railway managers and their subordinate officers in transportation work, but, in many cases, the idea that operating problems are largely susceptible of analytical study and precise definition by scientific methods has not been fully realized. However, a change is now taking place in this department of the industry, with a marked extension of so-called modern methods of operation.

As an example. In the matter of service regulation and schedule construction it will be found that great advances have been made by some of the representative companies. Standard routine for the assembling and compilation of data on which to base schedules, the use of graphs and the systematic comparison and study of such data with that obtained under identical conditions on previous occasions have enabled the production of operating time-tables that regulate the service furnished as nearly as practicable to the demands of traffic and to the economics of the situation. Standard units such as passengers carried per car-mile, average length of ride, capacity of intersections, rates of passenger inter-

change and the like are now being developed and are beginning to be used with valuable results. On one city system, by the use of analyses made possible by the establishment of standard units, the car mileage has been cut down by more than 10 per cent, although the efficiency of the service has actually been increased. Other instances might be quoted were they needed to demonstrate the value of such operating practices. Suffice it to say that such companies as have applied modern methods would, under no conceivable circumstances, go back to what are sometimes called the "horse-car ways" of conducting the transportation department.

PUBLIC RELATIONS

The public function of an electric railway is twofold, mechanical and social. From the mechanical standpoint it is to move a passenger with a mass of one or two hundred pounds between two points in a reasonable time. From the social standpoint this mass is a person who must be treated as a guest and made to enjoy himself as much as possible. The mechanical part of the railway's function is a technical one, and it can be performed easily by compliance with well-understood laws. The social part is not so easy as it requires personality to perform it and mine host in this case has to exert his hospitality by proxy. There is no doubt in the minds of any of us, however, that the success of a railway system depends partly upon the extent to which the passengers "enjoy themselves."

Of all the problems now before the managements of electric railways that of turning the antagonism of the public into friendliness is one of the most pressing. The commonly accepted formula is "take care of the service and public relations will take care of themselves," but the application of the formula is not easy. There is no popularly accepted standard of good service, for what some riders would consider such could be supplied only at a ruinous cost. The railways must therefore take the initiative in showing what good service is in view of all the conditions involved. To give the best practicable service and to demonstrate conclusively that it is such are the two problems of public relations. What is needed is to develop a sense of pride in the railway system on the part of the local public so that "boosting" will be as common as "knocking" was formerly.

The American Electric Railway Association, at the Atlantic City convention, promulgated a "code of principles" which is now officially a platform or creed of the members of the association and describes the duties which the railways owe to the public as well as those which the association thinks that the public owes to the railways. The work now to be done is twofold; first, to convince the public that the code is right and that the public should carry out its principles, and, second, that the railways themselves live up to their part of the contract. For example, the code makes certain statements in regard to service and publicity. Let each manager ask himself: "To what extent do I recognize the principle that the first obligation of public utility companies is service?" and "To what extent am I following the practice of full and frank publicity?" Finally, let him ask himself: "What am I doing to improve the public relations in my own community?" If these three questions are conscientiously asked and answered and the precepts contained in the answers are put in force, we believe that the most serious part of the problem connected with the establishment of good public relations will disappear. At any rate, each manager will feel that he has done his part toward the establishment and maintenance of good public relations.

THE BANNER YEAR IN ACCOUNTING PROGRESS

Since the first thought of uniform action on the part of electric railway accountants found concrete expression in 1897 in the formation of the Street Railway Accountants' Association of America, the advances made in electric railway accounting have been equalled only by the steady growth and improvements of the industry itself. To speak of 1914 as the banner year in electric railway accounting in the face of such a fact may seem slightly presumptuous, but voluminous and important as the results of previous years have been, they must give precedence to the twofold work of this year, the adoption of an official standard accounting system for interstate electric railways and the successful institution of a correspondence course for accountants.

This combination of a more nearly perfected uniform system of accounts with the machinery for fixing its principles in the minds of those who must put its provisions into practice seems to us most auspicious. Through the educational course the mature electric railway accountant can secure a broader view of his field, while the younger man will not only become familiar at the outset with the technical procedure and practice of his chosen calling but will also get a grip on the fundamental principles underlying its operations and a drill in the solution of many of the difficult problems with which he will be confronted. Of the real basis of the course as it specifically concerns electric railways—the official accounting system—little needs be said. The revision of the existing classifications of operating expenses, operating revenue, and road and equipment accounts, the adoption of standard classifications of income, profit and loss, and general balance sheet accounts, together with specific provisions for the depreciation of equipment and the segregation of power plant expenses —all were distinct advancements in electric railway accounting. Not the least satisfactory feature of the system, however, is the evidence it gives that electric railway accountants during the last two decades have been working on the right basis, for the changes made by the commission from the results embodied in old classifications of the Accountants' Association are simply the logical outcome of the industry's growth. This in a way weakens our assertion that 1914, the year of the accomplished accounting system, deserves the banner, for the basic work had been so largely and thoroughly laid in previous years by electric railway accountants.

While the accounting system and the educational course represent the only two completed results of the year, there were many other movements worthy of investigation that showed various stages of progress. Leading the list, probably, is the subject of cost ac-

counting, the functions of which are every day becoming more and more widely recognized by carriers. The joint engineering and accounting report at Atlantic City displayed a praiseworthy grasp of the theoretical principles of the subject, but electric railways have much to learn from manufacturing plants in regard to the accounting technique to be followed. The actual order requiring the separation of freight and passenger operating expenses on steam railroads and the growing necessity for a proper apportionment of costs between city and interurban service make it seem that the time is indeed here for electric railways to adopt a system of apportionment that will permit the accurate stating of costs for the various enterprises under one management.

Then, of course, there is our old friend "uniformity." Unrealizable as this ideal may be, it may still be approximated more closely than in the past. Uniformity of terms, uniformity of accounting practice for depreciation, uniformity of financial statements, uniformity of holding company accounts—all these should be fruitful sources for investigation and action. We are particularly interested in the uniformity of financial statements, both monthly and annual. Conformity between the statements required by the Interstate Commerce Commission and by various state commissions is eminently desirable, and the state commission with the interests of the public properly at heart will surrender its small differences in favor of the national system and not show unbecoming obstinacy because it happened to devise its system first. Moreover, on the part of some interstate companies there seems to be an undercurrent of feeling that inasmuch as the Interstate Commerce Commission does not compel them to issue their annual report to stockholders in the official form, such reports may be modified at will to suit their whims. We believe that it would be more beneficial to the industry if all individual managements would sacrifice personal prejudices and follow the standard provisions in order to make all stockholders' reports readily comparable, as the steam railroads have done.

In the matter of monthly reports, it seems to us unfortunate that barely 5 per cent of the electric railways in the country make public such reports to indicate the trend of gross and net earnings. While most companies cannot afford to go to the expense of compiling and printing complete monthly statistics, practically all should be able by the end of the succeeding month to furnish totals for gross earnings, operating expenses and net earnings. The Electric Railway Journal feels that there is a need for such information on the part of commissions, investors and operators, and it would welcome the receipt of simply a monthly communication with such amounts from the auditor of each company, the data to be kept confidential and to be used only in compiling totals and percentages for the several classes of lines and territorial divisions, somewhat similar to those published in the Financial Department in our issue of Nov. 28. This is one line of development where each accounting officer can do his part without waiting for any others, and we hope there will be a generous response.

A. C. ELECTRIFICATION

During the past twelvemonth more progress has been made in alternating-current traction than for some years past. Practically all of this development has occurred in this country, as the war abroad has naturally prevented much electric railway development there. One notable event of the year has been the completion for the Norfolk & Western Railroad of the split-phase locomotive, the contract for which was announced a year ago. Although only general descriptions of the locomotive have yet been made public, it is understood that the performances under test have been fully up to the calculations and in some points exceeded expectations. The liquid rheostat used in the secondaries of the induction motors during acceleration gives a smoothness to the control of the locomotive which it would be impossible to obtain in any other way. The automatic regeneration on descending grades is very important on a line such as the Pocohontas Division of the Norfolk & Western, where long, heavy grades like the Elkhorn are encountered, as it greatly increases the safety of operation and the reliability of the equipment, besides effecting a material saving in energy consumption. A combination gear and side-rod drive is used on these machines and removes all dead motor weight from the driving axles. While a comparatively large amount of apparatus is required in the cab, the apparatus is simple and rugged in design and should be easy to maintain. The main driving motors have, of course, all of the characteristics of three-phase induction motors with the wound secondary. Altogether these locomotives should give an excellent account of themselves in the heavy service in which they will be placed.

Another event of importance in a.c. development during the year is the electrification of the main line of the Pennsylvania Railroad at Philadelphia, where, like the Norfolk & Western, the single-phase system with 11,000 volts at twenty-five cycles is used on the trolley. The Philadelphia electrification will, however, employ initially multiple-unit cars, as the service is a suburban one. The motors will be somewhat in excess of 225 hp each and of the series commutator type for a.c. operation only. Hence the complications necessary for combined operation on direct current will be avoided, and as good results as those obtained in the operation of the New York, Westchester & Boston equipments should be expected. The overhead construction on both the Pennsylvania and the Norfolk & Western Railroads possesses marked advances in simplicity over the original designs for single-phase lines.

The experimental service obtained during the latter part of the year with mercury rectifier equipment has been notably successful, and a 1000-hp equipment installed on one of the Pennsylvania Railroad combination cars and now in test service on the New Haven railway was recently described in these columns. It is manifestly too early yet to predict the exact place of the rectifier equipment in future traction work, but its successful development would simplify a number of electrification problems, notably the interchange of

equipments on a.c.-d.c. lines. For such an equipment, it would only be necessary to add to a standard d.c. locomotive a transformer and rectifier, which would change the alternating current to direct current at the desired voltage, to make an equipment capable of operating with equal facility and capacity on both systems. Where the equipment is designed for operation on alternating current only, it would be natural to use voltage control and thereby avoid rheostatic losses. As a whole, then, we may look back upon 1914 as a notable year in a.c. electrification and as presaging still more valuable development in the near future.

CAR DESIGN IN 1914

Unquestionably the most prominent feature of the past year's progress in surface car design has been the truly remarkable growth in the use of the fully-inclosed platform. Of course, it is no new idea to have cars completely inclosed while in motion, thus preventing ingress and egress of passengers with the consequent practical elimination of boarding and alighting accidents. In fact, several lines, notably the Twin City Rapid Transit Company, have used it in modified form for many years. But the scheme has, until recently, met with scant favor throughout the country at large because of a widespread belief that it would involve a material decrease in schedule speed, and it is probable that the change in sentiment, such as has taken place within the past year, could only have been effected through the successful introduction some two years ago of the center-entrance car, which is, of necessity, completely inclosed. Including center-entrance cars the fully-inclosed designs constitute a surprisingly large percentage of the year's output, the principle appearing indiscriminately among all types from the smallest one-man cars to the largest standard units for metropolitan service.

The center-entrance idea, however, when considered alone has failed to grow in accordance with early expectations. Numerically, the center-entrance has just about remained stationary during the past year, although the decreased output of cars of all types has no doubt affected this to a marked degree. In general, sentiment seems to be still very much divided over its merits. Nevertheless, it has provided an excellent solution for many of the problems of trail-car design and also for the utilization of old equipments which, when operated alone, are too small for profitable use. Boston's articulated car, a scheme which has recently also been adopted in Portland, is a successful example of this development, and in Pittsburgh old bodies have been spliced together in pairs to make thoroughly satisfactory, large-size units. In several cases, too, old-style open or California-type cars have been rebuilt as closed center-entrance cars, so that it is safe to say that the center-entrance car, even if it has not revolutionized the industry, has at least produced a well-defined dent in the smooth outlines of conservative practice.

Of course, the center-entrance from the first has been associated with the low step, and this, in turn, has drawn a great deal of attention to the small wheel. During the past year the latter appears at last to have taken hold to an appreciable extent in places other than its birthplace, Pittsburgh. In San Francisco more than 100 cars have been re-equipped with small wheels and motors, the old equipment being scrapped, and the replacement has been found to pay handsomely. A considerable number of new city cars also have been thus equipped, and for interurban service the small wheel has been successfully used in several cases, the Ohio Electric Railway having five cars and the Seattle, Renton & Southern six cars with 22-in. wheels on the idler trucks.

It is with the single-truck car, however, that the most spectacular installation of small wheels has been made, the Third Avenue Railway of New York having used this combination under practically standard car-bodies 35 ft. long and seating forty-five passengers. Owing to the use of radial-axle trucks a 10-ft. wheelbase is provided, and as the platforms are brought within 12 in. of the rail the customary step is eliminated, the weight of the car complete being only 533 lb. per passenger. Much of the saving in weight is, of course, due to the single truck, and that this advantage, together with the accompanying reduction in maintenance expense, has been recognized to a great extent during the year is indicated by the relatively large number of new single-truck cars that have been built. In fact, there has been quite a revival of interest in the single-truck principle, which has even involved a fairly ready acceptance of the complication of radial axles. For the future it is difficult to avoid the conclusion that the single-truck car, in combination with the fully-inclosed principle, is going to play an important part in the design of equipment for city service.

CONDITIONS IN THE LABOR FIELD

While there have been several strikes during the past year and wide publicity has been given to certain arbitration proceedings between electric railways and their employees, 1914 has not been a year of labor discontent or unrest. In spite of the adverse business situation, few companies have followed the practice general in industrial establishments of reducing wages, and the policy of both companies and men has seemed to be to let well enough alone.

In welfare work and allied subjects there has been substantial progress. Of the many advances made in this direction those made in the extension of company loan bureaus, co-operative buying and group insurance have perhaps been the most conspicuous. The idea of establishing closer relations with the employees, especially in larger cities, by lending money to them for legitimate purposes, as in time of serious illness or death, instead of forcing them to pay exorbitant rates to loan sharks, is well conceived. Progress in co-operative buying for the benefit of the employee is necessarily slower, but the plans followed in New York and Philadelphia, though essentially different from each other, have shown every evidence of success during the past year and are being extended. Finally, the plan of group insurance has been adopted by a number of companies

as a very satisfactory means of testifying to the interest of the company in long-continued service of the trainmen.

The group insurance plans to which we refer are those of voluntary insurance, and have nothing to do with the mandatory insurance under compensation laws which have been passed by a number of states during the last twelve months, the New York law having gone into effect last July. The rapidity with which such laws are superseding the old master-and-servant and fellow-servant liability laws as a method of dealing with industrial accidents is indicated by the fact that, besides the national government, twenty-three states have enacted such legislation and the subject is being seriously considered in most of the other states. No electric railway will deny the innate justice of the general principle underlying such laws. Indeed, several of the railways in the states concerned had hardly established compensation systems for the benefit of their employees, similar in general scope to those covered by the various acts. As a whole, therefore, this new legislation has not changed the conditions on electric railway properties to so great an extent as it has in industrial enterprises, where, as a rule, no such provisions have heretofore existed. It has, however, like any entirely new legislation, introduced a number of new problems. Many of these acts were passed hastily and are crude, and these inconsistencies will have to be straightened out. Again, the questions of administration and best method of insurance remain to be solved. Many considerations govern this matter, but it seems as if a mutual association, acquainted with the problems of the industry concerned, or self-insurance, if the company is of sufficient size, offers the best solution.

Perhaps one of the most interesting events of the year was the report submitted to the American Federation of Labor last September on the subject of labor conditions on European municipally and privately owned railways. The conditions of railway employees abroad, especially on municipally owned lines, have been so often held up before the American laborer as exemplary that it must have come as a surprise to be told that the living standards here are only from 25 to 65 per cent higher than in Europe but that the maximum and minimum wages are twice as large respectively. But it is not only in the rates of pay that our car men are better off than their confreres abroad. Fines, ranging in size from a day's pay to eight days' pay, are enforced "for the slightest error made by men on duty," and the retention of wages to pay for repairs to company property injured while in charge of an employee, forfeiture of bond for leaving the service without due notice, renouncement of the right of appeal, etc., are common. In short, when we consider the rewards of the last year to trainmen in America and this vivid portrayal of European conditions, there seem to be few matters of which serious complaint can be made here, and the halo which some of the advocates of municipal ownership here have tried to throw around the labor conditions on European tramways disappears.

STATISTICS FOR 1914

Statistics for the past year, which are published in accordance with our long-standing custom in the first issue of the year, show a decrease both in cars ordered and miles of track built during the past year as compared with 1913. The decrease is greater in cars than in mileage, which, on the face of the returns, is within approximately 10 per cent of the figures for 1913, but some 25 per cent of the miles of new electric track is made up of electrified steam railroads or gas-electric lines. Most of the electrified mileage for the year was that completed on the New Haven extension of its electric zone, and this has given to Connecticut the leadership over the other states on the list. Outside of this electrical division, the mileage of new electric line constructed in New England was less than 20, or considerably less than one-half of 1 per cent of the mileage at the beginning of the year.

The Eastern states, as a whole, show approximately the same percentage rate of growth, as do also the Southern states, if we exclude the completion of a long interurban line in North Carolina which forms a part of the extensive hydro-electric development in that state. The states which have shown the greatest activity in electric railway construction during the year have been Minnesota, Utah and Michigan, each having two new interurban lines which bring the mileage of track constructed in each of these states up to an average of 75. All told, thirty-seven states are represented to some extent in this year's list, as against forty for last year, but in many of them the extensions constructed, as will be seen from the table elsewhere in this issue, represent merely short spurs or extensions, and no great amount of new electric railway has been built. On the other hand, several important enterprises have been inaugurated or brought to a successful completion. Outside of the New Haven electrification the most important have been a 50-mile line built in Michigan as part of the system of the Michigan Railway, two important interurban roads in Utah (one of which is described elsewhere in this issue), the gas-electric line in Minnesota and the Piedmont line in North Carolina, already mentioned. Proportionately, the interurban lines show much greater activity than the systems in larger cities, a situation that might be expected owing to the fact that an extension to an interurban line means additional fare, whereas on the city line it usually means simply a longer ride for the same fare.

When we consider the car statistics we find that the total number of cars ordered or built during the year is less than half of that recorded in 1913. In this case the major part of the reduction is traceable to the absence of a few large orders such as those made last year by Philadelphia and Chicago for more than 500 cars apiece, the number of roads buying cars being only 7 per cent less than last year. However, the fact that the smaller, and presumably weaker, urban roads as well as the interurban lines are providing an appreciably increasing percentage of the orders can be taken only as an encouraging sign of inherent strength in the

industry. Altogether the statistics confirm the previous general impression that the investment in electric railways is not keeping pace with the growth and prosperity of the country just as it has not done for a number of years back, but there are some signs that this condition will not continue indefinitely. This subject is discussed at length in the editorial on the business situation.

HIGH-VOLTAGE DIRECT-CURRENT RAILWAY EQUIPMENTS

Since the installation of the first 1200-volt equipment in 1907 on the lines of the Indianapolis & Louisville Traction Company, steady progress has been made in perfecting high-voltage car equipments and locomotives and extending their use. There are now in operation or under construction more than thirty roads in the United States and Canada using 1200 volts or higher on the trolley, and approximately 800 motor car or locomotive equipments are involved. The reliability and cost of maintaining such equipments compares very favorably with accepted 600-volt d.c. practice, and there is practically no disagreement among engineers as to the excellent qualifications of 1200-volt and 1500-volt d.c. equipments for interurban railway conditions.

It early became evident that no new fundamental principles were involved in the development of the high-voltage d.c. equipment. Two standard 600-volt motors connected permanently in series were found to operate perfectly on 1200 volts, but the addition of a greater creepage distance and more insulation to ground were of course desirable. Otherwise the motors used with the 1200-volt trolley do not differ from the commutating-pole d.c. motors in extensive use.

The control equipment at the higher voltage required some modification, but the construction of contactors, fuses, and auxiliary apparatus operating at higher voltages offered no difficulties, the only departure from regular 600-volt practice being the introduction of the dynamotors to reduce the line voltage to a safe operating control voltage.

The operation of 1200-volt and 1500-volt d.c. equipments has passed through so long a period of demonstration as to leave no room for doubt of their success, and interest therefore centers in the use of still higher potentials for either interurban railways or to meet the larger demands of steam railroad electrification. While the costs of substations and distribution copper are both entirely reasonable in interurban systems operating at a trolley potential of 1200 volts or 1500 volts, the need of a higher voltage was felt to take care economically of the requirements of main-line electrification. Experimental equipments built at the factory showed conclusively that higher voltages were feasible, and this led to the placing of contracts for 2400-volt d.c. locomotives and substation apparatus to operate the Butte, Anaconda & Pacific Railway. Here again no new departure was made in standard 600-volt d.c. practice except as to insulation and creepage distance, as already described. This installation has been in operation for about one and a half years and has not only been most successful from the standpoints of reliability and economy, but it has demonstrated the great advantages of electrification in general as compared with steam-engine operation on a road having the same traffic conditions in both instances. Contracts for similar apparatus have been placed by the Canadian Northern Railway, and 2400-volt motor cars are now in operation upon the lines of the Michigan United Railway. In all but one installation, two motors are permanently connected in series and the same practice is followed with the power supply in the substations.

The next step in advance appears to be the adoption of a still higher voltage under certain conditions. Indeed, this has already been specified in the very extensive work now under construction on the Chicago, Milwaukee & St. Paul Railway in whose initial installation of 113 miles of main line electrification 3000 volts will be used, and this section will soon be followed by a change to electricity on three additional engine divisions, or a total of approximately 440 miles of main-line track. The adoption of 3000 volts in this installation was undoubtedly largely influenced by the success of 2400-volt d.c. locomotives operating upon the Butte, Anaconda & Pacific, lying in the same territory as the Chicago, Milwaukee & St. Paul tracks to be electrified. The plans of the St. Paul Railway contemplate a substation spacing of more than 30 miles apart, and factory tests indicate no difficulty in the construction of motor-generator sets, switchboard apparatus and locomotive equipments at this potential. The locomotives are to be equipped with regenerative control and are much larger than those on the Butte, Anaconda & Pacific Railway. The results of this application of high-voltage direct current to heavy electric traction will certainly be watched with interest.

Just how much higher d.c. potentials for railway work will be carried during the immediate future is still an open question. There have been published accounts of tests made by one manufacturing company of two 100-hp motors operating permanently in series from trolley voltages of 5000 and 7000. In this case mercury arc rectifiers were used to supply the voltage so that all difficulties of commutation in the substation were eliminated. Undoubtedly the reduction to be effected in feeder copper, or the wider spacing of substations possible with this doubling of the voltage, constitutes an important saving, and the tests do not indicate that any serious difficulties are to be anticipated. On the other hand, any increase in voltage means necessarily a more expensive motor, and the higher cost in motor construction and maintenance will have to be balanced against the saving in substations and feeder copper. What the ultimate results will be in this economic equation remain to be seen. Certainly it has been proved that 3000 volts are economically desirable, and a much higher voltage is electrically practicable. There have also been advances in the method of current collection, secured by a modified double-shoe pantograph which permits the collection of larger current at higher speeds than hitherto has been practicable. These facts alone are noteworthy events of the year and hold forth the greatest encouragement for electrification in 1915.

New Electric Railway Track Built in 1914

Reports Received from the Different Railway Companies in the United States and Canada Show a New Mileage of 946.38 Constructed During the Past Year

The new track built during 1914 by city systems and interurban lines is tabulated in the accompanying lists, the mileage of old steam railroad track electrified during the year being also included. The statistics are compiled from reports received from the railway companies themselves, and the record is complete except in the case of a few of the small companies whose replies were not received in time for inclusion in the list. All items which appear are, of course, accurate. It is possible, however, that there may be some mileage that does not appear either because of the failure of the companies to report it, or because the construction was reported during 1913 and hence appeared in the statistical table published in the issue of this paper for January 3, 1913.

The following summary shows the electric railway lines built or put in operation each year since 1907 in the United States and Canada:

1907	1,880 miles
1908	1,258.5 miles
1909	887.1 miles
1910	1,397.2 miles
1911	1,191.5 miles
1912	950.2 miles
1913	1,018.9 miles
1914	946.38 miles

The total mileage of the year, 946.38, shows a decrease of 7 per cent from that recorded last year. In this year's record Connecticut heads the list of states with 208.94 miles reported. This unusually high total for a state intensively equipped with electric railways is due to the 204.94 miles of steam line electrified by the New York, New Haven & Hudson River Railroad between Stamford and New Haven.

Minnesota ranks second with 80.85 miles of track construction, 40 miles of which is contributed by the new gasoline electric line of the Electric Short Line Railway between Minneapolis, Wayzata, Watertown and Winsted, a part of the line which will ultimately extend to Hutchinson. The Twin City Rapid Transit Company also built 23.10 miles, and 17.54 miles were constructed by the St. Paul Southern Railway.

Utah is third with 77.55 miles. The Salt Lake & Utah Railroad built a 48.50-mile interurban line between Salt Lake City and Provo, and the Ogden, Logan & Idaho Railway made a 26.50-mile extension from Wellsville to Lewiston which will eventually reach Preston, Idaho.

In Iowa, which has a total of 56.80 miles, the Centerville, Albia & Southern Railway electrified 25 miles of its former steam line between Centerville, Moravia and Albia. The Waterloo, Cedar Falls and Northern Railway constructed 24 miles of new line between Center Point and Cedar Rapids. The greatest mileage built by any interurban railway in the United States during 1914 was constructed in Michigan by the Michigan Railways. The new mileage, 49.30 miles, connects Bradley, Grand Rapids, Kalamazoo, Martin, Moline, Plainwell, Shelbyville and Wayland.

The total mileage of steam lines electrified is recorded at 229.94 miles, which includes the New Haven's electrification of 204.94 miles and that on the Centerville, Albia & Southern Railway, 25 miles. The electric railways of Canada built 59.67 miles of track compared with 147.86 in 1913, a decrease of 60 per cent.

ALABAMA	Miles
Birmingham Railway Light & Power Co.—Between Baylis and Farrant City	1.29
Birmingham—Tuscaloosa Railway	4.00
Gadsden, Bellevue & Lookout Mountain Ry.—Between Noccalula Falls and Gadsden	1.00
Mobile & Baldwin County R. R.	5.00
	11.29
ARIZONA	
Phoenix Railway	2.00
	2.00
ARKANSAS	
Little Rock Ry. & Elec. Co.	2.38
Pine Bluffs Co.	.50
	2.88
CALIFORNIA	
Crescent City Ry.—Between Bloomington and Rialto	3.47
Fresno Interurban Railway—Connects Fresno with suburban properties, being portion of line under construction from Fresno to Clovis	4.50
Los Angeles Ry.	2.00
Municipal Railways of San Francisco—San Francisco	16.80
Northwestern Pacific R. R.—Between San Anselmo and San Rafael	1.33
Peninsula Railway—Santa Clara and vicinity	2.90
United Railways of San Francisco—San Francisco, South San Francisco	3.56
Visalia Electric Railroad	2.10
	36.66
CONNECTICUT	
New York, New Haven & Hartford R. R.—Electrification of steam line Stamford to New Haven, including yards and sidings	204.94
Waterbury & Milldale Tramway—Between Cheshire, Wolcott and Southington	4.00
	208.94
COLORADO	
Denver Tramway	1.00
	1.00
DISTRICT OF COLUMBIA	
Washington Railway & Electric Co.—Washington	2.06
	2.06
FLORIDA	
Central of Florida Railway—Between Daytona, Daytona Beach and Seabreeze	8.00
Jacksonville Traction Co.	3.29
St. Petersburg & Gulf Ry.	1.25
	12.54

GEORGIA	Miles
Augusta & Aiken Ry.	2.00
Savannah Electric Co.—Savannah	.57
	2.57
ILLINOIS	
Chicago & Interurban Traction Co.—Between Blue Island and Harvey	1.25
Chicago & West Towns Ry.	2.20
Chicago Surface Lines	19.00
City Railway, Mt. Vernon	2.50
Kankakee Elec. Railway	1.00
Kankakee & Urbana Traction Co.—Between Rantoul and Ludlow	5.00
Rockford City Traction Co.	1.29
Springfield Consolidated Ry.	1.00
Tri-City Railway Co. of Illinois	.13
	33.37
INDIANA	
Gary, Hobart & Eastern Traction Co.—Between Glen Park, New Chicago and Hobart	5.80
Terre Haute, Indianapolis & Eastern Traction Co.—Richmond, Ind.	.60
	6.40
IOWA	
Cedar Rapids & Marion City Ry.	1.70
Centerville, Albia & Southern Railway—Electrification of former steam line between Centerville, Moravia and Albia	25.00
Davenport & Muscatine Railway	.80
Iowa Railway & Light Co.—Between Mt. Vernon and Lisbon	2.50
Keokuk Electric Co.	.69
Mississippi Valley Electric Company	.30
Tri-City Railway Company of Iowa	.74
Union Electric Company	1.07
Waterloo, Cedar Falls & Northern Ry.—Between Center Point and Cedar Rapids	24.00
	56.80
KANSAS	
Choctaw Ry. & Lighting Co.	.83
Joplin & Pittsburg Ry.	.50
Manhattan City & Interurban Ry.—Between Eureka Lake, Ogden & Fort Riley	11.00
Metropolitan Street Railway and Kansas City Elevated Ry	2.94
Kansas City, Kaw Valley & Western Railway—Between Kansas City (Mo.), Kansas City (Kan.), Muncie, Edwardsville, Lake Forest and Bonner Springs	16.00
Topeka Railway	2.00
	33.27

MAINE	Miles
Bangor Railway & Electric Co.—Between Bangor and Brewer	.30
Biddeford & Saco R.R.	.23
	.53

MARYLAND	
United Railways & Electric Co.	1.44
	1.44

MASSACHUSETTS	
Bay State St. Railway	1.30
Boston Elevated Ry.	4.44
Holyoke Street Railway—Holyoke	.41
Springfield St. Railway—Westfield	.11
Worcester Consolidated St. Ry.	.12
	6.38

MICHIGAN	
Detroit, Almont & Northern R. R.	10.84
Detroit United Ry.—Detroit	5.62
Grand Rapids Ry.	2.78
Michigan Railway—Between Bradley, Grand Rapids, Kalamazoo, Martin, Moline, Plainwell, Shelbyville and Wayland	49.30
Michigan United Traction Co.	.75
	69.29

MINNESOTA	
Electric Short Line Ry. (gas-electric line)—Between Minneapolis, Wayzata, Watertown and Winsted	40.00
Mankato Electric Traction Co.—Mankato	.21
St. Paul, Southern Electric Ry.—Between Inver Grove, Pine Bend and Hastings	17.54
Twin City Rapid Transit Co.	23.10
	80.85

MONTANA	
Butte Electric Ry.—Butte	.79
Great Falls St. Ry.—Great Falls	.67
Missoula St. Ry.—Missoula	.06
	1.52

NEBRASKA	
Lincoln Traction Co.	.50
Omaha & Council Bluffs St. Ry.	2.74
	3.24

NEW HAMPSHIRE	
Springfield Electric Railway	2.00
	2.00

NEW JERSEY	
Cape May, Delaware Bay & Sewell's Point R. R.	2.00
Morris County Traction Co.—Millburn	.75
Public Service R. R.—Between Port Reading Junction and Sewaren Junction	1.68
Public Service Railway—Ridgewood	3.31
	7.74

NEW YORK	
Hornell Traction Co.	1.00
International Railway—Between North Tonawanda and Lockport; Buffalo	12.80
Manhattan & Queens Traction Corp.—Jamaica	.25
United Traction Co.—Troy	1.37
	15.42

NORTH CAROLINA	
Southern Public Utilities Co.	1.25
Piedmont & Northern Railway—Between Greenville, Paris, Taylor, Chick Springs, Greer, Duncan, Tucapau and Spartanburg	33.00
	34.25

OHIO	
Cleveland Ry.	9.66
Gallipolis & Northern Traction Co.	.12
Hocking-Sunday Creek Traction Co.—Between Chauncey and Athens	6.00
Lake Shore Electric Ry.	1.84
Lancaster Traction & Power Co.	.85
Mahoning & Shenango Railway & Light Co.	2.75
New Midland Power & Traction Co.	.75
Northern Ohio Traction & Light Co.	1.78
Springfield Ry.—Springfield	5.76
	29.51

OKLAHOMA	
Bartlesville Interurban Ry.	2.40
Sand Springs Ry.—Between Tulsa and Sand Springs	2.00
Tulsa St. Ry.—Tulsa	1.50
	5.90

OREGON	
Pacific Power & Light Co.—Astoria	1.00
Portland Ry. Light & Power Co.	3.13
Southern Oregon Traction Co.	2.37
Willamette Valley Southern Ry.—Between Beaver Creek, Mulino, Liberal, Molalla and Monitor	32.00
	38.50

PENNSYLVANIA	
Philadelphia Rapid Transit Co.—Philadelphia	.70
Pittsburgh, Harmony, Butler & Newcastle Ry.—Between Koppel Park Gate, Homewood and Morada Park	6.50
Pottstown & Phoenixville Ry.	4.00
Scranton Ry.	.26
Southern Cambria Ry.	3.50
West Penn Traction Co.—Between Leisenring and Uniontown	10.00
West Side Electric Street Railway—Between Charleroi, Bentleyville and Ellsworth	6.00
Wilkes-Barre Ry.	4.50
York Railways	.67
	36.13

RHODE ISLAND	Miles
Rhode Island Company	6.13
	6.13

SOUTH DAKOTA	
South Dakota & Sioux Falls Traction System	.25
	.25

TENNESSEE	
Chattanooga Railway & Light Co.	.70
Chattanooga Traction Co.—Between Chattanooga and Signal Mountain	10.63
Jackson Railway & Light Co.	2.00
Knoxville Ry. & Light Co.	.38
Memphis St. Ry.	.74
	14.45

TEXAS	
Austin St. Ry.	.54
Dallas Consolidated Elec. St. Ry.	2.69
El Paso Elec. Ry.	1.78
Houston Elec. Co.	5.77
Marshall Traction Co.	.33
Northern Texas Traction Co.	3.39
San Antonio Traction Co.	1.50
Texas City St. Ry.	.85
Tucson Rapid Transit Co.	.50
	17.35

UTAH	
Ogden, Logan & Idaho Ry.—Between Logan, Wellsville, Hyrum, Millville, Providence, Greenville, Hyde Park, Smithfield, Richmond and Lewiston (23 miles); Idlewild extension (1.75 miles); Ogden City (1.75 miles)	26.50
Salt Lake & Utah R. R.—Between Salt Lake City, American Fork, Lehi, Pleasant Grove and Provo	48.50
Utah Light & Traction Co.	2.55
	77.55

VIRGINIA	
Charlottesville & Albemarle Ry.	.19
Danville Traction & Power Co.	.83
Lynchburg Traction & Light Co.	2.84
Roanoke Ry. & Elec. Co.	.42
Virginia Ry. & Power Co.	2.03
	6.31

WASHINGTON	
Everett Railway Light & Water Co.	.90
Gray's Harbor Ry. & Lighting Co.	2.00
Municipal Line of Tacoma	1.51
Puget Sound Traction, Light & Power Co.—(Bellingham Div.)	.30
Seattle Municipal St. Ry.—Seattle	.14
	4.85

WEST VIRGINIA	
Appalachian Power Co.	1.25
Charleston Interurban Railroad	.75
Monongahela Valley Traction Co.—Riverside	1.50
Ohio Valley Elec. Ry.—Huntington	3.60
	7.10

WISCONSIN	
Badger Ry. & Light Co.—Connects Whitewater and Elkhorn	5.50
Milwaukee Northern Railway	.40
Sheboygan Railway & Elec. Co.	1.00
Wisconsin, Minnesota Light & Power Co.—Between Eau Claire and Altoona	3.00
Wisconsin Public Service Co.	.54
	10.24

CANADA	
Brantford Municipal Ry.	.13
Fort William Elec. Ry.	5.50
Guelph Radial Ry.—Guelph	.57
London St. Railway—London	.27
Montreal Tramways—Between Montreal and Pointe aux Trembles	6.35
Moose Jaw Elec. Railway	1.00
Niagara, St. Catharines & Toronto Ry.—Between St. Catharines, Port Weller, MacNab and Niagara-on-the-Lake	14.00
Port Arthur Municipal Ry.—Port Arthur	.50
Regina Municipal Ry.—Regina	.09
St. John Ry.—St. John	3.75
Sandwich, Winsor & Amherstburg Ry.	1.50
Saskatoon Municipal Ry.—Saskatoon	1.00
Suburban Rapid Transit Co.	1.37
Toronto Civic Ry.—Toronto	.74
Toronto Suburban St. Ry.—Between Thistletown and Woodbridge Mountain	7.83
Winnipeg Elec. Ry.—Winnipeg	7.57
Winnipeg, Selkirk & Lake Winnipeg Ry.—Between Stony Mt. and Stonewall	7.50
Total Mileage	59.67
Grand Total, United States and Canada	946.38

The Joplin & Pittsburg Railway, Joplin, Mo., and the Spring River Power Company have presented the city with a quit claim deed covering about $25,000 worth of improvements which they made in Schifferdecker Park, held by the companies under lease. When the owner of the park deeded it to the city to be used as a municipal resort the public service companies immediately signified their willingness to present the city with these improvements.

Electric Rolling Stock Ordered in 1914

A Tabulation Showing the Number, Type, Car-Body Length and Character of Construction of All Cars Built During the Year—Compiled from Official Returns Made by the Railway Companies

The tables below show in detail the number of cars of all kinds as well as electric locomotives which were either purchased by electric railways or else built in the companies' shops during the past year. The lists do not include freight trail cars for other than city or interurban lines, nor those used for interchange service. This differs from last year's procedure. The total number of rolling equipments of all kinds is 3010, a decrease of approximately 45 per cent from the number listed for the previous year. The tables, in accordance with the usual procedure, have been made up from the orders noted from week to week in the rolling stock columns of the Electric Railway Journal and from returns made at the close of the year by the electric railways of the United States and Canada. These figures were checked against reports received from practically all of the car builders, and every effort has been made to make the record complete, although there may be some omissions of a minor character.

The greatest number of cars ordered by any electric railway during 1914 was the 228-car order placed by the Chicago Surface Lines. The Cleveland Railway ranks second with a total of 223 cars ordered, including 200 city passenger and 23 miscellaneous cars. The New York Municipal Railway stands third with 200 subway cars ordered.

The number of electric locomotives ordered was seventy-eight as against sixty-eight in the preceding year. The chief orders of this kind were those of the Chicago, Milwaukee & St. Paul Railroad and the Norfolk & Western Railway, each for twelve locomotives.

The total number of cars of all types built in companies' shops was 228 as against 772 cars in 1913.

The number of cars ordered by Canadian electric railways during 1914 was ninety-seven, compared with 676 in the preceding year. Certain of the manufacturers have contributed the information that electric railways in foreign countries, not including Canada, ordered a total of 50 cars from American car builders, of which 27 cars were built for properties in South America, 7 for Panama, 8 for South America and 8 for other localities.

The following summary shows the records in condensed form for the past seven years, and gives the number of cars, classified in accordance to the service in which they are used, from 1907 to 1914.

Year	City Cars	Interurban Cars	Freight & Misc. Cars	Total
1907	3483	1327	1406	6216
1908	2208	727	176	3111
1909	2537	1245	1175	4957
1910	3571	990	820	5381
1911	2884	626	505	4015
1912	4531	783	687	6001
1913	3820	547	1147	5514
1914	2147	384	479	3010

Purchaser	No.	Gen'l Type	Motor or Trailer	Length of Car Body	City or Int.	All-steel, Semi-steel or Wood
Albany Southern R. R	2	Ps. Clsd.	Motor	30- 6	Int.	Semi-steel
	1	Express	Motor	....	Int.	Semi-steel
Allentown & Reading Trac. Co.	1	Car	.....	....	....	.....
Altoona & Logan V'y El. Ry...	5	Ps. Clsd.	Motor	28- 0	City	Semi-steel
	4	Ps. Clsd.	Motor	32- 6	Int.	Semi-steel
Androscoggin Elec. Co.....	1	Snow Plow	....	30- 0	Int.	Semi-steel
Arkansas Northwestern R. R.	1	Gasoline Mech. Drive	...	70- 0	Int.	All-steel
Arkansas Valley Int. Ry.....	1	Ps. Clsd.	Motor	30- 0	City	Wood
Atlantic Shore Line Ry.....	2	Ps. Conv.	Motor	30- 8	City	Semi-steel
Bartlesville Int. Ry.....	1	Ps. Clsd.	Motor	21- 0	City	Semi-steel
Batavia Traction Co.....	2	Ps. Clsd.	Motor	21- 0	City	Semi-steel
Bay State St. Ry.....	1	Ps. Conv.	Motor	30- 0	City	Semi-steel
Biddeford & Saco R. R.....	1	Snow Plow	....	....	....	....
Binghamton Ry.....	1	Ps. Conv.	Motor	....	City	.....
Birmingham-Tuscaloosa Ry..	1	El. Loco.	Motor	30- 0	....	.....
Boston Elevated Ry.....	100	Pass.	Trail	....	City	Semi-steel
	3	2-Way Dump	...	24-10¾	City	Steel
	1	Snow Plow	Motor	31- 6½	City	Wood
	1	Snow Plow	Motor	30- 0	City	Wood
	2	Sweeper	Motor	27- 0	City	Wood
Brantford Municipal Ry.....	6	Ps. Clsd.	Motor	21- 0	City	Semi-steel
	1	Express	Motor	45- 0	City	Wood
Bridgeton & Millville Tr. Co..	1	Ps. Clsd.	Motor	29- 6	City	Semi-steel
Brit. Columbia Elec. Ry.....	10	Ps. Clsd.	Motor	....	City	.....
	1	Ps. Exp.	Motor	....	Int.	.....
Bryan & Cent. Tex. Int. R. R.	2	Gasoline	.....	52- 4	Int.	All-steel
Bryan & College Int. Ry	1	Ps. Clsd.	Motor	45- 0	Int.	Semi-steel
Buffalo & Depew Ry.....	2	Snow Plow	....	....	....	....
Buff. & Williamsville El. Ry..	2	Ps. Clsd.	Motor	41-10	City	Semi-steel
Butte, Anaconda & Pac. Ry..	4	El. Loco.	Motor	80-Ton	Int.	.....
	3	El. Loco.	Motor	40-Ton	Int.	...
Butler County R. R.....	1	Gasoline Mech. Drive	.....	55- 0	Int.	All-steel
Butte Elec. Ry.....	6	Ps. Clsd.	Motor	41-10	City	All-steel
Calgary Municipal Ry.....	1	Sprinkler	.....	....	City	Steel
Cambria & Indiana Ry.....	1	St. Bat.	Motor	44- 4	Int.	Semi-steel
Canadian Northern R. R. (Montreal Tunnel & Ter.)..	8	Ps. Clsd.	Motor	67- 7	Sub.	All-steel
	6	El. Loco.	Motor	83-Ton	Sub.	.....
Carolina Trac. Co.....	2	St. Bat.	Motor	18- 0	City	Semi-steel
Cedar Rap. & Marion C'y Ry.	10	Ps. Clsd.	Motor	44- 8	City	Semi-steel
Centerville, Albia & So. Ry.	2	Ps. Clsd.	Motor	47- 0	Int.	Semi-steel
	1	Express	.....	41- 0	Int.	Semi-steel
Central Ill. Trac. Co.....	2	Ps. Clsd.	Motor	48- 0	Int.	Semi-steel
Central of Florida Ry.....	2	St. Bat.	Motor	32- 0	Int.	....
	1	Express	Trail	....	....	.....
Central N. Y. Southern R. R.	2	Gasoline, Mech. Drive	..	70- 0	Int.	All-steel
Central Passenger Ry.....	3	Ps. Clsd.	Motor	21- 9	City	Wood
Charleston Inter. R. R.....	12	Ps. Clsd.	Motor	30- 0	City	All-steel
Charlottesv'le & Albem'le Ry.	7	Ps. Clsd.	Motor	21- 0	City	Semi-steel
Chattanooga Trac. Co.....	2	Ps. & Bag.	Motor	44- 4	Int.	Semi-steel
	5	Flat	.....	32- 0	....	....
	1	Work	.....	35- 0	...	Steel
Chicago & Joliet Elec. Ry....	5	Ps. Clsd.	Motor	36- 0	Int.	Semi-steel
Chicago & West Towns Ry...	10	Ps. Clsd.	Motor	44- 6	City	Semi-steel
Chicago Elevated Rys.....	62	Ps. Clsd.	Motor	37-10	City	All-steel
	66	Ps. Clsd.	Trail	37-10	City	All-steel
Chicago Great Western R. R..	1	Gasoline Mech. Drive	.....	...	Int.	All-steel
Chicago, Mil. & St. Paul R. R.	12	El. Loco.	Motor	260-Ton	....	.....
Chicago Surface Lines.....	228	Ps. Clsd.	Motor	32- 8	City	Semi-steel
Cleve., Painesv'le & Ea. R. R.	1	Pass.	.....	37-10½	Int.	Wood
Cleveland Ry.....	200	Ps. Clsd.	Motor	51- 0	City	Semi-steel
	2	Sweeper	.....	....	....	.....
	8	Dump	Motor	....	....	Steel
	1	Crane	.....	....	....	.....
	12	Yd. Loco.	.....	....	....	.....
Clevel'd, Southw. & Col. Ry.	4	Dump	....	.....	....	Wood
Conestoga Traction Co.....	1	Ps. Clsd.	Motor	33- 6	City	Semi-steel
	2	Ps. Clsd.	Motor	28- 0	City	Semi-steel
	1	Work	.....	....	....	.....
Columbus, Del. & Marion Ry.	1	Flat	.....	32- 0	Int.	Wood
	1	Work	.....	32- 0	Int.	Wood
Columbus Ry., Lt. & Pwr. Co	1	Snow Plow	Motor	40- 0	City	Wood
	2	Sweeper	Motor	40- 0	City	Wood
Connecticut Co.....	10	3-Comp. Dump	.....	39- 9	Both	Semi-steel
	10	4-Comp. Dump	.....	25- 8¼	Both	Semi-steel
	2	El. Loco.	.....	25-Ton		
Corpus Christi St. & Int. Ry...	2	Ps. Clsd.	Motor	21- 6	Int.	. ...
Cumb. & Westernport El. Ry.	2	Ps. Clsd.	Motor	34- 3	Int.	Semi-steel
Cushing Traction Co.....	1	El. Loco.	.....	50-Ton	Int	.....
Dallas Consol. St. Ry.....	15	Ps. Clsd.	Motor	26- 6	City	Semi-steel
Danville Trac. & Pwr. Co....	2	Ps. Clsd.	Motor	43- 0	City	All-steel
Dayton & Troy Elec. Ry.....	4	Box Ft.	.....	47- 6	Int.	Wood
Day., Springfi'd & Xenia Ry.	3	Ps. Clsd.	Motor	29- 0	Int.	Steel
Dayton Street Ry.....	5	Ps. Clsd.	Motor	29- 0	City	All-steel
Denver Tramway.....	6	Ps. Clsd.	Trail	40- 8	City	Wood
	4	Sweeper	.....	28- 3	City	Semi-steel
Des Moines City Ry.....	1	Sweeper	.....	39- 2	City	Semi-steel
Detroit United Ry.....	5	Express	Trail	50- 0	Int.	Semi-steel
	1	Sw. Loco.	Motor	31- 1½	City	.....
E. Liverpool Trac. & Lt. Co..	4	Ps. Clsd.	Motor	32- 0	City	Steel
Easton Transit Co.....	1	Ps. Conv.	Motor	30- 8	Int.	Steel
	9	Ps. Clsd.	Motor	20- 8	City	Semi-steel
	1	Sweeper	.....	23- 8	Int.	Wood
	1	Work	.....	41- 8	Both	Steel
El Paso Elec. Ry.....	6	Ps. Clsd.	Motor	29- 0	City	Semi-steel
Elec. Short Line Ry.....	14	Pass.	Trail	60- 0	Int.	.....
	2	Gas-electric	Motor	71- 0	Int.	All-steel
	28	Flat	.....	....	....	.....
Elmira Water, Lt. & R. R. Co.	1	Ps. Conv.	Motor	....	Int.	Steel
	2	Gondola	.....	....	....	Wood
	1	Work	.....	22- 0	....	Semi-steel
	1	El. Loco.	.....	....	....	.....
Empire United Rys..... ...	12	Ps. Clsd.	Motor	26- 0	City	Semi-steel
	12	Ps. Clsd.	Motor	....	City	....
	5	Freight	Motor	....	Int.	Wood
Ephrata & Lebanon St. Ry...	3	Ps. Clsd.	Motor	41- 6	Sub.	All-steel
	3	Ps. & Bag.	.....	43- 0	Sub.	All-steel
	1	Bag. & Ex.	.....	40- 0	....	Wood
Escanaba Trac. Co.....	1	Ps. Clsd.	Motor	31- 6	City	Semi-steel
Evanston Ry.....	12	Ps. Clsd.	Motor	28- 0	City	All-steel
Evansville Sub. & Newb. Ry.	10	Gondola	.....	36- 0	....	Wood
Fargo & Moorhead St. Ry....	1	Ps. Clsd.	Motor	33- 0	City	Wood
Fitchb'g & Leominster St. Ry.	1	Ps. Conv.	Motor	30- 8	Int.	Semi-steel
Florence & Huntsv'le Int. Ry.	2	Pass.	Trail	....	Int.	....
	2	Pass.	Motor	....	Int.	.....
Fort Dodge, Des Moines & Southern R. R.....	1	Ps. Clsd.	Motor	32- 0	City	Semi-stee
Fort William Elec. Ry...	1	Work & Sn. Plow	....	30- 0	City	Wood

Purchaser	No.	Gen'l Type	Motor or Trailer	Length of Car Body.	City or Int.	All-steel, Semi-steel or Wood
Freeport Ry. & Lt. Co	1	Ps. Clsd.	Motor	30– 0	City	Semi-steel
Gadsden, Bellevue & Lookout Mountain Ry	2	Ps. Open	Motor	...	Int.	...
	2	Pass.	Trail	....	Int.	...
Gary, Hobart & Ea. Trac. Co.	2	Ps. Open	Motor	....	City	Wood
	2	Ps. Conv.	Motor	42– 6	Int.	Wood
	1	Ps. Clsd.	Motor	....	City	Wood
Geneva, Seneca Falls & Auburn R. R	2	Ps. Clsd.	Motor	34– 0	Int.	Semi-steel
Goldsboro St. Ry	2	Ps. Clsd.	Motor	....	City	...
Grafton Lt. & Pwr. Co	3	Pass.	.....	21– 0	City	Wood
Greeley & Denver R. R	2	Ps. Clsd.	Motor	28– 0	City	Semi-steel
Guelph Radial Ry	2	Ps. Clsd.	Motor	32– 0	City	Semi-steel
Hagerstown & Frederick Ry.	3	Ps. Conv.	Motor	30– 6¾	City	Semi-steel
Harrisburg Rys	6	Ps. Conv.	Motor	25– 0	City	Semi-steel
	4	Ps. Conv.	Motor	31– 8	Int.	Semi-steel
Hershey Transit Co	3	Flat	.....	....	....	.....
	1	Snow Plow	.....	....	....	.....
Hocking-SundayCreekTracCo.	3	Pass.	Motor	32– 6	Int.	All-steel
Homestead & Mifflin St. Ry	1	Ps. Clsd.	Motor	21– 0	City	Wood
Houston Elec. Co	10	Ps. Conv.	Motor	26– 6	City	Steel
Hutchinson Inter. Ry	1	Ps. Conv.	Motor	30– 0	City	All-steel
Idaho Ry., Lt. & Pwr. Co	1	Work	.....	28– 0	....	.....
Illinois Central R. R	4	Gas-electric	Motor	71– 0	Int.	All-steel
Illinois Traction System	30	Hopper Bot.	.....	....	....	.....
Indian. & Louisville Trac. Co.	1	Pass.	Trail	42– 0	Int.	Wood
Interborough Rap. Tran. Co.	10	Side Dump	...	33– 0	....	Steel
Ithaca Traction Corp	5	Ps. Open	Motor	28– 8	City	Semi-steel
	5	Ps. Clsd.	Motor	20– 8	City	Semi-steel
Jackson Ry. & Lt. Co	4	Ps. Clsd.	Motor	32– 0	City	Semi-steel
	1	Work	.....	26– 0	City	Wood
Jacksonville Trac. Co	15	Ps. Clsd.	Motor	26– 6	City	Semi-stel
Jamestown, Westfield & Northwestern R. R	6	Ps. Clsd.	Motor	53– 6	Int.	All-steel
	2	Bagg.	Motor	43– 0	Int.	Semi-steel
	1	Sweeper	...	28– 3	City	Semi-steel
	1	Work	...	45– 0	City	All-steel
	1	El. Loco.	.....	45-Ton	....	.....
Janesville Trac. Co.	4	Pass.	Motor	30– 0	City	All-steel
Jefferson Tract. Co	1	Ps. Clsd.	Motor	33–10	Int.	Semi-steel
Jersey Central Traction Co	5	Ps. Clsd.	Motor	42– 2	Int.	Semi-steel
	1	Flat	Motor	34– 0	....	Steel
Kansas City, Clay County & St. Joseph Ry	1	Line Car	.....	40– 0	Int.	Wood
Kansas City, Kaw Valley & Western Ry	4	Ps. Clsd.	Motor	50– 0	Int.	All-steel
	4	Ps. & Bag.	Trail	48– 0	Int.	Wood
	1	Express	Motor	48– 0	Int.	Wood
	6	Gondola	.....	....	....	.....
	1	Flat	.....	....	....	.....
	1	Work	.....	30– 0	....	W'd & St'l
Kansas City, Lawrence & Topeka Elec. R. R	1	Express	Motor	40– 0	Int.	Wood
Kansas-Oklahoma Trac. Co.	1	Ps. & Bag.	Motor	50– 5	Int.	Semi-steel
Keokuk Elec. Co	1	Ps. Clsd.	Motor	21– 0	City	Semi-steel
Kingston Consol. R. R.	1	Snow Plow	Motor	26– 0	City	Wood
Lackawanna & Wyo. Vy. R. R.	15	Steel Hop.	.....	31– 2½	....	All-steel
Lancaster Trac. & Power Co.	2	Ps. Clsd.	Motor	18– 0	City	All-steel
Lawton Ry. & Lt. Co	2	Ps. Open	Trail	34– 0	City	Wood
Lebanon & Campbelltown Ry.	2	Ps. Conv.	Motor	30– 8	Int.	Semi-steel
Lehigh Valley Tract. Co	2	Freight	.....	45– 0	Both	Wood
	1	Work	.....	40– 0	Both	Wood
	1	Work	.....	30– 0	Both	Wood
	1	Line	.....	33– 0	Both	Wood
	1	Private	.....	50– 2	Both	Wood
Lewisburg & Ronceverte Ry.	1	El. Loco.	.....	25-Ton	....	.....
Lincoln Trac. Co	4	Ps. Clsd.	Motor	41– 0	City	Semi-steel
	2	Pass.	Trail	39– 0	City	Semi-steel
London & Port Stanley Ry	3	El. Loco.	.....	60-Ton	....	.....
London St. Ry	4	Ps. Clsd.	Motor	21– 0	City	Semi-steel
Long Island R. R	2	Ps. Clsd.	Motor	22– 7	Int.	Semi-steel
Los Ang. & San Diego B'h Ry.	5	Ps. Calif. Type	Motor	50– 0	City	Semi-steel
	4	Ps. Calif. Type	Trailer	50– 0	City	Semi-steel
Los Angeles Ry	1	Ps. Clsd.	Motor	46– 0	City	Compos.
Macon Ry. & Lt. Co	9	Pass.	.....	20–0	City	Semi-steel
Mahoning & Shenango Ry. & Lt. Co	20	Pass.	Motor	45– 0	City	All-steel
Manhattan Bridge Three-Cent Line	6	Ps. Conv.	Motor	33– 3	City	Semi-steel
Manhattan & Queens Trac. Corp	1	Sprinkler	.	33– 0	City	Wood
Mansfield Ry., Lt. & Pwr. Co.	2	Pass.		19– 6¾	City	Semi-steel
Memphis St. Ry	25	Ps. Clsd.	Motor	31– 6	City	St'l Un. Fr.
	10	Pass.	Trail	30– 3	City	St'l Un. Fr.
	1	Sprinkler	...	.	City	Steel
Mesaba Railway	1	Ps. Clsd.	Motor	49– 0	Int.	Steel
Miami Trac. Co	4	St. Bat.	Motor	....	City	Wood
Michigan Central R. R. (Detroit River Tunnel Co.)	4	El. Loco.	Motor	120-Ton	...	.....
	1	Wreck Crane	.....	....	....	.....
Michigan Railway	6	Ps. Clsd.	Motor	67– 0	Int.	All-steel
	6	Ps. Clsd.	Motor	61– 0	Int.	All-steel
	4	Express	Motor	61– 0	Int.	All-steel
Michigan United Trac. Co	6	Ps. Clsd.	Motor	61– 0	Int.	All-steel
	4	Pass.	Trail	56– 8	Int.	All-steel
Milford & Uxbridge St. Ry	2	Snow Plow	...	..	....	...
Minneapolis, St. Paul & Sault Ste. Marie Ry	1	Gasoline, Mech. Drive	...	70– 0	Int.	All-steel
Minneapolis, St. Paul, Rochester & Dubuque El. Tr. Co.	5	Gas-elec.	Motor	....	Int.	Steel
Minnesota & Northwestern Elec. Ry	1	Gas-elec.	Motor	...	Int.	...
Missouri & Kansas Inter. Ry.	2	Pass.	Trail	35–10	Int.	Wood
Missouri & N. Arkansas R. R.	1	Gas-elec.	Motor	70– 0	Int.	Steel
Mobile & Baldwin Co. R. R.	1	Pass.	.....	22– 0	City	...
	2	Gasoline	Motor	....	Int.	.....
	1	Service	.....	....	....	....
	1	Flat	.....	....	....	....
Montreal & So. Counties Ry.	1	Flat	....	34– 0	....	Wood
Morris County Trac. Co	10	Ps. Clsd.	Motor	36– 0	Int.	All-steel
	1	Sweeper	.....	28– 3	City	Semi-steel
Motley County R. R	1	Gasoline, Mech. Drive	....	70– 0	Int.	All-steel
Mt. Mansfield Elec. Ry.	1	Express	Motor	35– 0	Int.	Semi-steel
Mun. Rys. of San Francisco	125	Ps. Calif. Type	Motor	32– 4	City	.....
New Bedford & Onset St. Ry.	1	Flat	...	49– 0	Int.	Semi-steel
New Jersey & Penna. Tr. Co.	4	Ps. Clsd.	Motor	52– 0	Int.	All-steel
	2	Bagg.	...	45– 0	Int.	Steel
New Orleans Ry. & Lt. Co	50	Ps. Clsd.	Motor	47– 8	City	Semi-steel
N. Y. Central & H. R. R. R.	1	Wreck. Crane	Motor	.	...	...
New York Municipal Ry.	200	Ps. Clsd.	Motor	66– 2¼	Sub.&El.	All-steel
New York, New Haven & Hartford R. R	1	El. Loco.	Motor	130-Ton		
Newport News & Hampton Ry. Gas & Elec. Co.	1	Express	Motor	45– 0	...	Wood
Niagara, St. Catherines & Toronto Ry	6	Ps. Clsd.	Motor	55– 6	Int.	Semi-steel
	6	Ps. Clsd.	Motor	45– 0	City	Semi-steel
	2	El. Loco.	Motor	34-Ton	.	Steel
Nipissing Central Ry	2	Ps. Clsd.	Motor	51– 0	Int.	Semi-steel
Norfolk & Western Ry.	12	El. Loco.	Motor	270-Ton	Int.	.....
Northern Elec. Ry	1	Ft. Loco.	Motor	....	.	All-steel
	1	Ft. Loco.	Motor	...	.	W'd & St'l
Northern Ohio Tr. & Lt. Co.	16	Ps. Clsd.	Motor	35– 5½	City	Semi-steel
	5	Ps. Smok.	....	42– 1¾	Int.	Wood
North Carolina Pub. Ser. Co.	2	Ps. Conv.	Motor	26– 0	City	Steel
Northern Texas Trac. Co.	20	Ps. Clsd.	Motor	33– 9	City	Semi-steel
Ohio Elec. Ry	5	Ps. Clsd.	Motor	50– 3	Int.	Steel
	4	Express	Motor	50– 0	Int.	Wood
	14	Box Ft.	....	38– 6	Int.	Wood
Ogden, Logan & Idaho Ry.	3	Ps. Clsd.	Motor	60– 0	Int.	All-steel
Ogdensburg St. Ry.	1	Ps. Clsd.	Motor	20– 8	City	Semi-steel
Ohio Elec. Ry	5	Ps. Clsd.	Motor	50– 2	Int.	Steel
	4	Express	Motor	50– 0	Int.	.....
	14	Freight	Trail	38– 6	Int.	.....
Oklahoma Ry	1	Box. Ft.	.....	36– 0	Int.	Wood
Orleans-Kenner Ry	4	Ps. & Smoking	Motor	54– 8	Int.	Semi-steel
Otsego & Herkimer R. R.	1	Express	Motor	45– 0	Int.	Semi-steel
	2	Gondola	.....	....	...	.....
	8	Dump	...	.	...	.....
Pacific Elec. Ry	24	Ps. Clsd.	Motor	58– 1	Int.	All-steel
Pacific Gas. & Elec. Co.	6	Ps. Calif. Type	Motor	38– 0	City	Semi-steel
Pacific Great Eastern Ry.	2	Gasoline	.....	65– 0	Int.	All-steel
Parkersburg, Marietta & Int. Ry	2	Ps. Clsd.	Motor	50– 0	Int.	All-steel
	4	Ps. Clsd.	Motor	38– 0	City	Semi-steel
	4	Ps. Clsd.	Motor	22– 0	City	Semi-steel
Peninsular Ry	1	.....	...	.	...	.....
Pennsylvania & Ohio Ry.	1	Pass. & Smok.	Motor	31– 8	Int.	Wood
Pennsylvania R. R	9	Ps. Clsd.	Motor	54– 6	Sub.	All-steel
(also 84 pass. coaches equipped with motors)						
Peterborough Radial Ry	2	Ps. Clsd.	Motor	30– 0	City	Wood
Phila. & Garretsford St. Ry.	5	Ps. Clsd.	Motor	44– 6	Int.	Semi-stee
Piedmont & Northern Ry.	8	Ps. Clsd.	Trail	62– 0	Int.	All-steel
	2	Parlor	.....	62– 0	Int.	All-steel
Piedmont Ry. & Elec. Co.	1	Ft. Loco.	.....	25– 0	....	Wood
Pittsburgh, Harmony, Butler & New Castle Ry	5	Ps. Clsd.	Motor	54– 0	Int.	Wood
	1	Express	Motor	35– 0	Int.	Wood
Pittsburgh Rys	50	Ps. Clsd.	Motor	45– 2	City	Steel
	50	Ps. Clsd.	Motor	45– 2	City	Steel
Port Arthur Municipal Ry.	1	Ps. Conv.	Motor	26– 0	City	Wood
	3	Ps. Conv.	Motor	26– 0	City	Semi-steel
Port Arthur Traction Co.	4	Ps. Clsd.	Motor	32– 0	City	Semi-steel
Portland, Eugene & Ea. Ry.	4	Ps. Conv.	Motor	21– 0	City	Semi-steel
	3	Bagg. & Mail	Motor	47– 0	Int.	Steel
Portland Ry., Lt. & Pwr. Co.	3	Ps. Clsd.	Motor	50– 0	Int.	Semi-steel
	3	Ps. Clsd.	Trail	50– 0	Int.	Semi-steel
	1	El. Loco.	Motor	50-Ton		Steel
Pottstown & Phoenixville Ry.	3	Ps. Clsd.	Motor	....	Int.	.....
Princeton Power Co	4	Ps. Clsd.	Motor	....	Int.	.....
Public Service Ry.	15	Ps. Clsd.	Motor	34– 0	Int.	Wood
	10	Ps. Clsd.	Motor	32– 0	City	.....
	1	Sweeper	.....	28– 0	....	Wood
	6	Side Dump	Trail	33– 0	....	Steel
	1	Line Car	.....	18– 0	....	Wood
Puget Sound Traction, Light & Power Co. (Bellingham Div.)	1	Ps. Conv.	Motor	50– 0	City	Semi-steel.
Puget Sound Traction, Light & Power Co. (Seattle Div.)	12	Ps. Clsd.	Motor	38– 0	City	Semi-steel
Regina Municipal Ry	1	Flat	....	21– 0	City	Wood
Reno Traction Co	1	Ps. Clsd.	Motor	34– 0	City	Semi-steel
Rhode Island Co.	50	Ps. Conv.	Motor	29– 0	City	Semi-steel
Richmond Light &R. R. Co.	32	Ps.Clsd.	Motor	28– 0	City	All-steel
Rockford & InterurbanRy.	4	Ps. Clsd.	Motor	....	City	.....
Rockland, Thomaston&Camden St. Ry	1	Bagg.	...	30– 0	Int.	Semi-steel
Saginaw Bay City Ry.	1	Sprinkler	.	....	City	.....
St. John Ry.	12	Ps. Clsd.	Motor	31– 0	City	Wood
St. Joseph Ry. Lt. Ht. & Pow. Co	2	Pass	.....	....	City	.....
	1	Work	.....	....	...	.....
St. Joseph Valley Ry	1	Gasoline	.....	65– 0	Int.	All-steel
St. Louis Southwestern Ry.	8	Gas-elec.	Motor	....	Int.	All-steel
St. Louis Water Works Ry.	2	Pass.	Motor	39– 0	Sub.	Semi-steel
St. Paul Southern Ry.	2	Ps. Clsd.	Motor	51– 0	Int.	Semi-steel
	2	Bag. & Pass.	Motor	51– 0	Int.	Semi-steel
St. Petersburg & Gulf Ry.	2	Ps. Open	Motor	36– 0	Both	Wood
	2	Ps. Conv.	Motor	40– 0	Both	Semi-steel
	2	Ps. Conv.	Motor	46– 0	Both	Semi-steel
	1	Express	Motor	40– 0	Both	Semi-steel
	2	Flat	.....	20– 0	Both	Wood
Salt Lake & Utah R. R	2	Ps. Clsd.	Motor	31– 8	City	All-steel
	5	Ps. Clsd.	Motor	59– 8	Int.	All-steel
	2	Ps. Clsd.	Trail	58– 7½	Int.	All-steel
	2	Ft.	Motor	50– 0	Int.	All-steel
	1	El. Loco.	Motor	50– 0	Int.	.....
San Antonio Trac. Co	3	Work	.....	....	.	.....
	11	Flat	.....	....	....	.....
San Diego Elec. Ry.	41	Ps. Calif. Type	Motor	50– 0	City	Semi-steel
Santa Barbara & Sub. Ry.	2	Ps. Clsd.	Motor	39– 4	City	Semi-steel
	1	Express	Motor	35– 0	....	Wood
	4	Flat	.....	34– 0	....	Wood
Scranton Ry	10	Ps. Clsd.	Motor	30– 6	City	Semi-steel
Seattle Municipal Ry.	1	Box Ft.	....	42– 0	City	Wood
Shamokin & Mt. Carmel Transit Co	1	Sweeper.	Motor	24– 0	...	Wood
Sheboygan Ry. & Elec. Co.	2	Ps. Clsd.	Motor	49– 0	Int.	Semi-steel

Purchaser	No.	Gen'l Type	Motor or Trailer	Length of Car Body	City or Int.	All-steel, Semi-steel or Wood
Shreveport Traction Co.	1	Sprinkler	....	....	City	.....
Sioux City Service Co.	8	Ps. Clsd.	Motor	38- 0	City	.....
Slate Belt Elec. St. Ry.	2	Ps. Conv.	Motor	30- 1	Int.	Semi-steel
Southern Cambria Ry.	1	Express	Motor	51- 0	Int.	Wood
Southern Public Utilities Co.	6	Ps. Clsd.	Motor	39- 0	City	Semi-steel
Southern Tr. Co. of Illinois	6	Ps. Clsd.	Motor	38- 0	Int.	Semi-steel
Southern Trac. Co.	11	Ps. Clsd.	Motor	28- 0	City	All-steel
Southwestern Trac. Co.	1	Pass.	.....	46- 8	Int.	.....
Spokane, Portland & Seattle	1	Gas-elec.	Motor	....	Int.	Steel
Springfield Consol. Ry.	12	Ps. Open	Motor	38-10	City	Wood
Springfield Ry.	10	Ps. Clsd.	Motor	28- 0	City	Semi-steel
Springfield Street Ry.	10	Ps. Conv.	Motor	30- 0	City	Semi-steel
Stark Electric R. R.	2	Pass.	.....	55- 0	Int.	Steel
	1	Snow Plow	.....	....	Int.	Wood
Steubenville & East Liverpool Ry. & Light Co.	4	Ps. Clsd.	.....	33- 2	City	Semi-steel
Stroudsburg Pass. Ry.	1	Ps. Clsd.	Motor	28- 0	City	.....
Sunbury & Susquehanna Ry.	4	Ps. Clsd.	Motor	41- 0	Int.	.....
Sunset Central R. R.	3	Gasoline, Mech. Drive	.....	10- 0	Int.	All-steel
Tacoma Ry. & Power Co.	5	Ps. Clsd.	Motor	34- 5	City	Semi-steel
Tennessee, Kentucky & Nor. R. R.	1	Gasoline, Mech. Drive	.....	70- 0	Int.	All-steel
Terre Haute, Indianap. & Eastern Trac. Co.	1	Express	Trail	45- 0	Int.	Semi-steel
Texas Traction Co.	1	Ps. Clsd.	Motor	28- 0	City	All-steel
Third Ave. Ry.	50	Ps. Conv.	Motor	24- 0	City	Semi-steel
	2	Snow Plow	.....	40- 0	City	Wood
	12	Sweeper	.....	26- 0	City	Wood
	2	Scrapers	....	29- 0	City	Wood
	1	Wing Car		29- 0	City	Wood
Tidewater Power Co.	3	Ps. Conv.	Motor	20- 8	City	Semi-steel
Toledo & Western R. R.	2	Cars	.....	.....	...	.....
Toledo, Fostoria & Findlay Ry.	2	Ps. Clsd.	Motor	51- 0	Int.	Steel
Topeka Ry.	6	Pass.	Trail	45- 0	Park	Semi-steel
Toronto Suburban Ry.	2	Ps. Clsd.	Motor	46- 0	Int.	Semi-steel
	1	Sweeper	.....	28- 3	City	Semi-steel
Transit Development Co.	26	Air Dump	Trail	26- 0	....	Wood
	2	Rail Trucks	.....	53- 0	....	All-steel
Trenton & Mercer County Trac. Corp.	10	Ps. Clsd.	Motor	32- 8	City	Semi-steel
Trenton, Bristol & Philadelphia St. Ry.	5	Ps. Clsd.	Motor	30- 6	Int.	Semi-steel
Twin City Rapid Transit Co.	60	Ps. Conv.	Motor	48- 0	City	Semi-steel
Union Electric Co.	6	Ps. Clsd.	Motor	27- 4	City	Semi-steel
Union St. Ry.	6	Ps. Clsd.	Motor	33- 0	Int.	Wood
	1	Snow Plow	.....	31- 6½	Both	Wood
	1	Air Sander	.....	35- 0	City	Semi-steel
Union Pacific R. R.	5	Gasoline, Mech. Drive	.....	70- 0	Int.	All-steel
United Rys. & Elec. Co.	85	Ps. Conv.	Motor	30- 8	City	Semi-steel
United Rys. of St. Louis	68	Poss.	.....	....	City	.....
Utah Light & Trac. Co.	18	Ps. Clsd.	Motor	36- 0	City	Semi-steel
	6	Ps. Clsd.	Motor	36- 0	City	Semi-steel
Vicksburg Lt. & Trac. Co.	2	Ps. Clsd.	Motor	21- 0	City	Semi-steel
Walla Walla Valley Ry.	1	Express	Motor	41- 0	Int.	Semi-steel
Washington, Baltimore & Annapolis Electric R. R.	10	Ps. Clsd.	Motor	51- 0	Int.	All-steel
	3	Ps. & Bag.	.....	51- 2	Int.	All-steel
Washington-Virginia Ry.	5	Ps. Clsd.	Motor	50- 8	Int.	All-steel
Washington Ry. & Elec. Co.	3	Work	.....	21- 9	....	Wood
	1	El. Loco.	Motor	30- 0	....	Semi-steel
Waterbury & Milldale Tramway	2	Ps. Conv.	Motor	30- 8	Int.	Semi-steel
Waterloo, Cedar Falls & Nor. Ry.	5	El. Loco.	Motor	60-Ton	Int.	All-steel
	4	Com. Ps.	.....	58- 0	Int.	All-steel
	3	Observ.	.....	61- 0	Int.	All-steel
Wellsburg, Bethany & Washington R. R.	1	Ps. Motor	Motor	30- 6	Int.	Wood
West Penn. Trac. Co.	2	Ps. Clsd.	Motor	56- 0	Int.	Semi-steel
	4	Ps. Clsd.	Motor	46- 0	Sub.	Semi-steel
Western New York & Pa. Trac. Co.	1	Flat Car	Motor	36- 0	Both	Wood
Western Ohio R. R.	1	El. Loco.	Motor	35-Ton	....	.....
Westmoreland County Ry.	3	Ps. Clsd.	Motor	40- 0	Int.	Steel
Wichita Falls Trac. Co.	3	Ps. Clsd.	Motor	27- 0	City	Semi-steel
Wilkesbarre Ry.	6	Ps. Clsd.	Motor	47- 0	City	Semi-steel
Willamette-Pacific Ry.	1	Gasoline, Mech. Drive	.....	55- 0	City	All-steel
Windsor, Essex & Lake Shore Ry.	2	Ps. Clsd.	Motor	....	Int.	.....
Winnipeg Electric Ry.	20	Pass.	.....	33- 0	City	.....
Wisconsin-Minnesota Light & Pwr. Co.	1	Ps. Clsd.	Motor	34- 0	Int.	Semi-steel
Wisconsin Public Serv. Co.	4	Ps. Clsd.	Motor	28- 0	City	All-steel
Worcester Consol. St. Ry.	10	Ps. Conv.	Motor	30- 0	City	Semi-steel
Yakima Valley Transp. Co.	4	....	Trail	46- 0	Int.	Wood
York Rys.	1	Pass.	Trail	46- 0	Int.	Stl. frame
Yuma Valley Ry.	1	Gasoline, Mech. Drive	.....	55- 0	Int.	All-steel

Electric Railway Signals

The accompanying list of signals installed by the electric railways during 1914 has been prepared from reports made by the various signal manufacturers, all of whom furnished partial statements. The record is complete with regard to important installations. In the list, under the heading "Remarks," a brief description of each installation has been given, and in this all installations not otherwise classified are of the trolley-contact type. In all cases the number of signals, not the number of blocks, has been shown, together with mileage where that is known. As might be expected from the depressed conditions affecting industrial activities the list shows a material decrease from last year, although the reduction is not so noticeable as it has been in the case of the electric railways' orders for rolling stock.

The number of roads purchasing signals during the year was just half of that recorded in 1913, but if allowance is made for the equivalent in signals of the speed-control system ordered by the New York Municipal Railways the number of signals ordered during the past year is more than 80 per cent of the number purchased during the previous year.

Name of Road	No. Sig.	Miles	Manufacturer	Remarks
Altoona & Logan V'y.	2	....	St. Ry. Sig.	S.T. Reg.
Auburn & Syracuse	10	....	U.S. El. Sig.	S.T. Reg.
Auburn & Syracuse	2	....	U.S. El. Sig.	S.T. Non-reg.
Aurora, Elgin & Chi	3	....	U.S. El. Sig.	S.T. Non-reg.
Bangor (Me.) Ry.	10	....	C. N. Wood	S.T. Reg.
Bay State St. Ry.	12	....	U.S. El. Sig.	S.T. Reg.
Birmingham Ry. & Lt.	9	....	U.S. El. Sig.	S.T. Non-reg.
Boston Elevated	10	....	U.S. El. Sig.	S.T. Reg.
Chautauqua Trac.	2	....	U.S. El. Sig.	S.T. Reg.
Chi. & Milwaukee	2	....	Nachod	S.T. Reg.
Chi., So. Bend & N. I. T.	6	....	Nachod	S.T. Reg.
Cleveland, S. W. & Col.	4	1.1	Union S. & S.	S.T. Track Circ. Light Sig.
Connecticut Co.	18	....	U.S. El. Sig.	S.T. Reg.
Cumberland C'y (Me.) Ry.	16	....	C. N. Wood	S.T. Reg.
Dallas Trac.	2	....	St. Ry. Sig.	S.T. Reg.
East St. Louis & Sub.	2	....	C. N. Wood	S.T. Reg.
Fitchburg & Leominster	2	....	U. S. El. Sig.	S.T. Non-reg.
Fonda, Johnst'n & G'v'le	3	....	Nachod	D.T. Rear-prot'n
Holyoke St. Ry.	2	....	C. N. Wood	S.T. Reg.
Hudson V'y Ry.	6	....	Nachod	S.T. Non-reg.
Ill. Trac. System	116	41.8	Union S. & S.	S.T. 89 Sema. 27 Light
Jamestown St. Ry.	6	....	C. N. Wood	S.T. Reg.
Jefferson County Trac.	4	....	U.S. El. Sig.	S.T. Non-reg.
K. C., Clay C'y & St. J.	100	71.4	Union S. & S.	S.T. Track Circ. 50 L't., 50 Sema
Lehigh V'y Transit	34	....	Nachod	S.T. Reg.
Lehigh V'y Transit	1	....	Nachod	Spur protection
Mass.-Northeast'n.	6	....	U.S. El. Sig.	S.T. Non-reg.
Middlesex & Boston	1	....	U.S. El. Sig.	Spur protection
Michigan Ry.	2	....	Nachod	S.T. Subway
Monongahela V'y Trac.	2	....	Nachod	S.T. Reg.
N. Y. Municipal Rys.	103	5.5	Federal Sig.	D.T. Track Circ. Light Sigs. Subway Auto Stops
N. Y. Municipal Rys.	Cab Sigs.	103	Gen'l Ry. Sig.	D. T. Subway Track Circ. Auto speed control
N. Y. & Queens Co.	14	....	St. Ry. Sig.	S.T. Reg.
Norfolk South'n.	2	..	U.S. El. Sig.	S.T. Non-reg.
North'n Ohio T. & L.	3	..	Nachod	D.T. Rear prot'n
North'n Ohio T. & L.	2	....	Nachod	Gauntlet track
Norwich & Westerly	2	....	U.S. El. Sig.	S.T. Reg.
Ogden Rapid Transit	4	....	U.S. El. Sig.	S.T. Reg.
Ogden Rapid Transit	12	....	U.S. El. Sig.	S.T. Non-reg.
Ogden Rapid Transit	1	....	Nachod	Special
Ottawa Elect. Ry.	1	....	U.S. El. Sig.	S.T. Non-reg.
Philadelphia R. T.	9	....	Nachod	S.T. Reg.
Philadelphia R. T.	1	....	Nachod	Repeater signal
Phila. & West. Trac.	2	....	St. Ry. Sig.	S.T. Reg.
Port Arthur Trac.	4	....	U.S. El. Sig.	S.T. Non-reg.
Rhode Island Co.	2	....	C. N. Wood	S.T. Reg.
Richmond Lt. & Ry.	24	....	U.S. El. Sig.	S.T. Reg.
San Fran.-Oakl'd Ter.	5	....	U.S. El. Sig.	S.T. Reg.
Sand Springs Ry.	2	....	C. N. Wood	S.T. Reg.
Schenectady Ry.	2	....	Nachod	S.T. Reg. With preliminary
Scranton & Bing't'n.	36	12	Union S. & S.	S.T. Track Circ. 18 Sema., 18 L't.
Terre H'te, Ind. & East.	2	....	St. Ry. Sig.	S.T. Reg.
Union Trac. of Ind.	20	13.8	Gen'l Ry. Sig.	S.T. Track Circ. Light Sigs.
Union Ry., New Bedford	6	....	C. N. Wood	S.T. Reg.
Westchester El. Ry.	4	....	U.S. El. Sig.	S.T. Reg.
Wheeling Trac.	2	....	Nachod	S.T. Non-reg.
Wilkesbarre St. Ry.	2	....	St. Ry. Sig.	S.T. Reg.
Yakima V'y Trans.	4	....	C. N. Wood	S.T. Reg.
Youngstown So. Trac.	2	....	St. Ry. Sig.	Headway Rec.

In connection with the Durban (South Africa) Municipal Tramways, two very handsome tourist gasoline-electric chars-a-bancs (sightseeing cars) have been put into service. The vehicles are of 40 hp and carry eighteen passengers. The chars-a-bancs at present run excursions within the town limits for sightseers, at a cost of 25 cents per tour, which lasts half an hour. Night tours of forty-five minutes are also made for which the charge is 35 cents. It is the intention of the tramways department to obtain power to operate these machines outside the town, thus opening up to visitors the magnificent country districts around Durban.

Receiverships and Foreclosure Sales in 1914

In Spite of Depression Tendency Is Shown Toward a Decline in Number of Receiverships and Forced Sales

The records of electric railways undergoing receivership during 1914 indicate that the number of companies whose finances were involved to such a degree, was, in spite of the current financial depression, only one-half as large as in the preceding year and the smallest in the last five years. Owing to the fact, however, that two companies, having more than 100 miles of single track, were placed under receivers, the mileage total affected for 1914 was only slightly less than in 1913. The amount of outstanding stock was greater for the last year on account of the $25,000,000 issue of the Northern Electric Railway, but this company's funded debt of $12,127,000 was far too small to bring the total up to last year's figures, in which were included the outstanding guaranteed funded debt of American Water Works & Guarantee Company subsidiaries. The record of receiverships for 1913 compares with the preceding four years as follows:

	Number of Companies	Miles of Track	Outstanding Stock	Outstanding Funded Debt
1910	11	696.61	$12,629,400	$75,490,735
1911	19	518.90	29,533,450	38,973,293
1912	26	373.58	20,410,700	11,133,800
1913	18	342.84	31,006,900	47,272,200
1914	9	332.39	34,812,550	18,745,460

The totals for 1913 in the above table do not include any figures for the Idaho Railway, Light & Power Company, which went into receivers' hands at almost the close of that year. The trackage of this company amounted to 85 miles, its outstanding stock $30,000,000. and its funded indebtedness, $11,266,000. If these amounts are included for 1913, so as to give mileage of 427.84, outstanding stock of $61,006,900 and outstanding debt of $58,538,200, the year just passed shows up better in all these respects. It may be noted, however, that the electric railway lines owned by this company are operated by the Idaho Traction Company under lease and are not under the direct supervision of the receiver.

A few of the companies placed under receivership had not reached the stage of operation as completed systems, and the mileage given is for the number of miles in actual operation, wherever ascertainable. An attempt was made in all cases to take the figures from the most up-to-date sources, but in the case of some companies, especially those newly or only partly constructed and those not publishing yearly reports, the information secured has been lamentably meager. It will be noticed from a glance at the accompanying list that most of the companies under receivership in 1914 operated a small mileage. The receivership of one of the larger companies, the Interurban Railway & Terminal Company, was a direct result of the severe floods in the Ohio valley in 1913 and drastic fare regulations over city lines in Cincinnati. During the year a receiver was appointed in Indiana for the Cincinnati, Lawrenceburg & Aurora Electric Street Railroad, but this was merely the formal appointment in that State of the receiver who had formerly been chosen to handle the more extensive Ohio interests of the company, as shown for the company as a whole in the 1913 table.

Although, as before stated, the number of companies placed under receivership during the year was small in consideration of the general condition of business, it must be admitted that this very depression kept the figure from being slightly larger. The resale of one large company was repeatedly postponed in the hope of obtaining more favorable selling conditions, while two smaller companies were three times offered for sale without bids being received. With a return to normal conditions the sale of these railways will undoubtedly be consummated.

ELECTRIC RAILWAY RECEIVERSHIPS IN 1914

	Mileage	Outstanding Stock	Outstanding Funded Debt
Birmingham, Ensley & Bessemer Railroad	36	$4,050,000	$2,650,000
Interurban Railway & Terminal Company	101.24	3,500,000	1,650,000
Lincoln Railway & Light Company	8	.....	.....
Minneapolis & Northern Railway	18	.....	.....
Northern Electric Railway	138.5	25,000,000	12,127,000
Washington Interurban Railway	8.45	500,000	232,000
Washington-Oregon Corporation	.....	1,552,500	2,018,500
Waukegan, Rockford & Elgin Traction Company	15	210,050	67,960
Waycross Street & Suburban Railway	7.2	.....	.....
Total	332.39	$34,812,550	$18,745,460

Although there were eighteen electric railway foreclosure sales in 1913, only eleven took place in 1914, and the mileage directly affected was little more than half as much. Most of the companies had low outstanding stock and funded debt issues, but the inclusion of the American Waterworks & Guarantee Company, a holding company, gives a material inflation to these totals for 1914. The following table shows the comparative figures for the last five years:

	Number of Companies	Miles of Track	Outstanding Stock	Outstanding Funded Debt
1910	22	724.36	$19,106,613	$26,374,065
1911	25	660.72	91,354,800	115,092,750
1912	18	267.18	14,197,300	10,685,250
1913	18	311.28	15,743,700	19,526,000
1914	11	181.26	26,239,700	44,094,241

As in previous years, it has been found that some electric railways for which receivers had been appointed and against which foreclosure suits had been brought, were able to carry out reorganization plans without offering the property at public sale. All the various forms of reorganizations, readjustments and change in ownership without formal receivership or foreclosure sales have been passed over. For example, the Columbus, Urbana & Western Electric Railway, Columbus, Ohio, was offered for sale, but no bids were received. Subsequently, through the State banking department the interest held by the Columbus Savings & Trust Company was sold by the State bank superintendent, but the remaining interests were held by the original owners. All claims against the property were later adjusted and the receiver discharged. In another case the receiver of the Grand Valley Railway System had control of the Grand Valley Railway and its owned lines, the Brantford Street Railway and the Woodstock, Thames Valley & Ingersoll Railway. The first two lines were sold to the municipality of Brantford, but the last, located in Woodstock, was taken over by a trustee under a mortgage prior to that giving rise to the receivership. The list of individual companies undergoing formal sales during the year is shown in the accompanying table.

ELECTRIC RAILWAY FORECLOSURE SALES IN 1914

	Mileage	Outstanding Stock	Outstanding Funded Debt
Alton, Jacksonville & Peoria Railway	21.5	$514,700	$600,000
American Waterworks & Guarantee Company	.....	20,000,000	37,589,000*
Brantford Street Railway	9.75	200,000	125,000
Grand Valley Railway	40.83	1,100,000	688,800
Ithaca Street Railway	9.56	325,000	788,041
Joliet & Southern Traction Company	47	1,500,000	1,608,400
New York, Auburn & Lansing Railroad	7†	1,000,000	1,095,000
Northern Illinois Electric Railway	12	.....	.....
Pekin & Petersburg Interurban Railway	7	50,000‡	50,000
Richmond & Henrico Railway	9.12	1,250,000	1,250,000
Titusville Electric Traction Company	17.5	300,000	300,000
Total	181.26	$26,239,700	$44,094,241

*Holding company had no bond issues; figures represent summary of funded debt of subsidiaries.
†Electric mileage; company also has 33 miles of steam mileage.
‡Authorized amount; outstanding amount not known.

Public-Be-Pleased Policy in Practice

SOME OPERATING PROBLEMS THAT AFFECT THE PUBLIC ATTITUDE

A Review of Current Electric Railway Practice in Such Matters as Courtesy of Platform Men, Complaint Bureaus, Public Referendums, Handling Lost Articles, Way Stations and Shelters, and the Like

THE interest that has been accorded of late to the establishment of mutually satisfactory relations between the electric railways and the public that they serve has focused attention during the past year upon those phases of operation in which the public is directly interested, and an issue in which the statistics of the year are published seems an appropriate place for the presentation of information of this kind. In most of these problems, of which a few are outlined in the following paragraphs, the interests of the public and the railways are largely identical. Indeed, a divergence of interest seems to occur in no case. Even in such matters as the development of a courteous attitude on the part of platform men and the use of public referendums to determine directly the wishes of the public, the efforts of the railway companies are not altogether without indirect benefit to themselves, and it is somewhat surprising to find that this important fact is not recognized in all cases.

COURTESY OF PLATFORM MEN

In the following pages no attempt is made to cover the practice of all companies, or even of all of those which have been conspicuous in each of the subjects covered. The purpose has been to describe the method rather than the company, and the examples selected were chosen with this object in mind.

Some months ago Thomas Duncan, chairman of the Public Service Commission of Indiana, was reported to have said: "Of all complaints that come to the commission, few are aimed against the conduct of the managers. The chief complaints arise from the insolence of employees." The point is obvious, yet, comparatively speaking, surprisingly little attention seems to have been afforded to this most important factor in establishing cordial relations with the public. Generally the efforts of the railway companies have been confined to the personal efforts of the officials of the transportation department. Nevertheless, a number of companies have supplemented these efforts by the conduct of definite and regular campaigns toward the end of developing courteous conduct on the part of the platform men. It has been thought that an account of a few of these special campaigns would be interesting.

Among the lines which have grasped, along with the doctrine of "The Public Be Pleased," the necessity for developing an invariably courteous attitude toward the public on the part of the employees, the Hudson & Manhattan Railroad possesses perhaps the greatest interest, for this company stands unique on having raised its short-haul fare from 5 cents to 7 cents without even involving itself in complaints from its patrons, let alone the opposition that might have been expected to result from such action. It is true that the enormous cost of tunneling the Hudson River, under which this line runs, involved such heavy fixed charges as to make the increased fare obviously just, but, even so, it is admitted that the cordial relations existing between the company and the public permitted the management to explain its case in places other than the courts.

The truly remarkable degree of popularity that is enjoyed by this company is, in the opinion of Wilbur C. Fisk, president, largely due to the trainmen, among whom a courtesy campaign is consistently carried on at all times. This policy, in fact, had its inception in an address that was delivered to the trainmen, when the line was opened for traffic, by W. G. McAdoo, then president of the company, and a copy of the address in pamphlet form is still issued to every new employee before he goes to work. The following is abstracted from it:

"I want to impress upon you the fact that this railroad is operated primarily for the convenience of the public. Safety and efficiency of the service are, of course, the first considerations, but among the things of the highest importance are civility and courtesy in your dealings with the public. It requires a great deal of patience to be courteous to people who may be rude and offensive to you, and it is human nature not to be, but, at the same time, you must learn to take such things in good temper; it is a part of your job. You must treat people courteously no matter how they treat you. You must not engage in unnecessary conversation with passengers, and you must not address passengers before they enter into conversation with you. You are not there for the purpose of entertaining the public; you are there for the purpose of seeing that the road is safely and properly operated. Attend strictly to your duties, answering questions when they are addressed to you. No matter if questions seem to be foolish, give civil replies. I want to caution all conductors, guards and platform men against telling passengers to 'step lively.' It does no good; people step as lively as they can any way, and to order them to do so in a loud and commanding tone is irritating and objectionable. The amount of courtesy you display is going to have an important bearing upon the popularity of this road. The day of 'the public be damned' policy is forever gone. It always was an objectionable and indefensible policy, and it will not be tolerated on this road under any conditions."

In brief, this covers the policy of the railroad, and the advice is driven home to each new employee by a personal talk with the superintendent of transportation, during which it is explained that, while Marshall Field's epigram that the "customer is always right" may not be literally true, the presumption is that passengers do not complain without grievances, and that any discourtesy will involve discipline.

New employees are taken only on a ninety-day probationary period. During this time they are watched carefully. Should complaints be made against any of them the first case involves a personal talk with the superintendent of transportation, as it is believed that the vast majority of men can be educated, but if a second complaint of any serious nature is received during a new employee's probation, he is dropped forthwith. The principle is that the trainman is paid to take knocks and that the mere fact of his getting into a dispute with a patron establishes a preponderance of evidence against his becoming a satisfactory employee.

In the case of older trainmen, however, such a drastic

procedure is not followed. Alleged infractions of the rule of courteous treatment for all passengers are investigated, and when it is found that the trainman has been goaded into making a retort by a disagreeable passenger, he is disciplined only to the extent of being given demerits on his record, a system based upon the Brown system of discipline being used. Of course, should such disputes occur several times, there is evidence that the trainman is not living up to the spirit of the rule and he is dropped, a bulletin being issued to that effect. When old employees are found to have wilfully entered into disputes with passengers the discipline is, of course, made proportionately severe, and involves discharge for serious offences, such as striking a patron.

In addition to the matter of complaints from the public, the conduct of trainmen is checked up by an efficiency system wherein trainmen are observed at intervals averaging about one week in length with regard to the performance of their work. These observations are made by the trainmaster, the motorman's instructor and the despatchers who ride the trains and fill out cards on which there is space for the identification of the trainman and a "test number" which refers to a printed list of 102 tests covering all branches of the service. Among these are included such items as treatment of passengers, neat appearance and the like.

Summed up, the maintenance of courteous deportment among this company's trainmen is due, according to John O'Rourke, superintendent of transportation, to a thorough drilling of new men in the "public be pleased" policy of the company and their education by personal contact with officials; to the rigid elimination of men who cannot get along with the public; to frequent and regular observation of the actions of platform men; and to considerate treatment and good wages for all employees. The feeling of confidence in the company on the part of the men is reflected in their attitude toward the public, and the spirit of co-operation between the men and the company makes for the popularity of the organization as a whole.

PROCEDURE IN ROCHESTER

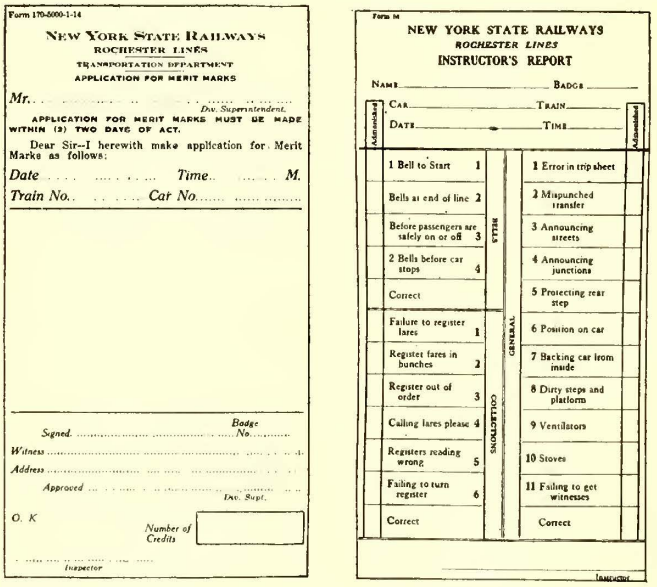
On the Rochester lines of the New York State Railways, also, results of a most satisfactory nature have been accomplished. It has been the practice to consider that employees during the first six months of service make mistakes rather through lack of knowledge of the correct manner of doing their work than through wilful action. For this reason new employees who are guilty of violations of rules or orders are sent to the company's instruction department for a talk, the assumption being that they have not been sufficiently instructed. The result has been that a new employee, instead of getting through his first six months' service with a record bearing many black marks, reaches the end of his probation with a much better working knowledge of railroading and with good-will toward the company.

Since 1906 the company has used the merit and demerit system of discipline. Published in the rule book is a schedule of credits for meritorious acts, as well as demerits for various violations of rules. Under this system it is necessary only to establish the fact that a rule has been violated and the discipline is automatic. On the other hand, a man who performs a meritorious act receives credit marks upon turning in a card requesting them, as the company believes that this plan of recognizing the meritorious acts of men is far superior to the other systems of discipline under which only delinquencies are entered on the records. It is not altogether necessary that a man should turn in a request for credits, as any official noting that a trainman has performed some act which would entitle him to credit, reports it, and the credits are given.

Under this plan ten credit marks are allowed for the first six months without demerit marks, and fifteen credit marks for each succeeding six months without demerit marks. Ten credit marks are allowed also for tying up trolley wire, or removing same to allow car to move; for making exceptionally good stop, thereby preventing accident, or using good judgment in preventing accident; for holding broken trolley pole on wire, and for securing names of witnesses or information valuable to claim department when off duty.

Five credit marks are allowed for removing obstructions from track or wire; for removing broken trolley wire from track; for placing or assisting to place cars on track; for tying up guy or span wire; for watching broken wire when off duty; for reporting defective cars or trouble on line when off duty; for protecting company's property, and for six months' neatness in appearance of person and car.

Three credit marks are given for recovering and turning in lost pass books and badges; for using good judgment in preventing blockades; for repairing parts of car, preventing it from being turned in or avoiding a blockade; and for finding and returning company's property, such as signs, train numbers and parts of car. From five to twenty credits are allowed for special cases of politeness or courtesy to passengers and also for using good judgment in avoiding controversy with a passenger who has real or imaginary grievances.



Form 170-5000-1-14

NEW YORK STATE RAILWAYS
ROCHESTER LINES
TRANSPORTATION DEPARTMENT
APPLICATION FOR MERIT MARKS

Mr. ..... Div. Superintendent.

APPLICATION FOR MERIT MARKS MUST BE MADE WITHIN (2) TWO DAYS OF ACT.

Dear Sir--I herewith make application for Merit Marks as follows:

Date ..... Time ..... M.

Train No. ..... Car No. .....

Signed. ..... Badge No. .....

Witness .....

Address .....

Approved ..... Div. Supt.

O. K

Number of Credits

Inspector

Form M

NEW YORK STATE RAILWAYS
ROCHESTER LINES
INSTRUCTOR'S REPORT

NAME ..... BADGE .....

CAR ..... TRAIN .....

DATE ..... TIME .....

Admitted				Admitted
	1 Bell to Start 1	GENERAL	1 Error in trip sheet	
	Bells at end of line 2		2 Mispunched transfer	
	Before passengers are safely on or off 3		3 Announcing streets	
	2 Bells before car stops 4		4 Announcing junctions	
	Correct		5 Protecting rear step	
	Failure to register fares 1	COLLISIONS	6 Position on car	
	Register fares in bunches 2		7 Backing car from inside	
	Register out of order 3		8 Dirty steps and platform	
	Calling fares please 4		9 Ventilators	
	Registers reading wrong 5		10 Stoves	
	Failing to turn register 6		11 Failing to get witnesses	
	Correct		Correct	

Inspector

PUBLIC-BE-PLEASED POLICY IN PRACTICE—TWO FORM BLANKS USED ON THE NEW YORK STATE RAILWAYS

In the discipline of new men, unless an act is of a distinctly wilful nature, no demerits are applied. E. E. Strong, superintendent of city lines, who developed this system, has stated that he has found that most men entering the employ of a railroad company are inexperienced in dealing with the public. As a result they are apt to be hasty in act or in speech and to have altercations with their passengers. Nothing is gained by immediately dismissing such a man from the service, as the chances are that another man employed in his stead would be equally liable to commit the offence, so that it is considered much better to keep the first man, providing that under proper training he can be taught to govern himself, thus assisting the company to secure proper relations between itself and its patrons. From the beginning every trainman should be given to under-

stand that while on duty no act of his will be considered as an individual act but as an act of the company. He should fully realize that he is a representative of the company, so designated by his uniform and badge, and that he is authorized to do business for the company he represents. If these men can be brought to realize the bigness of the work they are performing and how much depends upon their treatment of the public they will, by virtue of the consciousness of responsibility, do far better work than if they believed themselves to be mere machines. The company finds that recognition of meritorious acts never "spoils" the recipients and no difficulty is experienced in having men apply for credits.

In the case of men who have been in the service for some time and who are assumed on account of their long service to be able to avoid entering into controversies with passengers, discipline is invariably applied when disputes involving insolence occur. Twenty demerits are given in cases of insolence that may be classed as serious, a net total of sixty demerits being required for dismissal. The use of such expressions as "step lively" are, however, not considered as objectionable conduct.

During the first six months of a man's service he reports to the superintendent of the instruction department and is not disciplined by the superintendent of transportation. There are traveling uniformed instructors whose duties are to follow up new men on the road and to correct any wrong tendencies. Each instructor carries printed lists of the more usual failures on the part of the men, and failures are checked off on these. The company reserves the right under the merit and demerit system to dismiss a man for general lack of ability at any time during his first six months of service, or for failure to respond to instructions. All employees are advised regarding their balance of credits and demerits at six-month intervals, and they are notified every time when their credits or demerits are entered on their records to provide opportunity for an appeal when the employee desires this.

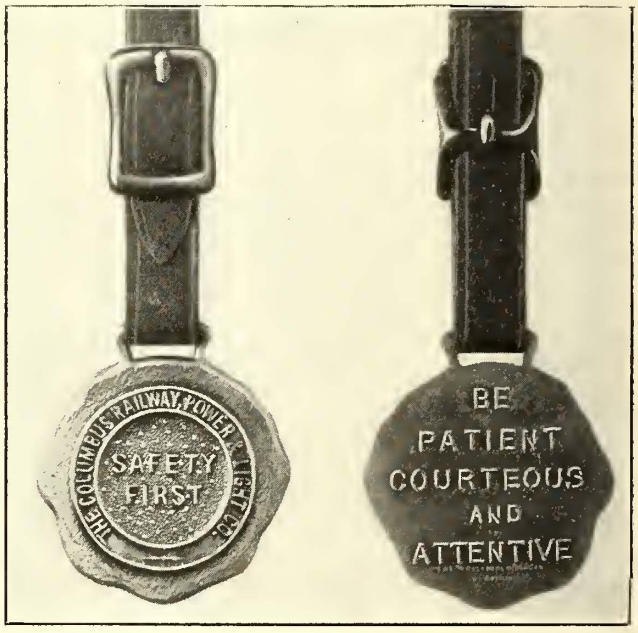
In cases where it is found that a trainman has been nagged by a passenger to such a point as to make a retort only natural, the matter of discipline is left to the disinterested judgment of the head of the service improvement department. In cases where the complainant demands discipline for an employee when the company believes it is not deserved, the service improvement department settles the matter by personal calls or by having a meeting between the employee and the complainant.

COURTESY CARDS

To improve the department of platform men several lines have made use of the so-called "courtesy card" with considerable success. The Twin City Rapid Transit Company has posted in all stations, clubrooms and other places where employees gather, a placard calling attention to the necessity of a courteous and cheerful attitude toward the public, especially with regard to the answering of questions by the passengers. The Federal Light & Traction Company has followed the same plan for all of its properties, a reproduction of its courtesy card having been shown in a recent issue. This is reported to have produced excellent results largely through showing the public that the company was anxious that its employees should accord every courtesy to its patrons. As a matter of fact the public press of every town in which this operating company has a property gave space to a notice regarding the use of the card. One of the editorial comments made at the time of the production of this card emphasized the fact that the company, by endeavoring to obtain courteous treatment of the traveling public, conferred a benefit on the town because visitors would be favorably impressed with the actions of the street railway employees.

COURTESY WATCH FOBS IN COLUMBUS

In Columbus a regular campaign was begun about a year ago. Prior to the inauguration of this campaign it had always been the policy of the company to take every precaution possible in the selection of its platform men, and upon their entering the service an endeavor was made to develop in them a proper sense of the attitude which should be taken toward the patrons of the company. This policy was so continuously followed up that it resulted in the general comment from the traveling public to the effect that the platform men of Columbus were exceptionally courteous. In the early part of 1913, however, with a view still further to improve the general attitude of the platform men toward the public a vigorous "courtesy campaign" was instituted as a part of the "safety first" movement. As a first step in this campaign, pamphlets on the subject of courtesy were distributed to all the employees by



PUBLIC-BE-PLEASED POLICY IN PRACTICE—WATCH FOB DISTRIBUTED TO COLUMBUS EMPLOYEES

S. G. McMeen, president Columbus Railway & Light Company. Each employee was also presented with a bronze watch fob with a leather strap, as shown in the accompanying illustration. The distribution of these pamphlets and fobs is continuous, and all of the new employees entering the service since the campaign was inaugurated receive them.

Another part of the campaign consists in weekly meetings between the operating officials and the traffic inspectors and transportation foremen. At these the superintendent of transportation, the claim agent and the general superintendent take part in the discussions which cover the company's policy of "Safety first and service next," which the management is perpetually endeavoring to instill in the minds of its employees.

It is stated by Harold W. Clapp, general superintendent Columbus Railway & Light Company, that the campaign has produced a distinct improvement in conditions in the territory involved. This is noticed in the daily course of routine business by the operating officials of the company. In fact, the civility of the platform men receives very favorable comment from time to time by

the traveling public as well as by the daily press of the city.

COURTESY BULLETINS

Several railways are making use of employees' bulletins for the same purpose. In May, 1914, the New York Railways Company began to issue a bulletin for distribution among its 8000 employees. This is similar in character to the *Interborough Bulletin*, which has been published for some years for the benefit of the employees of the subway and elevated lines of New York. A feature on both the bulletins is a page, "Pleasing the Public," in which are entered such matters as letters from patrons praising the action of the Interborough employees, acknowledging the receipt of lost articles and the like. Where a correspondent does not know the name of the employee about whom he writes, the man in question is traced and his name published in a note beneath the letter.

The Texas Traction Company has issued to trainmen a pamphlet containing numerous epigrammatic clauses pointing out the desirability of maintaining at all times cordial relations with the public. In the Memphis Street Railway the opportunity provided by the "safety first" organization has been used to advance the principles of courteous treatment of the public. This is accomplished by addresses from officials before the large safety committee that is formed among the employees. The Detroit United Railway distributes a pamphlet entitled "Courtesy" among the men, and also utilizes the columns of a trainman's magazine for the same purpose.

The United Railways Company of Baltimore depends largely upon the selection and training of its employees to attain the same result. To quote William A. House, president: "In the selection and training of motormen and conductors the method pursued by this company is thorough, and has for its object the highest possible standard of efficiency. Applicants are required to present a letter in their own handwriting, together with two letters of endorsement, one of which must be from the last employer. Accepted applicants, after a course of instruction and prior to being regularly assigned, are given a lecture by the superintendent on the rules, regulations and requirements with respect to deportment. Great care is taken to impress upon applicants the responsibility of their position, and they are informed that the wearing of a uniform stamps them as the duly accredited representative of the company who comes in direct contact with the public, and that, as such representative, they are expected to treat patrons with unfailing courtesy under all conditions. It is pointed out to them that proper deportment and consideration for the rights of passengers will in the majority of cases tend to make one who is disposed to be antagonistic to the company change his attitude, and, in the course of time, become one of its warmest friends."

COMPLAINT BUREAUS

The formal organization of a distinct bureau for receiving and investigating complaints is another matter of direct interest to the public of which the importance seems to be by no means generally recognized. In Rochester, however, such a bureau has been organized and has given remarkable satisfaction. This is called the service improvement department, already mentioned, and to it is assigned all the work of handling complaints, returning excess fares, settling transfer disputes, talking with vehicle owners about delays due to trucks on the company's tracks and similar matters. One of its cardinal principles is that no complaint must ever be dropped until it is either settled satisfactorily or else has reached an impasse. All complaints are immediately acknowledged and an investigation is started in the department involved. At the close of the investigation a personal call is made upon the complainant and the situation is explained to him with perfect frankness, no attempt being made to settle the matter by letters, as these are always open to misconstruction. Chronic kickers are followed with perfect patience and their complaints, under this gentle treatment, are reported to have become greatly reduced in number.

The service improvement department was first established by E. J. Cook, vice-president New York State Railways, on Feb. 1, 1911, as a complaint department, and the work was handled by the chief clerk to the vice-president. After Oct. 1, 1911, the work was handled in conjunction with that of the claim department on account of the many complaints which developed into claims. In August, 1912, the name was changed to "service improvement department" but the work was still handled in conjunction with that of the claim department. On April 1, 1913, the organization became a separate department, whose head was placed in charge also of the land and tax, insurance and special service departments.

ORGANIZATION OF SERVICE IMPROVEMENT DEPARTMENT IN ROCHESTER

The department consists of the head of department who devotes part of his time to the work, a stenographer and two outside men who call upon patrons, either for the purpose of receiving complaints or for satisfying complainants after investigation. The outside men also interview any witnesses furnished by the patrons or employees against whom complaint is made. Employees are encouraged in case of any controversy on a car to secure the names of witnesses to protect themselves just as they would do in case of accidents.

Complaints or suggestions for the betterment of the service are received by letter, by telephone or by personal calls. In addition patrons may notify the telephone operator after office hours when they have complaints or suggestions to make. The telephone operator takes the name and address of the complainant, and a member of the service improvement department makes a personal call on the following day to get the details. Thus provision is made so that patrons can reach the service improvement department for twenty-four hours in the day and for 365 days in the year.

In whatever one of the above ways a complaint is made, all receive investigation as promptly as possible and patrons are notified of the outcome in a personal interview by the outside members of the department. No case is considered complete until the complainant expresses himself as being satisfied. The number of cases where this assurance is not finally received is negligible. Originally it was found that the cost of investigating complaints was from $3 to $5 each. However, some changes have been made in the method of procedure which have reduced the cost without affecting the results.

The number of cases handled has increased each year over the preceding year. The number in 1911 was 1017; in 1912, 1631; and in 1913, 1947. For the first eight months of the year 1914 the number was 1401. The steady increase can be attributed to the work of the department and the co-operation of the public in the improvement of the service. It has been noted in cases where a patron has made a complaint and has been satisfied, and then has occasion to make a second complaint, that it is made in an altogether different spirit. Moreover, the attitude of the public toward the company has become more kindly by reason of the fact that

patrons call the company's attention to little grievances immediately after their occurrence instead of allowing a number of them to accumulate in their minds, thus embittering them in their relations with the company and its employees. In other words, if grievances can be satisfied as rapidly as they occur, each one is treated more as if it were an isolated case, whereas if complaint is not made, each individual annoyance recalls all that have previously occurred.

Handling Complaints on the New York Railways

The New York Railways Company has no special department for handling complaints, but it has established, with excellent results, a very thorough system under the immediate supervision of the vice-president and general manager for the receipt and utilization of complaints or statements that may be received from patrons or from the general public. In the case of telephone communications it is the rule to request the complainant for a confirmation in writing, the obvious reason for this being that a written communication tends to establish the fact that the report is made in good faith.

In the case of oral complaints that are made by personal calls at the company's offices, the statements of the complainant are copied in typewriting. The majority of such complaints are received at the division offices of the company located in the various carhouses. Therefore, a copy of each complaint is sent immediately from the division office to the office of the vice-president and general manager. There its receipt is at once acknowledged by means of a courteous letter to the complainant. Following this an investigation is made by the transportation department and a report of the investigation, together with a statement as to the action taken by the division superintendent, is sent to the executive office. In case the circumstances warrant a statement covering the investigation and outlining the action taken by the company is sent to the complainant.

Complaints that are made by mail are acknowledged in the same way, and a copy of the complaint, together with a copy of the acknowledgement, is sent to the division office for investigation and report. From this point the procedure is the same as that outlined in the case of oral complaints. In general, it is the custom to answer all complaints over the signature of the vice-president and general manager. Every case is investigated and in many cases the complainant is advised regarding the action that is taken by the company as a result of his complaint.

The organization by which this procedure is carried on consists of a single complaint clerk who devotes his whole time to the work and who is thoroughly experienced in dealing with the public. Several transportation department employees also devote part of their time to making personal calls upon complainants when this is necessary to adjust discrepancies that sometimes exist between the testimony of the complainant and that of the employees involved. In addition to the above, one of the assistants in the office of the vice-president and general manager devotes a large part of his time to this work.

All complaints are received at the general office by the complaint clerk, whether they come in the form of a letter or as transcriptions of statements made at division offices, and he writes the letters of acknowledgment. Each of these letters is passed to the assistant above mentioned, for check and criticism. When a report of the investigation is received it is handled in the same manner, the complaint clerk preparing statements regarding the action taken, if such a course seems necessary.

Each month all of the complaints received on each division are tabulated and thus a competitive system is set up between the various divisions. In these tabulations the complaints are classified under a series of headings such as "insolence," "short change," "transfer dispute," "erroneous information," "neglect of duty," "premature starting," etc., and the result of the investigation is given. For the month of October, for example, there were about 200 complaints received on the whole system; in approximately 42 per cent of these cases the employee was found to be at fault and was disciplined; in about 27 per cent of the cases the employee was found not to be at fault, and in the remaining cases the information which was furnished by the complainant was not sufficiently definite to determine the identity of the employee or whether or not he was at fault. A notation of the facts in each case is entered in the record of the employee involved and this record constitutes an important bearing on the continuance of his employment. Commendations as well as criticisms are invariably entered. During October, 1914, it should be stated that 33,950,000 passengers were carried, including transfer riders.

Another angle of this work covers the matter of fare box and transfer disputes. If a passenger inadvertently drops more money in the fare box than is required by the number of fares which he wishes to pay, the conductor makes out a card with the passenger's name and address and the amount involved, as the conductor is not authorized to make refunds, for obvious reasons. A report with the card attached is turned in to the receiver or cashier and from there sent to the division superintendent. In case the passenger is found to be entitled to a refund, a memorandum of the facts in the case is sent to the office of the vice-president and general manager and the refund, in stamps, accompanied by a letter, is sent to the person involved, the matter being handled in the same manner as previously outlined in the case of oral or written complaints. Many very commendatory letters are continually being received owing to the establishment of this system, as many patrons who receive refunds acknowledge their receipt. About four hundred such cases are handled each month.

In cases where passengers inadvertently place cash fare in the fare box, and subsequently tender valid transfers the same procedure is followed. A card with the passenger's name and address and a statement of the circumstances is sent, through the cashier to the division superintendent for investigation and then sent to the office of the vice-president and general manager. In general, in transfer disputes, the practice is followed of making a refund on a transfer whenever there is reasonably good evidence that the passenger is acting in good faith.

A typical letter from the company in regard to a refund is as follows: "Under recent date a conductor of the Broadway line of this company reported that you boarded his car and by mistake deposited 10 cents in the fare box in payment of your fare. I take pleasure in returning to you herewith, in the form of stamps, the equivalent of the excess amount which you paid." To this letter the following acknowledgment was received: "Gentlemen: Your letter received with the enclosure of 5 cents ($0.05) for excess fare dropped in the slot of a Broadway car. I take this opportunity to thank you for the same and to express my admiration for your system. While I am expressing these thoughts I am spending 2 cents ($0.02) out of my 5 cents ($0.05)."

Another reply to a similar letter said: "Yours of the 29th instant containing 10 cents refund has been received, for which please accept my thanks. It was

a mistake on my part in depositing 25 cents in change for three persons, but your conductor was very gentlemanly about it and insisted upon my giving him my name and address, which I did. It only shows that your company is conducted under good business principles in taking note of so small a matter as this. Hoping the next time I visit New York I shall not put you to this trouble again, I remain, etc." A refund to a resident of Cincinnati brought the following: "Gentlemen: I wish to thank you for the promptness of your remittance and would say also that I don't think the matter could have been taken care of as quickly without my writing you and explaining the circumstances in any other city but New York. Thanking you, I remain, etc." Still another acknowledgment said: "Permit me to thank you for the return of excess fare paid on the Sixth Avenue line and contained in your letter of June 30, and permit me also to congratulate you on the civility of your conductor and the efficiency of your organization shown by such prompt attention to a small detail. I, for one, appreciate the service given to the public by the surface lines and I am glad to have this opportunity of saying so."

The following statement also is enlightening: "Accept my sincere thanks for the efficient system which permits of the return of money which may be dropped into the box of your pay-as-you-enter cars by mistake. I may add here that I did not think at the time that the conductor had told me that my money would be returned to me that he was telling the truth, but I gladly apologize. Again thanking you, I am, etc."

A third section of the work of handling complaints on the New York Railways is that involved in cases of collisions with vehicles. Of course, when such collisions are serious in character the whole matter is referred to the claim department, but where the damage to equipment amounts to not more than a few dollars, a letter is written to the owner of the vehicle giving details of the collision and stating the number of the automobile or wagon that caused the accident. The object of sending these letters is to acquaint the owner of the vehicle with the actual conditions even though no claim for damages is made, because in this way it is believed that careless drivers can be located and eventually eliminated. The following letters taken at random from the correspondence indicate how this practice is working out:

"In reply to your letter of Oct. 29 regarding the careless driving of one of our drivers named ———, we beg to say, that, as it costs us hundreds of dollars yearly to settle claims arising from the carelessness of our employees, you can readily see we are very grateful to receive the result of your investigation. Thanking you for calling our attention to this matter, we are, etc."

"Accept my thanks for your courteous note of Nov. 20. Since I do not employ a chauffeur I suspect that my car was taken out of the garage on the occasion in question without my sanction, and in order to investigate this I would be glad to have a statement of the time of day at which the accident occurred, and whether there was any injury to my car during the occurrence. I found one of the fenders severely damaged at about that time, though I am not sure of the date, and was told that it had happened in the garage. If you can supply me with these further details you would aid me very much in running the matter down. Thanking you, I am, etc."

In another recent case a wagon driver called at the railway company's office and stated that upon receipt of the company's letter regarding a collision between his wagon and a car his employer had reprimanded him severely for his carelessness, had handed to him a set of traffic rules to study, and had instructed him to call upon the vice-president of the railway company and offer to pay for the damage done to the car. The driver stated that his earnings were not large and that he hoped the company would not be too severe with him. He admitted his responsibility for the accident and said that, although he had been driving for his present employer three years, this was his first collision. He was told that the company did not want to inflict any hardship on him and would not require him to pay for the damage done. He departed stating that in the future he would take no chances with street cars and expressed his gratitude for the consideration shown him, adding that hereafter the company would have no cause for complaint regarding him.

In cases such as these, whenever further information is requested, it is the policy of the company to furnish the facts. As a rule it has been found that the owners of the vehicles involved are glad to have these matters brought to their attention. They realize that it is to their advantage, as well as to the advantage of the general public and the street car company that occurrences of this character should be promptly investigated, in order to eliminate as far as possible the careless operation of vehicles in the streets of New York. Obviously all of this correspondence entails considerable work, but the results have been gratifying and tend to create a favorable sentiment toward the company on the part of the public.

PROCEDURE IN DENVER

Complainants are treated by the Denver Tramway Company on the assumption that they are always right, which, as a matter of fact, is correct from their point of view, otherwise the efforts extended by them in making reports would not have been exerted.

Grievances received by mail are sent at once to the various divisions for thorough investigation, while those registered in person or by telephone are taken down verbatim, typewritten and treated in the same manner. After each investigation has been completed, complainant is advised by mail as to the results obtained. In cases where trainmen are found in the right, the complainant is so advised in the most courteous and inoffensive terms at the company's command, thereby giving assurance that the investigation is at all times very thorough. Such methods are adopted in order to discourage exaggerated or false statements. Where fault is attributed to the actions of trainman, a letter of regret is forwarded to the complainant with an assurance that the matter has been effectively taken up with the offending employee.

In cases embodying charges of a serious nature, the names of witnesses are required from trainmen. The importance of this procedure is so well known throughout the entire system that such names are invariably procured at the time difficulties of this type occur. These are promptly forwarded to headquarters, together with the reports of trainmen. Written statements are then requested from such witnesses, in order that the company may have, along with the assertions of complainant and employee, the additional information available from disinterested parties.

All complaints are noted upon the records of employees, with added statements covering the result of each investigation. Every trainman is aware of the inadvisability of having very many such notations upon his record. Even though in all cases he might have acted within his rights, it is assumed that his manner and bearing must have been offensive to some extent if complaint is inspired against him. Such notations carry considerable weight in determining a man's fitness to deal with the company's patrons, since courtesy

toward and accommodation of passengers are considered two very important features of up-to-date operation. W. M. Casey, superintendent of transportation Denver Tramways Company, states that this system has brought about a very marked decrease in the number of complaints received by the company.

Procedure in Brooklyn

The Brooklyn Rapid Transit Company maintains a special department to deal with the general matter of complaints. This department, which is in charge of one of the executive officers of the company, handles all work of this class and it is so well known that about 95 per cent of all communications from the traveling public are addressed direct to it. All complaints are acknowledged by the vice-president in charge of the department, the reply being made sometimes at once and sometimes after an investigation, according to the nature of the complaint. In serious cases both an acknowledgment and a second letter are written, the latter giving in brief the outcome of the investigation. All complaints are handled by clerks, but all letters addressed to patrons are read and signed personally by the vice-president.

Investigations are made by the several departments, the department of complaints requesting them where necessary. Personal calls upon complainants are, however, made in certain cases by the complaint clerk, who is thoroughly informed as to details of the service on all lines of the system. These personal calls are considered to be of great value in cases where the complainant feels so much aggrieved as to extend the correspondence unduly.

All commendations as well as complaints about any employee are filed with his record. In cases where an employee is reprimanded, a standard form is made out and signed by the employee as evidence of his having read it. In cases where an employee is commended he is also advised of this fact by having the letter of commendation handed to him to read before it is filed with his record.

Transfer disputes and cases of overpayment of fare are also handled by this department, refunds being made by sending 5-cent tickets good for a ride on any of the company's elevated or surface lines. In all such cases the passenger is given the benefit of any doubt, but as a matter of principle refunds are not made upon a mere complaint but only after investigation has established a strong probability that the complainant is entitled to a refund.

Personal Discussions Encouraged in Boston

The Boston Elevated Railway receives about 250 complaints per month at its general offices, either by mail or personal calls. The former are promptly acknowledged by letters written either from the office of the superintendent of surface lines or by the division superintendent in whose territory the occurrence at issue happened. In case the complainant is found to be considerably exercised he is given full opportunity to discuss his views in person with the superintendent of surface lines, his assistant, or the division superintendent concerned. All complaints are consecutively numbered, and are indexed on cards, which furnish a means of making monthly comparisons of troubles, localities concerned, etc. Complaints received at the main office are forwarded to the division superintendent for investigation and report, followed by a review of the case by the superintendent of surface lines. If the affair is complicated it is usually brought before the company's discipline committee for consideration and action. This committee consists of four operating officials who meet daily at the headquarters of the company. If it is necessary to bring the employee and the complainant together to clear up the case, the committee frequently endeavors to do this. Anonymous complaints are considered by the company, but these do not furnish as satisfactory a basis for action as those which are signed.

Plan Followed by the Hudson & Manhattan Railroad

On the Hudson & Manhattan Railroad complaints are very few in number, and these are handled personally by the president of the company. About fifty complaints are received during the course of the year, and of these about 10 per cent relate to details of the service, the balance being aimed against employees. The sources of most of the latter are failures of car doors to open and the calling back of passengers by ticket choppers at the platform entrances. About half of these complaints are found to be without justification.

Upon receipt of a complaint it is at once acknowledged, and if opportunity exists a full explanation is made to the complainant. Often where employees are involved an extended investigation may have to be made, and in such cases the acknowledgment states only that fact. Investigations of complaints are made by the head of the department—equipment or operating—that is involved, and if necessary an investigator is sent to talk to the complainant. The complainant, however, is not advised regarding the final action of the company. Complaints about the service are discussed with the superintendent of transportation, and if they contain practical suggestions for the benefit of the service these are at once tried out. Complaints about any employee in the transportation or station department are noted on his record, and when the nature of the offense warrants strong corrective measures, demerits in accordance with a system which is based on the Brown system of discipline are entered in addition.

Card Form for Utica Complainants

In connection with fare and transfer disputes on the Utica lines of the New York State Railways, a novel procedure is followed. The conductors are furnished with three small blank books containing slips which can be torn out and handed to the complaining patron. Two of these provide for overpayments of fare and for other classes of complaints. The third slip provides for statements of conductors who are involved in disputes. This system was adopted about five years ago and was reported at that time to have been most favorably received by the public. The records of the company showed that more than 50 per cent of the slips issued by conductors were never returned, indicating that the complainants in half the cases concluded after thinking them over that their complaints were unjustified. At the present time the use of these blanks has diminished very considerably, as the public has become thoroughly acquainted with the local conditions and therefore the number of fare and transfer disputes and other causes of difficulty has been materially reduced.

Practice in Chicago

No regular complaint bureau is maintained on the Chicago Surface Lines. All complainants, however, are advised by a notice to the public that is posted in the cars to file any complaints about the service with L. A. Busby, president of the company. Mr. Busby has an assistant secretary who receives and classifies all complaints of this kind, devoting his entire time to the work. When the complaint is of a serious nature it is referred to Mr. Busby personally, and he writes a personal letter to the complainant. If the complaint is of such a nature as to require investigation it is referred to the department that is affected for a report to the

president. The company makes it a rule to write a courteous acknowledgment for every written complaint, but in no case is the complainant advised as to the nature of the action that is taken by the company after its investigation. The employee regarding whom the complaint is made is never informed as to the source of the complaint. Acknowledgments are generally made after the investigation has been concluded, and if the company or employee was found to be at fault a plain statement to this effect is included, as well as one to the effect that proper steps will be taken to prevent repetition of the occurrence.

On the Detroit United Railway the complaint bureau is included in the publicity department, and one man devotes practically his entire time to the work of receiving, acknowledging and answering complaints, of which about 250 are made each month. The practice of the company is to investigate practically all complaints and to advise the complainant of the results of the investigation.

PERIODICAL TRAFFIC COUNTS

Naturally, many complaints received by street railways deal with matters pertaining to sufficiency of service, and the use of frequent traffic counts has been introduced by several roads with a view to providing definite answers for them.

In the development of such a system, in which the results are generally expressed by means of curves, it has been advocated by C. M. Larson of the Wisconsin Railroad Commission that a characteristic curve for each line of any system should be obtained by counting the passengers on each car as it passes each one of a series of observation points. This scheme locates the point of maximum load for each line, and as this point is usually approximately stationary it is sufficient for all future counts to have two checkers stationed at it to count the passengers on all the cars as they pass. From the results thus obtained a traffic curve may be developed for each route in which each car is indicated by a vertical line located according to its time of arrival at the point of maximum load, the length of the line being proportionate to the number of passengers on the car. By averaging results on a half-hourly basis for several days and by plotting also the number of seats provided in which curve should be considered the voluntary standees, the relation of the traffic to the service may be accurately demonstrated in graphical form and a means is given for knowing at all times how to regulate the service to the needs of the public.

A different scheme is used in Pittsburgh, where a traffic bureau employing eight investigators has been permanently organized, the investigators devoting their entire time to the work of making traffic counts. Here the characteristic curve for each line is obtained by having observers ride separate cars during the rush hour, the average of the several observations being considered to give the average results for the line in question. From these characteristic curves half-hourly load curves are plotted, as outlined in the previously mentioned scheme, but in addition combined characteristic curves are made up for lines in which several routes converge in order to show the points at which the total load is discharged from all the cars during a given rush-hour period. In Pittsburgh there has also been introduced the so called time-load curve which shows the position of each car with regard to the schedule as well as its load, thus indicating any tendencies toward the bunching of cars.

In Boston also there is maintained a permanent traffic bureau, although its methods differ somewhat from the foregoing. The traffic counts are supplemented by tabulations of conductors, trip reports and by reports from street inspectors, although the latter, of course, are of only indefinite value as they are based on personal opinion only. Temporary changes in accordance with the varying needs of the traffic are provided for by information from the street inspectors, but permanent changes which are imbodied in the time-tables are made only upon the results of regular traffic investigations. These are made by traffic counts taken at seventy-six points on the 472 miles of track that is operated by the Boston Elevated Railway. A schedule of dates upon which traffic counts are to be made is drawn up for each division, every point being checked at approximately fifteen-day intervals. Thus, about five points are checked each day. The observers at the checking points report, for each car that passes them, the car number, the time of arrival and the number of passengers. The latter figures are totaled and averaged every half hour, and from these figures the service is regulated directly without the use of traffic curves. The method of utilizing these traffic counts was described in a contributed article in the last issue.

In Kansas City the railway has introduced the novel scheme of having all attaches of the general offices make out statements regarding the traffic as they travel to and from work on the company's cars. These statements are made out on cards which are provided with spaces to show route, car number, direction, the points where the employee boards and alights from the car, the number of passengers on the car and such additional remarks as the employee considers of sufficient importance.

PUBLIC REFERENDUMS

The public referendum or popular vote constitutes indirectly a method of handling complaints en masse that seems to have been treated rather gingerly thus far by the electric railway industry as a whole. Apparently, referendums have been held in only four cities, but of these Brooklyn has had two, one relating to the near-side stop and the other to a proposed new route.

In both of the Brooklyn referendums ballots 5 in. x 3 in. in size, which provided space for the name and address of the voter as well as his decision as to the matter at issue, were distributed by all conductors. Voting was carried on for two days in the first referendum, but only for one day in the second one. Ballots were collected by conductors, inspectors or ticket agents, or received by mail at the general offices of the company. The ballots called for the name and address of the voter, and all those which were not signed were rejected in the count. The public was prepared for the vote by advertisements in the daily papers setting forth the details of the proposal, as well as by posters which were located conspicuously in the cars. Both of these referendums are considered to have expressed definitely the wishes of the majority of riders, the result of the vote on the near-side stop constituting, in all probability, the main reason for the recent adoption of this scheme in Greater New York. It should be said that the total count of the vote was equal to 11 per cent of the total traffic for one day, or say 22 per cent of the total number of one-way riders. Duplication of votes was probably eliminated largely by the signature and address required on each ballot.

The popular vote conducted in Kansas City, Mo., was on the question of smoking on the cars. This matter

had been agitated for some time prior to June, 1912, and in view of this fact the company conducted a referendum for a whole week, passengers receiving ballots upon payment of fare. These ballots contained the printed words "yes" or "no," and one of these was marked by each voter and the ballot deposited in boxes, which were located one at the exit and the other at the entrance of the car. The interest with which the referendum was received was indicated by the fact that more than 1,500,000 votes were received during the week. This constituted more than 60 per cent of the riders during that period. About 60 per cent of the voters were against the permission of smoking on cars, and as a result of the referendum the City Council repealed the existing ordinance that covered the matter. Notwithstanding considerable opposition, which was reported to be encouraged by the manufacturers and dealers in tobacco, the "no smoking" rule was maintained and is now in force. It is generally considered that the referendum demonstrated accurately the wishes of the public, the cost of conducting the referendum involving an expenditure on the part of the company of about $3,000.

A popular referendum was held in Denver on the question of maintaining the skip-stop on one of the railway companies' lines. This was conducted by means of return postcards which were mailed to some 9600 householders who used the routes in question. Of these about 5600 replied within a short period, the vote on a percentage basis showing 30 per cent against the skip-stop and 70 per cent in favor of it. The final action of the company on the question was, however, complicated by premature action of the local government, although since that time the skip-stop has been introduced on other of the company's lines.

In Boston a referendum was held regarding the relative desirability of two proposed locations for an easterly terminal for a new subway. Notices outlining the various points in favor of each station were posted on all in-bound cars on the routes having passengers who would be affected by the station location, and upon the arrival of the cars at the downtown district they were boarded by uniformed employees who distributed printed ballots indicating a choice of route. The ballot was perforated across the middle so that either half could be used and the other half destroyed. Upon the arrival of the cars at the terminals ballot collectors in uniform on the platforms and stairways gathered the slips from alighting passengers.

The balloting was continued for three days, about 69,000 votes being cast during that time. Unfortunately, the opinion of the voters was almost evenly divided, and the result was considered indecisive. The company's officials were of the opinion that the opportunity for repeating votes that was afforded by limiting, necessarily, the balloting to the business district rendered such a referendum less useful than it would have been in a residential section. In its decision the local railway commission recommended the temporary use of a location, subject to the final action of the State Legislature.

HANDLING LOST ARTICLES

The return of articles left by passengers on cars is, naturally, a matter of direct interest to the patrons of an electric railway. A number of surface lines have established organizations to take care of the matter, but the system in use on the New York Railways is especially notable because of its extreme simplicity. Under it, lost articles are turned over at the end of the trip on which they are found to the receiver, or cashier, at the depot that serves the line. The receiver then makes out a lost property coupon in triplicate, upon which is given the date, the line, the time of finding the article, the number and direction of the car in which it was found, the name of the employee who turns it in and a description of the article in question. These coupons are made up in book form and are consecutively numbered. The original and the duplicate are torn out of the book and sent with the article by the depot messenger or wagon, on the morning following the receipt of the lost article, to the lost property room. This is located at a central point on the system. Upon receipt at the lost property room the original of the coupon is retained with the lost article and the duplicate coupon is receipted by the lost property clerk and sent back to the depot where the article was first turned in.

As soon as any lost property is received a search is made for any clew as to the ownership and if this is found the addressee is asked to call at the lost property room and identify the article, the request being made in printed form on the back of a postcard. When claimants call at the lost property room they are required to give all information that is written on the coupon which is attached to the lost article. If this identification is satisfactorily given the claimant signs the coupon as a receipt and is given the article to which it is attached. All communications regarding lost property are answered immediately, and if full descriptions of lost articles are given by mail by claimants who live out of town the articles are forwarded in any way that the owner may desire. In the case of New York residents, however, a personal call is required.

All lost property is retained for a period of six months, after which it is sold in semi-annual allotments and the proceeds are applied to the employees' benefit association, this procedure being in accordance with the Railroad Law of the State of New York. The number of lost articles turned in daily for all lines of the New York Railways varies between twenty-five and 100, and approximately 75 per cent of the material that is received by the lost property department is called for within three months after its receipt. All the material held for the first three months is kept in a single room, approximately 30 ft. x 100 ft. in size, which is equipped with shelves and cupboards upon which the property is stored. The articles are classified according to the lines on which they are found. The lost property room is in charge of a single clerk, who maintains a register in which is entered a record of every lost article turned in. In this is reported the date upon which the article was found, the line upon which it was found, a brief description, the date upon which it was received, the date upon which it was turned over to a claimant, the name and address of the claimant and place for remarks regarding the transaction.

In some cases rewards are left by claimants and these are recorded in a separate book showing the date when the reward was offered and its amount, together with the coupon number of the lost article, the badge number and the name of conductor finding the article, the date when the reward was turned over to the conductor and the signature of the conductor receipting for the reward. In case rewards are given numbered letters are sent to the superintendent of transportation asking to have the conductor call for the reward. About one article in each forty or fifty involves a reward for the conductor finding it, the majority of lost articles being of little value. Roughly speaking, about 25 per cent of all claimants at the lost property room are able to get their property back. However, if umbrellas are excluded from consideration, the ratio runs to about 50 per cent.

SCHEDULE SPEED IN CITY SERVICE

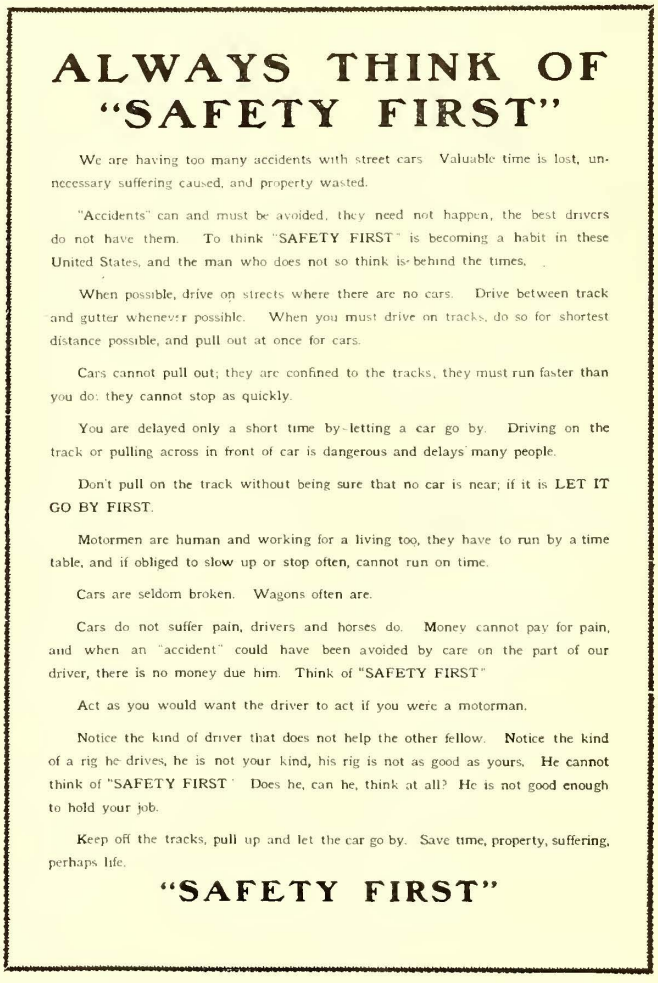
Of all details of operation affecting the public directly it is probable that schedule speed is the one that receives least attention from passengers. However, the value of the time that may be saved by high speed has been estimated at an average figure of 15 cents per hour per passenger, and, on this basis, the recently planned rapid transit scheme in Philadelphia was calculated to have a capitalized value, to the population of the districts affected, of $25,000,000. From the standpoint of the railway companies the importance of high schedule speed is generally given more attention, as fixed charges on rolling stock and cost of platform labor are reduced almost in exact proportion to the rapidity with which the cars are moved, or, in other words, to the number of revenue-miles that are obtained daily from each car.

An interesting case in connection with schedule speed occurred a year ago in Cleveland, where it was found, through an effort by the platform men to have the schedule rearranged, that the speed ordinance in the city had been repealed. The ordinance, which had limited the running speed to 10 m.p.h. in the business district and to 15 m.p.h. in the residence district, had permitted claimants in damage suits to allege that cars were exceeding the speed limit as a basis for an unwarranted action. For this reason, the repeal of the ordinance was accomplished, and for the last year Cleveland cars have been operated without a speed limit, the average non-rush hour schedule speed having reached the high figure of 10.51 m.p.h.

The most prolific cause of reduced schedule speed is generally admitted to be the delays due to vehicular traffic. Various schemes have been tried to overcome this. At the present time the Chicago surface lines are endeavoring to have the local City Council pass an ordinance making it an offense subject to fine for vehicles to occupy the street railway right-of-way during the rush-hour periods. It has even been suggested in connection with this movement that vehicular traffic should be kept altogether from the congested loop district during the rush hours, the term vehicular traffic meaning teams and trucks that transport package freight and similar material. In Chicago all movements of this character must originate with the local transportation committee of the City Council and then, to be effective, must take the form of an ordinance. The company's campaign to educate drivers of commercial vehicles to keep off the surface railway tracks is, therefore, confined to getting such an ordinance passed. However, in the past the police department has afforded considerable assistance to the street railway companies in keeping trucks from occupying the tracks unnecessarily, and in a large number of instances arrests have been made on the charge of obstructing traffic. Since that time teamsters have heeded the sound of the gong more rapidly, to the advantage of the patrons of the railway.

The Public Service Railway of New Jersey has organized a campaign with the same end in view as a part of its "safety first" movement. Placards requesting co-operation on the part of teamsters were submitted at personal interviews and then furnished free of charge to all owners of trucks in the cities through which the company's lines extend. After the cards had been posted the effort was followed up with talks before the truck drivers' social organizations and before meetings of the teamsters' unions. In addresses direct to the teamsters, generally, the attitude of the hearers was at first derisive, but later, when the object of the talk was fully disclosed, this changed completely. In the use of the pamphlet and in the talks, which are made by A. J. Van Brunt, director safety education Public Service Railway, the idea is to avoid exerting any actual pressure upon the teamsters but to appeal to them to recognize the matter as being of mutual benefit to themselves, to the motormen and to the passengers in the cars. On the posted placard no mention is made of the Public Service Railway, the card bearing only the signature of the owner of the stable or garage in which it is posted. Excellent results in regard to reduction of vehicular delays are reported from the campaign, a noticeable decrease having occurred during the year that the plan has been in operation.

The Northern Ohio Traction & Light Company about eighteen months ago sent out letters asking for the co-operation on the part of truck drivers in keeping the tracks clear. These are reported to have been well received and to have produced noticeably good results. The scheme has been followed up by letters sent to the actual offenders as they are found from time to time.



ALWAYS THINK OF
"SAFETY FIRST"

We are having too many accidents with street cars. Valuable time is lost, unnecessary suffering caused, and property wasted.

"Accidents" can and must be avoided, they need not happen, the best drivers do not have them. To think "SAFETY FIRST" is becoming a habit in these United States, and the man who does not so think is behind the times.

When possible, drive on streets where there are no cars. Drive between track and gutter whenever possible. When you must drive on tracks, do so for shortest distance possible, and pull out at once for cars.

Cars cannot pull out; they are confined to the tracks, they must run faster than you do; they cannot stop as quickly.

You are delayed only a short time by letting a car go by. Driving on the track or pulling across in front of car is dangerous and delays many people.

Don't pull on the track without being sure that no car is near; if it is LET IT GO BY FIRST.

Motormen are human and working for a living too, they have to run by a time table, and if obliged to slow up or stop often, cannot run on time.

Cars are seldom broken. Wagons often are.

Cars do not suffer pain, drivers and horses do. Money cannot pay for pain, and when an "accident" could have been avoided by care on the part of our driver, there is no money due him. Think of "SAFETY FIRST"

Act as you would want the driver to act if you were a motorman.

Notice the kind of driver that does not help the other fellow. Notice the kind of a rig he drives, he is not your kind, his rig is not as good as yours. He cannot think of "SAFETY FIRST." Does he, can he, think at all? He is not good enough to hold your job.

Keep off the tracks, pull up and let the car go by. Save time, property, suffering, perhaps life.

"SAFETY FIRST"

PUBLIC-BE-PLEASED POLICY IN PRACTICE—POSTER DISTRIBUTED AMONG GARAGE OWNERS BY PUBLIC SERVICE RAILWAY

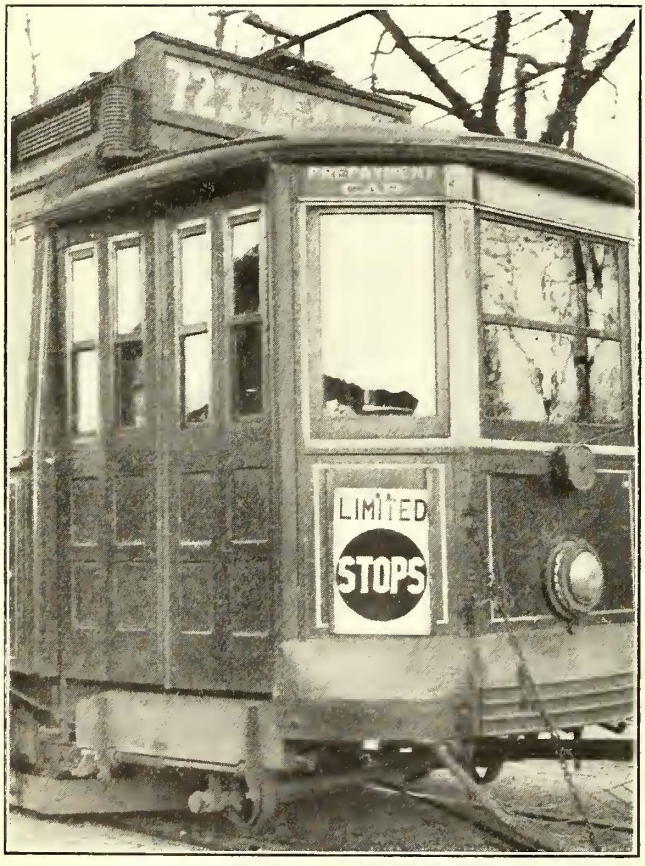
In Rochester, the New York State Railways has also made efforts along these lines, having published an advertisement in the local official trades union paper which showed, for each month of the previous year, the duration of interruption to service caused by stalled or broken-down wagons, automobiles or trucks. The advertisement appealed for co-operation on the part of teamsters, and asked them not to drive on the tracks except when absolutely necessary. The vehicular delays, it might be said, averaged lost time of six and a half hours in each month. The effect of this plan was excellent as regards the establishment of good-will between the teamsters and motormen, the latter being advised by bulletin to consider that pulling clear of the

track was an act of kindness rather than duty on the part of the teamster.

To the same end the Detroit United Traction Company takes up from time to time with the police department the question of diverting traffic from certain streets to aid in the movement of cars, and motormen are instructed to take the numbers of vehicles which cause delays. Complaints are then made to the vehicle owners, and the experience has been that they take prompt action to co-operate with the traction company.

RELIEVING TRAFFIC CONGESTION

The general question of traffic congestion is, of course, influenced to a large degree by the length of time over which the rush-hour traffic extends. This is especially noticeable in the case of lines having the traffic from large factories, but notwithstanding the



PUBLIC-BE-PLEASED POLICY IN PRACTICE—LIMITED STOP SIGN ON BOSTON CAR

attention that has been devoted to the possibility of establishing variable factory closing hours, little success has been attained in this regard. However, in Detroit a novel scheme has been introduced for reducing congestion at the plant of the Ford Motor Company, where 12,000 employees leave at the same hour. The Detroit United Railway sells seven tickets for 25 cents throughout the city of Detroit, and to avoid the necessity of making change on the cars a ticket booth has been provided within the grounds of the Ford factory near the exit, tickets being sold to the employees as they leave at noon and night. It has been found that the sales average $75 daily, the Ford Motor Company having posted notices in the plant requesting employees to purchase tickets before boarding the cars. The operating department of the traction company reports a great improvement in maintaining schedules since the introduction of this scheme, which eliminates entirely the delays that originally took place. It should be added that the Ford Motor Company releases its employees at 3 p. m., 4:30 p. m. and 11:40 p. m., the railway storing thirty-three cars for the 3 o'clock rush, and twenty-five and sixteen cars respectively for the other two. The tickets sold at the booth are not reduced in price, the sales being effected solely through the desire of the Ford company and its employees to co-operate with the railway.

Another case of great difficulty exists at the Schenectady works of the General Electric Company, which employs at the present time about 17,500 hands, including some 2500 office employees. At the main entrance to the works is located a trolley terminal, and the larger part of the traffic originates at this point, which is adjacent to a paved street having a double track. The terminal at the main entrance gate consists of a single-track loop of about 100-ft. radius where the different lines terminate, passengers being loaded and discharged around this loop, as well as on the main line during rush hours. Shunting from this loop and parallel with the main track is a 500-ft. siding where cars can be loaded or unloaded without interfering with the regular operation on the main tracks. The terminal is simply a continuation of this double track at the side of the public highway which runs adjacent to and parallel to the company's plant for about ½ mile and includes a cross-over for terminal purposes only.

Five of the eight regular scheduled lines in the city run to the main entrance of this plant on a headway of from twelve minutes to fifteen minutes. As the main entrance to this plant is only about ¼ mile distant from the principal business street of the city it serves as a sort of terminal for cars operated through the business section. In fact, all of the lines mentioned pass through the main business street of the city going to and from the General Electric plant.

About 20 per cent of the employees are classified as office help and go to work at 8 a. m., leaving between the hours of 5 p. m. and 5:15 p. m. The factory employees go to work at 7 a. m. and leave at 5:30 p. m. The headways on regular lines which run to this plant are decreased about one-half at these rush hours. About twenty extra trippers leave between 5 p. m. and 5:15 p. m., and about forty trippers immediately after 5:30 p. m. In the morning before 7 a. m. 90 per cent of all regular and extra cars are routed to this plant and from that point assume their regular schedules on the respective lines and divisions. The records of the railway company show that about 1500 of these passengers come from the neighboring cities of Albany, Troy, Ballston Spa, Saratoga and Amsterdam, and extra service is provided for their accommodation. It may seem that these track and terminal facilities are very small in proportion to the magnitude of the plant, yet James F. Hamilton, general manager Schenectady Railway Company, has stated that 50 per cent more traffic could be handled in this way without creating much delay or congestion.

One of the plans for relieving rush-hour congestion indirectly that is reported to have given successful results is the so-called M. U. F. campaign which was originated by the Cleveland *News*. This campaign was inaugurated to get passengers to move forward in the cars and thus prevent congestion at the rear entrance. The Cleveland Railway followed up the movement by posting in the cars signs reading "Please move forward." The campaign included the formation of a voluntary organization in which the members agreed to move up forward and to encourage others to do the same, badges being furnished to all members. It proved thoroughly successful and was even supported strongly by the local labor organizations. The same plan was

followed by the Pittsburgh Railways, but in this city the campaign was started by posting signs upon which were the letters "M. U. F." Considerable speculation as to the meaning of the signs was produced and this attracted a great deal of attention to them.

"Car full" signs for the purpose of preventing overcrowding of a delayed car have been tried in several cities. The Metropolitan Street Railway in New York introduced the scheme a number of years ago, and it has been left in use to a greater or lesser extent since then. The sign is displayed by the motorman upon receipt of a four-bell signal from the conductor and the car then picks up no more passengers. A similar plan was tried in Boston in March, 1913, the car full signs being carried in the vestibule and turned up so as to come into sight at the order of the traffic inspectors on the street. Cars upon which the signs were shown made no stops to receive passengers until reaching their destinations. The plan was adopted only for lines on which the headway was about two minutes or less.

FRONT-END COLLECTORS FOR CONGESTED POINTS

As an aid to the handling of rush-hour traffic front-end collectors were introduced in Kansas City some three years ago. At the present time about thirty-five of them are used regularly for the evening rush, which lasts from 3 o'clock to 6:30. They are placed at busy transfer points, at department stores, and also in the packing house district. The collectors stand on the ground opposite the front platform of each car as it comes to a stop. Each one is provided with a register carried on a cord from his shoulders and each one keeps a trip sheet exactly as do the regular conductors. In one test the loading time was found to have been reduced to 1.07 seconds per passenger, about 40 per cent of the passengers using the front door. Under similar conditions without the front-end collectors the loading time was found to be 2.23 seconds. It should be said that, while the public did not take kindly to the innovation at first, this sentiment was quickly overcome as soon as the results in faster schedule speed became apparent.

A similar scheme has just been introduced in San Francisco, where the presence of large numbers of passengers desiring to board cars at a few points in the heart of the business district complicates the handling of rush-hour traffic. Here a record of the front-end conductor's work is kept on a portable register, tickets being registered the same as cash. The trip sheet of the front-end conductor does not show the number of fares collected for any individual car, or for any particular line, but shows the collections made for the entire period. Receipts are credited to the several lines by the auditor in a proportion that is determined by a front-end conductor for each line passing the collection point for one week, after which the one conductor collects for all lines.

The front-end conductors are recruited from the various divisions and in some cases are used at terminals to the extent that they make a day's work. In other cases where used only for an hour or so morning and evening they are given any special work that may occur in the remainder of the day. They are used in place of regular men who want to get off but who do not care to lose an entire day, and consequently do the morning and evening work. In other cases regular conductors, after completing a day's work on their own runs ask to be assigned to this work during the evening.

Where front-end conductors are at work, all passengers desiring to leave the cars by the front exit are permitted to do so before intending passengers board the car. The front-exit door is of the standard small size, and, when at work, the conductor stands on the ground at its forward side collecting and issuing transfers as the intending passengers are ready to step upon the car. Where the conductor is collecting for one line only he issues the transfers at that line, but in cases where he is collecting for many lines, he issues a special conductor's transfer. The front-end conductor also assists materially in the moving of cars by signaling the motorman to proceed after having collected the fares and having seen that the rear end is clear. Sometimes the front-end conductor collects fares and issues a transfer before an approaching car has come to a stop; however, this practice has not developed to any great extent. In large crowds the conductor stations himself firmly against the car at the forward side of the exit gate so that only one passenger can pass at a time, and there has been experienced little or no difficulty in preventing people from slipping past the conductor. During periods of great congestion traffic officers are present to prevent jams and to regulate the crowd. This has been done frequently and with such success that many times the people voluntarily form a line in front of the door.

No difficulty was experienced in San Francisco in getting the public to accept the innovation. In fact, after an experiment at two or three prominent points, the people were enthusiastic in their praise and their demand for the increased convenience. The result of loading by front-end conductors is an advantage in time both to the patron and to the company; passengers are permitted to enter the front end where the car is the least crowded; the congestion on the rear end is greatly reduced, and the load is more evenly distributed throughout the entire car. In short, it fills the forward section of the car, that part which the conductor on the rear end has so much difficulty in trying to persuade passengers to occupy.

TRAILERS IN REGULAR CITY SERVICE

In many of the cities that have practically reached the physical maximum of service which can be handled owing to congestion the possibility of the use of trailers has been adopted. The important advantage is an increase in the size of the unit. The important disadvantage is the inevitable decrease in speed unless the number of stops is fixed. In 1912 a London County Council Tramway official made an investigation on the subject of trailers, finding that these were used in large numbers in all of the capitals of continental Europe with the exception of St. Petersburg, and that Brussels and Marseilles even had three-car trains. In this country, out of approximately 1300 electric railroads 130 use two-car trains either for city or interurban service. For regular city operation, however, not including special traffic to parks, ball games and the like, trailers are used in comparatively few cases. A partial list is shown below:

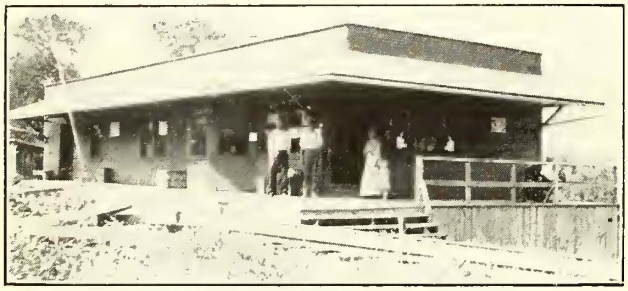
PARTIAL LIST OF CITIES REGULARLY USING TWO-CAR TRAINS

Birmingham, Ala.	Memphis, Tenn.
Boston, Mass.	Muskogee, Mich.
Charleston, N. C.	New Orleans, La.
Cleveland, Ohio.	Newark, N. J.
Cincinnati, Ohio.	Pittsburgh, Pa.
Columbus, Ohio.	Portland, Ore.
Denver, Col.	Savannah, Ga.
Des Moines, Ia.	St. Joseph, Mo.
Detroit, Mich.	St. Louis, Mo.
Fort Wayne, Ind.	Spokane, Wash.
Indianapolis, Ind.	Springfield, Mo.
Louisville, Ky.	Toledo, Ohio.
Montreal, Can.	Toronto, Can.

THE NEAR-SIDE STOP

The near-side stop, owing to the general belief in its ability to decrease delay under certain conditions, is another feature of operation that possesses mutual interest for the railways and the public. However, the railway companies in general have much less at

stake than their patrons. Except in the case of the larger cities, where traffic control is maintained, no increase in schedule speed can be effected by its introduction and its ability to reduce vehicular interference and collisions is still sometimes questioned. That it is distinctly advantageous under traffic control, however, can hardly be disputed, because of the saving in time which may be made by eliminating the double stop, one at the near side of the crossing for traffic and another at the far side for boarding and alighting passengers. For this reason, indeed, it has come into use in several of the smaller communities whose business districts suffer from badly congested traffic, and in order to avoid confusion on the part of waiting passengers its use has, in many cases, been extended to include all parts of such towns where the existence of paved streets make it no hardship to board a car at a distance from the cross-walk.



PUBLIC-BE-PLEASED POLICY IN PRACTICE—EXAMPLES OF K. C., C. C. & ST. J. STATIONS BUILT IN RETURN FOR NEWSSTAND PRIVILEGES AND PERCENTAGE OF RECEIPTS

This tendency toward the use of the near-side stop in the business districts of smaller cities is shown in the following partial list of places where it has been adopted.

Partial List of Cities with Near-Side Stop

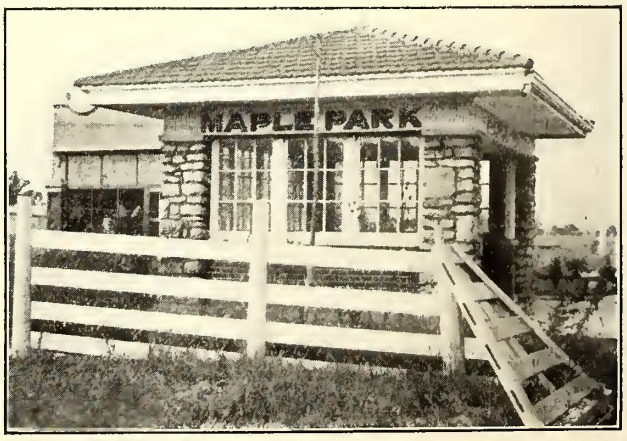
Atlanta, Ga.
Baltimore, Md.
Birmingham, Ala.
Buffalo, N. Y.
Charleroi, Pa.
Charleston, S. C.
Cincinnati, Ohio
Chattanooga, Tenn.
Chico, Cal.
Chicago, Ill.
Columbus, Ohio
Detroit, Mich.
Dubuque, Iowa
Denver, Col.
East St. Louis, Ill.
Fitchburg, Mass.
Hanover, Pa.
Jacksonville, Fla.
Indianapolis, Ind.
Kansas City, Mo.
Kewanee, Ill.
Knoxville, Tenn.
Los Angeles, Cal.
Lawrence, Kan.
Leavenworth, Kan.
Louisville, Ky.
Milwaukee, Wis.
Monterey, Cal.
Marysville, Cal.
Minneapolis, Minn.
Nashville, Tenn.
New York, N. Y.
New Orleans, La.
Norristown, Pa.
Owensboro, Ky.
Paducah, Ky.
Philadelphia, Pa.
Pine Bluff, Ark.
Pontiac, Mich.
Rochester, N. Y.
Sacramento, Cal.
Salt Lake City, Utah
San Bernardino, Cal.
San Francisco, Cal.
San Diego, Cal.
Scranton, Pa.
St. Paul, Minn.
Steubenville, Ohio
Syracuse, N. Y.
Springfield, Ohio
Tacoma, Wash.
Toledo, Ohio
Toronto, Can.
Trenton, N. J.
Vancouver, B. C.
Waco, Texas
Washington, D. C.

That the near-side stop is growing in favor is shown by the fact that more than two-thirds of the cities on record have adopted it since 1910, although the dates of introduction extend back as far as 1891, when it was reported to have been adopted in Toronto, Can. In the United States, Knoxville, Tenn., is reported to have adopted it in 1896.

In several cases the near-side stop has been tried and has failed to meet popular approval, but in others it has been tried and abolished and then introduced a second time with apparent success. This was the case in Rochester, where its temporary abolishment may be traced to the objections of individual merchants whose store locations were affected by the change. The near-side stop was reintroduced in this city at a later date owing to its time-saving features under traffic control and at the present time it is in successful operation.

In Newark, where it was abolished after a trial of less than four months, the railway company was absolutely non-partisan in the matter. The introduction was effected by city ordinance, as was also the abolishment, which was reported to be due to a few vigorous complainants who were lined up against the plan. Apparently the only case where the wishes of the majority of riders have been definitely ascertained on the question was that of the popular referendum in Brooklyn. Here the vote showed eleven to one in favor of the plan. This is undoubtedly one of the main reasons for its recent adoption in Greater New York.

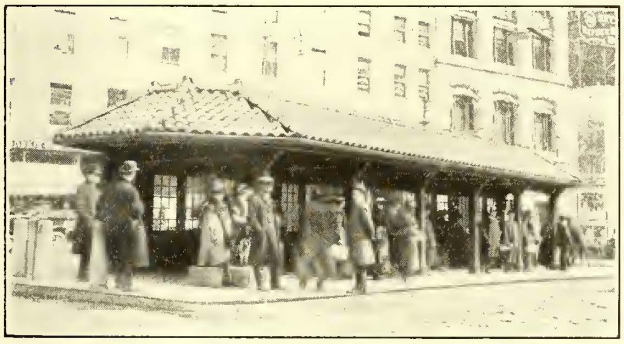
The saving in time due to the introduction of the near-side stop was reported in Rochester to be in excess of 20 per cent through the business district during the rush hours. In this city, prior to 1909, cars made two stops at each downtown intersection. Through checks it was found that the traffic stop at the near side was often as long as thirty-five seconds in addition to a twenty-five-second loading stop at the far side. Some of the delay at the near side was due to blockades of loading cars at the far side, so that the use of the near-side stop alone indicated a saving even greater than that effected through the elimination of the twenty-five-second stop at the far side of each crossing. On the first night when the near-side stop went into effect an increase of 20 per cent in speed was effected, and the headway in the business district was eventually reduced to twenty-five seconds, although later this was found to exceed the possibilities of traffic direction, which limited the average headway to twenty-eight seconds.



PUBLIC-BE-PLEASED POLICY IN PRACTICE—ORNAMENTAL SHELTER ON K. C., C. C. & ST. J. RY.

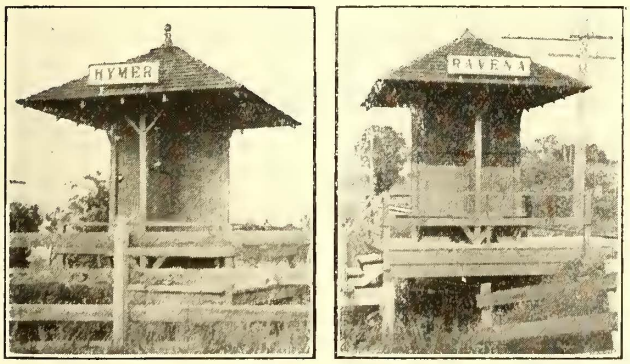
WAITING STATIONS AND SHELTERS

The construction of suitable stations and shelters for waiting passengers is generally conceded to be a most important provision for the comfort of patrons, and to this end the Kansas City, Clay County & St. Joseph Railway has developed the ingenious scheme of building its open shelters in the form of a cross, so that waiting passengers are enabled to avoid the wind regardless of the direction from which it blows. The illustration on page 32 shows the general arrangement. The same company also has recently adopted a novel policy for providing suitable waiting stations at the growing towns along its line. This consists in getting outside parties to stand the expense of the station building in return for store privileges, and the company has been successful in having a number of these stations built under



PUBLIC-BE-PLEASED POLICY IN PRACTICE—SHELTER BUILT BY CITY OF HARTFORD AT JUNCTION POINT

the following agreement: The company gives the contractor the lease for five years on the ground. The contractor erects the station, which is built large enough so that he can live in the building and carry on a store. He also acts as the company's agent and is paid by the company by receiving free rent both for his family and for his store. In addition he receives 5 per cent of all outgoing business emanating from that station. This provides an inducement for the agent to get as many passengers as possible to purchase tickets, thus keeping cash out of the hands of conductors. The percent-



PUBLIC-BE-PLEASED POLICY IN PRACTICE—SHELTERS BUILT IN THE FORM OF A CROSS TO PROTECT AGAINST WIND

age also provides an inducement to the agent to have as much grain shipped from his station as possible. There is a minimum compensation for the agent amounting to $10 per month in case his percentage falls below this figure. This line at present has an agreement with a parallel steam railroad to handle the grain originating at the electric railway's stations, and as most of the stations are located at switches, every carload of freight loaded at that switch provides 5 per cent of the returns to the agent.

On the Pacific Electric Railway the way stations have been erected very largely of reinforced concrete. A standard design with an overhanging roof, as shown in the illustration, has been adopted for important points. For the shelters at crossroads reinforced concrete has also been universally used, and the permanence and beauty of these small structures has been reported to have added greatly to the prestige of the line with the public.

Shelters within city limits are, of course, somewhat unusual, but the accompanying cut shows an elaborate structure built in Hartford at a main loading point of the local lines of the Connecticut Company, which operates in that city. The shelter, which cost $2,100, was built by the city of Hartford as a convenience for its citizens. Another novelty in shelters has been introduced on the Manila (P. I.) Electric Railroad. In the Philippines torrential rains are common, and the diffi-

PUBLIC-BE-PLEASED POLICY IN PRACTICE—ORNAMENTAL STATION ON PACIFIC ELECTRIC RAILWAY

culties of transferring passengers during the rainy season are, in consequence, acute. For this reason The J. G. White Management Corporation, which operates the property, has erected at five main transfer points in the city of Manila shelters that are located between double tracks or at turn-outs and have roofs extending over the tops of passing street cars. As the shelter roofs are carried out beyond the center lines of the cars there is no drip from the eaves upon boarding passengers, and transfers can be made from one car to another without a wetting, no matter how severe the rain. The structures are of the simplest character, the roof sloping both ways from the center and being supported at intervals by posts on the center line. In general the length of each shelter is sufficient to serve two or more cars. The distance between tracks at each shelter is, of course, increased enough to provide ample standing room between cars on opposite tracks, and a platform that is raised enough above street level to insure a dry footing is provided.

Electrical Smoke Recorder

In a recent issue of *Power* there is described a novelty in smoke recorders for steam boiler plants. The action depends upon the variable conductivity of the flue gases accordingly as more or less smoke is present in them. When the smoke is dense the conductivity is small, whereas the transparent flue gases from a furnace are comparatively good conductors. In the smoke flue there is a gap in the high-tension circuit of a small transformer, supplied from an a.c. lamp socket, and there are gaps in the circuit leading to a condenser; all are in parallel. When there is smoke the condenser is charged and this closes an electric circuit and operates a watch or recording clock. When there is no smoke the discharge occurs across the gap in the stack and nothing happens. By changing the length of the gaps the recorder may be made to record almost any density of smoke or fumes.

The "Safety First" Movement

HOW ELECTRIC RAILWAYS HAVE WORKED TO REDUCE ACCIDENTS

A Review of the Work Done from the Inception of the "Safety First" Slogan, and a Description of the Practices of Different Properties to Maintain Interest in the Subject

"Among the many objects to which a wise and free people find it necessary to direct their attention, that of providing for their **Safety** seems to be the **First.**"—John Jay, in *The Federalist*, Nov. 3, 1787.

THAT the safety of the lives and property in their charge has been the concern of operators from the early days of electric railroading is attested by the numerous convention papers on this subject and the still more numerous technical inventions and changes in operating rules. In fact, fully ten years ago the Street Railway Claim Agents' Association was organized for the sole purpose of reducing the number and cost of electric railway accidents. The work of this body in co-operation with the engineering and transportation men of the field had already borne good fruit, while the advent of the prepayment car had reduced materially the number of accidents in car operation. Nevertheless it is now plain that the accident prevention movement could not realize its possibilities to the full until the public, always the chief source of accidents, could be made to appreciate that the efforts of the railways were more humanitarian than financial in purpose. Here and there an occasional talk to school children had supplemented the time-worn cautions of "Wait Until the Car Stops" and "Watch Your Step," but the spark of public enthusiasm remained unkindled until there arose the magic-working phrase of "Safety First." The event has proved that the use of a catch phrase was the one way to bring accident prevention from the restricted field of the operator into the wide domain of public co-operation.

In an issue like this, which from its nature marks the progress of the industry, it seems especially appropriate to review a movement in the transportation field which of late years has grown so rapidly and produced such excellent results in promoting co-operation with railway employees and the public. Necessarily the scope of the subject makes it impracticable to present all of the valuable ideas applied by the different electric railways or even to assert priority of invention for any of their users.

The "safety first" movement was originated early in May, 1910, on the Chicago & Northwestern Railway, under the general claim agent of the company, R. C. Richards. Curiously enough this pioneer movement did not take the form of a direct appeal to the public, but was conceived to insure heartier co-operation from the employees following a fiscal year during which injuries to the men had increased 37 per cent. The work was organized by holding meetings of all the division officers and foremen of various division points on the system, and at these meetings the company explained what it wanted to do, and why. Meetings of the same kind were then held with all of the employees at accessible points throughout the system. As Mr. Richards could spend only a week or ten days of every month on this work, this initial organization required five months. The next step was to organize "safety first" committees of all the divisions in all the large shops, large terminals and points far distant from headquarters where any number of men were employed. A central safety committee was also organized to co-ordinate the work of the departmental committees. All committees, including the central committee, meet once a month, and the committeemen are paid for their time and expenses due to attendance. Each committee passes on all safety matters within its territory, corresponding to the jurisdiction of the division, shop or terminal offices, but any recommended changes in standards, rules or customs which apply to the whole system are referred to the central safety committee for action. If approved by that committee these general changes are referred to the management and adopted. Out of 9772 recommendations covering all phases of "safety" work, made in 1912 and 1913, a total of only 387 were found to be impracticable.

Mr. Richards points out that all committeemen are on an equal footing, whether they come as firemen, engineers, brakemen or officers. In the opinion of the executive officers of the company nothing that the Chicago & Northwestern Railway has ever done has brought about so much good feeling and so much co-

STATEMENT SHOWING NUMBER OF RECOMMENDATIONS MADE BY SAFETY FIRST COMMITTEES IN 1912 AND 1913, ON WHICH ACTION WAS TAKEN.

	ADOPTED	REJECTED
Division Committees	6480	291
Shop Committees	2180	69
Terminal Committees	744	20
Local Committees	180	7
Central Safety Committee . .	188	
Total	9772	387

SAFETY FIRST—STATEMENT POSTED BY CHICAGO & NORTHWESTERN RAILWAY TO SHOW EFFECTIVENESS OF EMPLOYEE'S CO-OPERATION

Statement showing reduction in number of accidents for four years ending June 30th, 1914, as compared with four years on same basis as year ending June 30th, 1910.

			PER CENT.
137	fewer employes	killed, a decrease of	32.
9150	" "	injured, "	26.5
813	" passengers	injured, "	21.8
176	" outsiders	killed, "	18.7
150	" "	injured, "	6.6

Mileage June 30th, 1910 - 7951.34
Mileage June 30th, 1914 - 8408.31

SAFETY FIRST—STATEMENT POSTED BY CHICAGO & NORTHWESTERN RAILWAY DEMONSTRATING BENEFICIAL EFFECT OF ITS SAFETY CAMPAIGN

operation on the part of the men as the organization of the "safety first" movement.

The continuing value of this work is proved by the fact that for the four years ending June 30, 1914, the number of deaths as compared with the four preceding years was decreased by 310 and the number of injuries by 10,113. This reduction is all the more remarkable because the length of line operated for the same period increased from 7951 miles to 8408 miles, while the wage roll increased from $12,000,000 to $15,000,000 a year. News concerning recommendations, accidents, etc., is printed on 5½-in. x 8½-in. leaflets similar to those reproduced. It may be interesting to state in conclusion that at this time at least seventy-seven American steam railroads, with a combined trackage exceeding 200,000 miles, have "safety first" organizations. The idea has even spread abroad, as appears from a splendid "Safety Movement" booklet of the Great Western Railway, England, from which several typical illustrations on the right and wrong way of doing things are reproduced on pages 43 and 44.

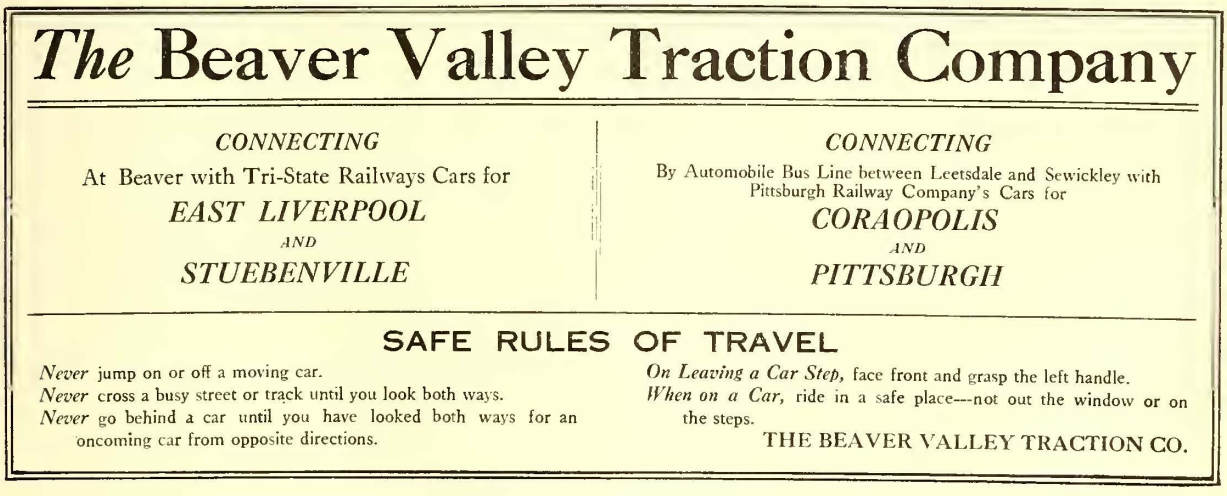
"SAFETY FIRST" WORK ON ELECTRIC RAILWAYS

The immediate success of the employees' committee plan on American railroads clearly has been due to the gratification that the men felt in becoming so directly associated with the management in the operation of the property, and in gaining the assurance that the company was ready to remove any avoidable risks that accompanied their employment. In turn, the enthusiasm of a large number of employees could not fail to react favorably on the attitude of the public toward the railway. In 1911 the committee plan was introduced on electric railways by the Fort Dodge, Des Moines & Southern Railroad. Previous to this time a number of claim agents and transportation superintendents had instituted accident talks to trainmen, but without following it up by committee organizations.

In enlisting the interest of the general public, however, the electric railways anticipated the steam railroads. In 1910 several electric railways on the Pacific Coast, notably those at Portland and Seattle, had begun a series of lectures to school children, while in the East the United Railways & Electric Company of Baltimore had inaugurated the distribution of accident prevention cards in schoolrooms with the approval of the Baltimore school board and in the Central states E. F. Schneider had begun an active campaign on the Cleveland, Southwestern & Columbus Railway. Thus the seeds of a popular safety movement had already been planted by the electric railways, and only some happy slogan like "Safety First" was needed to give a greater impetus to the work.

On the Pacific Coast the talks to school children were accompanied or followed by appeals to vehicle owners to instruct their drivers or chauffeurs to exercise greater care in avoiding collisions with cars and run-downs of pedestrians. Then the movement expanded into public safety leagues, with central and subsidiary committees composed of representatives from every large civic and industrial class. As the interest most vitally affected by accidents, it is natural that electric railway managements should be found among the most active elements in safety promotion. At the same time their co-operation with the most influential people in the community has given a much higher sanction to their motives for accident prevention than was possible under previous conditions.

The popularization of the safety campaign also has had the natural effect of developing specialists for this work who are available to those railway companies which feel that they have not within their own ranks men gifted as public lecturers or as inventors of attractive safety literature. The first comprehensive effort to exhibit and encourage the use of safety devices for general purposes was the exhibit of the American Museum of Safety, made as early as 1908. In October, 1913, a "safety first" exhibit was held in New York, and since then other conventions have been held. The safety medal for electric railways offered by the A. N. Brady Estate is another instance of the wide ramifications of this movement.



SAFETY FIRST—BLOTTER ADVERTISEMENT OF THE BEAVER VALLEY TRACTION COMPANY, NEW BRIGHTON, PA.

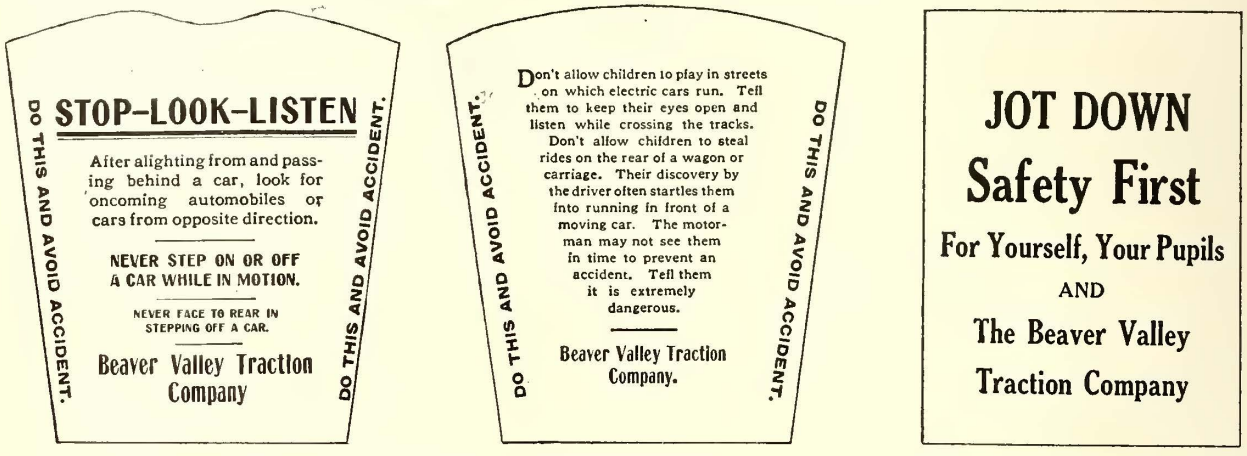
TALKS TO SCHOOL CHILDREN, PARENTS AND TEACHERS

The precociousness of American children is great enough to justify the famous German aphorism—"Es giebt keine Kinder mehr" (There are no longer any children). This forward disposition makes it hard to secure obedience to any advice about playing in streets or using cars recklessly, unless certain attractive elements like gifts, pictures and self-government are added. As to the last, the same principle that makes children willing to obey superiors when they are organized as boy or girl scouts, or as auxiliary street cleaners in a sanitary brigade, may be utilized to create enthusiasm for safety purposes. In a number of cities public school safety leagues have been organized, the members of which take the pledge not only to avoid street and vehicle dangers themselves but also to keep their younger brothers and sisters out of trouble.

As stated, the first work for school children consisted of class talks which were given during school hours under the sanction of the local education boards or principals. At first the talks were made by the claim agents of the local electric railways, but as the work was extended, special lecturers were employed. In the pioneer work at Portland, Ore., particular stress was placed on using caution in crossing streets where cars were operated, in taking youngsters out of danger zones, in confining all playing to trackless streets and in cultivating the habit of standing still until a car had gone by, instead of running in front of it.

signature which can be returned by the children to their teachers as proof that the circulars have been given to their parents. Placards in the cars are also used to supplement such publications, an endeavor being made to vary the text and pictures at frequent intervals. Such changes are essential to secure and maintain the interest of the public.

During August last year the Beaver Valley Traction Company, New Brighton, Pa., took advantage of a convention of the Beaver County Teachers' Institute to present the teachers with a pamphlet containing a series of safety first pictures with appropriate text.



SAFETY FIRST—ADVERTISEMENTS ON WATER CUP FOR CHILDREN, AND COVER OF FREE BLANK BOOK DISTRIBUTED AT A TEACHERS' CONVENTION

Most of the companies which have adopted this plan keep their precepts fresh in the memories of the children by donating "safety first" buttons and blotters. The Beaver Valley Traction Company, New Brighton, Pa., combines sanitation and safety promotion by giving paper drinking cups to the children, while the Trenton (N. J.) & Mercer County Traction Company presents celluloid calendars, also with health and safety advice. The Oklahoma Railway presents lead pencils bearing the "Safety First" slogan. In Brooklyn, after listening to the lectures the children have written essays on accident prevention and on accidents witnessed, some of these being printed in their school papers. In the immigrant sections of Brooklyn the safety notices have been used also as a basis for language studies.

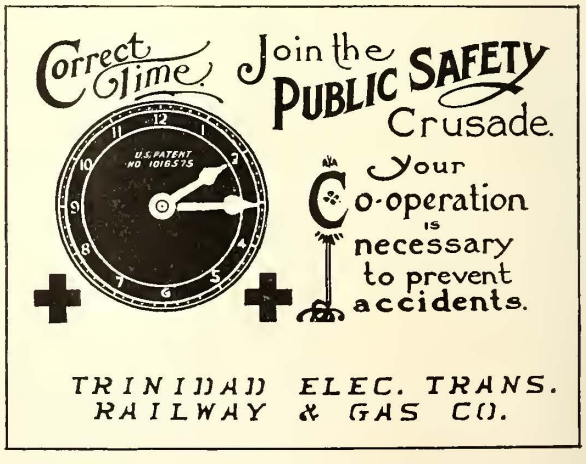
In 1912 the Boston Elevated Railway offered prizes for verses on this topic, and out of 780 sets which were submitted in response to newspaper advertisements the company gave 208 prizes totaling $700. Two of these prizes were for $50 each. In June, 1914, the Philadelphia Rapid Transit Company followed a similar scheme through its safety bureau by offering $250 in prizes from $10 down for essays, verses and drawings. The response was so great that the company doubled its reward, offering a total of $500, comprising one $10, twenty $5, fifty $2 and 290 $1 prizes. The Kentucky Traction & Terminal Company, Lexington, Ky., has also reinforced its school campaign by giving prizes for essays on accidents. The Montreal Tramways has made "safety first" cards palatable to the youngsters by placing them in boxes of chocolate for distribution at the company's annual picnic.

The straight printed matter usually distributed by the lecturers or by the class teachers consists of readable little pamphlets addressed directly to the children. Some companies, however, include material for the parents who are likely to need the advice as much as their children. To promote the delivery of such circulars, the Boston Elevated Railway attaches a receipt for

In addition each teacher received a notebook with no other advertising than the cover-wording shown in an accompanying illustration. This notebook scheme was a very good one as the teachers found the books convenient for making notes of the lectures and proceedings, so that the matter of caution was always before them. These books cost the company only $1 per gross.

THE MOVING PICTURE

In an editorial in the Aug. 3, 1912, issue of the ELECTRIC RAILWAY JOURNAL, it was suggested that the



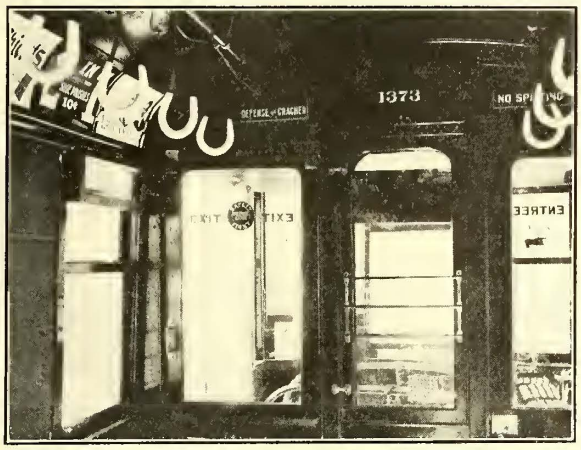
SAFETY FIRST—LANTERN SLIDE WITH MOVABLE CLOCK HANDS FOR DISPLAY BETWEEN REELS IN MOVING PICTURE HOUSES

moving picture could be used for teaching accident prevention in a most attractive way. Shortly thereafter word came that pictures of this kind had already been displayed at Düsseldorf, Germany. In the following year the first American story film entitled "The Price

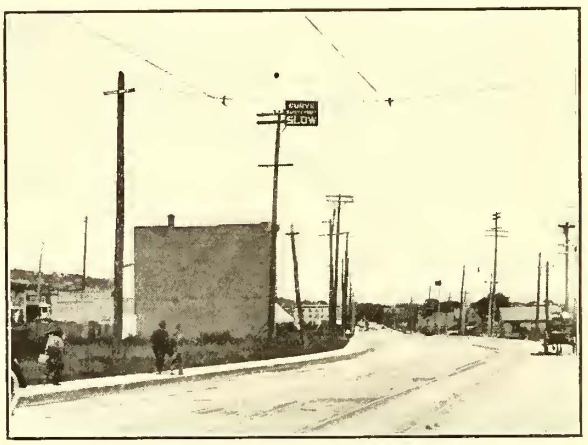
of Thoughtlessness," was used by the Brooklyn Rapid Transit System. This film is now making the rounds of the United States and Canada, and others will follow. The Kentucky Traction & Terminal Company, Lexington, Ky., gives a free moving picture show from 10 a. m. to 4 p. m. on Saturdays, comprising one accident picture with two others as sugar coatings for the pill. Similar free exhibits are made by other companies.

The usual type of film is made of inflammable celluloid and must be projected from a special booth, but a fireproof and narrower reel has been invented for use in schoolrooms, churches and other buildings which are not of fireproof construction. It requires no argument to see that this thoroughly modern device offers a splendid opportunity for safety education if the scenario does not make the accident prevention feature too obvious. Very recently one of the film companies has presented a splendid story of what happened to a workman who ignored a safety device.

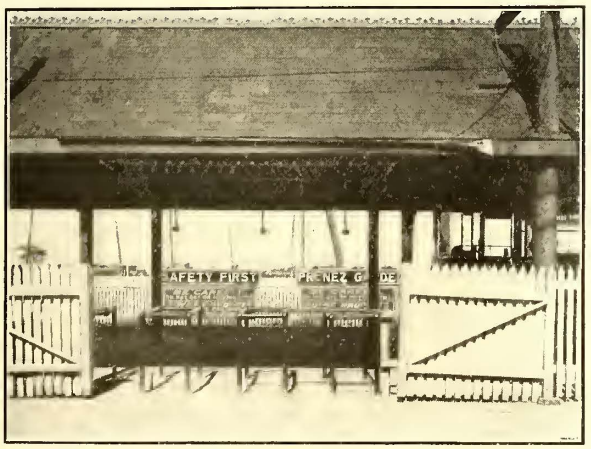
An interesting novelty in connection with this work is used by the Federal Light & Traction Company in the different cities where it operates public utilities. It displays in the moving-picture houses of these towns twenty-six colored slides, each of which bears some "safety first" advice. The novel feature of each slide, however, is the use of movable clock hands which are set for exact time by the picture operator and flashed between reels. This scheme has attracted the attention of other electric railways and it is possible that it will be adopted by several of them.



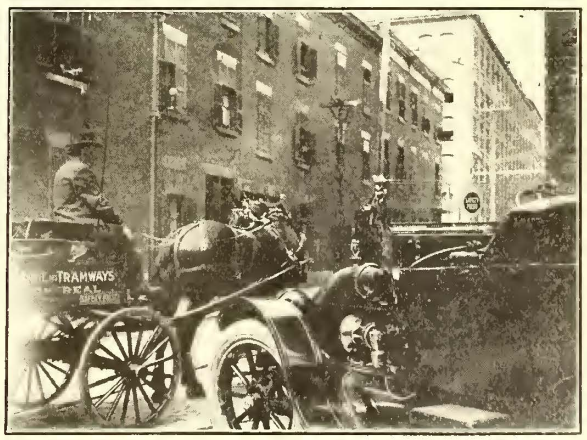
SAFETY FIRST—MONTREAL TRAMWAYS DECALCOMANIA SIGNS



SAFETY FIRST—MONTREAL TRAMWAYS WARNING SIGN AT CURVE



SAFETY FIRST—MONTREAL TRAMWAYS' CAUTION SIGNS AT DOMINION PARK



SAFETY FIRST—CAUTION SIGNS ON AUTOMOBILES AND WAGONS AT MONTREAL

Safety and the General Public

Wider public interest in the safety movement began with campaigns among school children and vehicle owners. The Cleveland, Columbus & Southwestern Railway and the Portland and Seattle companies appear to have been the pioneers in both of these fields, and the Northern Ohio Traction & Light Company, Boston Elevated Railway and Montreal Tramways are among those who have devoted much effort to the work among vehicle owners and users. The ordinary course in the latter work is to address personal letters to the owners of trucks and automobiles, but a variation introduced by the Montreal Tramways is to prepare a series of "Don't" cards for distribution among drivers and chauffeurs. Furthermore, the Montreal company demonstrates its sincerity in trying to protect the vehicle owner against car collisions by issuing to its men precautions concerning the kind of accidents which must be guarded against more particularly during certain seasons. Thus, during the autumn stress is placed upon the danger of greasy rails, and during the household moving days of spring precautions are issued concerning proper clearances with heavily-loaded furniture vans. The Montreal management has also pointed out to team owners that tail-lights are as indispensable to the security of a slow vehicle as they are to a pleasure

rig. In Boston and vicinity during a recent "Safety Week," the co-operation of the Boston Chamber of Commerce and of the local police and fire departments was secured to make a record of all vhicle operators who disobeyed the traffic regulations. The information was transmitted by the railway claim department to the Highway Safety League of Massachusetts, which in turn courteously took up the matter with the individual owners by correspondence. The Beaver Valley Traction Company obtains the direct interest of teamsters by furnishing them horse-blanket safety pins attached to a card of suggestions on wagon operation in and about railway tracks.

From these various forms of co-operation the safety movement inaugurated by many electric railways has expanded into a universal citizens movement to secure "safety first" in all industries as well as on the highways. In Brooklyn a public safety committee, whose membership includes many of the influential citizens of that borough, has been in existence for about a year, and early this year the Brooklyn Rapid Transit System contributed $1,000 as a basis for a "safety first" exhibit. The chairman of the Ontario Safety League at Toronto is a member of the Toronto Railway & Municipal Board, and otherwise the organizers embrace prominent men from other walks of life.

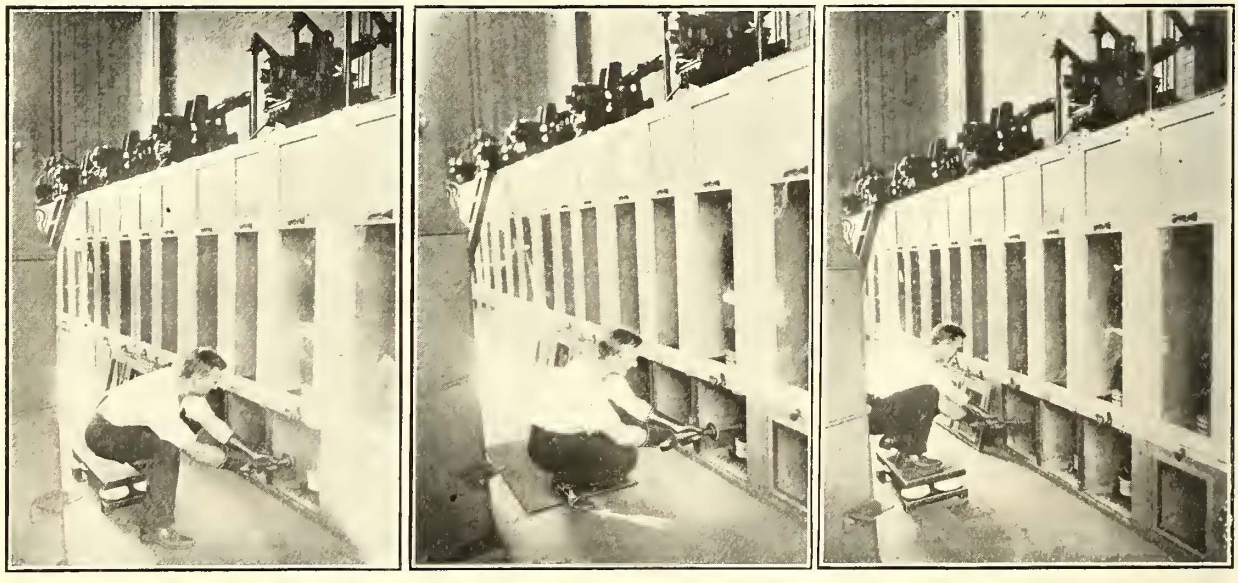
As the organization at Buffalo is one of the latest and most elaborate, it may be described in a little more detail. The Buffalo campaign was begun jointly by the mayor of the city and the International Railway. The general counsel of the railway is chairman of a general committee with thirteen standing committees as follows: school and playgrounds; boy scouts; church and civic bodies; public institutions other than schools; vehicular and pedestrian traffic; structures and pavements; street railways; explosives; fireworks and firearms; hazardous trades; legislation; publicity; finance and membership. Addresses are given by committee members and employees of the International Railway Safety Bureau. The week beginning May 3, 1914, was designated "Safety First" week, during which period a large number of lectures and safety exhibits were made; street banners with appropriate slogans were displayed and every automobile in the city carried "Safety First" streamers and pennants. Late in August a woman's committee was organized to act in conjunction with the general committee.

Safety Leagues

A most notable feature of modern "safety first" work is its dissociation from the old-time claim department. Thus the Chicago Surface Lines maintain a safety bureau; the Georgia Railway & Electric Company backs the Atlanta Public Safety League, Denver has a Tramway Safety League and Louisville has a Safety First League. Another important feature in the organization of safety work is in the co-operation of public utilities. A most conspicuous example of this kind is the Bureau of Safety, Chicago, which has supervision and direction of the safety work of the following public utility companies operating with general offices in Chicago: Commonwealth Edison Company, Public Service Company of Northern Illinois and the Middle West Utilities Company. This bureau devotes all of its attention to accident and fire prevention, sanitation and welfare and was organized primarily for the work outlined.

Believing that the chief factor in accident prevention is the proper education and co-operation of the workmen, the safety organizations of the various companies under the auspices of this bureau are arranged to include each and every workman in proper groups, officered from among their own members. These respective groups hold periodic meetings, reports of which are transmitted by the respective secretaries to committees of higher authority. Above these organizations of workmen are organizations of foremen designed as intermediate committees, and above these is a central committee composed of the active working heads of departments. The bureau maintains a staff of safety lecturers who devote their time to the proper instruction of the various committees and organizations, and a corps of inspectors who look after the elimination of fire hazards and mechanical dangers. This system has been very thoroughly tried out and has been most effective in these properties.

In bureaus and leagues like those mentioned, the financial aspect properly has been overshadowed by their humanitarian aspirations. It is also to be noted that these organizations maintain a permanent staff to keep

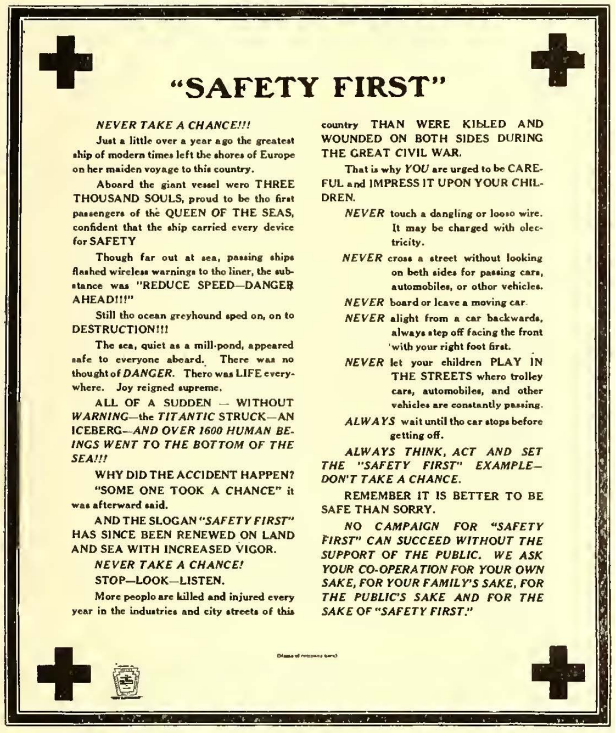


SAFETY FIRST—CHICAGO BUREAU OF SAFETY INSTRUCTIONS, SHOWING TWO WRONG WAYS (FIRST AND SECOND ILLUSTRATIONS) AND ONE RIGHT WAY (THIRD ILLUSTRATION) OF USING INSULATED STOOL IN OPENING OR CLOSING DISCONNECTS ON HIGH-TENSION OIL SWITCHES

up the interest in the campaign, especially in disseminating safety hints.

PUBLICITY

The newspapers have given most liberal space to the "safety first" campaigns, especially in Montreal, where all the dailies gave full pages gratis to reproduce the Montreal Tramways pictures and warnings. One of them even went to the additional expense of posing its own live models. Of course, regular advertisements have been used in great variety, and it is impracticable to reproduce even a fraction of them. Of those presented, one is a stock advertisement which the Federal Light & Traction Company has placed in a number of newspapers in towns where it operates public utilities. Where possible this announcement is printed with red crosses in the corners. This particular advertisement begins with a reference to the *Titanic* to back up the warning of "Never take a chance." Another good newspaper advertisement is that of the Wichita Railway &



"SAFETY FIRST"

NEVER TAKE A CHANCE!!!

Just a little over a year ago the greatest ship of modern times left the shores of Europe on her maiden voyage to this country.

Aboard the giant vessel were THREE THOUSAND SOULS, proud to be the first passengers of the QUEEN OF THE SEAS, confident that the ship carried every device for SAFETY

Though far out at sea, passing ships flashed wireless warnings to the liner, the substance was "REDUCE SPEED—DANGER AHEAD!!!"

Still the ocean greyhound sped on, on to DESTRUCTION!!!

The sea, quiet as a mill-pond, appeared safe to everyone aboard. There was no thought of *DANGER*. There was LIFE everywhere. Joy reigned supreme.

ALL OF A SUDDEN — WITHOUT *WARNING*—the *TITANTIC* STRUCK—AN ICEBERG—*AND OVER 1600 HUMAN BEINGS WENT TO THE BOTTOM OF THE SEA!!!*

WHY DID THE ACCIDENT HAPPEN?

"SOME ONE TOOK A CHANCE" it was afterward said.

AND THE SLOGAN *"SAFETY FIRST"* HAS SINCE BEEN RENEWED ON LAND AND SEA WITH INCREASED VIGOR.

NEVER TAKE A CHANCE!

STOP—LOOK—LISTEN.

More people are killed and injured every year in the industries and city streets of this country THAN WERE KILLED AND WOUNDED ON BOTH SIDES DURING THE GREAT CIVIL WAR.

That is why *YOU* are urged to be CAREFUL and IMPRESS IT UPON YOUR CHILDREN.

NEVER touch a dangling or loose wire. It may be charged with electricity.

NEVER cross a street without looking on both sides for passing cars, automobiles, or other vehicles.

NEVER board or leave a moving car.

NEVER alight from a car backwards, always step off facing the front with your right foot first.

NEVER let your children PLAY IN THE STREETS where trolley cars, automobiles, and other vehicles are constantly passing.

ALWAYS wait until the car stops before getting off.

ALWAYS THINK, ACT AND SET THE "SAFETY FIRST" EXAMPLE—DON'T TAKE A CHANCE.

REMEMBER IT IS BETTER TO BE SAFE THAN SORRY.

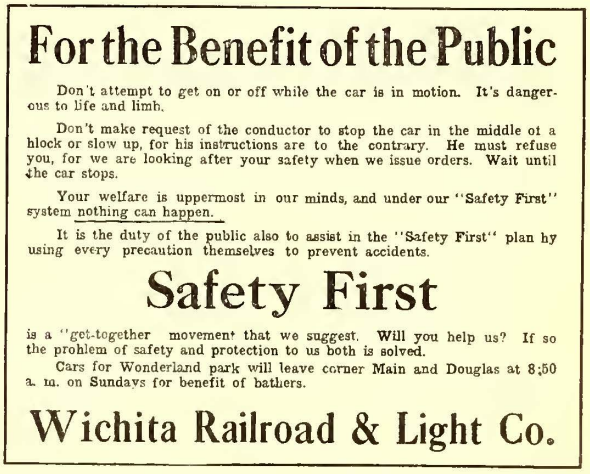
NO CAMPAIGN FOR "SAFETY FIRST" CAN SUCCEED WITHOUT THE SUPPORT OF THE PUBLIC. WE ASK YOUR CO-OPERATION FOR YOUR OWN SAKE, FOR YOUR FAMILY'S SAKE, FOR THE PUBLIC'S SAKE AND FOR THE SAKE OF "SAFETY FIRST."

SAFETY FIRST—STANDARD FORM OF ADVERTISEMENT WITH SOCIETY FOR ELECTRICAL DEVELOPMENT AND FEDERAL LIGHT & TRACTION COMPANY

Light Company. In this advertisement the "safety first" idea is combined with advice about stops that, if obeyed, will greatly simplify operation.

Even more numerous than the newspaper advertisements have been the astonishing variety of placards, posters, folders, letters and other printed matter prepared by electric railways on safety matters. The Metropolitan Street Railway, Kansas City, Mo., the Louisville (Ky.) Railway and the Montreal Tramways have prepared chains of car placards, several of which are reproduced. The Denver Tramways has issued illustrated posters showing possible accidents to wagons and automobiles respectively. A very effective scheme used by the Louisville company is to use colored backgrounds such as blue, orange, red, etc., thus presenting its cautions in a new dress at frequent intervals.

The Glasgow Corporation Tramways, the first British company to adopt the "safety first" idea, has developed a series of car posters a novel feature of which, and one flattering to the average Scotchman's knowledge of the Bible, is the use of Scriptural references to book, chapter and verse. A variety of blotters for children was also prepared during the summer for distribution at the opening of the schools in September, 1914. Several of the blotters carry little stories about boys who were injured through carelessness in playing on the streets, etc., and others bear the usual warnings. The Glasgow management recently suggested to the Glasgow Pres-



For the Benefit of the Public

Don't attempt to get on or off while the car is in motion. It's dangerous to life and limb.

Don't make request of the conductor to stop the car in the middle of a block or slow up, for his instructions are to the contrary. He must refuse you, for we are looking after your safety when we issue orders. Wait until the car stops.

Your welfare is uppermost in our minds, and under our "Safety First" system nothing can happen.

It is the duty of the public also to assist in the "Safety First" plan by using every precaution themselves to prevent accidents.

Safety First

is a "get-together movement that we suggest. Will you help us? If so the problem of safety and protection to us both is solved.

Cars for Wonderland park will leave corner Main and Douglas at 8:50 a. m. on Sundays for benefit of bathers.

Wichita Railroad & Light Co.

SAFETY FIRST—NEWSPAPER ADVERTISEMENT, WICHITA RAILROAD & LIGHT COMPANY

bytery that the ministers set aside one Sunday in the year for a sermon on "safety first." While the Presbytery did not accept the suggestion in this form it did promise to take up the matter in a way that would lead to the most beneficial results. The management is very well pleased with the results of the campaign to date despite the fact that no elaborate plans have yet been worked out.

The decalcomania car sign also has made its appearance on some roads, and that employed by the Chicago

SAFETY FIRST—PART OF A SERIES OF KANSAS CITY CAR POSTERS

Elevated Railways is typical. As this form of publicity is striking in outline as well as artistic in color, it cannot help but attract attention. The decalcomania shown in the accompanying illustration is printed in red and gold. The Montreal Tramways sign of this character is illustrated in the car on page 37.

SAFETY FIRST—PLACARD OF LOUISVILLE RAILWAY

SAFETY FIRST—PLACARD OF LOUISVILLE RAILWAY

SAFETY FIRST—A PLACARD OF DENVER TRAMWAYS, SHOWING SIX POSSIBLE KINDS OF ACCIDENTS TO AUTOMOBILES. A SIMILAR PLACARD IS ISSUED FOR WAGON DRIVERS

SAFETY FIRST—MONTREAL TRAMWAYS WARNING MEANING "TAKE CARE," "STOP," "LOOK," "LISTEN"

SAFETY FIRST—MONTREAL TRAMWAYS WARNING TO CROSS THE STREETS ONLY AT CROSSINGS

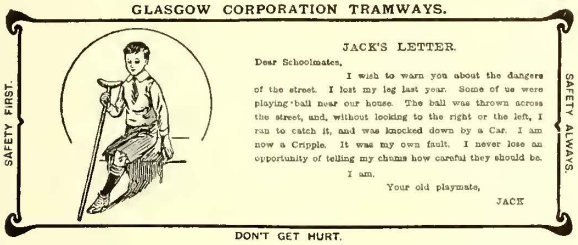
In its advertisements, the Boston Elevated Railway has discussed one kind of accident at a time, while the International Railway, Buffalo, N. Y., has treated separately all accidents which have occurred during a given time at a given block or crossing. Both of these ways of segregating statistics have shown good results. The Public Service Railway, Newark, N. J., finds department stores effective distributors of those pamphlets which show women how to get on and off cars, particularly when they are carrying packages. During the summer the Montreal Tramways gave 50,000 "safety first" fans to the ladies at Montreal, the moving picture

(Third Illustration)
The Right Way

Have oil switch in series open and ample light on disconnect. Have insulated stool or rubber mat placed directly in front of and at a convenient distance from the disconnect which is to be pulled or replaced.

Stand firmly with both feet on insulated stool or rubber mat, and with the aid of properly tested rubber gloves and clip puller, remove or replace disconnect. Use particular care not to lose your balance.

Perhaps the most elaborate form of publicity is the "safety first" instruction car of the Detroit United Railway and the "safety first" publicity car used by the Boston Elevated Railway. The Beaver Valley Traction Company, New Brighton, Pa., uses 5-ft. x 4-ft. spaces on



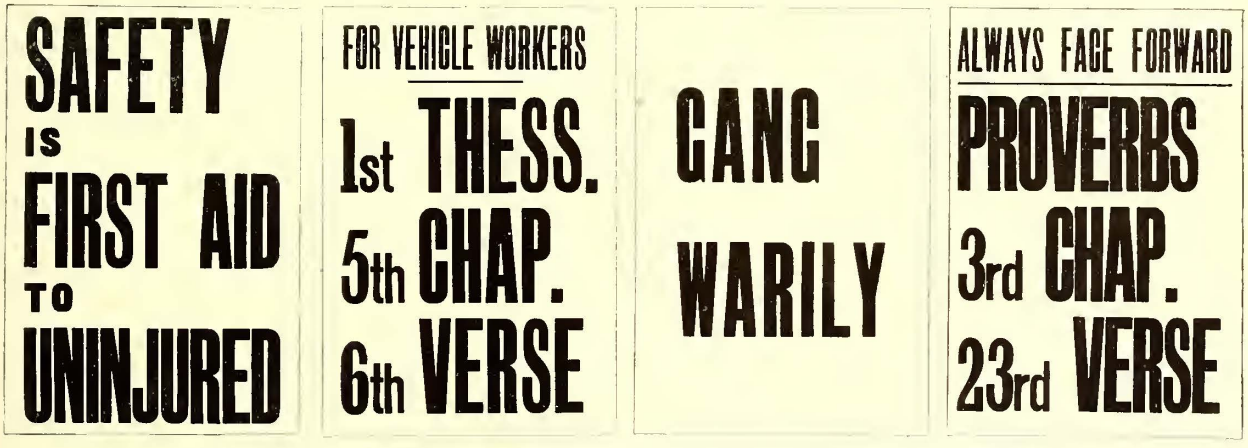
SAFETY FIRST — TWO OF THE BLOTTERS DISTRIBUTED AMONG SCHOOL CHILDREN BY THE GLASGOW CORPORATION TRAMWAYS

houses and the annual picnic being used for the distribution.

Other forms of publicity include monthly publications, such as those of the Detroit United Railway's *Safety*, the Chicago Bureau of Safety's *Safety Bulletin* and the United Gas Improvement Company's *Safety News*. Aside from advice and warnings the articles in these magazines contain many practical hints with illustrations to show how certain kinds of accidents are caused, how they can be avoided and how first aid should be applied. Thus, a recent issue of the *Safety Bulletin* contained a series of pictures to teach the safe

its park theater curtain to convey this message: "Safety First Means—Wait Until the Car Stops."

While the stenciling of the words "safety first" on all kinds of railroad property has become extremely common, too much should not be expected from this kind of reminder, because its excessive use means that it will soon be read unthinkingly. Permanent success can come only by devising features which will continually renew the interest of the public and employees. However, the fact that organizations like the Southwestern Gas & Electric Association and the New York State Electric Railway Association last year devoted en-



SAFETY FIRST—CAR PLACARDS OF THE GLASGOW CORPORATION TRAMWAYS

The first Biblical reference reads: "Therefore let us not sleep as do others; but let us watch and be sober." The second reads: "Then shalt thou walk in thy way safely, and thy foot shall not stumble."

way of handling the disconnects of high-tension switches. The instructions which appeared under the illustrations on page 38 follow:

(First Illustration)
The Wrong Way

The operator has neglected to move insulated stool after pulling disconnect from compartment directly in line with it. In this unsafe position he attempts to open or close an adjacent disconnect and thoughtlessly allows one foot to rest on the concrete floor.

This position is extremely hazardous.

(Second Illustration)
The Wrong Way

Rubber mat directly in front of adjacent compartment, and not of compartment from which disconnect is to be pulled, because the workman did not place the rubber mat in front of the compartment where he is working. He has thoughtlessly allowed one foot to rest on the concrete floor.

The position illustrated is very hazardous.

tire conventions to safety topics give good ground for belief that stagnation of ideas in this field is far away.

Of course, the "safety first" campaign has not been merely a question of talking and advertising, for this kind of work would have little lasting effect if it were not backed by tangible evidence that the railway companies were anxious to do their share to eliminate dangerous conditions. So far as city railways are concerned, the effect of prepayment cars in reducing platform accidents is generally admitted, but such accidents are being reduced still further by the use of the fully vestibuled car, even in cities where temperatures

are never low. Thus on the Jackson (Miss.) Light & Traction Company's lines fully-vestibuled cars are declared to have practically eliminated boarding and alighting accidents. Again, the Oklahoma Railway reports that the addition of folding doors and steps and the elimination of outside grab handles cut alighting accidents 75 per cent during the first month. In fact, the aim for safety is evidenced still further by the use of doors which cannot be opened while the car is in motion.

SAFETY FIRST—DECALCOMANIA SIGN, CHICAGO ELEVATED RAILWAYS

The step heights of modern cars are also much more moderate through the use of ramped floors, wells, baby motors, etc. The Portland (Ore.) Railroad, Light & Power Company and the New York State Railways—Rochester Lines, have actually rebuilt open cars to the center-entrance low-step design for reasons of safety alone.

The reduction of street-crossing accidents has been promoted by an extensive increase in the number of cities using the near-side stop. Thus the files of the Electric Railway Journal for the past three years record the change from far-side to near-side stops in about forty cities of all sizes and every part of the country. One of the latest large cities to adopt the near-side stop is New York, where its use became effective Sept. 1, 1914. In the preceding year the Brooklyn Rapid Transit System gave its patrons opportunity to express their preference in this matter, and of the votes received 181,764 were in favor of the near-side stop and only 17,128 votes were against it. In practically every case the chief reason offered for the change to the near-side stop, whether made voluntarily by the railway or arbitrarily by local ordinance, was the reduction of crossing accidents. In but one recorded case, that of the Tri-City Railway, which operates at Rock Island, Ill., was the far-side stop resumed after a trial of near-side operation. The agitation by citizens' safety committees concerning crossing stops has frequently disclosed and led to the cure of bad paving and lighting conditions, thereby absolving the electric railways from blame for accidents that had hitherto been ascribed to them.

Interurban railways are giving more thought than ever to signal systems, as is evident from the great increase in trolley contact and track signal installations. Reports from employees' safety committees have been largely instrumental in calling attention to danger points along the right-of-way, such as depressions along the road and obstructive trees at curves. Thus on the Beaver Valley Traction Company, New Brighton, Pa., the following improvements were made at the suggestion of the trainmen:

Removal of poles too close to the track; changing the location of derailing switches at railroad crossings; requiring the motorman to give two bells to the rear platform on the conductor's signal bell before proceeding over a railroad crossing, when the conductor is in front of the car and flagging the same over the crossing; the painting of an 8-ft. deep white strip on the third trolley pole approaching all railroad crossings, sharp curves and other dangerous places where during fogs the motorman might have trouble in locating his whereabouts; installation of hand-operated sand levers instead of foot pins; relocation of arc headlight buttons so that these lights can be switched off when approaching other cars or automobiles; the installation of warning signs at road crossings and the relocation of signal light boxes.

An important contribution to safety rules is that prepared lately by the bureau of standards, Department of Commerce, as Circular No. 49. The present rules, which are open to suggestions from operators, include all portions of work on or about power and signal lines and the electric equipment of central stations, substations, mines and testing departments. The first two parts consist of general rules which apply to the employer and employee respectively, and the third part consists of special rules which apply particularly to employees. Rules for employees in general are subdivided into six groups. The first enumerates those general precautions the necessity for which seems obvious but non-compliance with which is nevertheless responsible for many injuries. The second presents general operating rules, defining the duties and relations of those employees who direct others and the operating methods by which safety is secured. The third group prescribes the precautions for handling live parts under varying conditions of voltage and location. The fourth and fifth deal with the procedure for assuring the continued safety of work about normally live or moving parts respectively by avoiding all possible sources of misunderstanding in killing parts. The sixth group covers in some detail the procedure for making protective grounds and short circuits.

Special rules for employees cover separately the special hazards of work about electrical equipment in stations, at switchboards, about overhead lines, in arc-lamp attendance, on underground lines, meter setting,

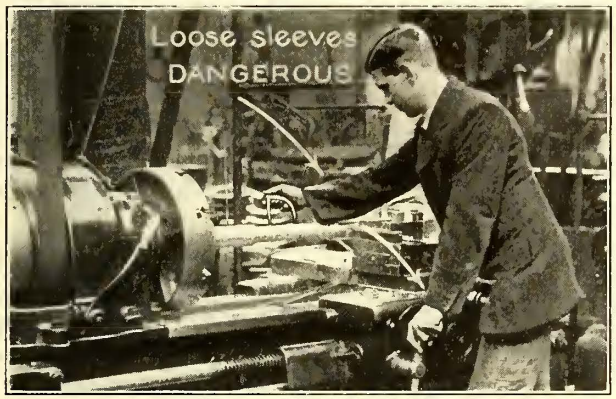
SAFETY FIRST—SAFETY LEAGUE COMMITTEE APPOINTMENT BLANK

testing and in tunnel work. Each class of worker is directed to familiarize himself also with the preceding general rules which apply to all classes of electrical employment. By this arrangement, a more adequate and convenient treatment has been realized without unnecessary repetition. In an appendix the value of organized accident prevention work through safety committees is emphasized as a means for reinforcing the effectiveness of safety rules. The report on this sub-

ject by the accident prevention committee of the National Electric Light Association is briefly abstracted, and citations are made from the reported organizations and methods of several large and some small electrical utilities.

SAFETY CO-OPERATION WITH EMPLOYEES

The Cleveland, Columbus & Southwestern Railway gave accident talks to trainmen as early as 1908, but the employees' committee plan is a later development



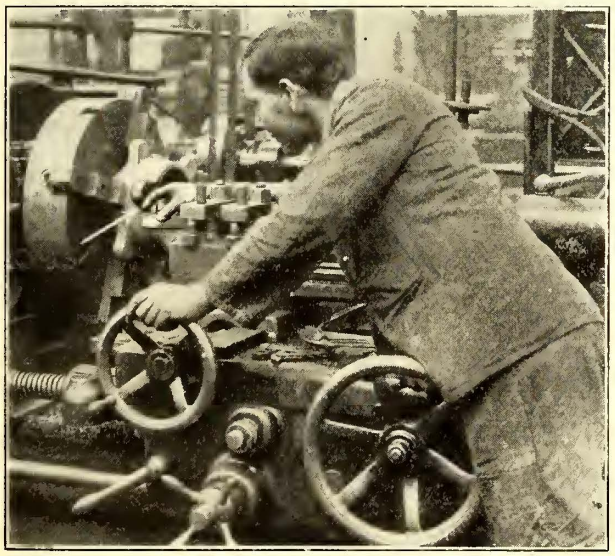
SAFETY FIRST—GREAT WESTERN RAILWAY—SHOWING DANGER OF LOOSE SLEEVES

SAFETY FIRST—GREAT WESTERN RAILWAY—TIGHT SLEEVES AVOID ACCIDENT

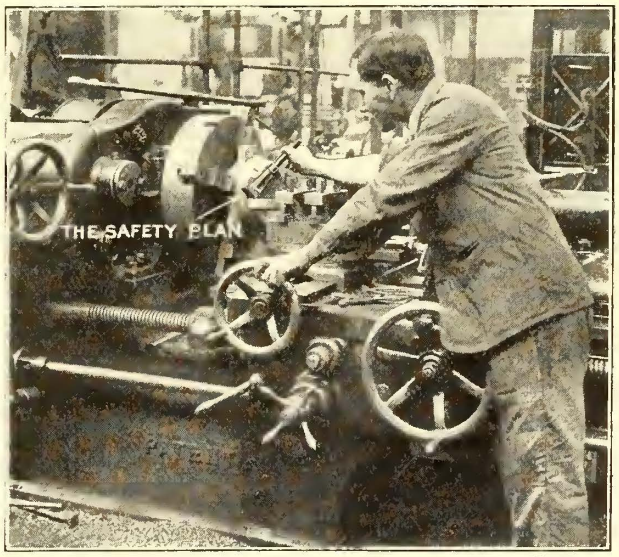
which has met with very gratifying results. Among the companies which have organized such committees are the Chicago, South Bend & Northern Indiana Traction Company, where the title of the committee is "Safety and Efficiency." On the San Francisco-Oakland Terminal Railways the executive and advisory committees are permanent in order to maintain the continuity of the work, but the divisional and departmental committees are appointed for terms of four months only, so that a large number of employees get a taste of executive responsibility in the course of the year. The executive committee meets once a month and the remaining committees twice a month. Monthly meetings are also in vogue on the Pacific Electric Railway, Los Angeles, Cal., with moving pictures as a feature in educating the trainmen. On the Union Traction Company of Indiana there is a general safety board and five local safety committees. The department head is a permanent member of each committee, and the members, numbering fourteen to fifteen per committee, are appointed for six months each.

Since Nov. 1, 1913, the former discipline board of the Hudson & Manhattan Railroad, New York, has been converted to a sub-safety committee. The latter committee, reporting to the general safety committee, is composed of one motorman, one switchman, one conductor and one station agent. It meets with the general safety committee on Thursday of each week. Any employee may offer safety suggestions through the sub-safety committee member in his department. For each safety suggestion which is subsequently adopted, the employee receives appropriate merit marks and a safety pin or button.

On the Chicago, South Bend & Northern Indiana Railway the work was organized in August, 1912. The committee as a whole meets at the office of the general manager the second Monday of each month, at which time reports of defects are gone over and checked up and such questions as are brought up in the matter of efficiency or further protection are discussed and settled. During the first six months of this committee's life 101 cases were brought up and disposed of. During the second six months ninety-two cases were handled. During the third, sixty-eight cases, and during the fourth six months fifty-three. The management feels that the movement has been extremely



SAFETY FIRST—GREAT WESTERN RAILWAY—DANGEROUS TO PICK UP STEEL CHIPPINGS BY HAND



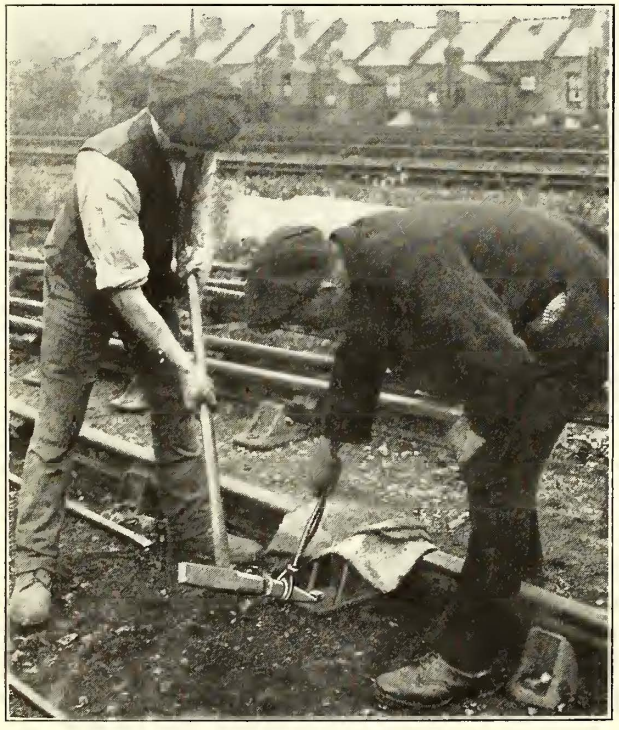
SAFETY FIRST—GREAT WESTERN RAILWAY—USE OF BRUSH TO CLEAN UP STEEL CHIPPINGS

profitable. It has not as yet gone into any expensive or extensive general campaigns, although it expects to inaugurate poster work during the present winter. On the Kentucky Traction & Terminal Company's system at Lexington the claim agent is chairman of an employees' safety committee numbering ten men. In Denver members of the departmental safety committees are furnished with cards like that on page 42. The Brooklyn Rapid Transit System is probably the largest electric railway in the world numbering platform men on its depot safety committees.

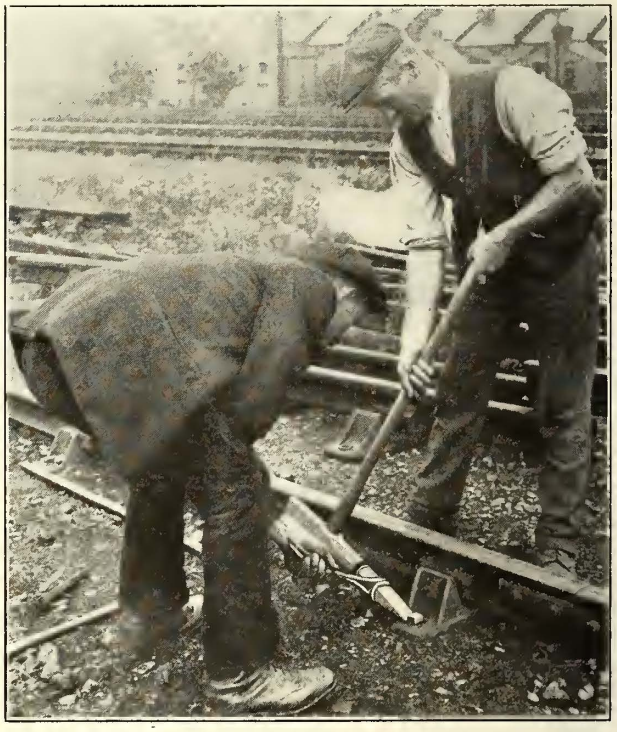
The work of the general safety board and publicity campaign has produced on the Detroit United Railway a decrease in collisions of 25 per cent during the first six months of the safety campaign. Again, on the lines of the Northern Ohio Traction Company, Akron, Ohio, intensive employees' committee work reduced fatal accidents from eighteen during the first seven months of 1913 to nine during the corresponding part of 1914, while the injuries decreased from 131 to forty-seven. The latter company makes it a point to analyze every accident in circular letters to all employees interested.

The "safety first" organization on the Spokane & Inland Empire Railroad at Spokane and Oregon Electric Railway and United Railways at Portland is a part of the general organization on the Spokane, Portland & Seattle Railway and affiliated lines which was started in January, 1913. The organization consisted of a general committee of seven general officers and two division committees of employees from each branch of the service, one at Portland and one at Spokane. These committees met once each month and considered suggestions made by the employees for the prevention of accidents. These suggestions were first considered by the division committee and referred to the officer in charge of the division or shop for investigation and action, or to the general committee if the suggestion called for a change in standards or rules. Considerable interest in the movement was shown by the men and it is believed that much good was accomplished in that conditions were made more safe and the men were urged to use greater care in the performance of their duties. Comparison of accidents occurring during the year ending June 30, 1914, with the previous year shows a considerable reduction in the number of serious accidents, and it is believed that in a great measure this was due to the campaign for "safety first."

Recently a change has been made in the safety organization by abolishing general and division committees. The work is now being handled by the bureau of safety and efficiency, in charge of the general claim agent. Suggestions made by the employees are sent to and handled by the superintendent of the division or shop, and after being acted upon are forwarded to the general claim agent's office with recommendation or advice of action taken. All accidents are investigated to determine the cause and apply a preventative remedy, and it is expected that by this method they will get better and quicker results.



SAFETY FIRST—GREAT WESTERN RAILWAY—SAFE WAY BECAUSE THE BAGGING WILL CATCH THE BOLT HEAD



SAFETY FIRST—GREAT WESTERN RAILWAY—DANGEROUS BECAUSE THE BOLT HEAD MAY FLY AND HIT SOMEONE

Quite a variety of "Safety First" insignia has been developed in the form of enameled or gold plate buttons and watch fobs. In Atlanta employees of the Georgia Railway & Electric Company carry fobs marked "Atlanta Public Safety League," but ordinarily the wording on the buttons or the fob is "Safety First" or "Safety League." The Beaver Valley Traction Company's button made in red, white and blue is so popular with the trainmen that they want two, one for their uniform and one for citizen's dress.

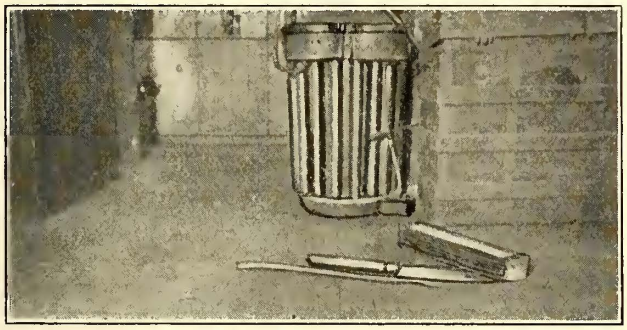
SAFETY BUTTON

Of course, co-operation with the men has not been confined entirely to safety committee work. A good plan seems to be that of the Union Traction Company of Indiana which sustains the interest of the trainmen in other ways by offering them prizes up to $15 for suggestions or essays on accident and prevention. The granting of prizes is made the occasion of a banquet where company matters can be discussed informally.

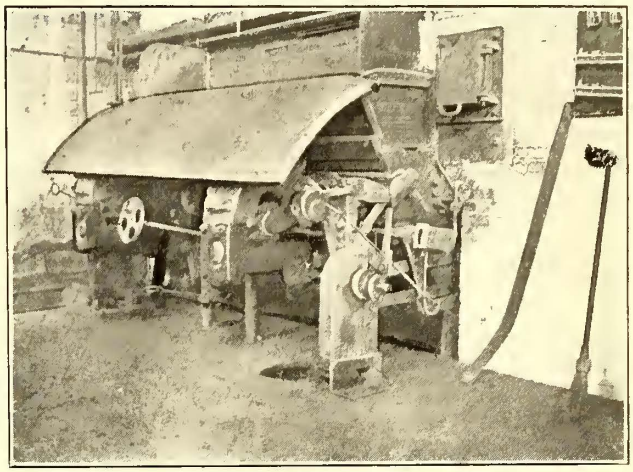
The Louisville (Ky.) Railway has set aside a safety fund of approximately $35,000 which is distributed by giving each motorman and conductor 1 cent an hour in addition to the regular platform rate. The distribution of this fund is to be operative during the year commencing June 1, 1914, and terminating May 31, 1915. Aside from this stimulus the company has employees' committees consisting of one conductor or motorman from each carhouse to constitute a committee of eleven which meets every two weeks with the heads of all departments to discuss methods of accident prevention. Every committeeman serves one month. Blanks on which safety suggestions may be written are distributed also among all the men.

The chauffeurs of the General Omnibus Company, Paris, also share in a safety fund. They are paid a monthly premium of 16 francs 65 centimes, or about $3.33, for a good accident record. If a chauffeur succeeds in obtaining this premium for three consecutive months he is entitled to another premium of $3.33 so that it is possible in a year for one man to obtain sixteen premiums of $3.33 on account of his accident record. London bus drivers are also rewarded for avoiding accidents.

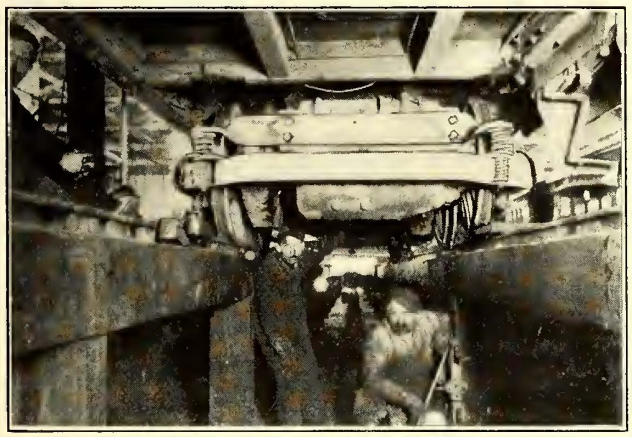
The Boston, San Francisco-Oakland and other rail-



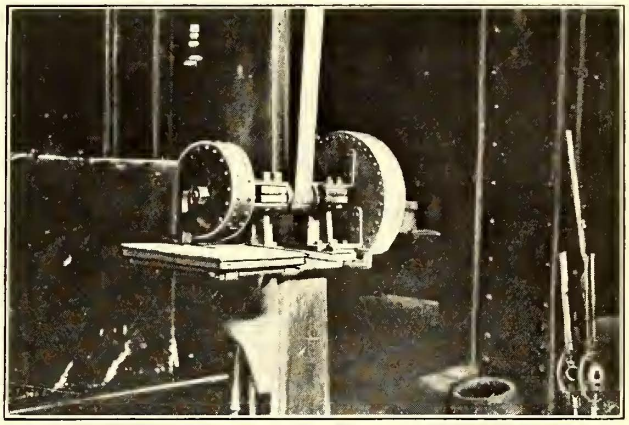
SAFETY FIRST—TRIPPING HAZARD, SHARP CLEAVER FOUND IN PASSAGEWAY



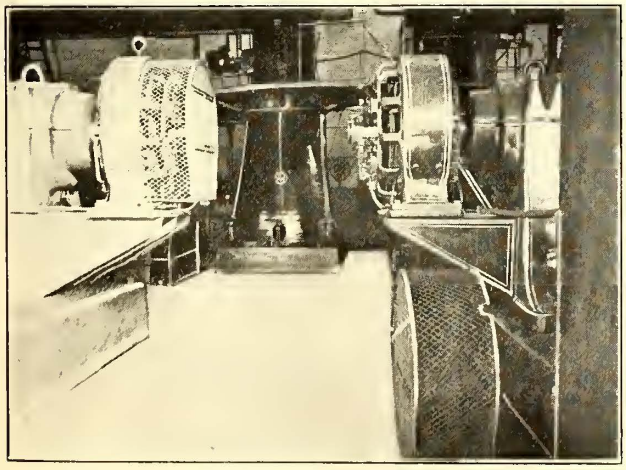
SAFETY FIRST—GUARD MADE FOR STOKER DRIVING MECHANISM, TO PREVENT INJURY



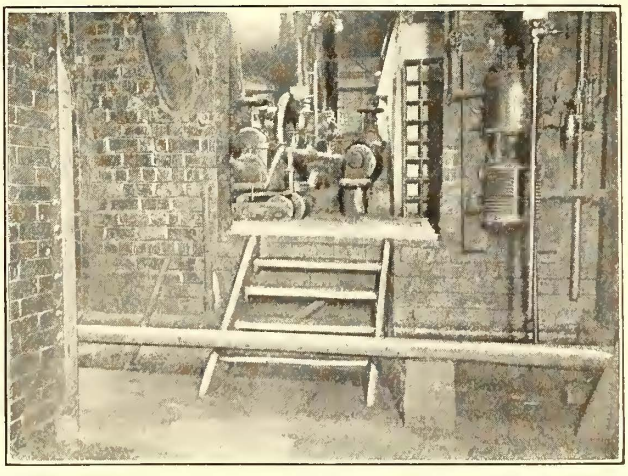
SAFETY FIRST—TAKING OFF CRACKED MOTOR SUPPORT, MOTOR NOT BLOCKED TO PREVENT INJURING MEN



SAFETY FIRST—GUARDS FOR EMERY WHEELS, WHICH WERE MADE BY THE EMPLOYEES



SAFETY FIRST—COMMUTATOR GUARDS WHICH ARE USED ON EXCITERS FOR FREQUENCY CHANGERS



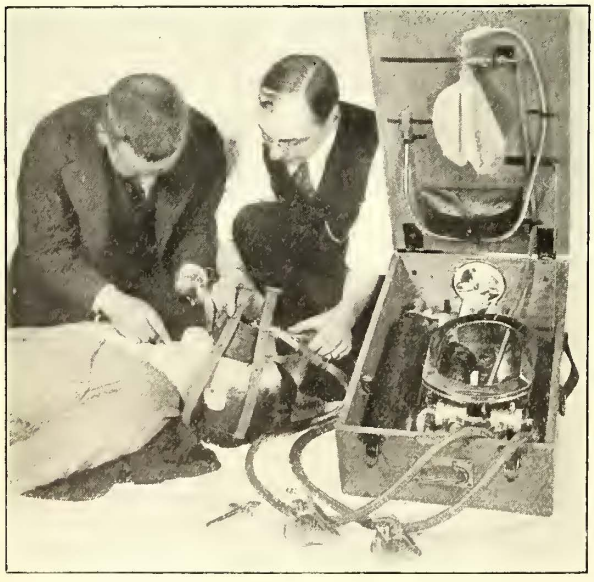
SAFETY FIRST—TRIPPING HAZARD, A PIPE PLACED DIRECTLY IN FRONT OF STAIRWAY TO BOILER ROOM

ways have made use of safety charts or bogie boards. These are analyses of the number and kind of accidents occurring during given periods on each division and the object in displaying them is to encourage competition for their reduction.

Unique bristol board safety cards reminding the men of certain risks supplement the work of the safety club of the Kansas City, Clay County & St. Joseph Railway. These cards may be regarded as ticklers to revive flagging interest. Incidentally a special card is dropped casually by the trainmen in places where trespassers are likely to pick them up and thus read timely warnings of the dangers that they risk. The Chicago Tunnel Company sends postcards to the homes of its men asking their dependents to preach the gospel of safety to their relatives in its employ.

PROTECTIVE DEVICES

While the greatest service of "safety first" among employees is to eliminate the foolhardiness or recklessness of men who have become accustomed to working under risky conditions, it is as essential to protect even deliberate carelessness by means of protective equipment. The spur of a workmen's compensation act should not be necessary to call for the use of such devices. In this respect the American electric railways have lagged far behind Europe. A beginning for the better has been made in some shops where belting is screened and dangerous parts of tools are shielded. At the car maintenance depots of one company a red flag is placed on the car by the man who is to work under it and this flag must not be removed by anyone else under penalty of discharge. Eye troubles from babbitt shavings may be easily avoided, and no shop can be



SAFETY FIRST—VIEW OF PULMOTOR INSTRUCTIONS IN HUDSON & MANHATTAN RAILROAD'S BOOKLET

said to be safely equipped unless cranes and hoists are provided in ample number to make it unnecessary for the men to lift any extraordinary weight or to take unnecessary chances with jacks.

As accidents may be unavoidable even under the best conditions, it is good practice to provide medical and surgical kits in shops and at other places where large groups of men are employed at some distanace from drug stores and physicians. These kits are now made in standard packages by surgical manufacturers, in accordance with their own experience or in accordance with the specifications of the railway physicians and surgeons. In addition some systems, like the Hudson & Manhattan Railroad, New York, have pulmotor installations at the places where high-tension apparatus is used. The pulmotor demonstration illustrated was reproduced in the Hudson & Manhattan Company's employees' booklet "Safety Hints" by permission of the National Electric Light Association.

TYPES OF ACCIDENT HAZARDS AND METHODS OF PREVENTION

As a supplement to the foregoing remarks it is of value to reproduce a fraction of a large number of instructive pictures taken by G. O. Smith, supervisor

CHICAGO TUNNEL COMPANY

If Speed Interferes with Safety, Give Up Speeding.

Safety First, Speed Afterward.

Chicago July 28 1914

Dear Madame:

The CHICAGO TUNNEL COMPANY is carrying on a vigorous campaign against MINOR ACCIDENTS to its employees, which, in the majority of cases, are directly due to the THOUGHTLESSNESS or CARELESSNESS of the EMPLOYEES THEMSELVES.

Will YOU do your share toward making this campaign a success, by frequently reminding YOUR loved ones to use CAUTION in their daily work, thereby saving suffering to them and sorrow to yourself?

Thanking you in advance for YOUR co-operation in this WORLD-WIDE movement for SAFETY FIRST, we are,

Respectfully yours,

By SAFETY COMMITTEE CHICAGO TUNNEL COMPANY.

SAFETY FIRST—POSTAL CARD SENT TO THE DEPENDENTS OF EMPLOYEES AS A CAUTION REMINDER

of safety, Doherty Operating Company, in the course of his work. These illustrations show a few of the accident hazards of the more common type, with which managers of electric railway companies have to contend. They also show certain methods which are used to prevent accidents, such as guards, protection for apparatus, non-slipping ladder shoes, etc. The hazards shown have either been eliminated or plans have been prepared to make the necessary changes to prevent accidents. Mr. Smith's views are published on page 45.

Statistics show that it is usually the simple, apparently insignificant hazard which causes the most trouble; that it is not the unprotected high-tension apparatus nor the unguarded flywheel, but rather the wheelbarrow carelessly left in front of a doorway or the improper placing of materials on shelves without protective risers. It should be the endeavor of every claim department and safety organization in all classes of public utility companies to watch carefully for these minor types of hazards and see that the property is kept free of them. Mr. Smith states that an accident prevention campaign around a power plant usually is found to be more in the nature of a general house-cleaning than a case for spending much money to put in expensive guards and other safety appliances for machinery, etc.

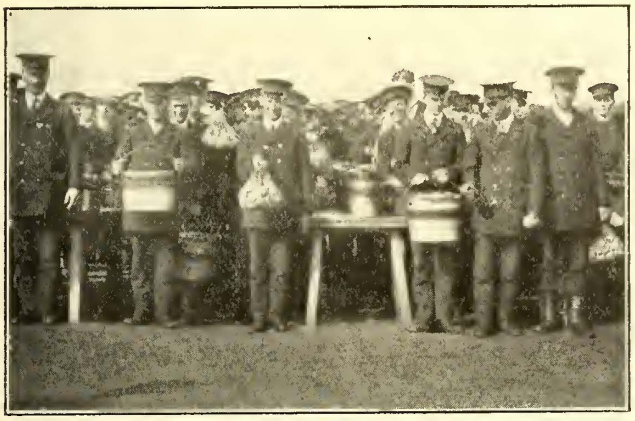
Nearly all of the photographs taken by Mr. Smith have been used in the form of lantern slides, and some will be used in the form of posters to show the men how simple can be the cause of a serious accident.

Under the title of "Trade Opportunities in South America," the New York, New Haven & Hartford Railroad has issued a 27-page pamphlet dealing with South American statistics and general information. Tables showing exports and imports to the Central and South American countries are presented, together with sections describing conditions relative to packing, credits, language, currency, postal and weight systems, steamship service, postal regulations and population.

Glasgow Railway Men As Soldiers

More than 1700 Out of a Total of 6100 Employees Are Now in Military Service—Glasgow Drained Dry of Free Briar Pipes for the Warriors

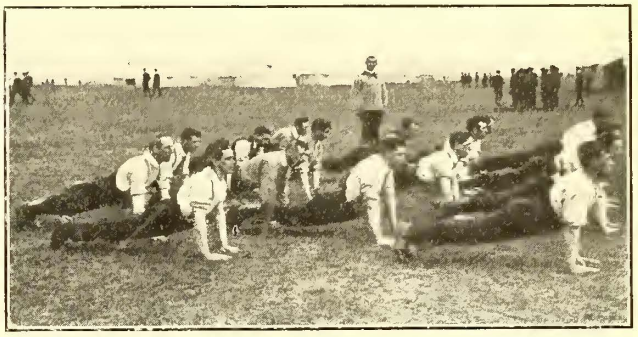
When war was declared on Aug. 4, 1914, a very large number of the men of the Glasgow Corporation Tramways, more especially of the motormen and conductors, were called up. At that time the Corporation had 592 reservists in the service. These men had immediately to hand in their uniforms, and they have been at the front almost from the start. A large number have been wounded and have spent some time at home in Glasgow. Most of these men, however, have already returned to the firing line. Almost every day, in fact, men who have been wounded call to see James Dalrymple, general manager, before returning to duty in France.



GLASGOW'S RAILWAY SOLDIERS—IN WAR TIMES THE SCOTCH LADS FORGET THEIR LOYALTY TO HAGGIS

Early in August all the men of the staff who were members of the local territorial battalions were also called up. The Corporation Tramways had, in all, 330 of this class. These men are now either on the firing line or are preparing for active service in their various training camps.

About the middle of September the municipality of Glasgow offered to raise and equip two battalions of 1100 men each for the government. On the day that the magistrates committee decided to put this recommendation before the Corporation, Mr. Dalrymple sent out a notice to all the depots of the department asking for volunteers for one of the city battalions, should these be formed. The following morning 1100 names were handed in. Some of these men were, of course, not accepted, but the "First Glasgow" is, for the most part, composed of tramwaymen. The men who were accepted for service were at once sworn in and sent off to camp, where they are still under training and are in the pink of condition. The Tramways arranged to let them keep their tramway uniform until they received their khaki. Their new regimentals have since been sent on to camp, and by this time every man has been thoroughly equipped for active service. One half



GLASGOW'S RAILWAY SOLDIERS—STRENGTHENING LIMBS AND WIND BEFORE THE DAYS OF KNAPSACK AND RIFLE

GLASGOW'S RAILWAY SOLDIERS—PIBROCH AND DRUM IN A RECRUITING PARADE SET SCOTTISH HEARTS ASTIR

GLASGOW'S RAILWAY SOLDIERS—GRUELLING RECRUITS IN CALISTHENICS DURING THE EARLIER DAYS OF CAMP TRAINING

of the battalion is made up of married men, and the average age of the whole battalion is twenty-seven and a half years. No one in the battalion is less than twenty-one, and no one is more than thirty-five years of age.

Recently the Tramways have been losing a number of men who are past the fighting age. These men are joining what is called the national reserve, and their work will be the guarding of bridges, railways, shipyards and other vulnerable points. Possibly also these men may get the work of guarding prisoners of war. Up to Dec. 14, 1914, the total number of men who had left for active service was 1711. The normal staff numbers 6100. Up to the date named the number of men killed in service had been nine.

That the British soldier of to-day deserves the designation of "best-paid" appears also from the co-operation of the Glasgow Corporation Tramways with the government. Thus the department is making up the income of the wives of the married men who have left the service to two-thirds of their husbands' pay. This sum includes the government separation allowance but does not include any allowance for children or any allotment which the soldier may make from his own pay. In general, therefore, the wives and dependents of the men are as well off, financially, as they were when their husbands were at home.

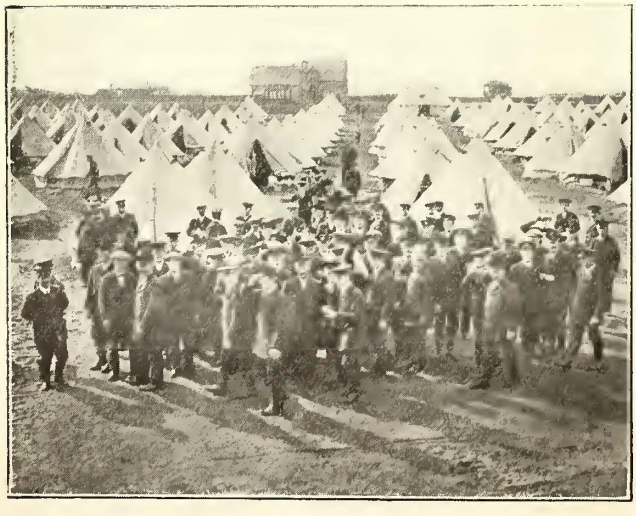
Single men, without dependents, get one-third of their wages. This weekly allowance is either kept for the soldiers or is paid over to any one who may be designated by them.

The Second Battalion, which has been raised and equipped by the municipality, is chiefly formed of old officers and men of the Boys' Brigade. This battalion is being trained in the same camp as the First Battalion at the Gailes territorial camping ground about 2 miles north of Troon.

The Tramways department is also doing a good deal in the way of recruiting among the general public. Illuminated cars are sent out during the evenings, and, in addition to these cars, there is always a second car with a band. Sometimes these cars are followed by four other cars full of soldiers, who, of course, usually make an abundance of noise. These cars stop for a few minutes at important points on the route, and the crowds on the street are addressed by a rousing speaker.

In addition to the above, the staff has been enthusiastic enough to collect from passengers and others old briar pipes, which, after being cleaned, repaired and disinfected, are sent out to the troops at the front. The Tramways department has already dispatched considerably more than 20,000 pipes, and Mr. Dalrymple receives every day numerous letters from the troops thanking the staff of the department for gifts. As Glasgow has now been drained pretty dry Mr. Dalrymple is endeavoring to get people throughout the other towns in Scotland interested in the collection of pipes.

The following are extracts from recent letters of Glasgow railway men: Horace Jowl, who is in the Army Service Corps, said "that they were now feeling



GLASGOW'S RAILWAY SOLDIERS—THE FIRST GLASGOW BATTALION OF STURDY RAILWAY SCOTS AT GAILES CAMP

GLASGOW'S RAILWAY SOLDIERS—A LESSON IN CUT AND COVER TRENCH CONSTRUCTION

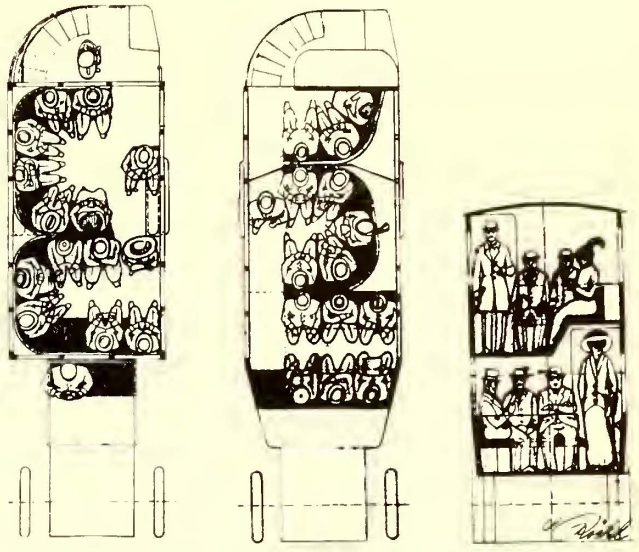
the pinch of both the war and winter, but they were contented with the knowledge that they were doing their best for King and country." A. E. Simmons, who is attached to the anti-aircraft section, in his letter said: "Firing here is going on night and day, and the way our infantry stick it seems to be beyond human endurance. South Africa was a picnic to this as regards firing, but our commissariat is far better than in that war.

"Troops are being very well fed under the conditions that exist at present. It is bitterly cold, and we have had rain for days, then frost, and now the ground is covered with snow, which makes a very pretty picture. We get no news about what is going on, only by a newspaper now and again, so, you see, you know more than us about what is going on. Our section has brought down three or four German aeroplanes that came spying over our lines. Our aeroplanes are very good, and the pilots are very daring. I am pleased to say that the majority of our section are keeping fairly well."

Well Construction of Vienna Auto-Bus

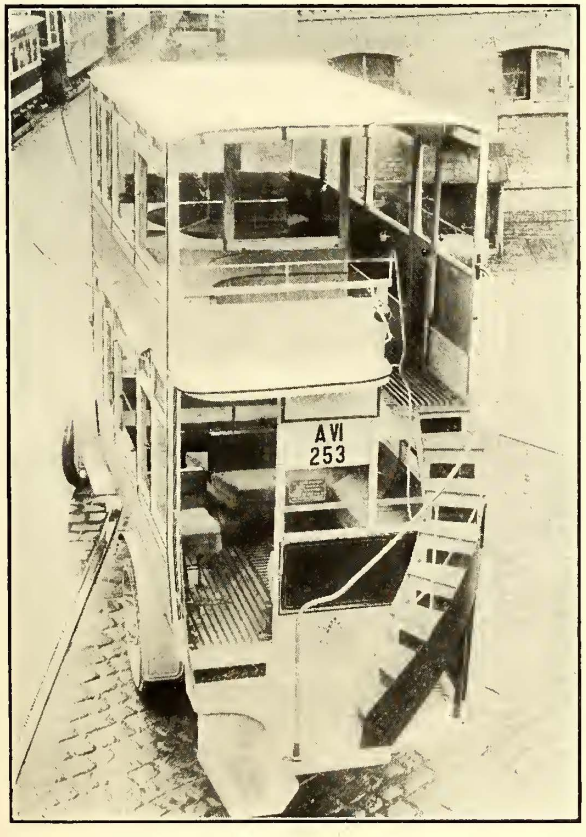
The Vienna Municipal Tramways, after a study of auto-bus designs used in Berlin, Paris and London, and following several experiments of its own, has recently installed a covered double-deck construction of the type shown in the accompanying illustrations. The most interesting feature of the new design is the use of wells whereby a most efficient seating arrangement is secured within the minimum over-all height, 14.4 ft. The cross-sectional view shows that this was obtained by lowering that part of the upper floor which is directly above the seating on the lower floor. As arranged for gasoline operation the new bus is 16 ft. over the body alone, 19 ft. from the front of the body over the rear stairway and 6.6 ft. over the sides. The lower deck seats fourteen passengers and the upper deck fifteen.

The view of the rear of the bus shows a single seat at the left. This seat is directly over the rear wheel,

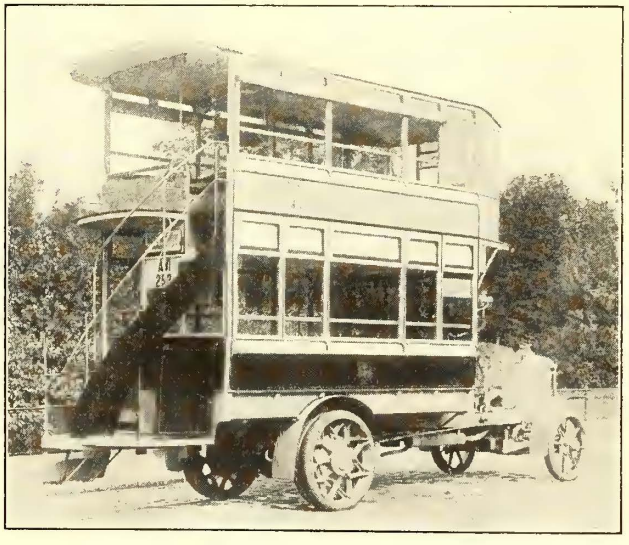


VIENNA AUTO-BUS—FIRST AND SECOND FLOOR PLANS AND CROSS-SECTION OF WELL-TYPE DOUBLE-DECK BUS

the housing of which extends through the flooring. Except for this seat a clear aisle 6.1 ft. high is provided to give access to the U-shaped seats, laid out as shown on the plan. The clearance between these seats and the ceiling is 4.8 ft. Passengers for the upper deck use the rear outside stairway which leads to a right-hand aisle 6 ft. high. Alongside this aisle are groups of curved and transverse seats, as illustrated. Another unusual feature is that a partition and door are provided on the upper deck to keep in the open, yet under cover, one three-passenger bench for the convenience of fresh-air lovers. This bus was invented by Ludwig Spängler, director Vienna Tramways.



VIENNA AUTO-BUS—REAR VIEW OF BUS SHOWING SEATING ARRANGEMENT



VIENNA AUTO-BUS—SIDE VIEW OF DOUBLE-DECK BUS WITH WELL FEATURES

On Nov. 29, 1914, occurred the twenty-fifth anniversary of operation by electricity of the street railway lines in the city of Ottumwa, Ia.

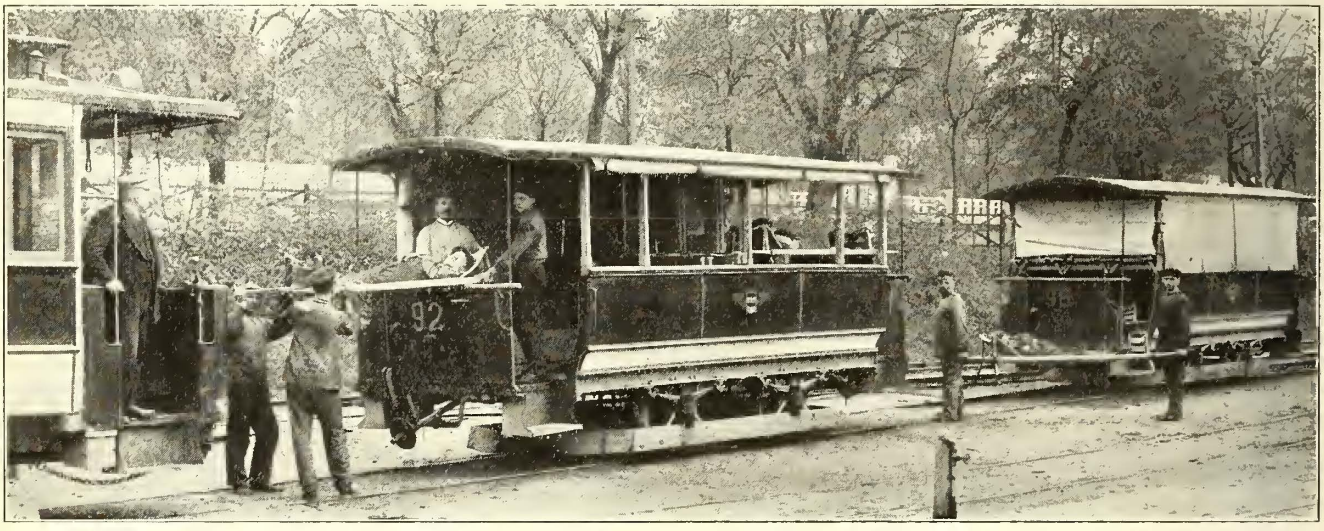
War Hospital Cars in Germany

The Tramways Assist in Transporting the Wounded to the Hospitals

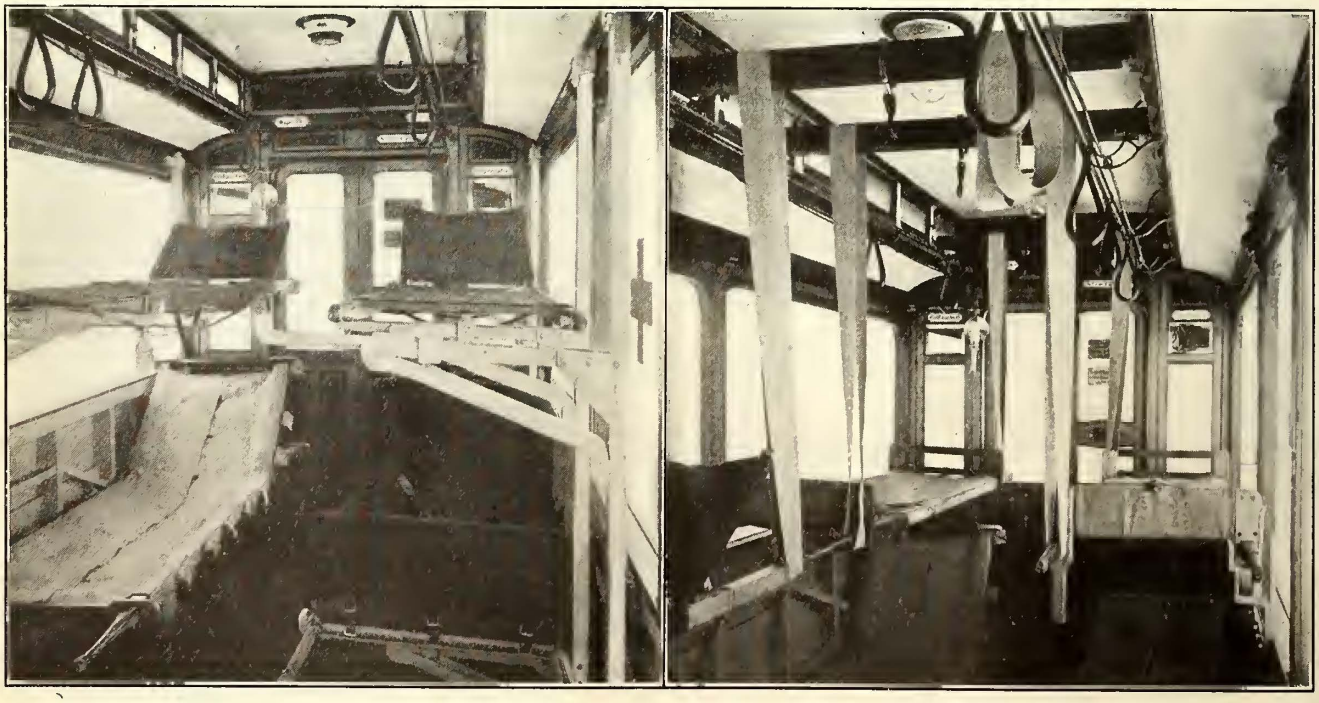
Through the courtesy of Eugen Eichel, editor *Elektrische Kraftbetriebe und Bahnen,* it is possible to present the accompanying data on what a number of the electric railways throughout Germany are doing to assist in the national crisis by the transportation of wounded soldiers.

In general, the soldiers who are wounded at the front are brought back for treatment by steam train to different cities in the Empire, where their proper care can be assured. Upon their arrival by train at the city thus selected they must be transferred from the railroad station to the local hospitals, and the tramways are used very largely for this purpose. The work is carried on in the thorough way so characteristic of German undertakings. A regular service has been inaugurated, and trains of one motor car and one or two trailers are usually provided by the tramway managements. The motor car serves to carry those who are slightly injured, whereas the trailers, which have been especially converted for hospital use with stretchers, etc., care for those men who have to be transported while recumbent. Especial pains are taken to disinfect all rolling stock.

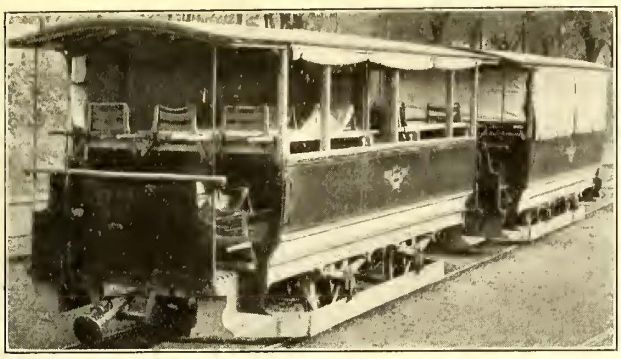
The simplest way of using the trailers, as at Cologne, is to support the handles of the stretchers on the window sills, at right angles to the track. The windows are replaced by weather-proof curtains. Where the cars are wide enough, as at Berlin, the seats have been removed and the cots have been placed at right angles to the track but entirely within the car. However, where the wounded men are to be carried an appreciable distance the less compact but more comfortable plan of placing the cots longitudinally is followed. It is usually possible to leave an aisle for the physician or nurse, and in some cases, as at Breslau, brackets have been installed to carry two tiers of stretchers. If the men require no attention during the trip, the cots are placed three in a row and in double tiers across the car (twelve



GERMAN HOSPITAL CARS—CARRYING WOUNDED TO BRÜNN TRAILERS BEFORE HAULING TO HOSPITAL VIA MOTOR CAR



GERMAN HOSPITAL CARS—BRESLAU CAR FITTED WITH BRACKETS TO CARRY UPPER TIER OF STRETCHERS, AND CAR WITHOUT BRACKETS



GERMAN HOSPITAL CARS—ARRANGEMENT OF TWELVE STRETCHERS PER CAR AT BRÜNN

cots in all), as at Brünn. Felt packing is used to minimize vibration. At Breslau the window posts and dashers were removed to facilitate the handling of stretchers. The sashes of the Breslau cars were also coated with a white oil paint to discourage the curious,

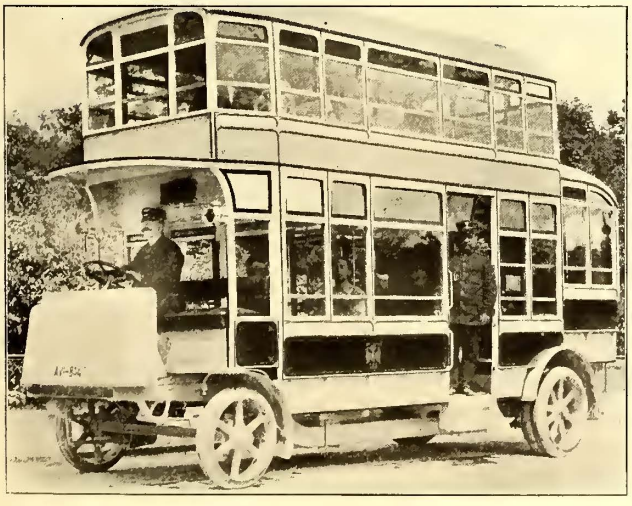
GERMAN HOSPITAL CARS—BRESLAU ROLLING STOCK IN RED CROSS SERVICE

and all dust-catching curtains and hangings were removed.

The Grosse Berliner Strassenbahn and several other railways have also built special sidings to bring these cars as close to the hospitals as possible.

Double-Deck Electric Buses at Vienna

The Vienna Tramways was one of the first street railway systems to look into the possibilities of the auto-bus. Its first trials were made with gasoline and trackless trolley types, but two years ago, on one line with 3.5 per cent grades, it placed in successful service thirteen storage-battery buses. These buses, however, had room only for eighteen seated and five standing passengers, which made their operation under city conditions too costly from the standpoint of crew expense. Following the purchase of some gasoline buses, the mu-



VIENNA SIDE-ENTRANCE BUS OF SPÄNGLER TYPE; NOTE OVERHANG

END VIEWS OF LONDON OPEN-TOP BUS; VIENNA ELECTRIC END AND SIDE-ENTRANCE BUSES

nicipality decided to develop a high-capacity (thirty-three-passenger) electric bus which would be more agreeable to the passengers and give more revenue to the city's power plant.

The double-deck type selected was designed by Ludwig Spängler, director Vienna Tramways. It is only 13.1 ft. high, a feature which enables it to clear places that are too low for the ordinary double-deck bus. Its center of gravity, as explained in the ELECTRIC RAILWAY JOURNAL for Dec. 12, is also very low. The first five buses have a wheelbase of 14.75 ft. and an over-all length of 23 ft. The drive for the rear wheels is by means of a double-motor and inclosed gearing. The battery sets have a range of 18.6 miles and are provided in triplicate to permit quick exchanges.

The accompanying set of end views shows three styles of Vienna buses: The one at the left is an open top cross-seat of London type; the second, a double-deck electric bus with low-step entrance on each side, rear platform and safety stairway of Spängler design; third, the latest, a side-entrance double-deck bus, with rear overhang 5 ft. long, as described on page 49. One novelty of the electric design is that the stairway is completely under cover.

The first buses of this type were placed in service on Sept. 20, 1914. Their maximum speed is 13.64 m.p.h. and their average speed 8 m.p.h. If the buses prove a financial success, others will be installed to serve the line between the stations of the Northwestern and Southern Railways, which include a run of 705 ft. over a 4.1 per cent grade.

The bodies were built in the municipality's car shops. The Accumulatoren and Daimler Companies furnished the accumulators and driving mechanism.

Illinois Central Gas-Electric Motor Car

Service with a General Electric Company's gas-electric motor car has been begun by the Illinois Central Railroad Company on its Hopkinsville-Princeton, Ky., branch, a distance of about 30 miles. The car makes three round trips each day and takes the place of a passenger accommodation train which formerly made the run. This car, with a capacity for eighty passengers, is divided into four compartments with a vestibule for the engineer, a baggage and mail room, a section for negroes, a smoker and a women's section, and is 74 ft. long. It was put into service on Dec. 1 without previous announcement that it would be used.

Results of a Straw Ballot of Readers' Preferences

Subjects of Greatest Interest Indicated by Subscribers from Selected Lists of Topics

In order to indicate to the editors of the ELECTRIC RAILWAY JOURNAL the preferences of the readers for the several departments, and at their request, the circulation department recently selected at random a thousand or more names from the subscription list and sent out a card ballot requesting data. Each reader who received a card was asked to select five from a list of topics covering those discussed by this paper and to arrange these selections in order of their interest to him.

Approximately one-third of these cards were returned, and the data have been tabulated. The results were so interesting that it was considered worth while to print them in the statistical issue. These preferences can be considered as approximate only, as the total number of ballots returned represent but a portion of the total circle of readers. However, the method used is similar to that employed in sampling coal and other material for test, and the errors due to the method of sampling are probably no greater than others involved in an investigation of this sort. In selecting from a list there is, of course, a tendency on the part of the reader to favor the topics printed high on the list, although in the present case this tendency was discouraged as far as possible by the order in which the topics were arranged. A reader, also, has considerable difficulty in selecting topics in order of interest, because the focus of interest is not a fixed point but shifts with business and engineering conditions. Readers also hesitate to imply by selecting certain topics that they are not interested in others. These and other psychological factors must be kept in mind in analyzing the tabulated data.

In compiling the data the subscribers who returned cards were classified by occupations as shown in Table I, where they are listed in numerical order.

In order to put the data into form for comparison the votes were "weighted" by allotting ten points for each first choice, eight for the second choice, six for the

TABLE I – OCCUPATIONS OF SUBSCRIBERS WHO REPLIED

	Number	Per Cent
Mechanical and electrical engineers	71	19.5
Manufacturers and consulting engineers	65	17.9
Master mechanics and assistants	47	12.8
General superintendents and assistants	37	10.1
Transportation superintendents and assistants	24	6.6
Auditors, comptrollers, etc	22	6.0
General managers and assistants	20	5.5
Roadway and structural engineers and foremen	16	4.3
Teachers and students	16	4.3
Presidents and other general officers	12	3.3
No names signed to ballots	8	2.2
Draftsmen and designers	7	1.9
Public service commissions and staffs	7	1.9
Claim agents	6	1.4
Purchasing agents and storekeepers	4	1.1
Signal engineers	2	0.6
Supervisors of safety	2	0.6
Total	366	100.0

TABLE II—WEIGHTED PREFERENCES FOR THE SEVERAL SUBJECTS

	Number	Per Cent
Operating methods and records	1,070	10.02
Equipment and Maintenance Department	982	9.20
Track and overhead lines	865	8.11
Heavy electric railroading	836	7.84
Car design, construction and equipment	830	7.78
Power generation and transmission	826	7.75
Employees' training and welfare work	776	7.28
Safety first methods	587	5.50
General news, personals, construction news	530	4.97
Public relations	528	4.95
Accounting methods	485	4.55
Carhouse and repair shop design	477	4.47
Signal apparatus and methods	389	3.65
Annual and monthly reports	359	3.37
Labor matters	329	3.08
Public service commission news	326	3.06
Legal decisions	251	2.37
Foreign electric railway practice	219	2.05
Totals	10,665	100.00

TABLE III—CHOICES OF DIFFERENT CLASSES OF READERS WEIGHTED AS DESCRIBED IN ARTICLE

Choices of Mechanical and Electrical Engineers	
(1) Power gen. and dist	428
(2) Track and o. h. lines	287
(3) Heavy elec. r. r	205
(4) E. and M. dept	204
(5) Oper. meth. and rec	198
All others	727
Total	2,049

Choices of Manufacturers and Consulting Engineers	
(1) Heavy elec. r. r	285
(2) Track and o. h. lines	181
(3) Gen'l news, etc	175
(4) E. and M. dept	165
(5) Oper. meth. and rec	157
All others	875
Total	1,838

Choices of Master Mechanics and Assistants	
(1) Car design	291
(2) E. and M. dept	245
(3) Carhouse, etc., des	211
(4) Empl. tr. and w	114
(5) Heavy elec. r. r	104
All others	445
Total	1,400

Choices of Gen'l Superintendents and Assts.	
(1) Emply. tr. and w	200
(2) Oper. meth. and rec	196
(3) E. and M. dept	126
(4) Safety first meth	118
(5) Track and o. h. lines	68
All others	392
Total	1,100

Choices of Transportation Supts. and Assts.	
(1) Empl. tr. and w	124
(2) Oper. meth. and rec	112
(3) Labor matters	74
(4) Safety first meth	72
(5) Public relations	62
All others	220
Total	664

Choices of Auditors, Comptrollers and Assts.	
(1) Acctg. meth	212
(2) Ann. and m. rep	138
(3) Oper. meth. and rec	64
(4) Empl. tr. and w	58
(5) Public relations	42
All others	138
Total	652

Choices of General Managers and Assts.	
(1) Oper. meth. and rec	126
(2) Public relations	54
(3) E. and M. dept	52
(4) Empl. tr. and w	48
(5) Safety First meth	46
All others	264
Total	590

Choices of Teachers and Students	
(1) Power gen. and dist	98
(2) Heavy elec. r. r	62
(3) Car design, etc	60
(4) Oper. meth. and rec	40
(5) Signal app. and m	34
All others	186
Total	480

Choices of Roadway and Structural Engineers and Foremen	
(1) Tr. and o. h. lines	138
(2) E. and M. dept	40
(3) Signal app. and m	34
(4) Public relations	30
(5) Empl. tr. and w	26
Gen'l news, etc	26
Heavy elec. r. r	26
All others	154
Total	474

Choices of Presidents and Other Gen'l Officers	
(1) Public relations	66
(2) Oper. meth. and rec	46
(3) Acctg. meth	32
(4) Empl. tr. and w	28
(5) Ann. and m. rep	26
Legal decisions	26
Safety first meth	26
All others	104
Total	354

Choices of Public Service Commission Staff	
(1) Car design, etc	32
(2) E. and M. dept	28
(3) Heavy elec. r. r	24
Oper. meth. and rec	24
(4) P. S. Comm. news	20
(5) Power gen. and dist	18
Tr. and o. h. lines	18
All others	44
Total	208

Choices of Draftsmen and Designers	
(1) Heavy elec. r. r	36
(2) Tr. and o. h. lines	26
(3) Carhouse des., etc	22
(4) E. and M. dept	20
(5) Safety first meth	14
Signal app. and m	14
All others	72
Total	204

Choices of Claim Agents	
(1) Legal decisions	40
(2) Safety first meth	38
(3) Public relations	20
(4) Labor matters	18
(5) Empl. tr. and w	16
All others	40
Total	172

Choices of Purchasing Agents and Storekeepers	
(1) Acct'g meth	26
(2) E. and M. dept	24
(3) Ann. and m. rep	16
(4) Car design, etc	10
Oper. meth. and rec	10
(5) Carhouse des., etc	8
All others	26
Total	120

Choices of Signal Engineers	
(1) Signal app. and m	20
(2) Tr. and o. h. lines	16
(3) Oper. meth. and rec	6
Safety first meth	6
(4) Empl. tr. and w	4
Heavy elec. r. r	4
Power gen. and dist	4
Total	60

Choices of Safety Supervisors	
(1) Safety first meth	18
(2) Car des., etc	12
(3) Empl. tr. and w	8
(4) Public relations	6
Carhouse design, etc	6
(5) Gen'l news, etc	4
Oper. meth. and rec	4
All others	2
Total	60

third, four for the fourth and two for the fifth. The weighted totals were first tabulated by topics in numerical order as shown in Table II.

Next the first five choices of each group were segregated and arranged as in Table III.

DEDUCTIONS

The most striking point brought out in the tables is that the ELECTRIC RAILWAY JOURNAL is a technical paper in the sense that its readers are primarily interested in those subjects which pertain to their own lines of work. For example, the mechanical and electrical engineers place highest on their list the subject of power generation and distribution, one to which naturally but a part of the paper can be devoted. Next, they are interested in the large problems of the industry, a fact shown by the large vote in favor of heavy electric traction.

The small showing of interest in foreign practice is somewhat surprising, but it can be accounted for, we think, to some extent at least, by the fact that it influences American practice but little. In scientific development of unusual electric railway equipment Europe undoubtedly leads, but it has little to teach of standard practice and methods.

The publishers of the JOURNAL have been much interested by the choice expressed by this portion of the readers of this paper, and it is believed that the readers also will be glad to learn of the different preferences named. Criticisms by readers of these lists of preferences will be welcomed.

Large Italian Order for Three-Phase Locomotives

In order to work the extensions of the electrically-equipped sections of the Italian State Railways now under construction, thirty-four 3000-volt, three-phase, 16 2/3-cycle locomotives have been ordered by the government—eighteen of the 4—6—4 type, weighing 84 tons, from Brown, Boveri & Company, and sixteen of the 2—6—2 type, weighing 68 tons, from the Italian Westinghouse Company. According to *Electrical Engineering*, both are driven by side-rods from two motors, jackshafts at the ends being employed in the former, but not in the latter. The motors develop 1300 hp each at 46.5 m.p.h. By a combined arrangement of pole-changing and cascade connection four economical speeds are obtained, namely 23.2, 31, 46.5 and 62 m.p.h. respectively.

Electric Railway Taxation in Indiana

The State Board of Tax Commissioners of Indiana has published its report for the calendar year 1914, regarding the assessed valuation of railway track, rolling stock and improvements on right-of-way of urban, suburban and interurban electric railways in that State, whether owned, controlled or operated by persons, companies, co-partnerships or corporations. The information contained in the report is summarized in the accompanying table, no distinction being made in regard to rolling stock operating over the company's own lines or over other lines under trackage rights.

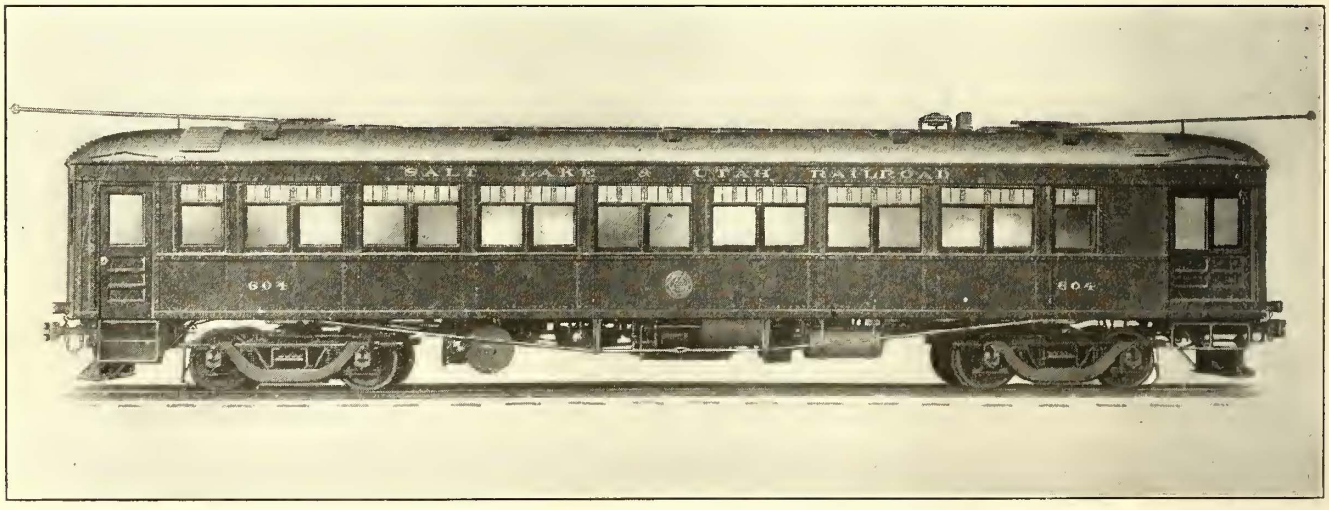
TABLE SHOWING ELEMENTS OF ASSESSED VALUATION FOR URBAN, SUBURBAN AND INTERURBAN ELECTRIC RAILWAYS IN INDIANA FOR 1914

Names of Railways	Main Track			Second Main Track			Side Track			Rolling Stock, Total	Improvements on Right of Way, Total
	Miles	Per Mile	Total	Miles	Per Mile	Total	Miles	Per Mile	Total		
Beech Grove Traction Company	3.94	$8,000	$31,520	0.05	$3,000	$150	0.13	$1,500	$195	$4,180	$6,400
Bluffton, Geneva & Celina Traction Company	18.17	4,000	72,680	....	....	....	1.12	1,500	1,680	1,817	300
Broad Ripple Traction Company	2.64	9,000	23,760	0.21	4,000	840	....	....	....	....	....
Brownstown & Ewing Street Railway	1.00	1,500	1,500	....	....	....	....	....	....	500	....
Central Indiana Lighting Company	5.26	5,000	26,300	....	....	....	0.04	1,500	.60	2,630	....
Chicago, Lake Shore & South Bend Railway	71.01	8,000	568,080	10.68	3,000	32,040	5.06	1,500	7,590	71,115	40,120
Chicago, South Bend & Northern Indiana Railway	95.24	9,000	857,160	15.85	3,000	47,550	9.32	1,500	13,980	95,240	24,500
Cincinnati, Lawrenceburg & Aurora Electric Street Railway	9.38	7,000	65,660	....	....	....	....	....	....	4,690	....
Evansville Railways	55.02	6,000	330,120	....	....	....	4.70	1,500	7,050	28,204	5,560
Evansville, Suburban & Newburgh Railway	24.36	7,300	177,828	....	....	....	2.73	1,500	4,095	19,488	18,800
Fort Wayne & Northern Indiana Traction Company	187.04	8,800	1,645,952	21.81	3,000	65,430	11.59	1,500	17,385	149,632	78,830
Fort Wayne & Northwestern Railway	41.73	6,000	250,380	....	....	....	0.38	1,500	570	25,038	11,947
Fort Wayne & Springfield Railway	19.55	5,000	97,750	....	....	....	0.47	1,500	750	6,615	2,500
French Lick & West Baden Street Railway	1.90	5,000	9,500	....	....	....	....	....	....	950	....
Gary & Interurban Railroad	76.99	9,000	692,910	5.52	3,000	16,560	1.09	1,500	1,635	61,592	23,000
Gary & Southern Traction Company	11.31	8,000	90,480	0.77	3,000	2,310	10	1,500	150	5,974	2,500
Hammond, Whiting & East Chicago Railway	19.94	12,000	239,280	7.88	3,000	23,640	2.05	1,500	3,075	19,940	5,600
Indiana Railways & Light Company	59.66	7,150	426,569	0.40	3,000	1,200	1.40	1,500	2,100	47,728	29,800
Indiana Utilities Company	3.70	3,000	11,100	....	....	....	....	....	....	370	....
Indianapolis & Cincinnati Traction Company	101.38	5,900	598,142	3.75	3,000	11,250	5.15	1,500	7,725	50,991	47,770
Indianapolis & Louisville Traction Company	40.67	6,000	244,020	0.23	3,000	690	1.18	1,500	1,770	25,479	8,135
Indianapolis, New Castle & Eastern Traction Company	58.72	5,500	322,960	....	....	....	3.26	1,500	4,890	35,441	22,420
Indianapolis Street Railway	111.28	52,000	5,786,560	....	....	....	5.41	2,000	10,820	333,840	39,215
Indianapolis Traction & Terminal Company	23.50	60,000	1,410,000	....	....	....	0.89	2,000	1,780	425,640	248,250
Interstate Public Service Company	58.11	8,500	493,935	....	....	....	4.01	1,500	6,015	58,514	17,080
Lebanon Thornton Traction Company	9.33	4,000	37,320	....	....	....	0.05	1,500	75	1,923	75
Louisville & Northern Railway & Lighting Company	16.38	8,500	139,230	....	....	....	1.21	1,500	1,815	16,576	2,590
Louisville & Southern Indiana Traction Company	11.42	11,400	130,188	2.61	3,000	7,830	1.22	1,500	1,830	23,016	2,580
Madison Light & Railway Company	3.00	4,000	12,000	....	....	....	0.10	1,500	150	1,200	2,000
Marion, Bluffton & Eastern Traction Company	31.74	5,500	174,570	....	....	....	1.79	1,500	2,685	12,696	6,000
Muncie & Portland Traction Company	30.59	6,000	183,540	....	....	....	0.65	1,500	975	15,405	10,370
New Albany Street Railroad	8.97	11,400	102,258	1.81	3,000	5,430	0.60	1,500	900	8,970	1,550
Ohio Electric Railway	22.38	8,800	196,944	0.68	3,000	2,040	0.35	1,500	525	18,380	10,000
Public Utilities Company	53.82	9,000	484,380	9.16	3,000	27,480	2.69	1,500	4,035	53,820	18,200
St. Joseph Valley Traction Company	31.61	5,000	158,050	....	....	....	0.49	1,000	490	6,322	70
Southern Michigan Railway	5.05	8,000	40,400	....	....	....	0.44	1,500	660	5,124	200
Terre Haute, Indianapolis & Eastern Traction Company	397.21	9,500	3,773,495	....	....	....	12.70	1,500	19,050	320,049	218,690
Union Traction Company of Indiana	335.33	9,000	3,017,970	10.24	3,000	30,720	22.11	1,500	33,165	268,982	160,640
Vincennes Traction Company	7.61	9,000	68,490	....	....	....	....	....	....	6,088	....
Washington Street Railway	2.60	4,000	10,400	....	....	....	0.15	1,500	225	1,300	....
Winona Interurban Railway	65.88	6,000	395,280	....	....	....	2.95	1,500	4,425	39,698	21,695
Winona & Warsaw Railway	2.83	7,500	21,225	....	....	....	0.92	1,500	1,380	5,660	1,020
Total	2137.25	....	$23,419,886	91.65	....	$275,160	108.50	....	$165,655	$2,280,817	$1,088,407

The Salt Lake & Utah Railroad

A 1500-Volt D.C. Interurban Railway Running Between Salt Lake City and Provo, a Distance of 48.5 Miles—The Line Was Built to Develop Good Agricultural Territory—Seven Trains a Day Are Operated Each Way, Exclusive of Freight—The Arch-Roof Combination Cars for High-Speed Train Service Are Described in Detail

An important addition to the heavy interurban electric railways of the Far West is represented by the Salt Lake & Utah Railroad, which was placed in operation for passenger service between Salt Lake City and Provo, Utah, on July 24, 1914. Regular freight service was inaugurated Aug. 15, 1914. The franchises for this line were secured in 1912 by the citizens of Salt Lake and the territory south of that city, and shortly thereafter W. C. Orem, now president, became interested in the financing and construction of the road. Actual construction was begun early in 1913, and through the extraordinary efforts of the Westinghouse Electric & Manufacturing Company, which furnished the substation, line and traction equipment, service was started at the date mentioned. The new line taps a great deal of territory which had not been served by the steam railroads, although this section is amply irrigated and suitable for fruit raising or intensive farming. There is every prospect that the population, now about 50,000, exclusive of 110,000 at Salt Lake City, will increase very rapidly owing to the liberal service offered by the new railway. Preliminary construction notes on this property were printed in the ELECTRIC RAILWAY JOURNAL for Jan. 10, 1914, page 87.



SALT LAKE & UTAH RAILROAD—INTERURBAN STEEL CAR WITH ARCH ROOF

WAY, LINE AND POWER

The roadbed is constructed on steam railroad standards with 75-lb. rail, continuous joints and 2840 ties per mile. Standard switches with spring rail frogs are used on all main line turnouts. The rails are bonded with the twin terminal bond of the American Steel & Wire Company. The maximum grades are 1 per cent. except in one or two places where temporary grades have been used. Thus, for a stretch of about 2 miles on both sides of Provo Bench near Provo a grade of 1½ per cent is employed. It is expected, however, that when business requires double track for freight and express passenger trains a detour of this 1½ per cent. grade will be built.

The overhead construction is of the catenary type to permit operation at 750 and 1500 volts d.c. Poles with angle-iron brackets support the messenger and trolley and are so arranged that future double-track requirements can be made by adding a bracket on the opposite side of the pole. A No. 0000 trolley and No. 0000 feeder are used.

Energy is purchased under a fifty-year contract from the Utah Power & Light Company at 45,000 volts, sixty cycles and converted at the substations to 1500 d.c. by means of three 150-kw transformers and two 250-kw rotary converters. These rotary converters operate at 750 volts alone and 1500 volts in series. A third rotary converter is installed in each substation as a spare for series connection with either of the others.

SERVICE AND ROLLING STOCK

At this time the company is operating seven trains a day in each direction on telephoned train orders, special attention being given to convenient connections with the Salt Lake & Ogden Railway and the Ogden Rapid Transit Company in a joint depot at Ogden. Special Sunday and holiday excursions as well as theater trains are a popular feature of the company's service. The theater trains are operated from both Salt Lake City and Provo, the trains leaving at 11:45 p.m. A popular pleasure resort is Utah Lake, near Provo. Here fishing, boating, hot and cold bathing and dancing are the chief attractions.

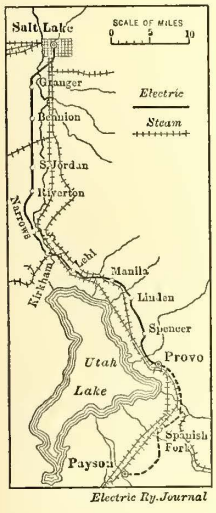
The company sells unrestricted mileage books at the rate of $11.25 per 500 miles and $20 for 1000 miles. These books are also good on the Salt Lake & Utah Railroad, Salt Lake & Ogden Railway and the Ogden Rapid Transit Company. Children between five and twelve years of age are carried at half fare. The baggage allowance is 150 lb. for every full fare and 75 lb. for every half fare. Although the company has been operating only a short time, it has already made a strong bid for special excursions for clubs, lodges, Sunday Schools, colleges, churches and other organizations.

The rolling stock of the company consists of five 61-ft. steel cars with passenger, smoking and baggage com-

partments, two 50-ft. straight express cars and one locomotive flat car, all with the same motor equipment. The general data on the arch-roof passenger cars, as furnished by the Niles Car & Manufacturing Company, Niles, Ohio, follow:

Length over the spring buffers	61 ft. 8 in.
Length over the vestibules	59 ft. 8 in.
Length of the body over the end plates	49 ft. 3 in.
Length of the rear platforms	5 ft. 2⅝ in.
Length of the main passenger compartment	31 ft. ½ in.
Length of the smoking compartment	10 ft. 11 in.
Length of the baggage compartment	11 ft. 9 in.
Width over all	9 ft. 6 in.
Width over the outside sheathing at sills	9 ft. 4 in.
Width, inside	8 ft. 10¾ in.
Width of the seats	40 in.
Width of the aisle	25¾ in.
Height from the under side sills to the top of the roof	9 ft. 6 in.
Height from the track to the top of the trolley platform	13 ft. 4 in.
Seating capacity	66
Weight of the car body, exclusive of the electric power equipment and air brakes	38,392 lb.

The underframe is built up entirely of steel beams, channels and angles with hot-riveted gussets and angles at all joints. The two center sills are 8-in. 18-lb. I-beams, the side sills are 8-in. 13¾-lb. channels, while 5-in. and 6-in. channels are used for the cross-sills. There are also diagonal braces, 6 in. x ¼ in., between the drawbar anchor plates and the side sills at the bolsters. Each end of the underframe has a buffer of 8-in. channel riveted by angles to all sills and fitted on the outside with radial spring buffers built up of steel channels and plates. The floor consists of 13/16-in. x 3¼-in. yellow pine in two layers, with two thicknesses of waterproof building felt between. The toilet section has a "Flexolith" floor.



S. L. & U. R. R.—MAP

The body frame is of steel riveted at all joints with corners or gussets. For the side posts 2¼-in. x ¼-in. T's are used. Corner posts and each alternate side post separating twin windows are double. The double posts have steel panels riveted to the outside. The side plates are 3 in. x 2 in. x ¼-in. angles; the sheathing below the windows and cross bulkheads are No. 12 gage steel and the belt rails are 2½-in. x ½-in. steel bars. The side walls below the windows are double, with 2¼-in. air space between the outside steel sheathing and the inside lining of ¼-in. agasote.

The roof is of the single-arch type with continuous steel carlins fastened to the side plates; also with wooden carlins about 10 in. between centers for fastening the roof sheathing and ceiling. The outside is sheathed with ½-in. x 2¼-in. cypress and No. 8 cotton duck. Ventilation is supplied through eleven Lintern automatic roof ventilators with ceiling grills or registers. Each side has sixteen windows of twin style, the upper sashes being stationary while the lower sashes are arranged to raise between the double upper sashes.

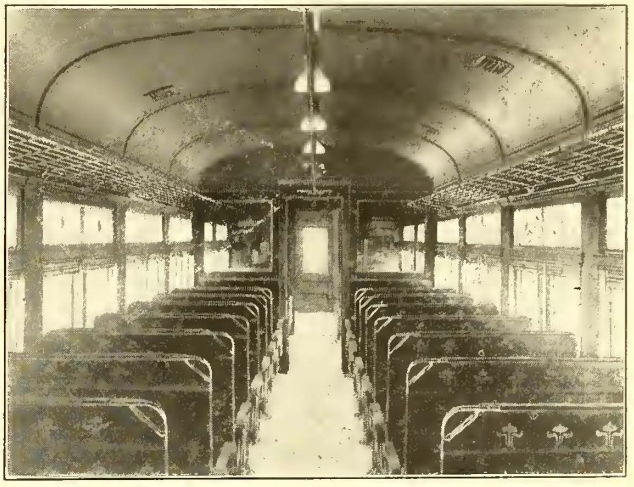
The main passenger compartment at the rear end of the car occupies a length of eleven side windows and the smoking compartment adjacent occupies four side windows. Swing doors are used throughout except that the baggage compartment has a 4-ft. sliding door at the side. The baggage door at the right-hand side of the motorman has a sliding sash in the upper part to enable the motorman to look backward.

The seating layout is as follows: Main compartment —seventeen 40-in. Hale & Kilburn No. 199-EE steel seats with 25-in. headroll, reversible backs, bronze grab handles, automatic foot rest, upholstered in dark green leather, and four corner seats with stationary backs; smoking compartment—four reversible and four stationary back seats, upholstered in canvas-lined rattan; baggage compartment—wooden slat seats, paneled underneath, with removable tops to form receptacles for sand, tools, etc.

The trucks are of Baldwin class AA type with 84-in. wheelbase, intended for operation over curves of 50-ft. radius. The center-plate capacity per truck is 34,196 lb. The weight on trucks, covering the car body only, including couplers, heaters, seats, etc, but without live load, is 38,392 lb. Other weights follow:

Electrical equipment with double-end control	2,600 lb.
Dynamotor	2,400 lb.
Air-brake equipment	2,500 lb.
Maximum load of 150 passengers at 150 lb. each	22,500 lb.
Maximum load on two-truck center plates	68,392 lb.
Weight on track of car body, including all equipment but without live load	45,892 lb.
Two trucks without motors, gears or cases	25,200 lb.
Motors, including gears and cases	14,800 lb.
Total weight of car on track without live load, ready for service	85,892 lb.

The trucks are fitted with 36-in. diameter Standard M.C.B. wheels, A.E.R.E.A. open-hearth axles, 7-in. diameter at the gear seat, and 5-in. x 9-in. journals. The bolster is of cast steel with Symington Ba center plates and quadruple elliptical springs. Perry roller side bearings are used on all cars.


SALT LAKE & UTAH RAILROAD—INTERIOR VIEW, SHOWING LOCATION OF VENTILATORS AND LAMPS

The motor equipment comprises four 115 hp Westinghouse 334-E 6 inside-hung motors, geared for 60 m.p.h. and capable of operation on either 750 or 1500 volts d.c. The control is of HL type suitable for single and multiple car operation. The air brakes are of Westinghouse automatic type with A.M.M. No. 24 valve, while the hand brakes include the Peacock No. 27-E drum and Pittsburgh bronze ratchet drop handle.

Each car is supplied with thirty-two Consolidated No. 393-T, single-coil truss plank heaters with thermostatic control. The lighting units for the interior consist of fourteen 94-watt lamps with Alba shades; also one circuit of 23-watt lamps for signs, vestibules, toilet, etc. A luminous arc headlight is used for operation over the 1500-volt section. Arrangement has also been made for one illuminated train number sign over each door. Among the miscellaneous equipment on the car the following may be noted: Janney automatic M.C.B. radial couplers, locomotive style pilots, steel alarm gong with air ringer and foot button for city service, whereas air whistles are used for interurban service, Lintern pneumatic sanders and Knutson No. 5 retriever.

Berkshire Semi-Outdoor Portable Substation

Last summer the Berkshire Street Railway, Pittsfield, Mass., whose out-door substation at Lee, Mass., was described in the ELECTRIC RAILWAY JOURNAL of Dec. 6, 1913, has added and placed in service a new semi-outdoor type of portable substation to supplement the power supply on certain sections favored with heavy excursion traffic. The substation was built by the General Electric Company and has a continuous capacity of 300 kw at 600 volts, transforming from a 33,000-volt, twenty-five-cycle, three-phase line supply.

This substation consists of an inclosed operating compartment containing the synchronous converter, the three-panel switchboard and the three-unit electric heaters; an inclosed central room for the multi-gap lightning arrester equipment; and an open section for the main transformer, the current transformer, automatic oil switch, choke coils, disconnecting knife switches, etc. Owing to the low overhead clearances the car has been kept within 11 ft. 6 in. above the rails, including the running board.

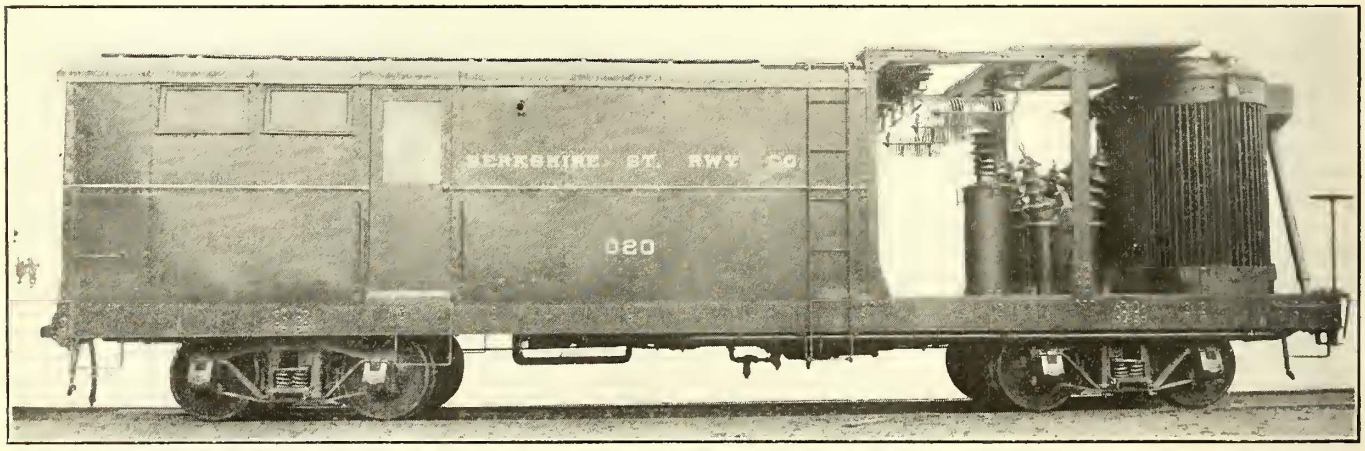
The car is an all-steel structure, the underframe including four 12-in. steel channels which extend the entire length of the platform. The two center channels, which form a box girder, are provided with ⅜-in. top and bottom plates, so that reliance is not placed on the floor plates to give the required strength. At the converter end, two pairs of 6-in. steel channels extending across the car are riveted on top of the underframing, the space between each pair being filled with concrete. These members constitute the foundations for the machine, which is set on wooden blocks, provided with leveling plates and secured by anchor bolts in the usual manner. Ventilating openings are located in the floor of the car under the converter to get cool air when the machine is in operation. The openings are fitted with removable sheet-iron covers and permanent wire mesh screens.

A snow shield formed of sheet steel and framed with angles extends from the center on top of the support over to a wooden block base on the transformer top. This protects the high-tension bushings to the transformer, which are brought out in a horizontal position because of lack of overhead clearance on the road, and also those to the oil switch units and the current transformer. A short cover likewise extends over the incoming line leads and those to the lightning arrester compartment at the other end of the supporting frame. The incoming insulators each side of the choke coils are suspended from cross-steel angles tied into the framing.

The operating compartment end of the car is bolted to the sides and roof so that it may be entirely removed for the installation or removal of the apparatus. The section of the roof over the converter is also bolted down so that it may be readily removed for installing or dismantling the apparatus when a crane is available. A galvanized sheet-metal ceiling is built on the interior so as to form air pockets between it and the roof sheathing to prevent any direct radiation of heat when the car is standing in the sun and also to drain any condensation or possible leakage to one side of the car away from the apparatus.

The electrical equipment includes a three-phase, twenty-five-cycle, 600-volt, commutating-pole, synchronous converter operating at 750 r.p.m. The transformer connections are arranged for a.c. starting from 50 per cent secondary taps, with series resistance to cut down the initial rush of current. The machine has a normal rating of 300 kw continuously, 450 kw for two hours and a momentary overload capacity of 900 kw. This high overload capacity is an important merit for interurban railway conditions.

The transformer is an oil-insulated, self-cooled, outdoor type, rated 330 kva, three-phase, twenty-five cycles. Voltage taps are arranged on the primary side for unusual flexibility, operating at either 33,000, 13,000 or 11,000 volts "Y" by using either series or multiple connections of the primary coils. The secondary, or low-tension winding, is designed for 385 volts and is provided with the 50 per cent starting taps previously mentioned. Series resistance is also used in starting. In order to make the secondary leads weatherproof at the point of entrance, they are inclosed in a small sheet-iron box, from which the connections are carried to the switch panels through conduit.



300-KW 33,000-VOLT PORTABLE SUBSTATION FOR THE BERKSHIRE STREET RAILWAY

The remaining apparatus is of standard General Electric design, including bell alarms for the automatic oil switch and for the d.c. 1000-amp circuit breaker.

The specific dimensions and important data applying to this portable substation are as follows:

Length over all	38 ft
Width over sides of car	8 ft. 4 in.
Maximum width (over side channels)	8 ft 6 in.
Height over all (including running board)	11 ft. 6 in.
Height of floor above rails	3 ft. 8½ in.
Total length of inclosed cab	23 ft. 6 in.
Length of operating room	14 ft. 6 in.
Length of lightning arrester compartment	9 ft.
Length of outdoor section	14 ft. 6 in.
Truck base	25 ft.
Wheelbase	5 ft. 2 in.
Wheels	33 in.
Total weight	80,000 lb.

The Omaha & Council Bluffs Street Railway has found that red gum at $40 per thousand feet B.M., affords it a means of making a considerable saving for the panels under the windows of its cars where it had been using cherry at a cost of $125 per thousand.

COMMUNICATIONS

Motor Overloads and Flashing

SALISBURY HOUSE, LONDON WALL,
LONDON, ENGLAND, Dec. 15, 1914.

To the Editors:

In regard to the matter of motor overloads raised in a letter by William A. Del Mar, published in a recent issue of the ELECTRIC RAILWAY JOURNAL, I would state that it is extremely difficult in practice to define what amount of overloading in a shop test will be sufficient to cover the prevention of flashing over under actual conditions in practice, and I am not sure that I should hold a manufacturer blameless should his motors flash over in practice even though a shop test of the nature specified should have been complied with. My own practice has been to specify the nature of the work, the average output, the maximum tractive effort, the number of stops and the permissible rise in temperature, and then to specify that under all reasonable working conditions the motors must be free from both sparking and flashing. I have known motors that would comply with the conditions set down in the proposed Section 418 of the A. I. E. E. standardization rules, and still flash over in practice, and I have known motors that would not comply with the specifications of this section and which have proved entirely satisfactory.

I do not profess to criticise the section referred to, but only point out that it is extremely difficult to formulate any clause that will secure the desired result.

H. F. PARSHALL, Consulting Engineer.

The New Jersey Decision

WELSH BROTHERS, INVESTMENT BONDS
PHILADELPHIA, PA., Dec. 21, 1914.

To the Editors:

The editorial in your issue of Dec. 19 entitled "New Jersey Rate Decision" has caused me some bewilderment. You close this editorial with the following words: "We hope that the clear exposition of this entire subject by the New Jersey court will help to clarify public opinion on this important matter." I have already read with care the full decision of this case by the New Jersey Court of Errors and Appeals and have found my opinion very much confused by it instead of clarified.

The official summary of this opinion concludes with the following: "It is erroneous to assign no value, or a merely nominal value, to such franchise when a substantial value is fairly reflected in the total market value of its securities." In attempting to give a value to the property of public service companies for the purpose of rate making the court would, I think, have the commission proceed along the following line of reasoning:

1. Rates must be such as to yield a fair return upon the value of the property used in the service of the public.

2. In that value must be included a substantial amount for the value of franchises.

3. The value of the franchise is based, in part at least, upon the earnings of the company just prior to the valuation.

I hold that if the value of the franchise, as a matter of right, is to be based upon the earnings of the company just prior to the date of valuation, they should be based upon the full earnings. If the full earnings are not used for this purpose, a part of the value of the franchise to which the company would be entitled according to the reasoning of this court will have been confiscated and full justice to the company will not have been done. If, then, the full earnings are to be used for this purpose, the rates already in effect will have to be approved in their entirety and the power of the commission to regulate at all will have been rendered nugatory.

It seems to me that the court is in error when it employs a procedure of valuation for purposes of taxation and public condemnation to establish a method for valuation for the purpose of rate making. Valuation for the latter purpose, it seems to me, is quite different from valuation for the two former purposes. For example, take valuation for the purpose of taxation: In the year for which the tax is levied, the company has received a certain income based upon rates, which, because not questioned by the rate making power, are legal for that year. The taxation for that year should, therefore, I think, be based upon that income actually and legally received. If, then, the rate making body proceeds to inquire into the justice of the rates in effect in that year, and, finding them excessive, reduces them for the following year, the valuation in the following year for the purpose of taxation should be correspondingly reduced and the actual tax in that following year will be based upon the actual income received in that following year. Therefore, the value of the franchise as based upon actual income should, at all times, be included in the valuation for the purpose of taxation. If it is included in the valuation for rate making purposes, it will inevitably result, as indicated above, that rates cannot be regulated downwards at least.

From the chapter entitled "Franchise in Rate Cases" in Whitten's "Valuation of Public Service Corporations" I have found that among the numerous decisions cited therein, with a few exceptions, there is none which specifically allows, in valuations for rate making purposes, the inclusion of value for franchises in excess of the fair cost of acquiring the same. The strongly marked trend of legal opinion, as indicated in this chapter, had seemed to me to make the question of the value of franchises for this purpose entirely clear and to render justice to the companies and the holders of their securities.

In your editorial you draw an analogy between the value of the franchise and the value of property taken up many years ago by individuals under the government homestead act. I fail to find any analogy between these two cases. Many of the state commissions grant to public service corporations the benefit of the increase in value of the real estate and property owned by them when those commissions base rates upon the cost of reproducing the property of the companies at the time of valuation for rate making purposes. Many, or most, of these commissions also allow a considerable going-concern value to cover the cost of building up the business. If there is a substantial risk connected with building up the business, that should be, and often is, taken care of by allowing a sufficient return upon a fair value to attract the capital necessary for constructing the plant and building up the business.

I cannot see how such value can be covered by the value of the franchise without recognizing the full earnings of the company at the time being, as reflected by the market value of the entire capitalization of the company and thus in effect rendering the rate making power null and void. HERBERT S. WELSH.

[EDITORS' NOTE—We realize that judicial opinion on this point is divided but hardly believe that the principle laid down by the New Jersey Court could be used in a hypothetical case to justify reasoning in a circle; that is to say, that the value of the franchise is large because the rates are high, and the rates must be kept high so as not to reduce the value of the franchise. The New Jersey court did not say that the value of the franchise should be a controlling factor in the

establishment of rates but condemned the policy of assigning no value to it or merely a nominal value when a substantial value is fairly reflected in the total market value of the securities. The comparison to the homestead act in our brief editorial was intended to show that the grant of the franchise, or the homestead, was a consideration in both cases for the recipient to undertake the risk and expense of developing the property. A good summary of the principle at issue, as well as the dictum of the New Jersey court, as we read the decision, is the wording used in Principle IX of the Code of Principles. This principle reads as follows: "In the appraisal of an electric railway for the purpose of determining reasonable rates, all methods of valuation should have due consideration."]

Publicity by Public Utility Commissions

State of North Dakota
Office of Commissioners of Railroads
Bismarck, Dec. 19, 1914.

To the Editors:

We have read with considerable interest the article on page 1240, of your issue of Dec. 5, on "Publicity by Public Utility Commissions."

While the North Dakota Railroad Commission is not, in the full sense, a public utility commission, I desire to express my concurrence with the views expressed in the article mentioned. In all proceedings of this commission, we seek the utmost publicity, and through official pamphlets and our State newspapers publish as news items practically all the proceedings of the board. We have found that this is not only beneficial to the board but highly appreciated by the people in general, as it has brought to common knowledge the powers and duties of the commission, which, a few years ago, were absolutely unknown. As a result, it has greatly strengthened the commission and broadened its field of usefulness to the people. As another result of this publicity, many things come before the board which heretofore have been settled with the public utility companies direct with satisfactory results.

I am a newspaper man and, naturally, appreciate the value of publicity in all its various phases and am very much impressed with the importance to the people of a complete knowledge of the acts of its public servants. The more publicity we can secure as to the proceedings of various public boards, I am thoroughly convinced, will be for the best interests of all concerned.

W. F. Cushing, Secretary.

Education and the Code of Principles

Purdue University
Lafayette, Ind., Dec. 22, 1914.

To the Editors:

The editorial bearing the title "Poisoning the Wells," which appeared in the Electric Railway Journal of Dec. 5, was a very clear exposition of the views which have been lying more or less dormant in the minds of many technical educators for years. Attempts to obtain in the past the necessary data and co-operation from the railway and lighting officials to enable both sides of the problem of the proper regulation of public service corporations to be fairly presented to classes in economics and engineering have been met with indifference. Whatever the motive, therefore, that prompts this policy of publicity toward the educational institutions of the country, it will doubtless receive a hearty reception, at least from engineering schools.

The writer cannot agree with the editorial in the contemporary which you criticise that "No conclave of disinterested public scientists would presume to formulate a canon of correct principles on the relations of public utility corporations to the state." This is the very activity in which economists have been engaged for years. It is also but natural that with the intimate contact which exists in most universities between departments of political science, economics and history, the part of the state should be emphasized at the expense of the corporation. This condition has been aggravated by the lack of interest on the part of corporation officials.

The original editorial in question points out that all but one of the "Code of Principles" of the American Electric Railway Association are debatable. Does it desire to confine technical education to undebatable problems? If so, the very foundations of engineering education are to be undermined, and the first debatable problem in practice will be met by the technical graduate with much less success than at present.

It is not argued that all the principles set forth are ideal or even unprejudiced, but it is believed that students, under the guidance of able instructors, will be able to arrive at a more sane solution of the problem at issue between the public service corporations and the state if both parties to the controversy are allowed to present their arguments in whichever form they may consider desirable.

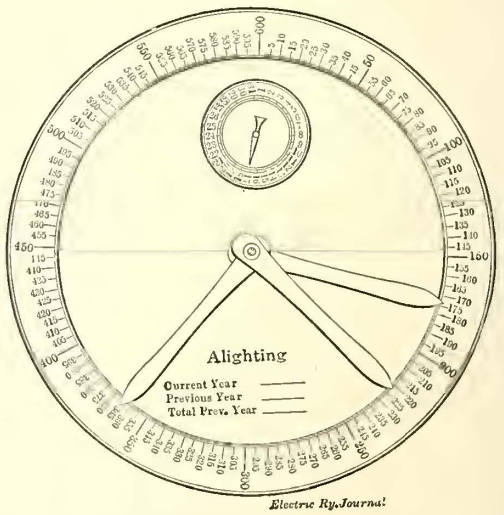
C. Francis Harding,
Professor of Electrical Engineering.

Graphic Comparisons of Accidents

By Edward Dana, Assistant Superintendent of Surface Lines Boston Elevated Railway

It is quite difficult to present statistical information to many officials of a large railroad and to its trainmen in such a manner as to be quickly understood in its proper relation.

Recently during our "safety first" campaign diagrams of the type illustrated were used very successfully to show results by the month for six types of accidents. The hands were colored respectively red, green and



Boston chart used to show comparative accident record

black. The black was permanently set at the total number for the corresponding month of the year previous, the red was changed from day to day to indicate the total up to that date for the present year and the green was changed from day to day to indicate the total up to that same day for the previous year. The small dial shows the day of the month to which the chart was corrected. The plan may be used for a division of carhouses as well as for the entire system. We have found that it gives a very quick comparison of accidents.

American Association News

Committee Lists for 1915 Practically Complete Are Given—Meetings of American Executive, Valuation, Block Signal and Educational Committees Are Announced—Preliminary Mid-Year Meeting —Transportation Plans Are Described

COMMITTEE APPOINTMENTS FOR 1914-1915

The following list of committees is practically complete but is subject to extension due to the fact that a few committees are not yet complete.

AMERICAN ASSOCIATION STANDING COMMITTEES

Aera advisory—H. C. Donecker, chairman, Newark, N. J.; J. H. Hanna, Washington, D. C.; J. K. Choate, New York, N. Y.; Edwin H. Baker, New York, N. Y.; Daniel W. Smith, Detroit, Mich.; C. G. Rice, Pittsburgh, Pa.; L. T. Hixson, Indianapolis, Ind.; Ernest Gonzenbach, Syracuse, N. Y.; J. V. Sullivan, Chicago, Ill.; C. B. Wells, Denver, Colo.; Anthony N. Brady medal—A. W. Brady, chairman, Anderson, Ind.; Frank Hedley, New York, N. Y.; C. S. Sergeant, Boston, Mass.; award of bronze medal for best paper presented before a company section—O. T. Crosby, chairman, Warrenton, Va.; S. G. McMeen, Columbus, Ohio; James H. McGraw, New York, N. Y.

Company membership—J. E. Gibson, chairman, Kansas City, Mo.; F. W. Hild, Portland, Ore.; R. W. Spofford, Augusta, Ga.; J. J. Caufield, Minneapolis, Minn.; A. M. Patten, Topeka, Kans.; George L. Radcliffe, Cleveland, O.; M. S. Sloan, New Orleans, La.; Samuel Riddle, Louisville, Ky.; C. S. Ching, Boston, Mass.; company sections and individual membership—Martin Schreiber, chairman, Newark, N. J.; R. P. Stevens, Youngstown, Ohio; H. A. Bullock, Brooklyn, N. Y.; H. H. Norris, New York, N. Y.; E. J. Blair, Chicago, Ill.; B. C. Edgar, Nashville, Tenn.; George G. Whitney, Washington, D. C.

Compensation for carrying United States mail—Capt. A. R. Piper, chairman, Brooklyn, N. Y.; W. H. Collins, Gloversville, N. Y.; P. N. Jones, Pittsburgh, Pa.; Henry S. Lyons, Boston, Mass.; H. A. Nicholl, Anderson, Ind.; J. K. Choate, New York, N. Y.; T. C. Cherry, Annapolis, Md.; cost of passenger transportation service—James D. Mortimer, chairman, Milwaukee, Wis.; Paul Shoup, Los Angeles, Cal.; Henry G. Bradlee, Boston, Mass.; Thomas N. McCarter, Newark, N. J.; Charles N. Black, San Francisco, Cal.; education—H. H. Norris, chairman, New York, N. Y.; H. A. Bullock, Brooklyn, N. Y.; Martin Schreiber, Newark, N. J.; W. L. Robb, Troy, N. Y.; A. M. Buck, Urbana, Ill.; V. Karapetoff, Ithaca, N. Y.

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Organization of the International Electrical Congress, San Francisco, 1915, acting with American Institute of Electrical Engineers—Frank R. Ford, New York, N. Y.; Henry G. Stott, New York, N. Y.; Henry W. Blake, New York, N. Y.; Edwin B. Katté, New York, N. Y.; public relations—Thomas N. McCarter, chairman, Newark, N. J.; T. S. Williams, Brooklyn, N. Y.; James D. Mortimer, Milwaukee, Wis.; James H. McGraw, New York, N. Y.; Guy E. Tripp, New York, N. Y.; S. M. Curwen, Philadelphia, Pa.; E. W. Rice, Jr. Schenectady, N. Y.; Frank R. Ford, New York, N. Y.; J. H. Pardee, New York, N. Y.; Frank Hedley, New York, N. Y.; Charles N. Black, San Francisco, Cal.; T. S. Wheelwright, Richmond, Va.; C. K. Knickerbocker, Chicago, Ill.; Arthur W. Brady, Anderson, Ind.; E. G. Connette, Buffalo, N. Y.; Geo. E. Hamilton, Washington, D. C.; R. M. Searle, Rochester, N. Y.; H. G. Bradlee, Boston, Mass.; H. H. Vreeland, New York, N. Y.

Relations with Manufacturers' Association—(representing American Electric Railway Association) C. L. Henry, chairman, Indianapolis, Ind.; Arthur W. Brady, Anderson, Ind.; R. E. Danforth, Newark, N. J.; (representing Manufacturers' Association) W. L. Conwell, New York, N. Y.; C. R. Ellicott, New York, N. Y.; E. H. Baker, New York, N. Y.; relations with state and sectional associations—R. P. Stevens, chairman, Youngstown, Ohio; Patrick Dubee, Montreal, Que.; H. C. Donecker, Newark, N. J.; James F. Hamilton, Schenectady, N. Y.; C. L. S. Tingley, Philadelphia, Pa.; Ernest Gonzenbach, Syracuse, N. Y.; representing association at the American Good Roads Congress—E. C. Faber, chairman, Wheaton, Ill.; C. N. Wilcoxon, Michigan City, Ind.; C. D. Emmons, South Bend, Ind.

Standards for car loading—S. W. Huff, chairman, Brooklyn, N. Y.; E. J. Dickson, Buffalo, N. Y.; E. J. Cook, Rochester, N. Y.; M. C. Brush, Boston, Mass.; W. F. Ham, Washington, D. C.; subjects—C. L. Henry, chairman, Indianapolis, Ind.; R. E. Danforth, Newark, N. J.; H. C. Clark, New York, N. Y.; C. S. Mitchell, president Accountants' Association, Pittsburgh, Pa.; L. P. Crecelius, president, Engineering Association, Cleveland, Ohio; William Tichenor, president, Claims Association, Indianapolis, Ind.; M. C. Brush, president, Transportation and Traffic Association, Boston, Mass.

Taxation matters — T. W. Wilson, chairman, Wilmington, Del.; *Alabama*—J. P. H. DeWindt, Birmingham, Ala.; *Arizona* — R. G. Arthur, Douglas, Ariz.; *Arkansas*—C. J. Griffith, Little Rock, Ark.; *California* —H. A. Mitchell, San Francisco, Cal.; *Colorado*—B. M. Lathrop, Colorado Springs, Colo.; *Connecticut*—L. S. Storrs, New Haven, Conn.; *Delaware*—T. W. Wilson, Wilmington, Del.; *District of Columbia*—W. F. Ham, Washington, D. C.; *Florida* — Hardy Croom, Jacksonville, Fla.; *Georgia*—P. S. Arkwright, Atlanta, Ga.; *Indiana*—R. I. Todd, Indianapolis, Ind.; *Iowa*—W. G. Dows, Cedar Rapids, Iowa; *Kansas* — A. M. Patten, Topeka, Kans.; *Kentucky*—F. W. Bacon, Lexington, Ky.; *Louisiana*—Jos. H. DeGrange, New Orleans, La.; *Maine*—Howard Corning, Bangor, Me.; *Maryland*—J. J. Doyle, Baltimore, Md.; *Massachusetts*—H. S. Lyons, Boston, Mass.; *Michigan*—F. W. Brooks, Detroit; *Minnesota*—A. M. Robertson, Minneapolis; *Mississippi* —A. B. Paterson, Meridian, Miss.; *Missouri*—A. H. Rogers, Webb City, Mo.; *Montana*—W. C. Callaghan,

Helena, Mont.; *Nebraska*—W. A. Smith, Omaha, Neb.; *New Hampshire*—E. C. Foster, Manchester, N. H.; *New Jersey*—George Barker, Newark, N. J.; *New Mexico*—W. P. Southard, Las Vegas, New Mexico; *New York*—B. E. Tilton, Syracuse, N. Y.; *North Carolina*—H. W. Plummer, Asheville, N. C.; *North Dakota*—C. P. Brown, Fargo, N. D.; *Ohio*—W. A. Draper, Cincinnati, Ohio; *Oregon*—C. N. Huggins, Portland, Ore.; *Pennsylvania*—C. L. S. Tingley, Philadelphia, Pa.; *Rhode Island*—D. F. Sherman, Providence, R. I.; *South Carolina*—F. H. Knox, Spartanburg, S. C.; *South Dakota*—F. M. Mills, Sioux Falls, S. D.; *Tennessee*—E. D. Reed, Chattanooga, Tenn.; *Texas*—W. J. Jones, Austin, Tex.; *Utah*—Simon Bamberger, Salt Lake City, Utah; *Vermont*—E. M. Addis, Brattleboro, Vt.; *Virginia*—A. B. Guigon, Richmond, Va.; *Washington*—J. B. Howe, Seattle, Wash.; *West Virginia*—W. W. Magoon, Huntington, W. Va.; *Wisconsin*—Dudley Montgomery, Madison, Wis.; Canada: *British Columbia*—George Kidd, Vancouver, B. C.; *Manitoba*—Wilford Phillips, Winnipeg, Man.; *Nova Scotia*—J. W. Crosby, Halifax, N. S., Can.; *Ontario*—J. D. Fraser, Ottawa, Ont.; *Quebec*—Patrick Dubee, Montreal, Que.

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American Association Special Committees

Arrangements for midyear meeting—Charles L. Henry, chairman, Indianapolis, Ind.; M. C. Brush, Boston, Mass.; J. H. Hanna, Washington, D. C.; W. F. Ham, Washington, D. C.; Charles C. Peirce, Boston, Mass.; S. K. Colby, Baltimore, Md.; Bertram Berry, New York, N. Y.; conferring with other associations regarding meeting dates—H. C. Clark, chairman, New York, N. Y.; E. B. Burritt, New York, N. Y.; H. G. McConnaughy, New York, N. Y.; membership provisions (representing the American Electric Railway Association)—L. S. Storrs, chairman, New Haven, Conn.; C. L. Henry, Indianapolis, Ind.; C. S. Mitchell, Pittsburgh, Pa.; L. P. Crecelius, Cleveland, Ohio; James H. McGraw, New York, N. Y.; (representing the American Electric Railway Manufacturers' Association) Charles C. Peirce, Boston, Mass.; S. K. Colby, Baltimore, Md.

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Transportation and Traffic Association Committees

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land, Fort Wayne, Ind.; J. K. Punderford, New Haven, Conn.; E. M. Walker, Dubuque, Iowa.

Rules—W. H. Collins, chairman, Gloversville, N. Y.; L. H. Palmer, vice-chairman, New York, N. Y.; W. C. Callaghan, Helena, Mont.; C. E. Morgan, Jackson, Mich.; Sam W. Greenland, Fort Wayne, Ind.; W. R. W. Griffin, East Liverpool, Ohio; Edward Dana, Boston, Mass.; standards—L. H. Palmer, chairman, New York, N. Y.; C. V. Wood, Springfield, Mass.; J. N. Shannahan, Hampton, Va.; N. W. Bolen, Newark, N. J.; J. E. Gibson, Kansas City, Mo.; F. D. Norviel, Anderson, Ind.; W. H. Collins, Gloversville, N. Y.; C. S. Ching, Boston, Mass.; P. P. Crafts, Mobile, Ala.; Alexander Jackson, Newark, N. J.; George L. Radcliffe, Cleveland, Ohio; subjects—H. C. Donecker, chairman, Newark, N. J.; L. H. Palmer, New York, N. Y.; E. F. Schneider, Cleveland, Ohio; training of transportation employees—C. S. Ching, chairman, Boston, Mass.; W. J. Harvie, Syracuse, N. Y.; Bruce Cameron, St. Louis, Mo.; E. E. Strong, Rochester, N. Y.; F. I. Hardy, South Bend, Ind.; to develop uniform definitions—H. C. Donecker, chairman, Newark, N. J.; Frederic Nicholas, New York, N. Y.; William C. Greenough, Worcester, Mass.

JOINT COMMITTEES, ACCOUNTANTS' AND ENGINEERING

Engineering accounting—Accountants—F. H. Sillick, co-chairman, New York, N. Y.; M. W. Glover, Mobile, Ala.; Charles H. Lahr, Akron, Ohio; J. C. Collins, Rochester, N. Y.; H. A. Gidney, Boston, Mass.; engineers—Charles Rufus Harte, co-chairman, New Haven, Conn.; Martin Schreiber, Newark, N. J.; C. H. Clark, Cleveland, Ohio; J. P. Ripley, New York, N. Y.; J. P. Barnes, Rochester, N. Y.; life of railway physical property—engineering—Martin Schreiber, co-chairman, Newark, N. J.; Robert B. Rifenberick, Detroit, Mich.; J. H. Hanna, Washington, D. C. (Accounting members not yet appointed.)

JOINT COMMITTEE, ACCOUNTANTS' AND TRANSPORTATION AND TRAFFIC

Transportation accounting—accountants—M. R. Boylan, co-chairman, Newark, N. J.; G. W. Kalweit, Milwaukee, Wis.; I. A. May, New Haven, Conn. (Transportation & Traffic members not yet appointed.)

JOINT COMMITTEES, ENGINEERING AND TRANSPORTATION AND TRAFFIC

Block signals for electric railways—engineers—J. M. Waldron, co-chairman, New York, N. Y.; C. H. Morrison, New Haven, Conn.; J. Leisenring, Peoria, Ill.; G. N. Brown, Syracuse, N. Y.; transportation and traffic—J. W. Brown, co-chairman, Newark, N. J.; C. D. Emmons, South Bend, Ind.; H. A. Nicholl, Anderson, Ind.; A. E. Roome, Los Angeles, Cal.; transportation engineering—engineers—R. N. Hemming, co-chairman, Anderson, Ind.; W. E. Rolston, Michigan City, Ind.; R. D. Beatty, Cleveland, Ohio; transportation and traffic—P. N. Jones, co-chairman, Pittsburgh, Pa.; J. B. Stewart, Jr., Youngstown, Ohio; C. N. Wilcoxon, Michigan City, Ind.

AMERICAN ASSOCIATION CORRESPONDENCE COURSES OF INSTRUCTION

The International Correspondence Schools, with which the educational committee of the American Association has arranged for conducting the courses outlined in the 1914 report of the committee, has issued a special circular briefly describing these courses. Copies of the leaflet can be secured by addressing Secretary Burritt. It is the plan of the committee to have the courses in full operation at once, and the committee has been pleased to learn from the officials of the correspondence schools that enrollments are already being secured. At the committee meeting to be held next Monday, arrangements will be made for supplying full information to member companies and their employees regarding the part which the association will play in conducting the courses.

MID-YEAR MEETING ARRANGEMENTS

Secretaries Burritt and McConnoughy are in Washington at work upon the details of the mid-winter meeting program and will announce them in a few days.

The committee in charge of transportation matters held a meeting in New York on Dec. 21 to discuss the subject of special trains from New York and Chicago. The former will leave New York about 1 a. m. on Friday Jan. 29, arriving at Washington not later than 8 a. m. No arrangement for a special train returning will be made. A local sub-committee was appointed to make the arrangements for the special train from Chicago.

The general plan of procedure adopted by the committee for suggestion to the association secretaries was this: Notices regarding the dinner and special trains, and applications for dinner tickets will be sent to company and individual members of both associations. Upon receipt of an application a dinner ticket will be sent for each individual, with a circular giving information regarding special trains, and a post-card application form for train space. These cards, when returned, will be forwarded to the railroad company which will issue tickets, including an identification card admitting to a special train.

COMING COMMITTEE MEETINGS

Jan. 4, New York, 10 a. m., American Association educational committee, H. H. Norris, associate editor, ELECTRIC RAILWAY JOURNAL, chairman.

The meetings of certain sub-committees of the joint committee on block signals, scheduled for Jan. 4 and 5 have been postponed.

Jan. 7, New York 2 p. m., American Association valuation committee, L. S. Storrs, president The Connecticut Company, chairman.

Jan. 11, Chicago (Congress Hotel), sub-committees of the Engineering and Transportation & Traffic Associations' joint committee on block signals for electric railways, J. M. Waldron, signal engineer Interborough Rapid Transit Company, and J. W. Brown, assistant general superintendent Public Service Railway, co-chairmen, will meet as follows: on certain changes in phraseology in regard to standard light aspects, J. W. Brown, chairman; on revision of block signal rules for contactor signals, C. D. Emmons, Chicago, South Bend & Indiana Traction Company, chairman; on study of highway crossing protection, J. Leisenring, Illinois Traction System, chairman; to report on advisability of operating single-track interurban signal-blocked lines without dispatchers, H. A. Nicholl, Union Traction Company of Indiana, chairman.

Jan. 28, Washington (New Willard Hotel), 10 a. m., American Association executive committee, C. Loomis Allen, Allen & Peck, Inc., chairman.

REQUEST TO COMMITTEE CHAIRMEN

Secretary Burritt has requested that chairmen of committees have progress reports in his hands by Jan. 20 in order that they may be digested and presented to the executive committee at the above meeting in Washington.

Equipment and Its Maintenance

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

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

Location of Trolley Wire on Curves—I

BY S. L. FOSTER, CHIEF ELECTRICIAN UNITED RAILROADS OF SAN FRANCISCO

As long ago as 1895 the author evolved a plan for getting the exact location of the trolley wire on curves that proved extremely simple and satisfactory, and he had always supposed that others similarly situated had done as well or better. Of late there has been much in print on this subject, but as nothing has seemed to be as efficient as the results of the author's work of 1895, it may be worth while to present it.

Of course, the trolley wire location can be found by the use of a drafting table and a lot of instruments and time, and it can be calculated for each case from a complete set of essential measurements. However, in flat city work the writer's twenty-year old method calls for no mathematical work, neither mental nor written, by the linemen and but one official calculation is needed for each type of car.

The author's original formula is identical with the one presented to the American Electric Railway Engineering Association by the committee on power distribution at its annual 1914 convention, except that the latter formula omits consideration of the wheelbase of a double-truck car. This omission is not very serious but, as it causes an error of from ½ in. to 1½ in. in the accuracy of the trolley location, this factor would seem to be worth incorporating in the formula.

The 1895 formula was as follows:

$$O = R - \sqrt{R - \left(\frac{b}{2}\right)^2 - \left(\frac{B}{2}\right)^2 + C^2 - L^2 + (H - I)^2} + \frac{EH}{G}$$

Where O = offset of trolley wire from center of track toward inside of curve
E = elevation of outer rail
H = height of trolley wire above rail
G = gage or distance between rails of one track
R = radius of curve
b = wheelbase of one truck
B = center to center of king pins of the two trucks
C = center of car to center of trolley base
L = length of trolley pole
I = height of car roof above rail.

The feature of interest of the author's method, however, is not in the formula but in the fact that from it was obtained the length of a chord that was common to all curves and that served for the lineman everywhere and forever as long as the type of car and height of trolley wire remained unchanged.

For example, in flat city work with a certain type of car the lineman needed only to be told to stretch a line 31 ft. long as a chord across the curve and to measure from the center, or 15½-ft. mark, the shortest distance or versed sine or middle ordinate to the nearest rail to get the distance to locate the trolley wire inside the center of the track on any and every curve.

In country work with 19-ft. height of trolley, the standard of the California State Railroad Commission, the lineman, of course, has to multiply each inch of elevation of the outer rail by 4 and add this product to his versed sine obtained by the common chord.

When new types of cars were added, the line foreman was given a new common chord length for each one. When several types of cars used the same curves the average length of the common chord was used, etc. The following is a more exhaustive presentation of this and other subjects connected with the location of overhead curves.

The proper location of the trolley wire on curves in American practice, where the usual trolley wheel harp is used, depends on—

First—The dimensions of the car used, the trolley pole and the height of the trolley wire.

Second—The gage of the track, the radius of the curve and the elevation of the outer rail.

Third—The distance between the ears or points of support.

In the following calculations it is assumed (1) that when there is but one trolley pole on a car it will be located at the exact center of the car roof, and (2) that when there are two poles on a car the rear pole only will be used and used trailing.

Formulas

In deriving a general formula for use in determining the exact proper location of the trolley wire for least trolley wheel friction the following letters will be used:

R for radius of the center line of the track
g for gage of the track—distance between rails on one track
b for wheelbase of one truck, that is to say, from center to center of the two axles on one truck
B for distance from the center of one truck to the center of the other truck
C for distance from the center of one trolley base to the center of the car roof
h for height of the trolley wire above the top of the rail
i for height of the base of the effective trolley pole or top of the car roof above the top of the rail
l for length of the trolley pole or distance from top of the car roof to trolley wire contact with trolley wheel measured along the line of the trolley pole
p for projection of the trolley pole on the horizontal plane in which the trolley wire lies.

All these measurements are in feet. When the trolley wheel is rolling along the wire on the straight track, it is doing so with the least frictional resistance compatible with sufficient electrical contact. The problem to be solved here is so to locate the trolley wire over the curved track that the trolley wheel with the usual American rigid harp, as distinguished from the English bed-caster type of harp, will still roll around on the curved wire with approximately the same small resistance as on the straight track.

In order to secure this result the trolley wire curve must be moved in or out, usually in, until the projection of the trolley pole makes a true tangent with this trolley curve. The trolley wire is then parallel to the

sides of the trolley wheel and not at an angle with them as is the case when the curved trolley wire is not properly located and the wheel scrapes against the wire as it passes, wearing both rapidly.

Fig. 1 is a diagrammatic representation of the trolley pole extending from the car roof to the trolley wire at the usual angle of about 45 deg. From this figure it is clear that the projection,

$$p = \sqrt{l^2 - (h - i)^2} \qquad (1)$$

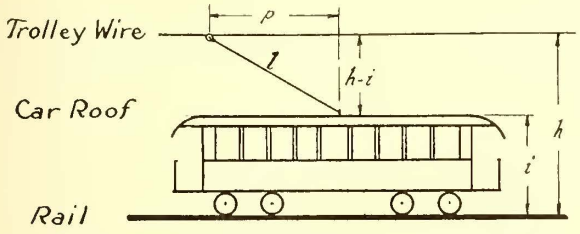


FIG. 1—STUDY OF TROLLEY POLE PROJECTION

Fig. 2 is a diagram representing a double-truck car on a curved track. In this figure

a, a, a = the center line of the curved track
K, K = the rails of curved track
b, b = the two four-wheeled trucks of the car
d = the center of the car
e = the location of the trolley base
f = the center of one truck
g = the gage of the track
m = the trolley wheel on the projection of the trolley pole when on the wire over the center of the track
n = the trolley wheel when the trolley wire curve is so located that the projection of the trolley pole is a tangent to the trolley wire curve, making an angle of 90 deg. with the radius.
O = the center of the curve
R = the radius of the center of the track curve
R' = the radius of the properly located trolley wire curve—s, s—that is sought.

We will determine the factors in the formula step by step as follows:

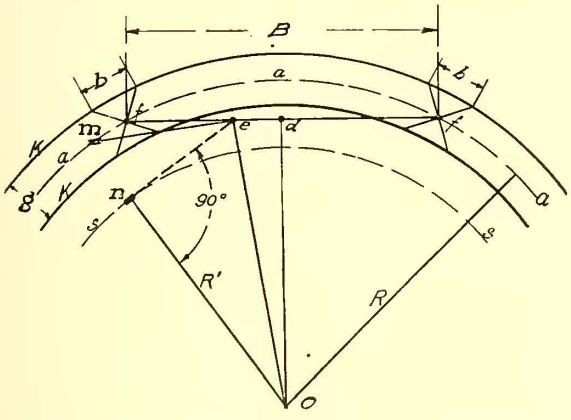


FIG. 2—DOUBLE-TRUCK CAR ON CURVED TRACK

Case A—The center f of one truck is distant radially from the curve a, a, a, a distance expressed by $R - \sqrt{R^2 - \left(\frac{b}{2}\right)^2}$ as will be clear from Fig. 3.

In Fig. 3,

ACE = a short arc of the track curve to which the wheelbase of one truck is chord AE.

$\frac{b}{2}$ = half the wheelbase of one truck,

R = radius of center of track curve

$D = \sqrt{R^2 - \left(\frac{b}{2}\right)^2}$

$V.S.$ = Versed sine or middle ordinate or distance the center f of the truck is inside the center of the track =

$$R - D = R - \sqrt{R^2 - \left(\frac{b}{2}\right)^2} \qquad (2)$$

Case B—The center d of the car is distant radially from the center of the track curve—a, a, a—a distance expressed by $R - \sqrt{R^2 - \left(\frac{b}{2}\right)^2 - \left(\frac{B}{2}\right)^2}$ as will be clear from Fig. 4.

In Fig. 4,

$A'C'E'$ = A short arc of a curve passing through the centers of the two trucks and to which the imaginary line joining the centers of two trucks is a chord $A'E'$.

$\frac{B}{2}$ = Half the distance between centers of trucks

D = Radius of an imaginary curve passing through the centers of the trucks and having the same centers as R in Fig. 3.

$$D = R - V.S. \text{ or } \sqrt{R^2 - \left(\frac{b}{2}\right)^2}$$

$V.S.'$ = New versed sine or distance center of car is inside imaginary curve of radius D

$$D' = \sqrt{D^2 - \left(\frac{B}{2}\right)^2} = \sqrt{R^2 - \left(\frac{b}{2}\right)^2 - \left(\frac{B}{2}\right)^2}$$

$$\text{Since } D = \sqrt{R^2 - \left(\frac{b}{2}\right)^2}$$

$$V.S.' = D - D' = \sqrt{R^2 - \left(\frac{b}{2}\right)^2} - \sqrt{R^2 - \left(\frac{b}{2}\right)^2 - \left(\frac{B}{2}\right)^2}$$

Adding this $V.S.'$ to the $V.S.$ obtained from consideration of Fig. 3 and combining the terms of this sum,

$$R - \sqrt{R^2 - \left(\frac{b}{2}\right)^2} + \left[\sqrt{R^2 - \left(\frac{b}{2}\right)^2} - \sqrt{R^2 - \left(\frac{b}{2}\right)^2 - \left(\frac{B}{2}\right)^2}\right]$$

we get $V.S. + V.S.' = R - \sqrt{R^2 - \left(\frac{b}{2}\right)^2 - \left(\frac{B}{2}\right)^2}$ (3)

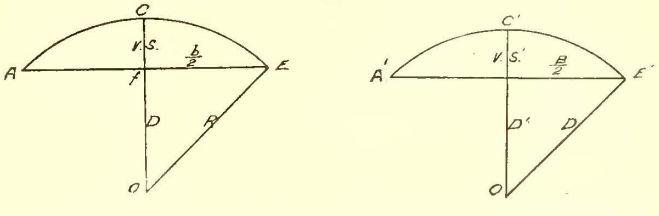


FIG. 3—RADIAL DISTANCE FROM CENTER OF ONE TRUCK; FIG. 4—RADIAL DISTANCE OF CAR CENTER "D" FROM CENTER OF TRACK CURVE

Case C—Returning now to Fig. 2,

$$do = R - (V.S. + V.S.') \qquad (4)$$

$$eo = \sqrt{(do)^2 + (ed)^2} \qquad (5)$$

$ed = C$ or distance from the center of the trolley base to the center of the car roof.

en = Projection—p—of trolley pole.

$$R' = \sqrt{(eo)^2 - (en)^2} \qquad (6)$$

Substituting in equation (4) for $V.S. + V.S.'$ its value in equation (3) and combining, we get

$$do = \sqrt{R^2 - \left(\frac{b}{2}\right)^2 - \left(\frac{B}{2}\right)^2} \qquad (7)$$

Substituting this value of do and value C of ed in equation (5) we get,

$$eo = \sqrt{R^2 - \left(\frac{b}{2}\right)^2 - \left(\frac{B}{2}\right)^2 + C^2} \qquad (8)$$

Substituting in equation (6) this value of eo and the value of en or p in equation (1) we get,

$$R' = \sqrt{R^2 - \left(\frac{b}{2}\right)^2 - \left(\frac{B}{2}\right)^2 + C^2 - l^2 + (h-i)^2} \qquad (9)$$

The distance the trolley wire should be inside the center of the track, if flat, is thus,

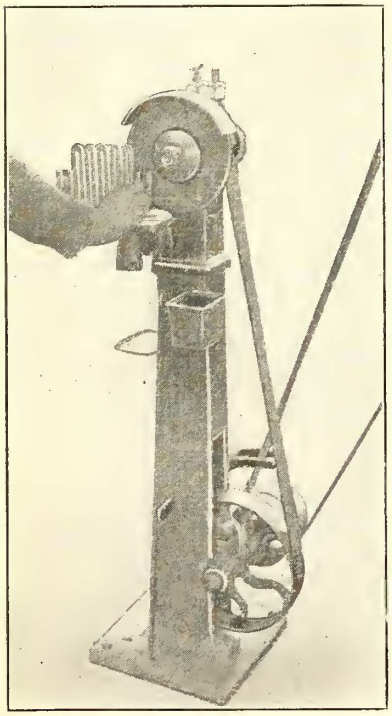
$$R - R' = R - \sqrt{R^2 - \left(\frac{b}{2}\right)^2 - \left(\frac{B}{2}\right)^2 + C^2 - l^2 + (h-i)^2} \qquad (10)$$

We will leave formula (10) for the present and take up the subject of elevation of outer track rail.

Machine for Grinding Home-Made Grids

BY C. L. KELLER, ASSISTANT MASTER MECHANIC DETROIT UNITED RAILWAY

For several years the Detroit United Railway has found it could make quite a saving by manufacturing its own cast-iron grids. In preparing these grid castings prior to assembling, the only work necessary embraced grinding the contact faces smooth and parallel. In order to facilitate this operation, as well as to insure a full contact area, a special grid grinding machine has been devised.



DETROIT UNITED RAILWAY GRID GRINDING MACHINE

This machine was made from an old twist drill grinder by providing a rest with a groove of proper width to take the grid casting. The grinding operation consists simply of sliding the casting forward and back in this groove with the face against the wheel. The size and location of the groove in the rest is such as to insure a good contact between adjacent grid castings when mounted on the frame. The simplicity of the machine and the easy manner of carrying out the work are apparent from the accompanying halftone illustration.

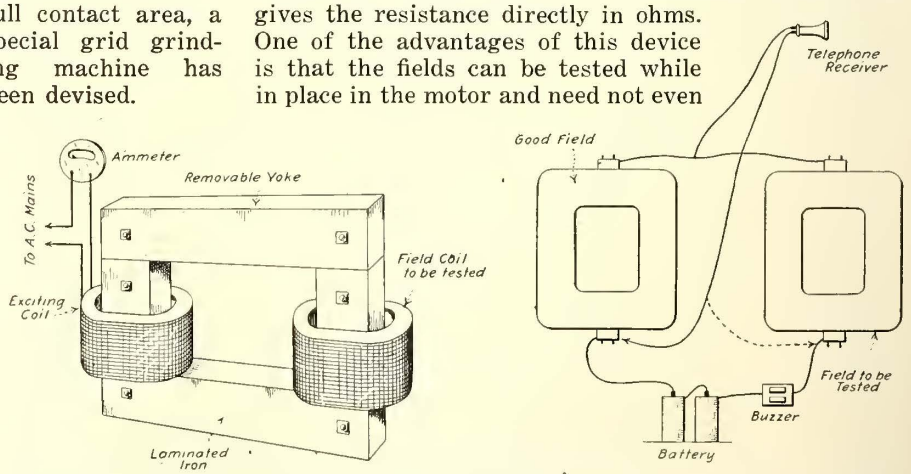
Methods of Testing for Short-Circuits in Field Coils

BY F. J. FOOTE, MASTER MECHANIC OHIO ELECTRIC RAILWAY, COLUMBUS, OHIO

There are several satisfactory methods of testing for short-circuits in field coils. The writer believes that where the fields are out of the motor case the most satisfactory field tester is the transformer type. A rough sketch of this style is given in Fig. 1. It consists of a heavy rectangle of laminated iron with an exciting coil on one leg and the coil to be tested on the other. An ammeter is connected in series with the exciting coil, which is supplied with alternating current of proper voltage. If there is no short in the coil the ammeter will show only a very small current. With a good field coil this current will be the same whether the field coil is on the free leg of the transformer or not. If there is a short in the coil under test the ammeter will indicate the short by showing a heavy current.

A very convenient circumstance in connection with the transformer method is that it not only indicates a short, but often cures it. If a short develops the repeated and rapid turning on and off of the current will often burn away enough metal at the point where the turns are in contact to remove the short entirely. If the field is afterward impregnated there is little chance that the short will return. While most satisfactory where the field is out on the bench, the transformer method has the following disadvantages: It cannot be used on fields installed in motor cases; the tester is somewhat expensive and not all carhouses are supplied with alternating current.

The next best field tester is one that measures the actual resistance of the field. This can be done by passing a known current through the field and measuring the drop with a low-scale voltmeter, and the resistance is then computed according to Ohm's law. A more convenient arrangement, however, and one which is on the market, is a modified form of Wheatstone bridge which gives the resistance directly in ohms. One of the advantages of this device is that the fields can be tested while in place in the motor and need not even be disconnected from each other, as one, two or four fields can be tested in series, as desired. To use this tester the correct resistance for each type of field must be known, but this information is readily obtained from the manufacturers, or it can be secured by measuring several types of fields which are known to be good and taking the average. As with the other methods, some judgment must be exercised because fields of the same type and number, even when new, will vary slightly in resistance. A field should not be condemned if it shows a few per cent high or low in resistance.



FIGS. 1 AND 2—TRANSFORMER AND BATTERY—TELEPHONE METHODS OF TESTING FIELD COILS

Several field testers on the market have proved more or less satisfactory, depending on the care and judgment of the operator. One inexpensive method that has proved very useful to the writer in many cases, largely because the necessary apparatus is nearly always to be found in any carhouse, is illustrated herewith. It requires one good field of the same kind as the one to be tested, a small doorbell battery, an ordinary telephone receiver and a buzzer. The two fields, the battery and buzzer are connected in series, which will cause the buzzer to "buzz"; the receiver wires are then applied repeatedly to the terminals, first of one field and then of the other, until there is no doubt in the mind of the operator as to which field gives the louder sound or if there really is a difference in the intensity of sound. If the field under test has a very weak sound, it is badly shorted and should be condemned. If the difference in sound is very slight, it is likely that the field is all right and merely of slightly different resistance. With a little practice this test gives very satisfactory results, especially on small motors and where only one kind of motor is handled by the same operator.

An Oil Bath Tank

BY R. H. PARSONS, ELECTRICAL FOREMAN

As a part of the equipment of an electrical repair shop an oil bath will be found useful if not positively necessary.

A recommended practice for the treatment of the wooden parts of controllers, etc., is as follows: "Use kiln-dried lumber and finish complete, taking care to remove all saw marks. Drill all holes except those for wood

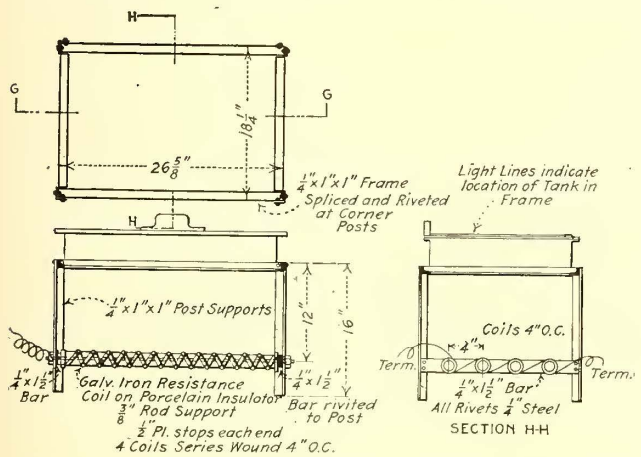


FIG. 1—PLAN OF FRAME SUPPORT FOR OIL BATH TANK

screws. Place in oven and heat for eight hours at a temperature of 100 deg. Cent. to 120 deg. Cent. While hot place in raw linseed oil at room temperature and soak for sixteen hours. Drain for four hours and place in oven and bake at a temperature of 120 deg. Cent. for four hours. Remove from oven and scrape. Then finish with coat of shellac."

For these controller parts the plain oil bath without heat is all that is required. Heat is desirable, however, in treating contact rods and other wood which is exposed to water and weather. In such cases the oil if heated to just below the boiling point and kept at that heat for about forty hours will permit much deeper penetration of hardwoods.

The oil bath tank herewith illustrated can be used for either condition mentioned, and it will also be found useful for other purposes. Fig. 1 illustrates the frame support for the tank, which is made of 1-in. x 1-in. x ¼-in. angle irons riveted together at the corners. The tank proper is so made that it can readily be lifted from the frame, for the purpose of cleaning, etc.

The four heater coils, made as part of the frame, are so placed that there is a clearance of about 2 in. between them and the bottom of the tank. These coils are made from the parts of obsolete car heaters. Each coil has a

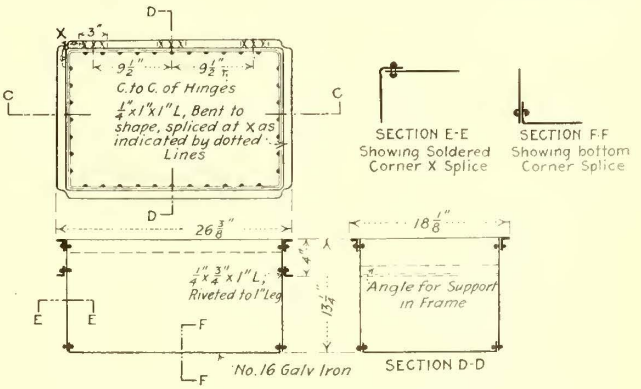


FIG. 2—PLAN OF OIL BATH TANK

resistance of approximately 14 ohms, making a total of 56 ohms per set. In this way we get about 10 amp at the ordinary street railway voltage of 550 or a little more.

The tank itself is shown more clearly in Fig. 2. It is constructed of No. 16 galvanized iron, riveted and soldered at the joints and made more firm by an angle rim around the top. It is supported in the frame by a 1-in. angle riveted at each end. The cover shown in Fig. 3 is made of No. 16 galvanized iron, strengthened by a 3/16-in. x 1-in. flat iron bent edgewise and riveted.

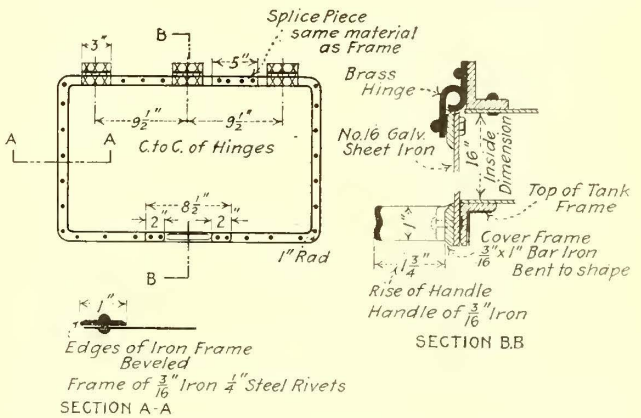


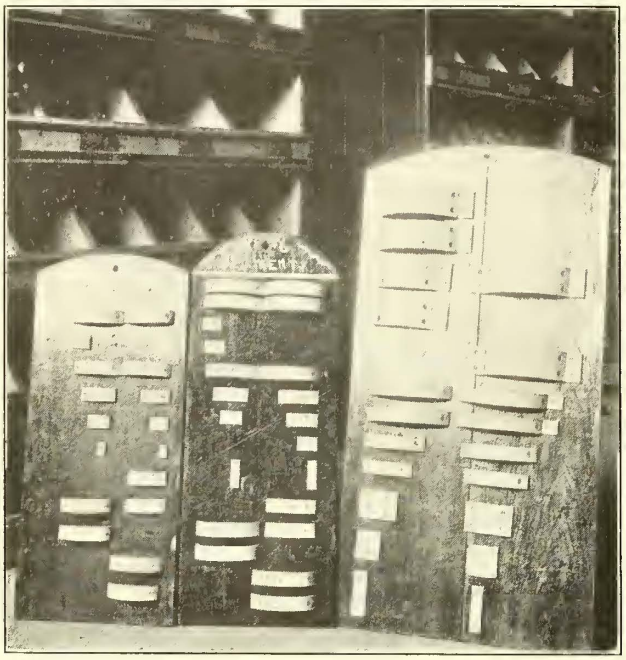
FIG. 3—PLAN OF COVER FOR OIL BATH TANK

This band around the cover makes a strong anchor for the hinges and the handle of the cover. The complete tank is not heavy and has capacity enough for all general purposes.

Street railways in Kentucky have noted with interest the progress of litigation to determine the constitutionality of the workmen's compensation law recently enacted in that State. The lower court has upheld the validity of the measure and it is now before the Court of Appeals, whose judgment will be final. The traction companies have indicated that they will come under the law, as if they elect to remain out they lose the right to plead the common law defenses in damage suits. None of them, as far as has been learned, will enter the State insurance system, however, but the usual plan will be to carry their own insurance, as at present. Under the law the maximum payment for death is $3,750.

Controller Segment Sample Boards

To insure the correct delivery or purchase of segments for the different types of controllers employed on the lines of the Chicago, South Bend & Northern Indiana Railway, a sample set of segments of each type

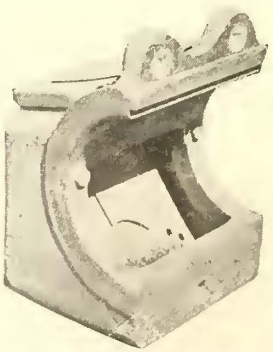


BOARDS CONTAINING CONTROLLER SEGMENT SAMPLES

of controller has been mounted on a board. Three of these sample sets are shown in the accompanying halftone illustration. These boards are hung on the wall convenient to the stockroom clerk's window so that when a certain segment is desired workmen may indicate it on the board. Each segment contains the bin number in which it is to be found in the stockroom, as well as the manufacturer's catalog number for use in making requisitions and orders.

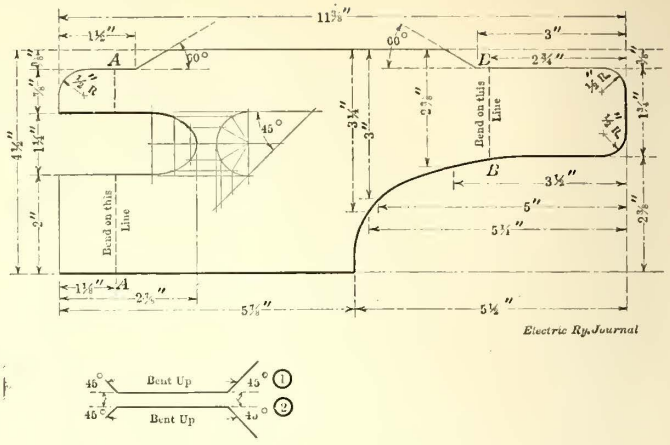
Oil-Saving Filler for Motor-Axle Cap

The high-speed cars of the Aurora, Elgin & Chicago Railroad Company are equipped with either two or four GE-66 motors, and W. J. Bowman, master mechanic, Wheaton, has devised special filler pieces which, when inserted in the axle caps, provide an oil-well space for approximately 3 pints of oil and improve the oiling arrangement. The special filler pieces have reduced the amount of packing about one-half. As they are on a 45-deg. angle the packing does not drop away from the axle, therefore giving good lubrication to axle and bearings and decreasing the wear on both.



AXLE CAP WITH FILLER

The dimensions of the filler pieces, one right and one left for each cap, are shown in the line drawing. The material is 1/16-in. sheet iron cut as shown, and drilled for bolting to the cap casting. When inserted, these two pieces form a 45-deg. baffle, behind which clear oil accumulates. Two ¾-in. pipes, 9¼ in. long, are set vertically under the cap cover and these



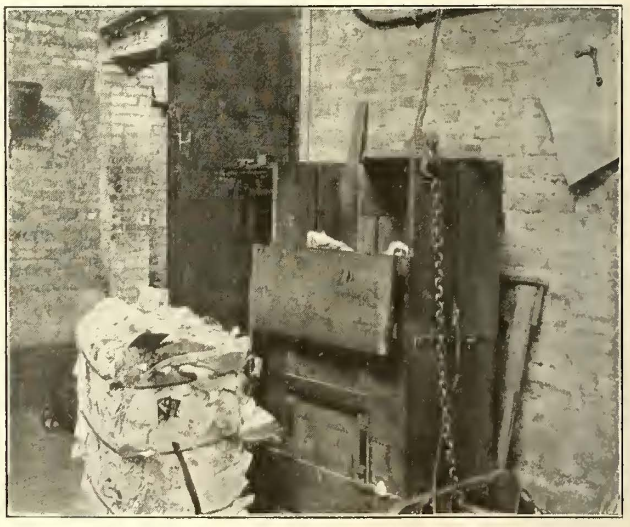
DIMENSIONS OF SHEET-IRON FILLER

permit filling and testing without admission of dirt to the oil chamber.

Since these special baffles have been installed Mr. Bowman reports a reduction in the amount of oil used and that hot motor axle bearings have been practically eliminated.

Baling Paper by Machine

While the waste elimination campaign of the larger street and interurban railways includes the collection of waste paper preparatory to baling and sale, smaller companies have not generally adopted this means of good housekeeping and economy because the savings have been considered too small and the cost of the baling outfit too large. Nevertheless, the general repair shops and storage yards of the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., have a small



WASTE PAPER BALING OUTFIT

baling equipment which has paid for itself many times. The baler proper was purchased from a manufacturer at a cost of about $12. All paper collected in the offices, stations, shops and cars is placed in the baler, which serves as a container until enough has been collected to make a 100-lb. bale. Heretofore this company has been burning paper rubbish, which not only was wasteful, but required the time of one workman as watcher during the burning. Now the time required to prepare a bale is much less than that necessary to burn the same amount of paper, while the paper finds a ready market at approximately 40 cents per 100 lb.

110-Ton D.C. 2400-Volt Locomotives for 15-mile Chilean Mine Railway

A remarkable deposit of iron ore is found at Tofo, Chile, where the Bethlehem-Chile Iron Mines Company is preparing to mine it for shipment to the United States via Panama Canal for use in the blast furnaces at South Bethlehem, Pa. These mines occupy the summits of two hills, approximately 2000 ft. above sea level and about 4 miles in an air line from the port of Cruz Grande.

An electric railway operating at 2400 volts direct current is now being built from the mines to the piers for a length of approximately 15 miles (within a 4-mile air line) with an average grade of 3 per cent for nearly the entire distance. This is also the maximum grade. The physical conditions made it desirable to use regenerative control and electric braking, thereby economizing energy, brakeshoes and wheels.

The General Electric locomotives designed for this service will weigh 110 tons on drivers and will be equiped with four 300-hp 1200/2400-volt motors operated two connected permanently in series on 2400 volts. The first installation will consist of three locomotives, each having a capacity to haul a 450-ton train up grade at 10½ m.p.h. and exerting the same braking effort when regenerating at 12 m.p.h. If the locomotives are operating with the maximum train weights down grade a portion of the braking will be done with air brakes, and when stopping air brakes will be used alone.

The trolley will be of No. 0000 grooved copper wire catenary suspended from a steel messenger supported by a mixture of bracket and cross-span construction on United States cedar poles, as Chile grows no timber suitable for this purpose. A duplicate 22,000-volt high-tension transmission line will in general follow the trolley and will be carried on the same poles when possible.

In the power house oil-fired boilers are to be used. The oil will be received in tank vessels and pumped to an oil storage tank above the power station. The generating room will contain two 3500-kw, three-phase, sixty-cycle, 2300-volt Curtis steam turbines with direct-connected exciters for supplying power to the railroad and the mines; two 300-kw, three-phase, sixty-cycle, 600-volt turbines for operating motor-driven auxiliaries, fire pumps, etc., and at night, lights for the piers, villages, and mines when the main turbines are shut down.

Street and Station Indicator Used at Los Angeles

The Pacific Electric Railway, Los Angeles, Cal., is now trying out the street and station indicator of the National Street & Station Indicator Company of that city, as hereinafter described.

The truck of the car carries two horizontal magnets spaced 36 in. apart, about 4 in. above the pavement, although it is possible to carry them higher. Half-way between these two magnets is an airtight and waterproof compartment, containing a miniature armature in the form of a vane held in normal position by a spring. Near places where it is desired to announce a new street or station, two 2-in. x ¼-in. bars of iron 1 ft. apart are installed parallel with the rails, each bar being 6 in. on either side of the center of the track. These bars range in length from 3 ft. in the downtown districts to 6 ft. on suburban lines. They may be covered with pavement.

When the truck magnets are brought close to the two iron bars, the bars form a magnetic field strong enough to attract the small armature to a different position. In moving to this new position, a switch is operated, supplying the indicator mechanism with an impulse which causes it to move ahead or back one more space. The indication is given a block ahead to give the passengers time to get ready to alight. The reverse series of indications is made automatically upon the reversal of the car motor.

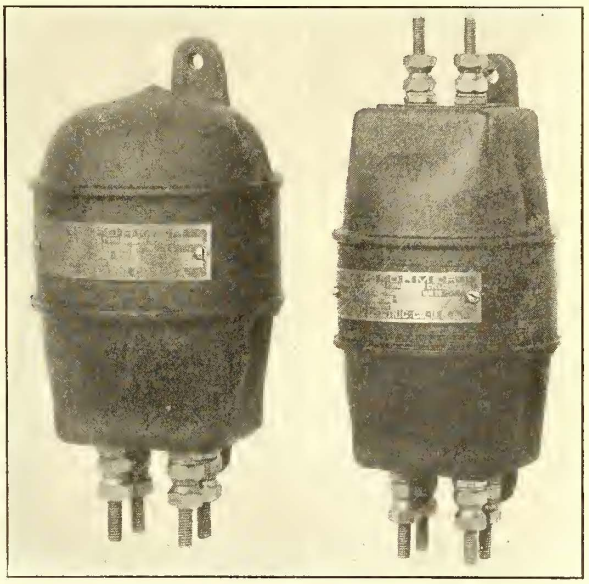
The indicator holds 200 to 400 plates. The device can be arranged to show the same name on opposite sides, to hang in the center of the car or to operate indicators at opposite ends of the car in series. A separate compartment on the end of the indicator case contains an oscillating armature with a spring to hold it in normal position. The upper end of this armature carries two pawls, one for driving in either direction. These pawls engage the teeth of a ratchet wheel, which is mounted on a shaft extending through the plate compartment. This shaft has two or more hexagon disks over which the plates are arranged.

The maker intends to lease these devices at a monthly rental and keep them in working order.

Signal Lighting Transformers

A new line of miniature air cooled transformers, known as type M, has been developed by the General Electric Company for railway signal lighting. These transformers are distinctive in application and design. They are inclosed in a neat and compact case, either for indoor use or in a weatherproof form for outdoor use.

The transformers are fitted with standard R.S.A.



OUTDOOR SIGNAL LIGHTING TRANSFORMERS, 25 TO 125 WATTS, SIXTY CYCLES, 110 VOLTS PRIMARY, AND 10 VOLTS AND 6/12 VOLTS SECONDARY

terminals, as shown by the accompanying illustrations, and are furnished in sizes for 25 to 125 watts, twenty-five and sixty cycles.

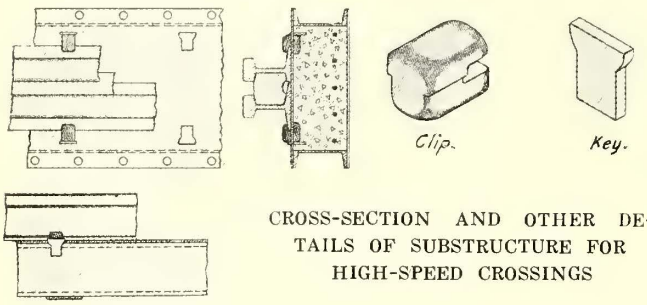
A lamp of from 2½ to 5 watts is generally considered sufficient for signal illumination; consequently, a transformer of this kind with 6 to 12 volt, 2½ to 5 watt, high efficiency Mazda lamps makes a very satisfactory, as well as economical, system of lighting.

A British Consular report states that there are now 250 miles of double-track electric lines in operation within a radius of 50 miles in Osaka, Japan, and that a further 80 miles of line are under construction.

Two Years' Maintenance Record of Track Crossing on a Steel Substructure

On Dec. 4 and 5, 1912, the Union Traction Company of Indiana installed on Ohio Avenue, Muncie, Ind., a steam railroad double-track crossing of the steel substructure type made by the International Steel Tie Company, Cleveland, Ohio. This crossing consisted of 90-lb. A. S. C. E. rail with a compromise joint of 80-lb. A. S. C. E. rail at the south end and of 72-lb. T-rail at the north end.

The report made by the user of this installation states that during the year 1913 the only charge against the crossing was one of $16.57 in labor for surfacing, while during the year 1914 the company spent $29.86 in labor for surfacing and tightening bolts. In two years, therefore, only $46.43 was spent for maintenance. Not a single bolt was renewed, and the frogs are stated to be as good as the day they were put in. The crossings installed later on Perkins Avenue, Muncie, also according to the International system, have cost nothing at all since they were placed.



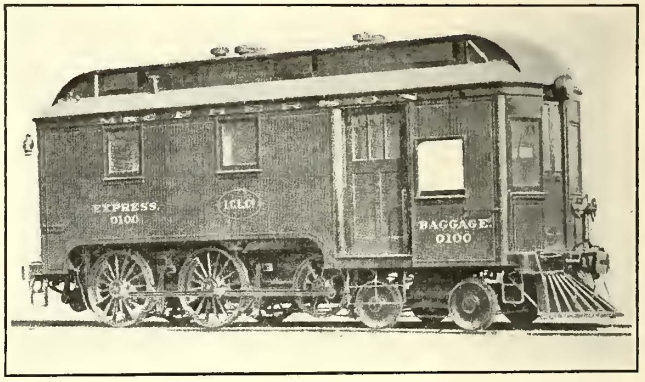
CROSS-SECTION AND OTHER DETAILS OF SUBSTRUCTURE FOR HIGH-SPEED CROSSINGS

As the detail drawing shows, the substructure common to this form of construction is built up on much the same lines as the International steel twin ties, and the connection of the rail to the substructure is made with the standard rail clips. The latter anchor the crossing so firmly that creeping is practically impossible.

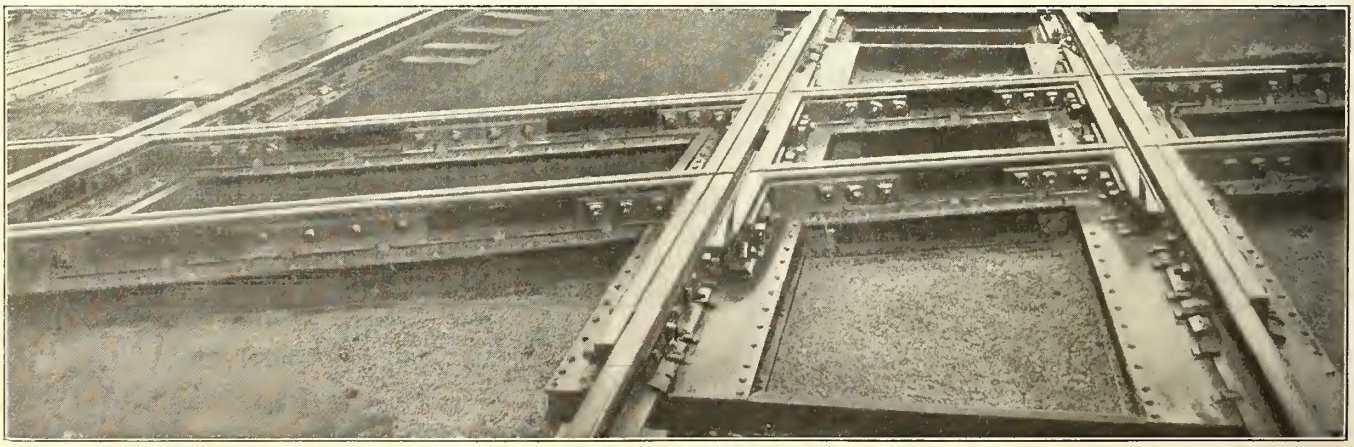
It is well known that ordinary wooden ties form an unsatisfactory support, and even the use of special length ties leaves much to be desired. On the other hand, a steel substructure of the section illustrated gives a firm, non-rocking and non-sagging support on a liberal bearing area. The tamping, which has the advantage of being entirely under the load, is done with a horizontal pick stroke from both sides of each supporting member, and the job is accomplished far more easily and effectively than under wooden ties.

A One-Man Internal-Combustion Locomotive

The Internal Combustion Locomotive Company, Wilmington, Del., has just brought out an internal combustion locomotive for double-end operation similar to drivers, frame, and swing form pony trucks for negotiating sharp curves. The engine is a self-starting six-cylinder gasoline equipment which develops 450 hp the regulation steam, connecting-rod locomotive with on the rails. The transmission has a master clutch of the Hele-Shaw type, connecting with the engine and driving shaft of the variable speed transmission system. The driven shaft of the transmission carries an individual clutch for each speed to be applied, thus giving a transmission without gears to slide in and out of mesh. This transmission differs from the automobile form in having the same number of speeds for backward as for forward running. The application of power by this transmission is through chain and sprocket, although gears, constantly in mesh, may be substituted. The fuel may be gasoline, kerosene, ozoline, crude oil, compressed natural gas or distillates. The heating and lighting of the trailing passenger cars are provided by the locomotive.



ONE-MAN INTERNAL COMBUSTION LOCOMOTIVE



STEAM RAILROAD CROSSING SUPPORTED ON STEEL SUBSTRUCTURE, OHIO AVENUE, MUNCIE, IND.

One of the strongest points asserted in favor of this locomotive is its remarkable per car-mile saving in operating expense, not to mention the large saving in the first cost of new interurban lines. For railroad service requiring 35-ton to 50-ton locomotives, and interurban service, requiring 15-ton to 25-ton machines, this internal combustion locomotive is considered ideal. It handles trains at a speed of 25 to 50 m.p.h.

LONDON LETTER

New Car in Glasgow—London Bill to Unify Electricity Control—Serious Interruption to London Surface Traffic

(From Our Regular Correspondent)

The Glasgow Corporation is experimenting with a new type of car designed by James Dalrymple, the general manager of the tramway department, in an endeavor to facilitate the egress and ingress of passengers at the stopping places. Passengers leave by the front platform on the near side of the road, while ingress is only possible at the rear end of the car on the near side. In order to provide head room for the exit on the front platform, the stairway has been moved forward to the dashboard and a vertical brake introduced. Hitherto, all the cars have been provided with ordinary seats on the upper deck, each capable of holding two passengers, with a gangway between. In the new car each passenger is provided with an independent chair with back rest. Each seat is mounted on a pivot, which allows it to be turned when the direction of the car is altered. The seats are staggered so that the shoulder of one passenger does not come against that of his neighbor, but overlaps to a certain extent, securing much greater comfort. The use of the car has been sanctioned by the Board of Trade.

The Edinburgh & District Tramways has offered to sell its undertaking to the corporation for £250,000, although the company places its present value at £292,742. The corporation tramways committee has decided to take no action in the matter, the city chamberlain having submitted to the committee a statement showing that the purchase of the undertaking at the figure put forward would involve a loss of £70,000 to the ratepayers, as compared with the price the corporation would have to pay on the expiration of the lease in 1919.

The military authorities at York have arranged with the corporation tramways committee to extend the tramways from Lendal Bridge to the railway goods station, and from Fulford Road to the Ordnance Stores, to give the military authorities facilities for carrying stores from the railway to the depot. The military authorities will advance the money for the extension, estimated at £4,700, and pay carriage on terms which are to be fixed. The work will be commenced at once.

The Sheffield tramways committee is recommending the City Council to promote a bill in the present session of Parliament authorizing the corporation to construct a tramway from the junction of Bawtry Road with Sheffield Road to the city boundary at Tinsley, and to give the corporation running powers over the Rotherham Corporation Tramways from Weedon Street to the city boundary at Templeborough; also for power to purchase the Rotherham Corporation Tramways within the city, and for power to run motor omnibuses from the city boundary at Handsworth Bridge to Aston. Rotherham Corporation, it is reported, is seeking similar powers in respect to its Sheffield service.

The Hove Town Council has not yet been able to agree with the Brighton Town Council as to the particular system of railless traction to be adopted on the through routes between the two towns. Hove favors the Cedes-Stoll system, which has an over-running trolley, while Brighton desires to adopt the under-running trolley system. It looked as if arbitration was the only way in which the matter could be settled, but the Hove Council has now entered into an agreement with the Brighton Corporation for an extension of time for the construction of the through routes for a further period of six months on condition that the Brighton Corporation agrees to defer making application to the Board of Trade for the appointment of an arbitrator for a like period.

The extension of the Baker Street & Waterloo Railway from Paddington to Queen's Park, where a junction is effected with the main line of the London & North-Western Railway, will probably be opened for traffic in January. Including Queen's Park, the new line will serve three stations and extend the benefit of the tube railway services to the populous district of Maida Vale and Kilburn. The complete scheme provides for through service from the Baker Street & Waterloo System over the new electric tracks of the London & North-Western Railway to Watford, and at Queen's Park, where the connection between the underground and surface railway is made, a new joint station is being provided. Through service of the kind contemplated between a London tube railway and a main line of an existing steam railway constitutes a departure, as hitherto, although the London Electric Railways have had underground communication with each other, and with surface lines there has been no physical junction which would permit through service. It will be necessary when the Queen's Park extension is first opened for passengers to change at Queen's Park into the steam-propelled trains of the London & North-Western Railway, which are serving the stations on the Watford electric route pending the completion of the work of equipment and of the power house at Stonebridge Park, but before the end of 1915 electric service will be in operation between Watford and the Elephant and Castle.

The London County Council is promoting a bill in Parliament to unify the control of the supply of electricity in and around the metropolis. The measure provides for the establishment of the London Electricity Authority, consisting of representatives of the County and County Borough Councils in the area, namely, the County Councils of London, Essex, Kent, Hertford, Middlesex and Surrey, and the County Borough Councils of Croydon and East Ham and West Ham. Assessable value has been adopted as the basis of representation, one member being appointed by each of the authorities, with the addition, in each case in which the assessable value exceeds £2,500,000, of one member in respect of each £2,500,000 of the excess. On this basis the membership would be: London County Council, eighteen; Middlesex, two, and Essex, Hertford, Kent, Surrey, East Ham, West Ham and Croydon one member each. The principle of the bill is that all existing power shall be conferred on the authority, but that the powers relating to supply and the construction of works, the purchase of lands, and the purchase of undertakings shall be delegated by the authority to an operating company. It is provided that the authority shall supply electrical energy only to authorized undertakers in the area of supply or contiguous to it, to any company or body or persons owning or working railways, tramways, canals, docks or waterworks, and for general purposes. The bill has been approved by the Parliamentary committee of the London County Council.

The most serious interruption which the London County Council has yet experienced on its vast tramway system occurred recently. The entire tramway service of London was stopped for nearly twenty-four hours. A transformer blew out in the power house at Greenwich. Extensions are being carried on there and much temporary work has been put up while the alterations were being made. The explosion set fire to a wooden staging in the vicinity of the switchboard which controls the whole system. This put out of service all the cables transmitting energy from the switchboard to the various substations.

The Stepney Borough Council has been advised by the London County Council that it intends to relay the lines in Burdett Road and Grove Road for horse traction, but in such a position that they would be suitable for electrification if desired.

Application is to be made to Parliament in the present session by the Bristol Tramways & Carriage Company, Ltd., with respect to the revival of powers and the extension of time for the compulsory purchase of lands, and an extension of time for the completion of authorized tramways. The tramways in question are proposed extensions of some of the present routes into the country beyond the existing city boundaries. The reference to compulsory purchase of land is with regard to acquiring strips of land in different parishes to provide the required distance between the rails and the sidewalks.

Edinburgh Corporation is applying for a provisional order for new tramways and a tram road in the Colinton and Corstorphine districts.

The Dunfermline Town Council has applied for a provisional order authorizing the construction of a tramway between Dunfermline and the new Rosyth dockyard, and for permission to link up tramways in the Inverkeithing and Forth Bridge districts with those of West Fife.

A. C. S.

News of Electric Railways

ST. LOUIS MILL TAX DECISION

Opinion of Judge Walker of the Missouri Supreme Court Upholds the Right of St. Louis to Tax Fares of the United Railroads by the 1904 Ordinance

On Dec. 19 the Missouri Supreme Court handed down an opinion confirming the validity of the mill tax ordinance and holding the United Railways, St. Louis, liable for the payment of taxes that have accumulated in the ten years since the ordinance was passed. The majority opinion was written by Judge R. F. Walker and was concurred in by Justices Lamm, Woodson and Brown. Judge Woodson filed a separate concurring opinion. Judge Graves dissented in an opinion in which Judges Farris and Bond concurred. Judge Walker held that the ordinance was the exercise of a separate and distinct power clearly within the authority of the city. The gist of the court's ruling was that the tax was not a double tax, Judge Walker declaring it to be a license tax and one upon a privilege and not upon the property itself and that it did not come within the letter or the spirit of the national or State constitution prohibiting double taxation. Judge Graves held that the validity of the ordinance was not settled in the Supreme Court of the United States and that the ordinance results in double taxation.

The St. Louis mill tax ordinance was drafted by William F. Woerner in 1902. It was finally enacted into law in 1903 and went into effect on Jan. 1, 1904. An injunction against the enforcement of the ordinance was at once sought in the Federal Circuit Court by all of the street railways in St. Louis and an injunction was granted by the lower court restraining the city from collecting the tax of 1 mill for every pay passenger carried. The Supreme Court of the United States reversed the holding of the lower court in May, 1908, and ordered the injunction dissolved. In the meantime the United Railways had absorbed all of the other street railways in St. Louis. Suits entered in the State circuit courts were delayed by a second appeal to the federal courts, which again declined to modify or reverse the prior decision. After some further delays the cases were then pressed for trial for the collection of the tax and judgment given in every instance for the city in the respective sums sued for, representing the amount for different quarters in question. All of the judgments rendered in the St. Louis Circuit Courts were then appealed by the United Railways to the State Supreme Court. The first of these is the one just passed on by that court. The amount which has been accumulating for more than ten years now totals between $2,000,000 and $3,000,000. The company assailed the validity of the ordinance on the following grounds:

First—That it was an impairment of contract obligations.

Second—That it was not within the charter powers of the city, for the reason that it was not a license tax, but was any one of a number of other things, such, for example, as a general tax upon property, a tax upon gross receipts, an occupation tax or an income tax.

Third—That if the city had power to levy the tax under the charter, that power had been taken away by the statutes of the State.

Fourth—That the ordinance was invalid because it contained more than one subject not expressed in the title.

Fifth—That the tax violated the provisions of the Missouri constitution requiring uniformity of taxation.

Sixth—That the ordinance was unreasonable.

Following the action of the Missouri Supreme Court refusing to grant an extension of time to Jan. 10 to attorneys for the United Railways in which to file a motion for a rehearing in the suit, Henry S. Priest, counsel of the company, issued a statement in which he said that the motions for rehearings would be filed in the time required by law, and that failing the granting of a rehearing the matter would be taken to the federal courts again. Mr. Priest said in part:

"I intend to prepare a motion for rehearing and by brief in support of it to demonstrate to the court that the majority opinion is predicated upon a misapprehension both of law and of fact in the record.

"I am sure I note in the majority opinion some misapprehension of fact and some omissions of fact and some calculations as to fact, and consequently some misapprehension of law, which I am sure the majority will be quite willing to correct, and possibly, upon correction, change its views as to the ultimate decision of the case.

"I cannot, of course, anticipate what action the Supreme Court will take on such motion for rehearing, as I may file. I shall call the attention of the court to many cases which I cited in my brief and some subsequently rendered, none of which were cited or commented upon in the majority opinion, and ask it to consider and distinguish those cases in their application to the issues which the court has before it.

"The opinion of the court based the affirmance of the judgment below wholly upon the fact or supposed fact that the precise and identical issues now before it were decided and determined adversely to the United Railways, in the suit brought by the company against the city and decided by the Supreme Court of the United States, reported in 210 United States Supreme Court Reports.

"A decision of the Federal Court is a federal law, and the Supreme Court of the United States is the final interpreter of all federal laws that are drawn in question and form the basis of judicial judgment. From the fact, therefore, that the Supreme Court has predicated the city's right to recover in these cases upon a judgment of the Supreme Court of the United States gives the United Railways Company, upon that question alone, the right to appeal to the Supreme Court of the United States as the final interpreter of its own opinion."

WHAT BRITISH RAILWAYS DID AT THE OUTBREAK OF THE WAR

According to the *Tramway and Railway World* of Dec. 10, 1914, the members of the Railway Executive Committee of Great Britain were on Nov. 13 the guests of honor of the American Luncheon Club at the Savoy, London. H. A. Walker, general manager of the London & South-Western Railway, reviewed the way the railways handled the military traffic on the outbreak of war. Mr. Walker said:

"The government gave the railways a time limit of sixty hours to make ready for the despatch of 350 trains of, roundly, thirty vehicles each to Southampton, the port of departure for the expeditionary force. We delivered the goods, as Americans would say, in forty-eight hours. For practically every day of the first three weeks of the war, we handled at Southampton during a period of fourteen hours no fewer than seventy-three of these trains, including the running of them to the boat side and the unloading of the full equipment of guns, ammunition and horses. The trains arrived at intervals averaging twelve minutes. It was a matter of special pride to all the railwaymen concerned—and we general managers give credit for the feat to the efficiency of our disciplined staffs—that practically every train without exception came in on schedule time. Some of them came from remote parts of the kingdom—Wales and the north of Scotland."

H. W. Thornton, general manager of the Great Eastern Railway, and lately of the Long Island division of the Pennsylvania Railroad, in acknowledging a tribute which the previous speaker had paid to his zeal during mobilization, said that so far as his knowledge of transportation achievements went, there was no event in railway history to compare with what British lines had accomplished in August, 1914. Certainly in America, "the land of big stunts," there had never been anything which could be compared to it.

Sir Guy Granet, general manager of the Midland Railway, who also spoke, declared that primary credit for the really remarkable work performed by British railways during the days of mobilization was due to the energetic direction of the railway executive committee's labors by its chairman, H. A. Walker.

POINTED PARAGRAPHS ON PUBLIC POLICY

During nineteen years' experience in utility work D. L. Gaskill, Greenville, Ohio, has observed that there are certain definite factors which tend to produce congenial relations betwen the public and the utility companies. In his characteristic epigrammatic style Mr. Gaskill recently gave some of his thoughts on this subject to the members of the Indiana Electric Light Association at their convention in Indianapolis. The following paragraphs are excerpts from his address:

"To-day to the alert public utility manager the public policy of the company is a distinct and well-defined part of his organization, calling for expenditure of time and money and bringing greater results, both good and bad, than any other department.

"The interest of the public in the utility is confined to two things—service and rates. When the utility has made the first of these perfect and the latter reasonable, and has convinced the public that it has done so, the public policy of that company is a pretty well-settled question.

"I know of some cases in which regulations controlling service in Western towns are made by men in Eastern cities, and the fit they make is wondrous to behold. It is comparable to an elephant's blanket for a Shetland pony. Straightforward and open dealing, with few rules, will produce less discrimination than lots of rules and part of them broken.

"A disordered liver and a utility manager have no business being incorporated in the same man. They won't mix. The man who can receive a complaint as if it were a pleasure is the pearl we are seeking. No other is worth the price of his wages.

"Not all complaints are worthy, not all are well founded, but all persons having them think that they are, and to receive them, attend to them, and make the complainant think he has attained his end, is the art we should cultivate.

"I believe that it would be a good thing for utilities if a law could be passed requiring the public utility manager to call upon every business customer at least once a month and ascertain if his service is satisfactory."

THE NEW YORK PUBLIC SERVICE COMMISSIONS

Indications Point to Their Being Reorganized or Supplanted

The announced determination of Charles S. Whitman, the new Governor of New York, to take up at once the question of the Public Service Commissions of New York would indicate that important changes are likely to be brought about in New York State in the method of public service regulation. Some time ago agitation was directed chiefly at the commission for the second district, which has jurisdiction in the state outside of Greater New York. More recently it has been directed against the commission in Greater New York. It was admitted some time back that the work of the commission for the second district was considerably behind and that complaints and actions were greatly delayed. Following the appointment of Mr. Van Santvoord to that commission and the taking of office by Commissioner Emmet the work was greatly accelerated so that now there appears to be little complaint on the score of the workings of that body.

The most recent developments as regards the commission for the first district are the letter to Mr. Whitman from the president of the City Club, New York, and the defence of the commission given out on Dec. 29 by Mr. McCall. Mr. Spencer, the president of the club, says that "it is at least a matter of doubt whether the commission has used or is using its functions to the extent or in the manner contemplated at the time of its creation, or, indeed, properly." To which Mr. McCall has replied that while he "can readily see that the temper of the people may be sorely tried they must recognize that it would be much easier for all the companies to give the most complete service and obviate these complaints rather than to curtail their service wilfully and with malice and invite complaints." Added to all this is the statement of Mr. Whitman that he has been giving the commissions serious attention with a view to action at Albany of a practicable character and that "within the next month you will hear something from Albany which I trust will be appreciated by the public, who have every reason to be dissatisfied with present conditions."

Meanwhile the commissioner of health of New York City has demanded that steps be taken to ameliorate alleged overcrowding of cars. To this Mr. McCall rejoined that the jurisdiction of the commission did not extend to control over people sneezing and coughing in cars. Over in Brooklyn the matter of alleged unsatisfactory transit conditions has been put before the grand jury, and many witnesses have been called to testify, including the representatives of the commission.

At least three propositions regarding the commissions have been laid before the Governor-elect. The suggestions made are that the commissions be done away with altogether, that the two commissions be combined into one, and that the present double commission be practically done away with by legislation and promptly reestablished on much the same basis, with altered powers.

The original commissions, created during the Hughes administration in 1907, contained representation from both important political parties. At present the only Republican member of the commission for the first district is Milo Roy Maltbie, who was appointed by Governor Hughes. The Democratic members are Chairman McCall, J. Sergeant Cram, George V. S. Williams and Robert C. Wood.

CLEVELAND REPORT FOR NOVEMBER

The operating report of the Cleveland (Ohio) Railway for November showed an increase of $17,614 in the interest fund, making a total at the beginning of December of $222,600. The gross receipts were $89,872 larger than for the same month in 1913, but this is attributed, to some extent, to the blizzard in the early part of November last year. The transfer charges were $56,040, as compared with $60,542 in October, although the increase in the number of persons carried over the same month a year ago was 895,968. The ordinance surplus for the month was $15,901.

The ordinance introduced by Councilman Dittrick for the purpose of rendering the manner of paying fares uniform on all lines was defeated at this meeting. Mr. Witt opposed the movement.

A WORD ABOUT ELEVATED RAILROADS IN GENERAL

President Williams Shows That Elevated Railways Do Not Depreciate the Value of Abutting Property

The Brooklyn (N. Y.) Rapid Transit Company has reprinted and is distributing through the boxes in its surface cars the address made by T. S. Williams, president of the company, before the Brooklyn committee of one hundred on Dec. 7, 1914. This address had to do with the removal of sections of the company's elevated railroad. Mr. Williams referred to the consideration which the removal of the elevated railroads received at the time the dual subway contracts were being negotiated. He said that the project for the removal of the structure in lower Fulton Street now advanced after the contracts have all been executed was not the company's seeking, but that if the city had the money to spend for the work in the interest of beautifying lower Fulton Street he saw no reason why such a provision should not be incorporated in the transportation arrangements now under way, provided a decision was reached promptly. Otherwise the company's duty and its obligations require it to proceed as the city and the company had previously contracted. In his conclusion Mr. Williams quoted many tax values to show the property in streets where there are elevated structures to be more valuable than on parallel streets equally accessible. In regard to elevated railways in general he said in part:

"If we had not, in our own minds, identified subways with express and local service, and with frequency of service justified by the congestion of population through which they have heretofore been built, subways would not be so popular. A two-track subway of itself offers no advantage in speed or comfort over a two-track elevated. There is the same elevation to overcome in access and egress. The only difference in this respect is whether we climb at the beginning of our ride or at the end. Indeed in the matter of air, and light, and noise, and dust, and interest, and health, the advantage is all with the elevateds. When we consider that 5 track-miles of elevated can be built for the same money as 1 track-mile of subway, the number of

people who can be benefited with the same amount of money may be quintupled. Our own elevated railroads, limited to two tracks and to a type of structure now not recommended, are not to be compared with the new and improved types such as we are erecting for our extensions and our third-tracking, with their provision for express service. From the point of view of the man who rides, therefore, the advantage is with the elevated railroads, provided the facilities for express and local service are equal to those of the subways. From the point of view of the pedestrian, the man who rides in trolley cars, carriages or automobiles the subways have the advantage.

"From the point of view of the abutting property owner the argument is by no means one-sided. There seems to be a common impression that elevated railroads depreciate the value of abutting property. I had occasion recently to procure from the assessment rolls the valuation of property along streets in Brooklyn and in Manhattan where there are elevated railroads and that of property on adjacent and parallel streets where all of the advantages of transportation are at hand with none of the apparent disadvantages. The fact seems to be that while elevated railroads change the character of property their construction and operation do not usually impair its value.

"Our duty as citizens and the duty of city officials seems to lie along the pathway of our contractual program. Let us all co-operate to complete speedily the undertaking to which we are now committed, and to make it the material and financial success which it should be, and in that way we shall be rendering the best service not only to our present fellow-citizens but to those who come after us. When a man with limited resources builds a home to live in he does not go out first to buy oil paintings—he concerns himself with walls, and floors, and light, and water, and heat, and furniture; and then later, as his resources permit, he may indulge himself in the luxuries of pictures and bric-a-brac. The parable is not inapplicable to the city's transit building."

SPEED-CONTROL FOR THE BROOKLYN SUBWAY

The speed-control system approved for installation on the lines of the New York Municipal Railway Corporation in Brooklyn, N. Y., and mentioned briefly in last week's issue, will be the first installation of the kind in the country. In the original plans for the lines in question a standard signal system was considered with speed-control only as an alternative, the installation involving some 103 miles of track and approximately 870 fixed signals. After the opening of the bids for the work, however, it was decided to adopt the speed-control system, and on this basis the quotation of the General Railway Signal Company was lower than that of the Federal Railway Signal Company, which was the low bidder for the original signal system, the Union Switch & Signal Company eventually withdrawing its proposal for the alternative system.

By the use of speed control the major part of the 870 fixed or roadside signals will be eliminated, as indications will be given to the motormen by means of lights in the cab. Fixed signals at interlocking plants, however, will be retained to indicate the position of the switches. The signal lights in the motorman's cab will be controlled by the engagement of shoes on the cars with ramps located at frequent intervals at the side of the track, a speed-recorder connected with the local circuits on the car providing the means for limiting the speed by brake-applications.

In general the system will follow the principles of the recently patented Simmen automatic speed-control, as the General Railway Signal Company has obtained an exclusive license to manufacture and sell this system in the United States. This speed-control system, however, should not be confused with the original Simmen system of signaling, which has been installed on several interurban roads and which includes continuous cab signals, centralized control of signals by the dispatcher and automatic recording of train movements. The Simmen Automatic Railway Signal Company will continue to install the latter system, and it is reported also that this company has reserved the right in its agreement with the General Railway Signal Company to use speed control wherever the Simmen signal system is installed.

POWER TO REVOKE CHICAGO TRACTION ORDINANCES STUDIED

The city of Chicago has obtained legal opinion from its corporation counsel on two franchise questions in the controversy between the City Council and the Chicago Surface Lines regarding the alleged non-fulfilment of contract obligations in the matter of service and extensions. One question concerned the annulling of the 1907 ordinances for specific refusals by the company to obey the Council's mandates. The other concerned the revoking of the traction ordinances for non-fulfilment of contract obligations. In the opinions rendered by the corporation counsel to the city the first was considered as a question of public policy and the second as a proposition in law. The fiscal year for the traction companies closes on Feb. 1, 1915. Under the compulsory provisions of the settlement ordinances the city ordered the company during this period to construct 20 miles of extensions to the surface lines. Under the provisions of the ordinance the companies are required to build an additional 20 miles annually, making a total of 40 miles in all. About 20 miles of these extensions have been completed.

Cleveland Rapid Transit Grant Approved.—Mayor Newton D. Baker, of Cleveland, Ohio, has signed the amended grant to the Cleveland Rapid Transit Railway.

Ohio Tax Values Increased.—Public utility companies of all kinds in Ohio will pay taxes on a valuation of $1,095,848,080 for 1914, an increase of $37,751,410 over 1913.

New Road in Alabama.—George I. Brown, general manager of the Birmingham-Tuscaloosa Railway & Utilities Company, Tuscaloosa, Ala., recently announced that the company expected to have the line of the company in Tuscaloosa in operation shortly after Jan. 1.

The Lexington Arbitration.—Hearings of evidence in the controversy between the Kentucky Traction & Terminal Company and the local carmen's union are to be resumed at once and speedily completed. The sessions of the board of arbitrators, of which Charles Bagby, Danville, Ky., is chairman, have been interrupted by illness of George Macleod, a member of the board.

Chicago Elevated Stub Removal Case Continued.—The suit to force the removal of the Chicago Elevated Railways' stub structure on Market Street was up in the United States District Court on Dec. 17. Upon request of the attorneys for Samuel Insull, receiver for the Chicago & Oak Park Elevated Railroad, the owner of this portion of the structure, the case will be up for final hearing on Jan. 11, 1915.

Chicago Terminal Electrification Report.—The report of the Chicago Association of Commerce committee investigating smoke abatement and electrification of railway terminals has been completed by its engineering organization and is now being considered by the commission, which must pass on the report before it is made public. As originally outlined, this report will discuss the necessity for a change from steam to electricity as motive power on the railroads as a means of reducing air pollution. The change is being considered from the standpoints of physical and financial practicability.

Sale of Seattle Municipal Railway Rejected.—The resolution reintroduced before the city utilities committee of the City Council of Seattle, Wash., providing for the sale of the Seattle Municipal Railway to the Puget Sound Traction, Light & Power Company, has been defeated in the committee of the whole by a vote of seven to one. The other propositions pertaining to municipal railway matters, referred to in the Electric Railway Journal of Dec. 26, page 1404, have also been rejected. Councilman Erickson moved that consideration of the resolutions be indefinitely postponed and this was carried.

New York Signal Contract Stands.—Joseph S. Auerbach, counsel for the Federal Signal Company, has requested the Public Service Commission for the First District of New York to reconsider its action awarding the contract for the new signal system on the New York Municipal lines to the General Railway Signal Company, Rochester, and that a public hearing be held on the matter, stating that he would advance reasons sufficient to con-

vince the commission that the contract should be awarded to his clients, who, he said, were the lowest bidders on the initial bidding. After Mr. Auerbach's argument the commission by a vote of three to two declined to reconsider its action.

Western Massachusetts Transportation.—The legislative recess committee on transportation facilities in western Massachusetts has submitted a draft of its report to Governor Walsh, with a proposed bill giving the Public Service Commission authority to require street railways to extend their lines in the five western counties of the State. No recommendation is made by the committee in favor of state ownership of street railways, although sentiment favoring this course developed at the hearings. The committee favors extension of lines by private capital. It is expected that Governor Walsh will discuss the proposed building of new lines in his message to the next Legislature, which will convene on Jan. 6, 1915.

Reports of Maine Railways.—According to the annual report filed with the Public Utilities Commission the net income of the street railways of Maine for the year ended June 30, 1914, was $561,519, or $24,283 less than in 1913. The gross income increased $243,910 while the total charges were $263,204 greater than in the previous year. The operating expenses increased $117,306. Transportation earnings were $2,895,192 compared with $2,762,105 for the preceding year. Operating expenses were $1,956,123 compared with $1,838,-817 for the previous year. The number of fare passengers carried was 51,024,110, an increase of 854,101. The total mileage of street railways in operation was 497.27, an increase of 9.18 miles for the year. During the year no passengers were killed and only fifty-three passengers were injured. One employee was killed and six injured. Seven other persons were killed and twenty-five injured, making a total of eight persons killed and eighty-four injured. The number of persons, excluding general officers, employed on the street railways, was 2004, an increase of 233 over the previous year. The wages paid amounted to $1,325,300. Forty-four general officers received $72,415 in wages.

Mobilizing a Million a Day.—William Clayton has contributed to the *National Magazine* for December, 1914, a fourteen-page illustrated article dealing with the handling of New York transportation by the Interborough Rapid Transit Company, which operates both elevated and the subway lines in Greater New York, and the New York Railways, which operates surface lines in the Boroughs of Manhattan and the Bronx. Various phases of the activities of both companies are taken up, including the establishment of the welfare department. The article is illustrated with a portrait of Theodore P. Shonts, president of both companies, and with photographs showing the signal post in the New York subway, the evolution of the street car as shown in the recent street car parade, the low center-entrance surface car, the double deck surface car, and the subway band. The writer say that fifty years ago the people of New York were considering transportation by subway, and that for more than forty years unsuccessful attempts were made by the city to secure underground rapid transit. The article is particularly interesting in the light that it sheds to the public on the efforts made by both companies to increase their transportation facilities. The writer says that manifestly the Interborough Rapid Transit Company has done everything that human ingenuity could do to increase the capacity of the subway.

PROGRAM OF ASSOCIATION MEETING

New York Electric Railway Association

A meeting of the executive committee of the New York Electric Railway Association was held at the Transportation Club, New York, on Dec. 22. Those in attendance were James F. Hamilton, Schenectady; John J. Dempsey, Brooklyn; S. Walter Mower, Cooperstown; Wilber C. Fiske, New York; William O. Wood, New York, and Charles C. Dietz, Brooklyn. It was decided to hold the next quarterly meeting at the Fort William Henry Hotel, Lake George, N. Y., on Tuesday and Wednesday, March 2 and 3. The program will be announced later. Other matters of importance were considered by the committee at the meeting on Dec. 22.

Financial and Corporate

IMPROVED EXPORTS AND STEEL TRADE

Although the trading has been comparatively dull on the Stock Exchange during the last week and not so conducive to optimism, the betterment now showing in that excellent barometer of general conditions, the steel trade, is a most hopeful feature at the beginning of the year. Already some advances in prices have been made, following a substantial increase in the volume of orders. This increase up to the present time has not included many demands from the railroads, but with the new year and its promise of more remunerative rates it can be expected that the carriers will feel free to order a little more widely. When this happens it is likely that the steel market will be rapidly strengthened as regards prices, but they are now very low and will still be low after a moderate advance over the figures now prevailing. The present, therefore, seems to offer profitable opportunities to electric railways for the placing of orders.

Another encouraging fact is that the excess of merchandise exports over imports has been accumulating a trade balance in favor of the United States in recent weeks at the rate of more than $1,000,000,000 a year, and this with but little more than 50 per cent of the usual amount of cotton going abroad. For thirteen districts through which 88 per cent of the imports and 85 per cent of of the exports pass the total imports for the fourth week of December were $19,-259,000 and the exports $38,667,000, making a favorable balance of $19,408,000. For the four weeks ended December 26 imports totaled $91,068,000 as compared to exports of $179,-846,000, an excess of exports amounting to $88,778,000. It is estimated by Secretary Redfield that for the full month the United States will have an excess amounting to well over $100,000,000.

WESTINGHOUSE ELECTRIC TO ABSORB MACHINE COMPANY

Charles A. Terry, Walter D. Uptegraff and H. H. Westinghouse, executors for the estate of George Westinghouse, have sent the following circular to the stockholders of the Westinghouse Machine Company:

"The undersigned have entered into a contract for the sale of their stock in the Westinghouse Machine Company to the Westinghouse Electric & Manufacturing Company upon the basis of one share of the common stock of that company being issued in payment for three shares of the stock of the machine company, and upon the condition that all other stockholders of the machine company shall have the privilege for thirty days, namely, until Jan. 26, 1915, to sell their stock upon the same basis.

"Our conclusion that this sale is advisable has been reached after very careful consideration of the present condition and future prospects of the Westinghouse Machine Company. The business of that company cannot be carried on profitably without a substantial amount of additional capital, which it has been impracticable to procure under present financial conditions and the large mortgage debt of the company. In view of this and other difficulties which confront the company, it seemed to us advantageous to exchange our shares for shares of a strong company which is doing a prosperous business and paying dividends.

"Stockholders of the Westinghouse Machine Company desiring to join in this sale should promptly send their stock certificates (indorsed for transfer in blank and properly stamped) to the Colonial Trust Company, Pittsburgh, or to the Franklin Trust Company, New York. The trust company receiving the stock will at once issue in exchange therefor transferable certificates of deposit, which will be exchangeable for the stock of the Westinghouse Electric Manufacturing Company upon the consummation of the sale, or for the deposited stock in case the sale should not be consummated."

The Westinghouse Machine Company has a total outstanding capital stock of about $7,500,000 and almost an equal amount of outstanding funded debt. The Westinghouse Electric & Manufacturing Company has outstanding preferred stock amounting to $4,000,000 and $36,700,000 of common stock. It also has $22,000,000 of funded debt.

ANNUAL REPORT

American Public Utilities Company

The statement of combined earnings of the subsidiaries of the American Public Utilities Company, Grand Rapids, Mich., for the year ended June 30, 1914, follows:

Gross earnings from operations	$2,319,594
Operating expenses	1,338,715
Net earnings from operations	$980,879
Miscellaneous income	45,303
Gross income	$1,026,182
Less expense	51,486
Net income	$974,696
Fixed charges:	
Interest on underlying securities	$554,659
Interest on collateral trust bonds	44,650
Total fixed charges	$599,309
Remainder	$375,387
Dividend on $3,914,000 of preferred stock	234,840
Balance	$140,547

According to an analysis of operation made by the directors, the gross earnings for the year increased 8.14 per cent, the operating expenses 13.59 per cent, and the net earnings from operation 1.59 per cent. The increase in operating expenses was largely caused by abnormal expenditures for maintenance on lighting properties at Indianapolis and La Crosse, made after their acquisition in order to bring them up to the proper operating efficiency, and also by the expenditure of nearly $20,000 for the acquisition of new business. In general, funds otherwise available for dividends or surplus were returned to the several properties in maintenance and acquiring new business. The fixed charges upon subsidiary obligations increased $28,350. There was expended for extensions and additions by subsidiaries $794,079, against which subsidiary bonds amounting to $567,000 were issued and sold. The sum of $300,401 was expended in enlarging the Indianapolis property alone.

In June the company acquired the Chippewa Valley Railway, Light & Power Company through the medium of the Wisconsin-Minnesota Light & Power Company, the successor to the La Crosse Gas & Electric Company. It is stated that the earnings of the Chippewa Valley Railway, Light & Power Company increased rapidly during the last five years. In 1905 the gross receipts were $122,093, and the net earnings $49,268, while in 1912 the gross earnings were $394,842, and the net earnings $230,235, an increase of $181,076, or 367 per cent. In discussing the possibilities of future growth of this company, the annual report calls attention to several undeveloped water power sites, and says that as these are brought into use and the product marketed, the public service commissioner will authorize additional securities to be delivered to the American Public Utilities Company in consideration of its having financed the merging of the properties and the building of dams, etc., thus materially increasing the assets and earning power of the company without further expenditure on its part.

NEW SAN FRANCISCO-OAKLAND NOTE ISSUE

The Railroad Commission of California has authorized the San Francisco-Oakland Terminal Railways to issue $246,666 of promissory notes to be secured by an issue of $370,000 of general lien bonds. The commission states that it has given its authorization for this temporary financing in order that the company may be preserved in the best possible operating condition. The order provides that the face value of the notes shall at no time be less than 66 2/3 per cent of the face value of the bonds pledged as collateral. The notes will mature in a period not to exceed one year from date and will bear interest at a rate not to exceed 7 per cent per annum. It is made a condition of the order that the notes shall be issued only to persons in direct interest in the corporation, who shall be fully advised of all the circumstances surrounding the company's finances and who shall agree to hold the bonds as collateral until the notes have matured or have been paid or refunded. The company proposes to use these notes for the following purposes: reimbursement for moneys expended from income, and after such reimbursement for the purpose of paying interest on outstanding bonds and notes, $148,922; purchase of new cars, $75,000, and construction of interlocking power at Stanford Avenue and Lowell Street, Oakland, $22,744.

TIME EXTENSION IN KANSAS CITY

The City Council on Dec. 28 authorized an extension of six months in the time in which the reorganization committee of the Kansas City Railway & Light Company may accept the terms of the new franchise voted by the people at the recent election. This was done in order that the officials of the company, as well as the reorganization committee, may have sufficient time to go over the franchise matter before its acceptance.

The plan for the reorganization of the property is rapidly approaching completion, and it is expected that an official announcement regarding the matter will soon be forthcoming. Frank Hagerman, counsel for the company, was in New York this week conferring with bankers in regard to the necessary financing incident to the plan. The earnings of the Kansas City properties are said to be highly satisfactory, and as soon as the necessary details are worked out in connection with the reorganization, it is believed that they will be again on a substantial operating basis.

Charlottesville & Albemarle Railway, Charlottesville, Va.—At a meeting of the directors of the Charlottesville & Albemarle Railway, held on Dec. 1, a semi-annual dividend of 3½ per cent on the preferred stock was declared payable on Jan. 1, 1915, to stockholders of record of Dec. 10.

City Railway, Dayton, Ohio.—A quarterly dividend of 1½ per cent was paid on the $2,400,000 of common stock of the City Railway on Dec. 31 to holders of record of Dec. 21. This compares with 2 per cent paid quarterly from June, 1912, to September, 1914.

Cleveland, Youngstown & Eastern Railway, Cleveland, Ohio.—Judge Estep in the Common Pleas Court of Cuyahoga County at Cleveland has appointed Robert Beatty receiver for the line of this company lying between the Cuyahoga County line and Garrettsville, Ohio, in the suit to foreclose the $52,000 mortgage of 1910 having a first lien thereon. The court ordered that after Dec. 28 the receiver should discontinue the operation of this portion of the road. The line from Chagrin Falls to Cleveland is in no way affected by this order, and its operation will be continued the same as before. The Cleveland, Youngstown & Eastern Railway took over the property of the Chagrin Falls & Eastern Railway and the Cleveland & Chagrin Falls division of the Eastern Ohio Traction Company some time ago. The complete lines connect Cleveland, Chagrin Falls and Garrettsville.

Dry Dock, East Broadway & Battery Railroad, New York, N. Y.—The Public Service Commission of the First District of New York has been served with a writ of certiorari, obtained by the Dry Dock, East Broadway & Battery Railroad, for a review of the commission's action in refusing to approve an issue of $2,800,000 of bonds applied for by the company. The company contends that the finding of the commission was contrary to the evidence and that the laws authorizing the decision are unconstitutional because of the impairment of contract obligations.

Fresno (Cal.) Interurban Railway.—The Fresno Interurban Railway has filed an application with the Railroad Commission of California renewing its request for authority to issue 200 shares of capital stock at $80 a share and $14,700 of ten year 6 per cent bonds at not less than 90. The company was recently authorized to issue 100 shares of capital stock at not less than $80 per share in lieu of 100 shares of stock issued for incorporation purposes at $10 a share. The company contends that it has not the authority to release the 100 shares of old stock issued for incorporation purposes, it having been mutually understood by the subscribers that these shares would be held by the company solely for voting purposes.

Hudson Companies, New York, N. Y.—Holders of preferred stock of the Hudson Companies, formed originally to finance the construction of the Hudson & Manhattan Railroad, have formed a protective committee consisting of Charles P. Curtis, Allan Forbes, Arthur B. Silsbee and Charles W. Taintor, Boston, and Charles P. Cooley, Hartford. The committee has issued a circular calling for

proxies to vote at the annual meeting on Jan. 12. The committee says: "The manner in which the company's affairs have been dealt with seems to evidence the need for a thorough examination of the methods whereby the cash paid in by the preferred stockholders, amounting to nearly $16,000,000, has dwindled to a quoted value of little more than one-twentieth of that amount, and it seems evident that if such examination is to be properly or seriously made, the management of the company's affairs should be taken from the hands of the interests which have hitherto controlled it." The company owns $25,000,000 of the $40,000,000 of common stock of the Hudson & Manhattan Railroad, $2,300,000 of its preferred shares, and a block of the tunnel concern's bonds. The Hudson Companies also holds $2,450,000 of 5 per cent bonds of the Greeley Square Realty Company.

Interborough-Metropolitan Company, New York, N. Y.—On Dec. 24 the directors of the Interborough-Metropolitan Company authorized the retirement on Jan. 1 of $1,000,000 of the outstanding $4,000,000 of five-year 6 per cent notes, maturing on July 1, 1915, from the proceeds of the 5 per cent extra dividend which was recently declared on the stock of the Interborough Rapid Transit Company. The board also authorized a new issue of $3,000,000 of ten-year 6 per cent notes to refund the remaining $3,000,000 of notes. All of the holders of the latter have, it is reported, agreed to take the new notes in exchange. Out of the new notes, $300,000 will be retired annually through sinking fund, through the use of which the bonds may be called at any time.

Minneapolis & Northern Railway, Minneapolis, Minn.—The Minnesota Loan & Trust Company, formerly receiver of the Minneapolis & Northern Railway, has resigned and its resignation has been accepted by the court, which has allowed its account. F. H. Hunter has been appointed receiver in place of the trust company.

Sunbury & Susquehanna Railway, Sunbury, Pa.—The receivers of the Sunbury & Susquehanna Railway have applied to the Northumberland County Court for an order for the sale of the property of the company under foreclosure. Argument will be heard on Jan. 8. The company is a consolidation of the Northumberland County Traction Company, Sunbury, Lewisburg & Milton Railway and the Sunbury & Selingsgrove Electric Street Railway.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.—The Terre Haute, Indianapolis & Eastern Traction Company recently made the following announcement to stockholders: "In pursuance of the policy announced in our communications of March 10 and June 10, 1914, the directors have unanimously determined that the dividend payable on Jan. 1, 1915, should not be declared at this time."

Titusville (Pa.) Traction Company.—The Titusville Traction Company has filed at Harrisburg notice of an issue of $265,000 of bonds. The Titusville Traction Company is the successor of the Titusville Electric Traction Company, the property of which was sold at foreclosure in Titusville in August to Frederick W. Garvin, New York, N. Y., representing the bondholders.

Washington Water Power Company, Spokane, Wash.—A quarterly dividend of 1½ per cent has been declared on the $14,081,900 of stock of the Washington Water Power Company, payable on Jan. 2, to holders of record of Dec. 12. This compares with 1¾ per cent paid in October, 1914, and 2 per cent from April, 1911, to July, 1914, inclusive.

West Jersey & Sea Shore Railroad, Camden, N. J.—The directors of the West Jersey & Seashore Railroad have decided to call a meeting of the stockholders in thirty days, to consider the authorization of an increase in the capital stock to the extent of $3,000,000 and the creation of a $13,000,000 general and refunding mortgage upon the company's property. Stock amounting to $2,000,000 will be offered to shareholders at par and the proceeds used to retire certificates of indebtedness held by the Pennsylvania Railroad. The additional $1,000,000 will not be issued in the immediate future. Of the proposed new mortgage bonds $6,500,000 will be reserved to take up the present first consolidated mortgage bonds at maturity, and the proceeds of the remainder will be used to pay for improvements.

DIVIDENDS DECLARED

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

Cincinnati (Ohio) Street Railway, quarterly, 1½ per cent.

City Railway, Dayton, Ohio, quarterly, 1½ per cent, preferred; quarterly, 1¾ per cent, common.

Columbia Railway, Gas & Electric Company, Columbia, S. C., quarterly, 1½ per cent, preferred.

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

London (Ont.) Street Railway, quarterly, 5 per cent.

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

New England Investment & Security Company, Springfield, Mass., preferred, 2 per cent.

Omaha & Council Bluff Street Railway, Omaha, Neb., quarterly, 1¼ per cent, common and preferred.

Porto Rico Railways, Ponce, Porto Rico, quarterly, 1¾ per cent, preferred.

Puget Sound Traction, Light & Power Company, Seattle, Wash., quarterly, 1½ per cent, preferred.

Rome Railway & Light Company, Rome, Ga., quarterly, 1 per cent.

Scioto Valley Traction Company, Columbus, Ohio, quarterly, 1¼ per cent, first preferred and preferred.

Stark Electric Railroad, Alliance, Ohio, quarterly, three-fourths of 1 per cent.

Thirteenth & Fifteenth Streets Passenger Railway, Philadelphia, Pa., quarterly, $6.

Tri-City Railway & Light Company, Davenport, Ia., quarterly, 1½ per cent, preferred; 1 per cent, common.

Western New York & Pennsylvania Traction Company, Olean, N. Y., 3 per cent, first preferred.

Winnipeg (Man.) Electric Railway, quarterly, 3 per cent.

Youngstown & Ohio River Railroad, Leetonia, Ohio, quarterly, 1 per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

ATLANTIC SHORE RAILWAY, SANFORD, MAINE.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Nov.,		'14	$24,267	$26,025	$1,758	$644	$2,402
1 " "		'13	25,797	22,139	3,662	661	3,001

AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.

1m., Oct.,		'14	$172,580	$116,793	$55,787	$43,044	$12,743
1 " "		'13	176,808	116,775	60,032	37,551	22,481
4 " "		'14	783,790	478,585	305,205	173,309	131,896
4 " "		'13	797,159	468,625	328,534	149,349	179,185

CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY, CLEVELAND, OHIO.

1m., Nov.,		'14	$100,184	$61,066	$39,118	$32,159	$6,959
1 " "		'13	98,490	68,708	29,782	32,059	†2,276
11 " "		'14	1,158,384	694,551	463,833	355,934	107,899
11 " "		'13	1,149,871	696,580	453,292	348,843	104,449

INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK, N. Y.

1m., Nov.,		'14	$2,882,819	$1,054,344	$1,838,475	$1,077,575	$751,000
1 " "		'13	2,865,329	1,041,756	1,823,573	1,080,988	742,585
5 " "		'14	13,499,304	5,180,865	8,318,439	5,404,900	2,913,539
5 " "		'13	13,236,392	5,175,973	8,060,419	5,631,749	2,428,670

LEHIGH VALLEY TRANSIT COMPANY, ALLENTOWN, PA.

1m., Nov.,		'14	$149,940	$75,274	$74,666	$57,748	$16,917
1 " "		'13	191,199	71,199	119,999	71,331	48,668
12 " "		'14	1,841,034	905,246	935,738	699,311	236,477
12 " "		'13	1,764,998	881,941	883,057	578,144	304,913

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO.

1m., Nov.,		'14	$286,732	$186,009	$100,724	$65,366	$35,358
1 " "		'13	265,097	184,001	81,095	62,992	18,103
11 " "		'14	3,319,704	2,040,014	1,279,691	722,007	557,683
11 " "		'13	2,989,155	1,829,359	1,159,797	649,107	510,689

TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.

1m., Nov.,		'14	$752,502	$396,674	$355,829	$228,924	$126,905
1 " "		'13	751,113	374,947	376,166	234,979	141,187
11 " "		'14	8,499,229	4,392,277	4,106,952	2,507,433	1,599,519
11 " "		'13	8,085,035	4,086,321	3,998,715	2,584,509	1,414,206

UNITED RAILWAYS COMPANY OF ST. LOUIS, ST. LOUIS, MO.

1m., Oct.,		'14	$1,073,964	$796,643	$277,321	.....	.....
1 " "		'13	1,129,269	908,529	220,740	.....	.....
10 " "		'14	10,478,950	7,903,501	2,575,449	.....	.....
10 " "		'13	10,542,580	7,584,902	2,957,678	.....	.....

*Includes taxes. †Deficit.

Traffic and Transportation

ASSISTING CHRISTMAS SHOPPERS

Conductors in White Gloves Assist Kansas City Passengers, Call Cars and Answer Questions

The Metropolitan Street Railway, Kansas City, Mo., went a little out of its way this Christmas season, as for the past two years, to accommodate the shopping public and the general traffic. A week before Christmas the company picked twenty especially gentlemanly and well-appearing conductors and stationed them at busy corners to assist people onto the cars. These men were in full uniform, and in addition wore white gloves—which were "kept white" through renewal when necessary during the day, that the clothing and especially the packages of passengers assisted might not be soiled. Their most valuable service was in helping the children, who thronged downtown to visit the stores. The conductors stood at the points where the rear ends of the cars would stop, and their only duties were to hold packages while people got on the cars, assist the passengers, expedite the movement by calling the names of the cars, and answering questions. They did not collect fares. They were on duty as late at night as shoppers crowded the streets, and until midnight Christmas Eve. The "front end collectors" were on duty also, as usual, at downtown corners, collecting fare from the street so that passengers could get on the front ends of the pay-as-you-enter cars; a few more were put on, and they were on duty during a greater part of the day than under normal circumstances.

BAY STATE AGREEMENT

Terms Reached Between Bay State Street Railway and Its Employees in Agreement Which Expires on Sept. 30, 1916

In agreeing to arbitrate the question of wages, the Bay State Street Railway, Boston, Mass., and branches of the Amalgamated Association represented in sixteen local unions of employees, came to terms upon a number of transportation matters which had been under discussion for about two months. It was agreed that the hours of labor of blue uniformed men are to be exempt from arbitration as they are established by law.

In the event of suspension or discharge, the agreement arranges for the taking up of the case with the division superintendent by the union, with appeal to the general superintendent and thence to the general manager, followed by arbitration in case of disagreement. The arbitration provision does not apply, however, to conductors and motormen during their first six months of service. In the event of nine consecutive months without error, a trainman's record is to be considered clean. Seniority choice is to prevail for runs in both passenger and service car operation, with the exception of freight and express cars, but men are not to be permitted on runs which, because of age, disability or other disqualifications, they are not fitted to operate.

The company agrees to furnish employees free transportation over the division in which they are employed, and upon request will furnish transportation to a reasonable extent over other parts of the system. No discrimination is to be made against members of the association, and the company agrees to dismiss or suspend union employees from its service upon proof of violation of the association's constitution and general laws, where such violation has caused the dismissal or suspension of the employee from the union. In the arrangement of schedules the company agrees to recognize the principle of dividing the total number of hours in such schedules into runs of nine hours, to be completed in eleven consecutive hours, so far as possible. Not more than 20 per cent of all runs are to be completed in excess of twelve hours. Payment for time in excess of twelve hours' outside limit is to be determined by the arbitration board now sitting.

The present practice of requiring men to report and to remain to protect runs, or for extra work, is to remain in force. Any conductor or motorman promoted to the position of starter, inspector, foreman, or other official post, is to be given a year in which to try the work without loss of rating. Extra compensation at the rate of 3 cents an hour is to be allowed for breaking-in new men. Seniority is to prevail in the mechanical and miscellaneous departments, so far as consistent with qualifications, the latter being subject to arbitration in case of dispute.

The agreement is to continue until Sept. 30, 1916, with provision for extension and change upon due notice.

SERVICE QUESTION IN CHICAGO

Several newspapers, the local transportation committee of the City Council and Mayor Harrison's public service department are all agitating increases in transportation facilities in Chicago. The city has threatened to resort to the courts to enforce or annul the city traction ordinances, despite the fact that authorities are agreed that downtown track capacity is used to its limit during the rush-hour periods and that the only means of relieving congestion is to be found in the construction of a subway. The subway is again up for consideration, but definite action is being delayed until it is possible to determine whether the surface and elevated lines may be merged, as upon this merger will depend the character of the subway. If the merger takes place the subway would serve for both surface and elevated cars, but if the consolidation cannot be brought about the subway may be used to furnish additional capacity either for the surface or elevated lines. The Board of Supervising Engineers is making traffic checks to verify complaints and recommends as a cure the service standard which it submitted to the city in May, 1913. This standard provides for a maximum of seventy passengers to a forty-seat car during any thirty-minute rush-hour period, or any fifteen-minute non-rush hour period. This standard it is thought if adhered to would provide seats for all passengers during the non-rush hours and eliminate undue crowding during the rush-hour periods.

SPECIAL MESSAGE ON THE "JITNEY" BUS

Los Angeles Mayor Says Further Delay of Regulatory Legislation Would Be Gross Injustice

Mayor Rose of Los Angeles, Cal., issued a statement to the City Council on Dec. 23 in which he recommended that that body should enact drastic legislation to regulate the "Jitney" bus business in Los Angeles. The Mayor contended that the use of the streets by the "Jitney" buses was an additional burden not contemplated in the original dedication of the city streets and that the city had the indubitable right to regulate and restrict this form of traffic. He said that drastic rules and regulations were demanded "to cope with what has become in the last sixty days a grave menace to the community." In his communication Mayor Rose reviewed the tremendous growth of the "Jitney" bus business and pointed to the official police records to prove the increase in accidents recently. In this connection figures were cited to prove that the 5-cent buses had been involved in 22 per cent of the personal injury mishaps reported to the authorities. The Mayor suggested that both incompetence and recklessness on the part of the drivers were in a degree responsible for the unusual increase in accidents and that only drivers of proved ability should be licensed to enter the business district. In addition to this he would require all applicants for licenses to state the course intended to be traversed and compel them to maintain these courses and make designated station stops. The mayor said that he had plenty of sympathy for the bus drivers, but that the authorities must see that the drivers do not jeopardize life and property. A considerable part of the address was devoted to the consideration of the effect of the operation of the "Jitney" buses on street railway transportation. The Mayor said in part:

"Assuming that the 700-odd autobusses operating in Los Angeles are averaging $3 a day in fares, we have a total of $2100, or about $60,000 a month, subtracted from the earnings of the street railways. How does this affect the public? As is well known, the street railroads operate under franchises which entail heavy expense for street maintenance, taxes and public improvements. It is estimated that the street railways maintain at least one-third of the streets along which their tracks run, at a cost to them of upward of $350,000 a year. In addition, they have to bear their proportion of special assessments for street openings and for condemnation of lands for parks and other public purposes, for which their occupancy of contiguous streets renders them liable. Moreover, at least 2 per cent of the

close partnership of the traffic-regulated street railways with the public. Besides this impost they must pay their regular taxes in support of the government, amounting to about 5 cents on the dollar.

"One of the executive officers of the Los Angeles Railway is authority for the statement that for every nickel collected in fares more than 3 cents is expended directly for labor in this city. Of the remaining 2 cents at least 1 cent goes for taxes, license, street improvements and material, or four-fifths of the whole is returned whence it came, to benefit the people of Los Angeles. The remaining fifth takes care of the interest charges on the bonded indebtedness, and as many of the bonds are owned in California, a share of this last fifth also remains here.

"In contrast to this showing is the 5-cent fare paid over to the 'Jitney' bus driver. Four-fifths of this sum must go for gasoline, oil, rubber tires and to pay for the machines, for few of them are owned outright by the men operating them. It is a direct reversal of conditions. In the latter case 4 cents in 5 goes out of the city; in so far as the street cars are concerned, that same proportion in the nickel stays here.

"I am thus explicit because I wish to show our people the partnership interest created by the franchise regulations that bind the street railways to certain specific obligations, directly benefiting the public, as opposed to the non-regulated auto-busses, having no such onerous liabilities imposed upon them. It is patent that if the street railways are losing what will amount to $750,000 a year the public service heretofore furnished by the street railways will be curtailed to comport with these new conditions.

"The people in the end will be compelled to depend upon the street railways for transportation. Meanwhile, the loss of revenues has affected the whole city as shown. Extensions have been necessarily blocked and the enforced economies have been reflected in a hundred different directions beyond the street railways themselves. It is they that have most seriously felt the pinch thus far, but it requires no seer's vision to perceive that the people so immediately concerned in the prosperity of the big corporations sharing their incomes with the city must suffer from the restricted revenues.

"To dally longer in our present state of irresolution and inaction as regards the 'Jitney' bus is to be guilty of gross injustice to the people."

THE AUGUSTA-AIKEN FARE CASE

Hearings on the application of the Augusta-Aiken Railway & Electric Company for permission to increase its fares were held before the South Carolina Railroad Commission on Dec. 10 and 16. The application to the commission briefly was for permission to increase the fares from 1 cent to 2 cents a mile. At the hearing on Dec. 10 J. H. Pardee, vice-president of the company, said that a fair income on the investment was imperative, and that last year, after deducting $41,000 for depreciation, there remained only $25,000 income, a return of approximately 3 per cent. Mr. Pardee agreed at the hearing to have S. B. Culley, auditor of the company, and R. W. Spofford, general superintendent, appear before the commission. He took the position, however, that neither Mr. Culley nor Mr. Spofford could testify to anything material except facts already sworn to by Mr. Culley in the last annual report of the company to the Railroad Commission.

On Dec. 16 James U. Jackson, formerly vice-president of the company, reviewed his association with the company from the time that the road was built until quite recently. Mr. Jackson did not consider the line an interurban one in the strict sense of the word, and said that two or three times each session of the South Carolina Legislature for eight years he opposed bills to force the Augusta-Aiken Railway & Electric Company to install water coolers, toilets and separate cars for the whites and negroes. Mr. Jackson said that he advanced the argument each time that the road was a trolley road with cheap fares and could not afford to better the equipment under the charge of 1 cent a mile for transportation.

Perhaps the principal contention of the opposition to the increase in fares was that the people had been induced to invest money in land, homes and factories in the territory served by the line, on the assumption that the present rate of fare would be continued, and that to put into effect the fare now proposed would practically amount to the confiscation of the investments of these people.

The commission set Dec. 29 as the date for the final hearing.

Chicago Tests Destination Sign Provisions.—A suit to test the right to force the Chicago (Ill.) Surface Lines to provide signs showing the destination of cars has been filed in the Municipal Court. In all there are 170 of these suits for violations.

Fare Case to Ohio Supreme Court.—The Supreme Court of Ohio has been asked to review the decision of the Hamilton County Circuit Court involving the payment of a 5-cent fare between Pleasant Ridge and the business section of Cincinnati over the lines of the Interurban Railway & Terminal Company and the Rapid Railway.

Suit to Force New Transfer Points.—The city of Chicago, Ill., has filed two suits for $1,000 each in the Municipal Court against the Chicago Surface Lines to force new transfer points. The specific purpose of the suit is to require the railways to accept transfers at any point where cars of several lines run on the same track.

Inquiry Into Seattle Service.—The Washington Public Service Commission has filed a complaint on its own initiative against the Puget Sound Traction, Light & Power Company alleging inadequate service in Seattle and ordered the company to have its officials appear at a hearing which it intended to hold in Seattle on Dec. 28.

Safety Zones in Cleveland.—Standards connected by chains have been secured to mark the safety zones at several of the stops in the business district in Cleveland where traffic is exceedingly heavy. According to Director of Public Safety Benesch the use of chains will be extended to other parts of the business district as rapidly as may be advisable.

Reduction in Schedules Asked in Atlanta.—The Georgia Railway & Power Company, Atlanta, Ga., has asked the Railroad Commission of that State for authority to diminish existing schedules on several lines. The petition sets forth that traffic in Atlanta has been decreasing steadily, and that the receipts for the month of November showed a decrease of $2,230 compared with November, 1913, and were actually less than those for November, 1912.

Puget Sound Fare Change.—The Puget Sound Electric Railway, Tacoma, Wash., has filed with the Public Service Commission a supplemental tariff naming a round-trip rate of $1 between Puyallup and Seattle. This gives patrons from Puyallup the same round-trip rate as is in effect between Tacoma and Seattle, while previously they have paid the one-way rates to and from Seattle amounting to $1.50. The change went into effect on Dec. 24.

Transfer Charge Under Consideration at Boston.—A special committee of the Chamber of Commerce of Boston, Mass., is investigating the financial side of electric railway operation with a view toward determining the feasibility of a charge for transfers on Massachusetts street railways. The investigation grows out of the 20 per cent maintenance and depreciation requirement of the Massachusetts Public Service Commission as set forth in the recent Middlesex & Boston fare decision.

Good, Bad and Indifferent Suggestions.—Many suggestions have been made to the United Railways, St. Louis, Mo., in connection with the effort to have passengers move forward in its cars. Some of the suggestions made for signs for use in the cars follows: "The best looking girls are in the front seats," "Follow St. Louis to the front," "Confer a favor upon those who follow by moving to the front," "Success is gained by moving to the front," "Consideration of others is a mark of good breeding," "Kindly move to the front."

Inquiry Into St. Louis Service.—The Missouri Public Service Commission has announced that the inquiry being conducted by it into the question of the adequacy of the service furnished in St. Louis by the United Railways will be continued on Jan. 13 at the Planters Hotel. John M.

Atkinson, chairman of the commission, says that on the hearing on Jan. 13 the company will have an opportunity to present evidence concerning its financial ability to carry out the extensions and improvements which have been proposed and of denying the need of such improvements.

Combined Steel and Wooden Trains Discontinued.—The Long Island Railroad has notified the Public Service Commission for the First District of New York that it is now complying with the terms of the commission's order to discontinue the use of wooden trail cars in trains made up in part of steel cars. The commission's order was issued to become effective on Dec. 1, 1914, but the company requested permission to continue the operation of the fifty-three wooden cars until new equipment could be purchased. This application the commission denied and compliance with the order followed this action.

Fare Zone Petition Denied.—The Public Service Commission of Maryland has dismissed the petition of F. L. Hawley to require the Washington, Berwyn & Laurel Electric Railway, Washington, D. C., which operates between Washington and Laurel, to establish three fare zones, instead of four as now, between Laurel and the District line. The present zone system of the road was established by authority of the Interstate Commerce Commission, and the local body decided that it could not act in the matter because the Supreme Court of the United States had held in the Shreveport case that where the jurisdiction of the Interstate Commerce Commission and a local regulatory body conflicted the former authority prevailed.

Transfer Greetings in Kansas City.—The Metropolitan Street Railway, Kansas City, Mo., expressed Christmas and New Year's greetings as usual to all the passengers that took transfers. On December 24, 25 and 26, and on Dec. 31, Jan. 1 and 2 the transfers bore the following on the reverse side: "It is our wish that you enjoy A Merry, Bright Christmas and A Happy New Year." These words were printed in red ink; and in a corner of the space was a picture, printed in green, of Santa Claus astride a reindeer bearing a big sack of toys and waving a miniature Christmas tree. The transfers were printed on stationers' bond. The change in the texture of the transfers aroused curiosity in the passenger.

Service Matters in Los Angeles.—The City Council of Los Angeles, Cal., has adopted a resolution ordering the Board of Public Utilities Commissioners of Los Angeles to conduct an investigation of the local surface railways and to submit recommendations at the earliest possible date regarding more direct routes, quicker running time and the construction of cut-offs. In line with this resolution Councilman Snowden has recommended stopping alternate cars at alternate blocks. Councilman Roberts announced recently that suits would be started against the Pacific Electric Railway to restore transfer privileges on the Edendale line. The company has granted the demand for a 5-cent fare and stop at Harriman Avenue.

Fare Readjustment Asked.—The Kansas City-Western Railway, Kansas City, Kan., has asked the Kansas Public Utilities Commission for permission to readjust rates. The schedules which have been proposed show some decreases, but provide for an average increase, including a higher round-trip rate between Kansas City and Leavenworth. The basis of the proposed schedule is a straight one-way fare of 2 cents a mile; round trip at 1.8 cents a mile, fifty-ride one-year books at 1.56 cents, fifty-ride ninety-day books at 1.25 cents, and twenty-five-ride sixty-day books at the rate of 1.35 cents a mile. The receipts of the company are understood to have suffered a decrease on account of the withdrawal of 3100 soldiers at Fort Leavenworth, who were called away eighteen months ago.

"Safety First" in Nashville.—The Nashville Railway & Light Company, Nashville, Tenn., is using advertising space freely in the newspapers in connection with its "safety first" campaign. A recent Sunday issue of the Nashville *Tennesseean* contained a four-column display advertisement, the full length of the page, in which drawings by F. D. Spotswood, Lexington, Ky., were used. Included in the text of the advertisement was the following paragraph: "We beg the drivers of wagons, teams, buggies and automobiles to remember that the cars are bound to run on a fixed track and cannot vary their course, nor shut off their speed at once—but the drivers can, and the responsibility for a collision is generally with them. Drivers: Be deliberate and careful when crossing a track or driving beside it."

Service Complaints in Cincinnati.—W. Kesley Schoepf, president of the Cincinnati Traction Company, sent a long communication to Mayor Spiegel on Dec. 22, 1914, in which he explained in detail the efforts of the company to meet the complaints filed with the Director of Public Service. After suggesting a number of changes that would result in improvements, Mr. Scoepf concluded: "In general, I desire to say that, while the reduction in our traffic has been large, the service given by this company, as measured by the number of seats provided for the traffic during the rush-hour periods, has been maintained well above the service for the same days of last year." The transfer schedule worked out by representatives of the company and the street railway committee of the City Council was presented to Council on Dec. 22, but its consideration was fixed track and cannot vary their course, nor decrease their deferred until members have an opportunity to study it carefully.

Berkshire Petition Finding.—The Massachusetts Public Service Commission has refused to order the Berkshire Street Railway to remove its high-tension wires from poles in Cheshire or to discontinue the use of its local substation, as petitioned by the Selectmen. The board points out that the wires were attached prior to the passage of any act making the consent of the Selectmen mandatory upon the company in connection with the erection of transmission lines and that no provision of law was cited which required the company to obtain the consent of the Selectmen prior to building a local substation. The petitioners claimed that the substation is a local disturbance of the peace, but the commission points out that the company is endeavoring through the manufacturers to reduce the noise of the machinery and refuses to take action at present. Regarding the demand for lower fares, the board withholds action until the company shall submit a proposed new schedule of rates subject to public hearing.

Louisville's "Ruddy Runabouts" Rerouted.—After having passed through the heart of the retail section of Louisville for many years, turning into Fourth Street at Chestnut Street and running one block north before turning West on Walnut Street, the Brook Street cars of the Louisville (Ky.) Railway on Dec. 15 were routed straight down Chestnut Street to Fifth Street, thence north on Fifth street to Main street as usual after the Walnut Street intersection was passed. This routing has long been desired by the officials of the company, which in 1912 tried it, beginning at a time when construction work effectually blocked Walnut Street. Popular clamor, however, compelled restoration of the time-honored routing, and it has taken an order from the board of public safety, acting in the interest of pedestrians at that always busy corner, to divert the cars. This line has for years been the butt of the "village wits" and the cars have variously been dubbed the "Crimson Ramblers," "Red Rovers" and "Ruddy Runabouts" on account of the tortuous course they have taken through the city.

Pension Plan for St. Louis Employees.—Richard McCulloch, vice-president and general manager of the United Railways, St. Louis, Mo., announced on December 24 a pension system for old employees effective on Jan. 1, 1915. Under the plan about twenty-five present and former employees will receive from $240 to $600 a year. The pensions will be paid entirely by the company. Any employee of sixty years who has been with the company fifteen years or more continuously and is incapacitated for work may upon request retire from active service with a pension for life. Any employee seventy years old with the company twenty years continuously can be retired on a life pension unless exempted by special ruling of the general manager. The amount of the annual pension is to be 1½ per cent of the average annual wage received during the employee's last ten-year period of service multiplied by the number of years of the employee's continuous service. It is provided, however, that no pension shall be less than $240 a year or more than 40 per cent of the average annual wage. The largest salary considered for the purpose of computing the pension allowance will be $1,500 a year.

Personal Mention

Mr. Samuel W. Pennypacker, Philadelphia, has been designated chairman of the Pennsylvania Public Utility Commission to succeed the late Nathaniel Ewing.

Mr. Walter H. Gaither, Pittsburgh, Pa., private secretary to Governor Tener of Pennsylvania, has been appointed a member of the Pennsylvania Utility Commission.

Mr. Henry Clay Hall, Colorado Springs, Col., has been nominated by President Wilson for re-appointment to the Interstate Commerce Commission for a term of seven years from Jan. 1, 1915.

Mr. James W. Carmalt, Montrose, Pa., attorney for the Interstate Commerce Commission, has been appointed chief examiner of the commission. He succeeds Mr. Ross D. Rynder, New York, who resigned to become commerce counsel for Swift & Company, Chicago.

Mr. P. B. Sawyer, vice-president and general manager of the Utah Power & Light Company, Salt Lake City, and formerly general manager of the Union Electric Company, Dubuque, Ia., in charge of street railway and electric service interests, has resigned from the Utah Power & Light Company, with which he has been connected since its organization more than two years ago.

Mr. Harry W. Alexander, publicity and sales manager of the Federal Light & Traction Company, New York, has resigned his position to become manager of the editorial and advertising section of the Society for Electrical Development. He will begin his new duties Jan. 1, 1915. Mr. Alexander's first position was in the accounting department of the San Pedro, Los Angeles & Salt Lake Railroad, at Los Angeles. Later he was transferred to the passenger department. Some time later he became press representative of one of the large amusement holding companies, and for three years traveled for this corporation throughout the United States and Canada. He later acted as its resident agent at different times in Salt Lake City, Pocatello, Idaho, and Denver, Col. In 1909 he became connected with the Chicago *Inter Ocean.* Early in 1911 he became associated with the Federal Light & Traction Company's operating department, resigning a year later to go with the construction forces of the Kansas City, Clay County & St. Joseph Railway. He returned late in 1912 to the Federal company, in the sales department, and in May, 1913, became publicity manager. Later he was placed in charge of the sales department.

Mr. George M. Cox has been appointed vice-president of the Middlesex & Boston Street Railway and of the Norumbega Park Company, with headquarters at Newtonville, Mass. He will retain his title and official duties as general manager of the railway company and as assistant treasurer of the Boston Suburban Electric Companies. Mr. Cox is a native of West Newton, and was graduated from the Newton High School in 1884. After eight years in mercantile business in Boston he joined the Middlesex & Boston organization as a clerk in the bookkeeping department. He served successively as chief clerk, assistant treasurer and assistant general manager, succeeding Mr. Carl A. Sylvester as general manager shortly after the latter's departure for Rio Janeiro, Brazil. Mr. Cox has just been re-elected a member of the Newton Board of Aldermen, after four years' service in that body. He is a member of the New England Street Railway Club and the Massachusetts Street Railway Association. Mr. Cox has had immediate charge for the company of the campaign for the establishment of a standard fare of 6 cents on the system, which culminated in the recent favorable Middlesex & Boston rate decision of the Massachusetts Public Service Commission, providing a new outlook for street railway financial administration for the roads within its jurisdiction.

OBITUARY

Clarence L. Chapman, at one time superintendent of the Holyoke (Mass.) Street Railway, is dead. Mr. Chapman was born in Sanford, Maine, on Dec. 1, 1843. He served in the Civil War and was postmaster of Somersworth, N. H., for ten years. He was connected with the Springfield (Mass.) Street Railway for many years as a foreman.

Construction News

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

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

RECENT INCORPORATIONS

Torrington (Conn.) Traction Company.—Application for a charter has been made by this company in Connecticut to build a 10-mile electric railway between Torrington and Thomaston. Incorporators: Hosea Mann, Torrington, George B. Goodwin, Torrington, and Howard Guernsey, Thomaston. [E. R. J., Dec. 19, '14.]

***Hartford, New Britain & Meriden Railway, Hartford, Conn.**—Application for a charter will soon be made by this company in Connecticut to build an electric railway from a connection with the tracks of the Connecticut Company in Meriden northerly along Broad Street or Colony Street and the Hartford turnpike, or on private right-of-way near the highway in the towns of Meriden, Berlin, Newington, Wethersfield and Hartford to the intersection of Fairfield and Maple Avenues in Hartford and to a connection with the tracks on Fairfield Avenue, Hartford. The petitioners also ask for a right-of-way at some convenient point or points on the route to extend a line or lines westerly to the center of Berlin and to the center of New Britain. John C. Warnock, Meriden, attorney.

FRANCHISES

Tucson, Ariz.—The Tucson Rapid Transit Company has received a twenty-five-year franchise from the Council for several extensions of its lines in Tucson.

Los Angeles, Cal.—The Los Angeles Railway has agreed to purchase the franchise for the extension of the Brooklyn Avenue line on Evergreen Avenue in Los Angeles to serve the Malabar district, on condition that the Trilby rail requirement be eliminated.

Lewiston, Idaho.—The City Council at a special meeting granted the Nortz Syndicate of Minneapolis a twenty-five-year franchise in Lewiston. The railway must be in operation by Aug. 1, 1915. As soon as R. C. Dahlkjeim, representing the syndicate, can secure a franchise in Clarkston, Wash., work will be begun. The matter of granting the syndicate a franchise is before the Clarkston City Council at this time.

Augusta, Maine.—The Lewiston, Augusta & Waterville Street Railway has received permission from the Public Utilities Commission to change the location of its tracks on Western Avenue and on Rhines Hill in Augusta.

St. Louis, Mo.—C. Brenner, John A. Robitch and F. Arnold have asked the Council for a franchise for an extension of the Bellfontaine Street line from its present loop to the city limits.

Orange, N. J.—The Public Service Railway has filed with the city clerk the acceptance of the franchise granted by the Council on Nov. 24, 1914, for the extension of the Central Avenue line in Orange.

Toronto, Ont.—Plans and specifications for the Eglinton Avenue section of the Forest Hill Railway are under consideration of the York City Council.

Dallas, Tex.—The Dallas Consolidated Electric Street Railway has asked the Council for a franchise for an extension to the proposed union interurban terminal station in Dallas.

Houston, Tex.—The Houston Electric Railway has asked the Council for a franchise to extend its tracks on San Felipe Street to the city limits in Houston.

TRACK AND ROADWAY

Mobile & Baldwin County Railroad, Mobile, Ala.—During 1915 this company will build 60 miles of new track to connect Volanta, Bay Minette, Pensacola, Fairhope and Yerkon.

Fresno (Cal.) Interurban Railway.—J. B. Rogers, president of this company, has agreed to change the routing of this line in Fresno to the southeastern city limits from K Street to L Street. The company will soon apply for

a franchise along Inyo Street from K Street to L Street and along L Street to its southeastern limits, thence over private right-of-way to Hamilton Avenue in Fresno.

Pacific Electric Railway, Los Angeles, Cal.—Work has been begun by this company on the reconstruction of the line from San Bernardino to Highland and Patton. The improvements include new ties, heavier rails and complete reballasting of the line.

San Francisco, Cal.—The Fifteenth Street and Park Hill Improvement Association has filed a petition with the Board of Works in San Francisco to extend Alpine Street, widen Fifteenth and other streets in the neighborhood and to acquire a right-of-way from Masonic Avenue and Levant Street to Pluto Street, so that a route for an extension of the municipal railway may be provided. The board has referred the petition to the city engineer.

San Francisco (Cal.) Municipal Railway.—The Board of Works has awarded the contract for the construction of the California Street Municipal line in San Francisco to F. Rolandi, San Francisco. Plans are being made to begin work at once on Second Avenue and Geary Street in San Francisco.

Sausalito (Cal.) Incline Street Railway.—The contracts for surveys, general plans and specifications have been awarded by this company to A. E. Roberts, and plans are being made to begin work about Feb. 1 on this incline railway from the bay front in Sausalito to the summit of the heights, 1000 ft. above Sausalito. The company will operate two electric, compensating cable cars and the power station will be located at the top of the incline. Capital stock, authorized, $50,000. Capital stock issued, $3,000. Officers: Allen H. Vance, Sausalito, president; George H. Harlan, secretary; F. A. Robbins, treasurer and A. E. Roberts, chief engineer, all of Sausalito. [E. R. J., Nov. 14, '14.]

Connecticut Company, New Haven, Conn.—Plans are being considered by this company to extend its tracks in Norwich in five different directions, including the Maplewood, cemetery, Mohegan Park and Fitchville extensions.

Columbus (Ga.) Railroad.—This company is asked to consider plans to extend its lines to Riverdale.

***Boise, Idaho.**—C. J. Franklin, Boise, Idaho; J. G. Brown, Galion, Ohio, and E. A. Pack, Weiser, Idaho, contemplate the construction of a 75-mile electric line over Blue Mountain from Boise to La Grande, Ore.

Lewiston, Idaho.—Arrangements are being made to begin work about Feb. 1 on the 3-mile electric line to connect Lewiston, Idaho, and Clarkston, Wash. The repair shops will be located in Clarkston and power will be obtained from the Lewiston-Clarkston Improvement Company. It is planned to operate three cars. R. C. Dahlhjelm and A. G. Nortz are interested. [E. R. J., Dec. 12, '14.]

City Railway, Mount Vernon, Ill.—This company plans to build 2 miles of new track during 1915.

Peoria (Ill.) Railway.—Plans are being contemplated by this company to double-track its Jackson Street line to the city limits of Peoria.

Rockford (Ill.) City Traction.—About 50 miles of new track will be built by this company during 1915.

Kankakee & Urbana Traction Company, Urbana, Ill.—Plans are being considered by this company to begin work in the spring on the extension to Paxton and south from Paxton.

Fort Dodge, Des Moines & Southern Railway, Boone, Ia.—This company has purchased three 96-ft., deck-girder spans weighing approximately 176 tons from the American Bridge Company. These are to be used in replacing temporary structures with permanent ones in the roadway near Boone.

Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan.—During the year this company plans to build its 25-mile line to connect Linwood, Eudora and Lawrence.

Hutchinson (Kan.) Interurban Railway.—About 1 mile of track will be built by this company during 1915.

Manhattan City & Interurban Railway, Manhattan, Kan.—About 1 mile of new track will be built in Manhattan during 1915 by this company.

Louisville (Ky.) Railway.—Something over 1 mile of new street paving is to be done next spring on West Market Street in Louisville by this company. According to the terms of its charter, the company will be required to pave, with granitoid, the spaces between its double tracks, as well as a strip 2 ft. wide on each side of the tracks. The roadways will be of bituminous concrete and the gutters of brick. The cost of the improvement is estimated at about $65,000.

Kentucky Utilities Company, Somerset, Ky.—Plans are being considered by this company for an extension between Somerset and Burnside, 7 miles.

Southwestern Traction & Power Company, New Iberia, La.—This company plans to build its 60-mile line to connect New Iberia, Jeanerette, Berwick and St. Martinville during 1915.

New Orleans Railway & Light Company, New Orleans, La.—During 1915 this company expects to construct 10.50 miles of new track in New Orleans.

Orleans-Kenner Electric Railway, New Orleans, La.—Construction is well under way on this line to connect New Orleans, Southport, West Carrolton, Harlem, Shrewsbury, Harrihan and Kenner. The repair shop will be located at Harrihan and power will be purchased from the New Orleans Railway & Light Company. The company will operate four cars and will also furnish power for lighting purposes. Capital stock, authorized, $3,000,000. Capital stock issued, $250,000. Officers: E. A. Stanford, New Orleans, president; A. Fitzpatrick, vice-president; John Lorenz, 409 Tulare Newcomb Building, New Orleans, secretary and treasurer, and E. J. Morris, superintendent. [E. R. J., Dec. 19, '14.]

***East Kildonan, Man.**—The Public Utilities Commission of East Kildonan is considering plans for an electric railway from East Kildonan to Morse Place.

Detroit, Almont & Northern Railway, Detroit, Mich.—This company has awarded a contract to Frank Bishop, Almont, Mich., to build an extension from Almont north to Imlay City, 8.5 miles. The company has completed work on 9.35 miles of first track, and about 1 mile of second track between Romeo and Almont.

Minnesota & Central Minnesota Railway, Minneapolis, Minn.—This company, which is now building a line between St. Cloud and Kimball, is considering plans to build through Ramey to the iron range if certain concessions are made by those interested in the proposition. E. G. Potter, 433 Andrews Building, Minneapolis, president. [E. R. J., June 27, '14.]

Trenton, Lakewood & Seacoast Railway, Point Pleasant, N. J.—Completion by May 1 of the first link in a trans-State electric line is said to be assured through the awarding of a contract by this company to the Vandergrift Construction Company. The company has a capital stock of $1,500,000, and all but $250,000 is available for use in the construction of the proposed line. The right-of-way extends along the wagon road the greater part of the distance to Lakewood from Point Pleasant. It is announced that the right-of-way for the entire cross-State line has been acquired, and that it is planned to make the run from Point Pleasant to Trenton in fifty-five minutes. The line will take the most direct route from Trenton to the seashore. The intention is to make it a freight as well as passenger-carrying line.

Brooklyn, N. Y.—The Public Service Commission, First District, has sent to the Interborough Rapid Transit Company, for its criticism and suggestions, the form of contract for the construction of Section No. 2 of Route No. 12, the Eastern Parkway subway in Brooklyn. This section extends from the end of the present construction, at Prospect Park Plaza out Eastern Parkway to a point 635 ft. east of the center line of Nostrand Avenue, and includes the spur turning southeasterly into Nostrand Avenue for the Nostrand Avenue subway. The company will have ten days in which to consider the contract and return it to the commission with its recommendations, after which the Commission will adopt it and order advertisements for bids.

Hudson Valley Railway, Glens Falls, N. Y.—During 1915 this company plans to build about 1 mile of new track in Glens Falls.

Cincinnati (Ohio) Traction Company.—A 2-mile extension will be constructed by this company in Cincinnati during 1915.

Cleveland (Ohio) Rapid Transit Railway.—According to a statement by President Hopkins of this company the Ohio Public Utilities Commission will be asked to authorize an issue of $12,000,000 or $15,000,000 bonds to build the first two lines of the proposed subway system in Cleveland.

Toronto Suburban Street Railway, Toronto, Ont.—During 1915 this company plans to build 40 miles of new track between Toronto and Guelph.

Toronto, Ont.—A by-law will be submitted to the voters on Jan. 2, 1915, in Toronto for authority to build new civic lines in North Toronto and extend south from Earlscourt, Hill Crest and Wychwood districts, at an estimated cost of $455,000. R. C. Harris, City Hall, is Commissioner of Works.

Willamette Valley Southern Electric Railway, Portland, Ore.—Officials of this company state that the line will be in operation before Feb. 1, 1915. The trolley wires have been strung from Oregon City to a point about 2 miles southwest of Molalla, and it is expected that the line will be completed to Mt. Angel within two weeks. G. B. Dimick, president.

***Bristol, Tenn.**—Plans are being considered to build an electric railway from Kingsport, on the Holstein River, across the counties of Sullivan, Washington, Greene and Cooke to Newport, Tenn. No names are yet given of those interested in the project.

Carolina, Greenville & Northern Railroad, Greenville, Tenn.—Work will be resumed in the spring by this company on its 70-mile line between Kingsport and Greenville. Power will be purchased from the Tennessee Eastern Electric Company, Greenville. Capital stock authorized, $1,500,000. Officers: H. S. Reed, 205 Grant Building, Los Angeles, president; James L. Calahan, 111 Broadway, New York, N. Y., vice-president; A. M. Blauvelt, 61 Broadway, New York; secretary; E. R. Eston, Greenville, treasurer; Kirby Thomas, 43 Exchange Place, New York, general manager and purchasing agent, and F. A. H. Kelly, Greenville, Tenn., chief engineer. [E. R. J., Dec. 26, '14.]

Knoxville Railway & Light Company, Knoxville, Tenn.—Plans are being made by this company to extend its lines in Knoxville.

Beaumont, Tex.—Two plans are under consideration for a line through Chambers County. One is to route the line through Chambers County direct and the other to route the line from Houston to Beaumont, through Liberty County and extend a spur from Liberty to Anahuac. Edward Kennedy and associates are interested. [E. R. J., Dec. 19, 1914.]

San Antonio (Tex.) Traction Company.—Work has been begun by this company on Trevino Street to connect Main Plaza and Military Plaza in San Antonio.

Southern Traction Company, Dallas, Tex.—Double tracks are being laid by this company through Trinity Heights near Dallas, and plans are being made to lay new heavy rails on Third Avenue in Dallas.

Southwestern Traction Company, Temple, Tex.—A 2.3-mile extension will be built in Temple by this company during 1915.

Texas City (Tex.) Street Railway.—Work has been begun by this company on the extension east on Eleventh Avenue to Second Street and south on Second Street to Eighth Avenue and thence to the passenger pier in Texas City.

Ogden, Logan & Idaho Railway, Ogden, Utah.—Following the completion of the extensions between Lewiston and Smithfield and between Providence and Wellsville, through service was established recently between Lewiston and Wellsville by this company. Grading on the extension between Lewiston and Preston is more than half completed, and the construction work on the link between Wellsville and Brigham has been begun. It is estimated that the entire line will be completed and through service established between Ogden and Preston by June 15, 1915. The line will be about 190 miles long.

Hershey (Pa.) Transit Company.—This company has completed the first section of 5 miles of its line from Hershey to Elizabethtown, 10 miles. It is expected that the remaining 5 miles will be completed in 1915. H. N. Herr, Hershey, chief engineer.

Warren (Pa.) Street Railway.—During 1915 this company plans to lay about ½ mile of new track in Warren.

Regina (Sask.) Municipal Railway.—About 1½ miles of new track will be constructed in Regina during 1915.

Sioux Falls (S. D.) Traction System.—During 1915 this company plans to build 1 mile of new track and to pave 3 miles in Sioux Falls.

Ogden (Utah) Rapid Transit Company.—During 1915 this company plans to build its 33-mile northern terminus to connect Wellsville, Mendon, Collinston, Deweyville, Honeyville, Garland, Tremonton and Brigham City.

Norfolk (Va.) Southern Railway.—Plans are being considered by this company for an extension to Cape Lookout.

Tacoma (Wash.) Municipal Railway.—Rapid progress is being made by this company on its new line in Tacoma. All the material is on hand and being installed.

Charleston-Dunbar Traction Company, Charleston, W. Va.—About 18 miles of new track will be built by this company during the year 1915.

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—This company is receiving bids for the construction of a new passenger and freight station in Gardena. The building will be a Type "A" structure about 72 ft. x 30 ft., and much of the construction work will be of concrete.

New York Municipal Railway Corporation, Brooklyn, N. Y.—The Public Service Commission, First District, has approved the plans and contract submitted by this company for the construction of the stations on the Sea Beach railroad, as reconstructed for the dual system of rapid transit. The stations to be built are designated as: Eighth Avenue, Fort Hamilton Avenue, New Utrecht Avenue, Eighteenth Avenue, Twentieth Avenue, Twenty-Second Avenue, Kings Highway, Avenue U and Eighty-sixth Street. The successful bidder will be required to give a bond of $50,000 to begin work within ten days after the delivery of the contract, and to complete the same within six months from that date. The work will include the erection of complete station buildings, passages and stairs, with newsstands, ticket booths, etc., although the specifications differ for different stations.

POWER HOUSES AND SUBSTATIONS

East St. Louis Light & Power Company, East St. Louis, Ill.—This company will add to its substation equipment a 1250-kw, 300-r.p.m., 2300-volt frequency changer set with synchronous motor panel. The order for the apparatus has been placed with the General Electric Company.

New Bedford & Onset Street Railway, Wareham, Mass.—This company will place in operation new substation apparatus consisting of 400-kw and 500-kw rotary converters, three 135-kva and three 165-kva transformers, switchboard and accessories. The equipment has been purchased from the General Electric Company.

New York Municipal Railway Corporation, Brooklyn, N. Y.—This company will make additions to substation equipment comprising three 2000-kw and three 4000-kw rotary converters, nine 750-kva and nine 1400-kva transformers, switchboard apparatus and accessories, the contract to build all the apparatus having been awarded the General Electric Company.

Toledo Railways & Light Company, Toledo, Ohio.—This company has ordered from the General Electric Company four additional 2000-kva, four 600-kva and four 300-kva transformers and switchboard euqipment.

Monongahela Valley Traction Company, Fairmont, W. Va.—All contracts have been awarded by this company for its new power house near Hutchinson, W. Va. The new station will have 8600-hp capacity. The gas engines will be furnished by the Bethlehem Steel Corporation and the generators by the General Electric Company.

Nashville Railway & Lighting Company, Nashville, Tenn.—This company will place in operation in one of its substations an additional 2000-kw three-unit motor-generator set which will be built by the General Electric Company.

Manufactures and Supplies

ROLLING STOCK

Chicago & Milwaukee Electric Railroad, Highwood, Ill., will buy immediately fifteen interurban cars.

Stockton Terminal & Eastern Railroad, Stockton, Cal., expects to use gasoline motor cars on its line.

Wilmington, New Castle & Delaware City Railway, Wilmington, Del., expects to purchase four semi-convertible cars.

Long Island Railroad, New York, N. Y., is asking for bids on twenty all-steel trailers for summer use, about 55 ft. over all, of light-weight and flat roof construction.

TRADE NOTES

Automatic Ventilator Company, New York, N. Y., is furnishing its "A. R. I. E." type intake-and-exhaust ventilators for the twenty-four arched-roof, all-steel interurban cars which the Pressed Steel Car Company is building for the Pacific Electric Railway.

P. & M. Company, Chicago, Ill., has appointed Fred N. Baylies as Eastern manager with offices at 30 Church Street, New York City. Mr. Baylies was formerly assistant sales manager of the Aluminum Company of America, with office in Chicago, but has been a director of the P. & M. Company since its incorporation.

Esterline Company, Indianapolis, Ind., has received an order to equip all the cars of the Mobile Light & Railroad Company with "Golden Glow" headlights. This equipment was adopted after a thorough test extending over considerable period. The installation replaces present arc and incandescent headlight equipment.

W. N. Smith, formerly electrical engineer of Westinghouse, Church, Kerr & Company, has just completed a report on the power generation and distribution system of the San Francisco-Oakland Terminal Railways. His headquarters are now in Watertown, N. Y.

Charles H. Dodge, general Western sales agent, Taylor Electric Truck Company, of Troy, N. Y., has resigned to take effect Jan. 1, 1915. Mr. Dodge has been general Western sales agent for the past ten years and is widely known throughout the Central West district. Immediately following his resignation he expects to devote the greater portion of his time to private interests.

Gifford-Wood Company, Hudson, N. Y., engineers, founders and machinists, will open an office in Room 1038 Hudson Terminal Building, 30 Church Street, New York City. This office will be managed by A. W. Berghoefer, who will also have associated with him Joseph A. Boucher. The territory covered by this New York office will include New York City and the Hudson River up to and including Westchester County, New Jersey, southeastern Connecticut and southeastern Pennsylvania, also including the southern states east of the Blue Ridge Mountains. This company is prepared to furnish machinery equipment for handling bulk material such as coal, boxes, barrels; also ice levelers and Eureka flange teeth for attachment to snow plows, etc.

Northern Equipment Company, Erie, Pa., manufacturer of the Copes boiler feed water regulator and the Copes pump governor, reports that 1914 was the most prosperous year in the history of its business. Its sales exceeded those of its next best year by 9 per cent. This company has purchased the plant, equipment and business of the Erie Pump & Engine Works. V. H. Dougherty, formerly with the International Steam Pump Company, has been engaged to take charge of the centrifugal pump design. A consolidation of the two companies is being perfected and the new combination will be known as the Erie Pump & Equipment Company. The officers of the new company are: E. W. Nick, president and treasurer; D. H. Du Mond, vice-president; V. V. Veenschoten, secretary. John G. Pfadt, former president of the Erie Pump & Engine Works, is not with the new company.

ADVERTISING LITERATURE

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued Catalog No. 21 describing its small d.c. and a.c. small motors.

Chicago Pneumatic Tool Company, Chicago, Ill., has issued a catalog describing and illustrating its Class N-SO and N-SG fuel-oil and gas-driven compressors and their application to the unit system of air-power plants.

Edwards Manufacturing Company, Cincinnati, Ohio, has issued a folder describing and illustrating its iron and steel trucks for handling freight. A feature of the truck construction is the continuous-piece "V"-shaped frame, which gives unusual rigidity and strength.

Busch-Sulzer Bros. Diesel Engine Company, St. Louis, Mo., has issued a catalog which contains curves, data and other results of a number of tests recently conducted for the purpose of determining the efficiency of the fuel oil engines of this company with unchanging and constant loads and also for the purpose of comparison with loads under fluctuating conditions.

Roller Smith Company, New York, N. Y., has issued Bulletin sheet No. 86 which contains an illustrated description of its new a.c. portable signal system testing volt-ammeter. The case of this instrument is of oak and handsome in appearance. It is provided with a substantial leather handle, hinged cover and snap catch. The binding posts are heavy and have non-removable tops. Each binding post is legibly marked with a numeral corresponding to the scale value which is obtained when this binding post is employed. A zero adjuster convenient for manipulation is included. Particular attention is called by the manufacturer to the method of indicating by diagrams on the scale the proper connections for the various ranges and data covering the values per scale division.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 45602 dealing with the subject of protection of series lighting circuits by lighting arresters. The arresters described in the bulletin are two types, the horn type and the aluminum type. The former is designed for the protection of series transformers and rectifiers against lightning discharge and similar trouble, and the latter particularly for the protection of cable circuits running from series arc rectifiers. Bulletin No. 42300 describes this company's line of small direct-connected generating sets of sizes ranging from 2½ to 75 kw. These generating sets are adapted for power and lighting in isolated plants and as exciters for a.c. generators in central stations. Bulletin No. 42010 describes in considerable detail horizontal turbine sets of small capacities ranging from 7 to 300 kw., direct current, and 100, 200 and 300 kw., alternating current. They are adapted for supplying light and power in machine shops and for train lighting. The turbines can be furnished for either condensing or non-condensing operation and in general for any steam pressure of over 80 lb.

Western Electric Company, New York, N. Y., is distributing the first edition of its 1915 electrical supply year book. A new feature incorporated in the book is the adoption of a complete series of list prices upon which a uniform basic discount applies, such a discount indicating to the holder of the catalog his approximate price on all the articles listed. The adoption of this system in place of the many and confusing manufacturers' lists and their wide variety of discounts makes this publication of especial convenience for reference. The innovation enables the trade to determine at a glance approximate costs on any one of the many thousands of articles listed. It simplifies the complicated method of quoting prices and estimating costs, with which the industry has so long been burdened, and it should therefore materially reduce the cost of doing business to seller and buyer alike. To illustrate, no longer will the contractor who is called upon to estimate on jobs find it necessary to refer to one list price and carry in his mind one string of discounts for his wire, another for his porcelain, another for his schedule material, another for his fixtures, etc. With this book before him, he can open at any page, apply a uniform discount and arrive at a price which he can safely figure represents his cost, or he can group the quantities of material he needs together with the total list prices applying thereon and again apply the uniform discount and have a working basis upon which to figure his profits on the job.

Special effort has been made to render this book easy of reference as well as complete in its listings. Although containing 1200 pages besides an alphabetical index it is of unusually light weight for its completeness.