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RETROGRESSION IN RATE MAKING

While we have all proper respect for the theory that administrative bodies should exercise constraint in interpreting "doubtful" provisions of law relating to their own powers, we believe that the Public Service Commission, Second District, New York, has no right so rigidly to interpret its enabling act as to rob it of one of its most progressive and constructive features. In declaring in the Ulster & Delaware Railway mileage case that it must be subservient to the old 2-cent statutory maximum rate fixed before commission regulation began in New York, it has reverted to the practice of inexperienced legislative domination which the commission law endeavored to destroy. The maximum rate was simply an ill-considered guide pending the installation of more scientific methods which the present regulatory machinery was intended to supply. While this should be self-evident, the point is strengthened by the facts that in Michigan the maximum rate law has been declared superseded by the commission law and that in New York since 1907 Governors have vetoed all rate bills as infringements on the powers delegated to the commissions. For a non-expert Legislature to force a commission to exercise discrimination so as to grant unlimited relief to the public and greatly restricted relief to the carriers, is a travesty upon the whole spirit of commission rule. Of course, if the Legislature wishes to resume its rate-making power, it can; but while commissions last, no super-technical nullification should be exercised against their potential usefulness in granting rates which they are convinced are just to carriers.

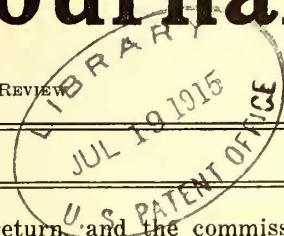
THE PURPOSE OF COMMISSIONS

We realize that it is not a popular thing for a commission to raise rates and so diminish the privileges which the public has enjoyed for a great many years. We believe, however, that the "unpopularity" which would result from such an action is more imaginary than real. In the first place, the public mind is prepared to accept increases in railroad rates with much more grace than it was a few years ago. There has been so much publicity on the necessity of higher rates that everyone now realizes that the expenses of operation of the railroad companies have increased, just as have the living expenses of individuals. Again, the public has a better recognition of the obligations of the railroad commissioners to grant such increases when they are justified. This view of the situation was well expressed in a recent address by Hon. J. F. McLeod, chairman Public Service Commission of Massachusetts. He said: "Capital honestly and prudently invested under economical and efficient management has a constitu-

tional right to a fair return, and the commission is under legal compulsion to allow such rate as will make that return possible. If an increase in fares is shown to be just and reasonable according to that standard, the commission has no discretion except to allow it." We agree with the sentiment thus expressed. The purpose of the appointment of a commission is to provide an impartial body with opportunities in the way of obtaining testimony on which the merits of the rate case can be judged. The testimony alone, and no outside considerations of popularity or unpopularity, should decide whether the rates are to be increased or decreased in any particular case.

SAFETY FIRST FEDERATION

An effort to correlate and perpetuate the general safety work now being conducted in different cities is the purpose of the Safety First Federation of America. For many years electric railway companies have been working out their problems largely unaided. When safety-first work began the railway companies were possibly surprised but certainly gratified to find that they would have willing associates among the public authorities, representatives of the public schools, chambers of commerce and individual, public-spirited citizens. While in many cities the initiative in the safety-first movement was taken by the local railway companies, it soon became, and properly, a community movement in which all of the interests already mentioned participated. In this form most important work has been accomplished, but there have been two points upon which some fear has been expressed in regard to the future. The first of these has been a question of the maintenance of interest in it. In all volunteer movements, after the first enthusiasm has passed away, there is danger that the interest in it will flag. This feeling was expressed in these columns some months ago under the heading "The Brass Band in the Safety Movement." The question raised was: How long-lived will a movement be which has no definite organization behind it whose sole purpose would be to keep it alive? The other point was in connection with the correlation of the work done in the different cities so as to get the most effective results for the least expenditure of energy and money. This meant a comparison of methods followed wherever safety-first work has been undertaken. These two needs, in brief, it is the aim of the Safety First Federation of America to supply. As with the movement in individual cities, it is not primarily a railway matter or even a corporation matter, and it is well that it is not so, but President Allen of the American Electric Railway Association has accepted the office of chairman of the trans-



portation committee of the federation so that the railway interests will be properly represented. A report of the first meeting of the transportation committee, which occurred this week in New York, will be found on another page of this issue.

THE TELEPHONE IN CITY DISPATCHING

Mr. Strong's article in the issue of May 8 on telephone dispatching at Rochester and the article in this issue on a similar system at San Antonio should help to promote wider use of this most rapid means of communication. If it is a good thing to be able to adjust schedules from day to day it is a better thing to adjust them from hour to hour and even from minute to minute. On the European battlefields of to-day we see millions of men moved about as easily as Napoleon maneuvered his thousands, and in no small measure is this due to the telephone. It is not enough to order a regiment to do a certain thing; it must be possible to change its orders almost instantaneously.

Car operation should be on the same modern plane. The schedule, for example, may designate certain cars as short-liners and others as through. Now, if a car is carrying a large number of passengers who want to go beyond the short-line terminus, literal obedience to the schedule will probably displease some of the passengers, especially in bad weather. Sometimes an inspector is stationed at the short-line terminus to decide whether or not the car shall go on, but with telephone dispatching in practice the crew could get instructions directly from the dispatcher. Contrariwise, a long-line or through car could be converted to a short-liner if it has no through passengers and when the dispatcher knows that the following car will go through in a few minutes.

Most deviations from the schedule, like those due to mass meetings, public concerts and ball games, can be provided for in advance; not so with large movements of people due to fires or other unforeseen events. Not long ago there was a big fire in a large Southern city. Had an effective telephone dispatching system been in use the local railway would not only have rerouted the affected car line more quickly, but would also have collected thousands of fares by running special cars to and from the fire. Instead, the jitneys got the business. The way the San Antonio Company dispatched and rerouted cars in accordance with the progress of a parade shows how readily the telephone permits the remodeling of a schedule.

It is hardly necessary to reiterate here the advantages of telephone dispatching as revealed by the detailed practices of Rochester and San Antonio. But the conclusion may be drawn that the telephone offers barely-appreciated opportunities to make the service flexible, thereby securing with one stroke more revenue and greater public satisfaction. The latter result, in fact, is seldom capable of attainment by direct means, but where every car crew, even in the farthest outlying districts, can notify the passengers in advance regarding unexpected operating changes, at least one prolific source of friction is at once removed.

COLLECTING TRAFFIC DATA

The latest article by F. W. Doolittle, director of the bureau of fare research, published elsewhere in this issue, is unusually valuable by virtue of its lucid presentation of the best practice in the work of collecting traffic data. From the experiences of individual railways and engineering companies that have made traffic surveys, Mr. Doolittle has collated basic information for all electric railway operators and has also added carefully-drawn distinctions in regard to the survey plans to be followed by companies of different sizes. Officials who desire for themselves or for their traffic survey staff a readable analysis of traffic survey procedure will find Mr. Doolittle's article replete with concrete suggestions.

In constructing his paper Mr. Doolittle develops his theme logically along the line of the items to be covered by a traffic survey, the frequency of their collection, the preliminary work, and the actual collection and the recording of data. The two points most interesting are in connection with the frequency of collecting data and the extent of the data to be taken. The frequency of traffic studies is impossible of exact determination on account of such factors as size of company, character and growth of territory, traffic density, business conditions and season changes, but sufficient generalization can be made on this topic to say that the time interval between collection dates should be short so that the company will keep pace with traffic fluctuations. The conducting of separate studies for the five ordinary week-days and for Saturdays, Sundays and holidays; the use of twenty-four hours as a minimum period of observation and the making of surveys by preference in the autumn and winter better to estimate peak conditions—these seem also to be becoming definitely formulated principles. It is more difficult to state the extent to which traffic count data should be accumulated, but we believe that Mr. Doolittle has outlined a feasible platform for the average comprehensive survey when he suggests in general the ascertaining of the average number of passengers getting on and off each car at every point during twenty-four hours in the case of the larger companies, the number of passengers getting on and off each car at important traffic points during eighteen hours for companies of medium size and the number of passengers on each car at the point of maximum loading during rush hours for the smaller companies.

It may be that some traffic experts will not agree entirely with this platform. The more one goes into the detail of Mr. Doolittle's article, the greater chance there is of finding particular practices which some experts may not like so much as their own. The science of making traffic surveys is still new to the transportation field as a whole, and through the kindness of local conditions individual initiative has had full sway in its development up to now. But Mr. Doolittle's article is concerned not so much with details as with general principles. Traffic survey principles are gradually becoming clarified and more widely accepted, and he who desires to understand the theory of such work should give the article a careful perusal. The technique to be followed,

however, in applying these principles to specific properties under the varying effect of local conditions and inherent characteristics is a problem to be worked out with all possible standardization by the men who are experienced in the multitudinous details of traffic surveys.

CONTACT SYSTEMS FOR HEAVY TRACTION

Never were there more interesting developments in progress in electric traction than at the present moment and in no place are these developments more interesting than in heavy electric traction. In this field one hears more about locomotives, cars, power plants and transmission lines than about contact systems, but the importance of the contact system was brought out in the railway papers and discussion presented at the A. I. E. E. convention, which were abstracted at length in last week's issue of this paper. While much of the discussion was taken up with routine construction and operation, one can read between the lines and note some very significant facts.

In the first place the phraseology of contact systems needs definition in order that the apparatus and its performance may be accurately and concisely described. The art is changing so rapidly that there is the possibility of adopting names for objects almost off-hand, that the words that are first perhaps thoughtlessly applied will remain. This would be unfortunate. In the early days of electrical development cases of this kind occurred, and expressions then coined have become so closely associated with the industry that it has never been possible entirely to get rid of them. The terms "booster" and "to boost down" are examples. In the present advanced state of the art, however, there is no excuse for the establishment of such barbarisms or their perpetuation.

It is further quite apparent that this is a trying-out period for heavy electric traction contact equipment. Broadly speaking, the system is entirely successful, but in detail there is much that is experimental. Steel contact wires are substituted for copper or phosphor-bronze contact wires, but it is found that they rust; rollers are supplied with wood cores and sleeve bearings, but later the cores are omitted and roller bearings are substituted. At the same time data of cost of operation are being accumulated, and if the operators and manufacturers will make these data fully available there will be ample compensation for the annoyance and expense accompanying the developmental work.

In the third place progress in this instance, as always, brings up new problems or old ones in new guise. Provision for voltage rises in third-rail conductors is one such problem. Readers of this paper have noticed several recent references to the subject. When a current in any circuit is interrupted the collapse of the accompanying magnetic field upon the conductors produces a voltage rise. This is more evident when there is magnetic material in the neighborhood of the circuit, as is the case with a third-rail conductor. Such voltage

rises add to the difficulties of design of high-voltage d.c. equipment.

Electrification has not as yet made serious inroads upon the steam railroad field. It will do so in due time. Meanwhile the present experiments with motors, contact systems, drives, etc., will make it possible ultimately to electrify a large system without danger of obsolescence losses like those incurred in the early street railway electrifications.

A REMEDY FOR THE NEWSPAPER YELLOW PERIL

The false public impression created by undeserved criticism from unscrupulous newspapers is difficult and often impossible for public utility companies to correct by mere improvements in service. Experience has shown, however, that the misrepresentation may occasionally be rectified by deflecting the editorial "punch" in another direction.

The president of a public service company in a medium-sized city recently related confidentially the experience of his company, which for a while found itself at the mercy of two local newspapers. One of them bitterly attacked its service, while the other stood up for it, putting it in a position somewhat like that of the ancient mariner when the two specters were dicing for his life. Though many of the attacks were unwarranted the company realized that some of them were justified. It accordingly remedied the defects of service and then, calling the hostile newspaper's attention to the betterments accomplished, requested it to give due publicity to them. The editor of the newspaper, however, frankly replied that retraction of its present propaganda would be impossible, for without such a resourceful means of opposing its local rival's policy life would become a bore to his readers and the circulation list would melt away. This answer was a hard blow to the company, but it presently adopted another plan. Through its influence a citizen's advertising club was formed for the purpose of attracting people and industries to the city. When the new plan was explained to the hostile newspaper, the latter, tickled at the thought of prospective subscribers from a city of increased population, at once discarded its treading policy and backed the advertising club with enthusiasm. It even claimed to have originated the plan. The officials of the public service company smiled inwardly at this assertion, but were perfectly satisfied to allow the newspaper full credit because the latter's columns now glowed with notices of the special facilities afforded by the city, among which were mentioned an up-to-date street railway and a low-priced lighting system.

Whether newspaper criticism is just or unjust, so long as the criticism is sincere public utility companies may aspire to overcome its effect by adopting more progressive operating methods. If the motive behind the attack, however, is simply the idea that to keep attention attracted to it the paper must always be charging with head down at somebody, practically the only remedy, as in the above case, is to wave a red flag in a different direction.

Telephone Dispatching at San Antonio

The Flexibility of Schedules in Meeting Traffic Changes Has Been Greatly Improved—All Outside Men and Service Cars Are Also Controlled from the Dispatcher's Office

The San Antonio (Tex.) Traction Company has been using, since August, 1914, a telephone dispatching system with connections to forty-two street box dispatching stations. The equipment is of Western Electric manufacture installed and operated under lease by the Southwestern Telegraph & Telephone Company. The system is so arranged that in case of need any Bell telephone may be used.

The dispatcher's board is equipped with two private trunks which join it to the San Antonio public telephone exchange. The board also has connections to the traction company's commercial switchboard. The number of active plugs is now forty-two, with room for sixty. The telephones of all officials of the company are tied in with this board so that the dispatcher can get into touch with them at once.

The primary purpose of the board is, of course, the dispatching of cars, but the use of the telephone gives a much greater flexibility than would otherwise be the case, and certain other uses have developed as by-products.

The cars are dispatched by one man ordinarily, an assistant being employed only for meal relief and during the peak hours. The board is operated for the complete daily transportation period of nineteen hours. To enable two men to work together if necessary the board is divided into two sections.

CHARACTER OF SCHEDULES

The regular schedule calls for headways varying from five to fifteen minutes, according to the line and the time of day. However, conditions frequently arise which make it desirable to deviate from the regular headways. Practically all runs are of such character that the men report for orders on reaching each end of the run. In this way the dispatcher can give clearance orders to the men at frequent intervals or special orders if necessary.

A typical conversation is as follows: The dispatcher says: "Hello." The motorman then replies, "Car 317, Tobin Hill (the line), Otto (motorman)." The dispatcher then says, "9:15 a. m." (time of day). The motorman repeats "9.15," and the dispatcher closes with "O.K."

MAKING CHANGES IN SCHEDULES

The usefulness of the telephone in adding to the flexibility of the schedule will be apparent from the following instances:

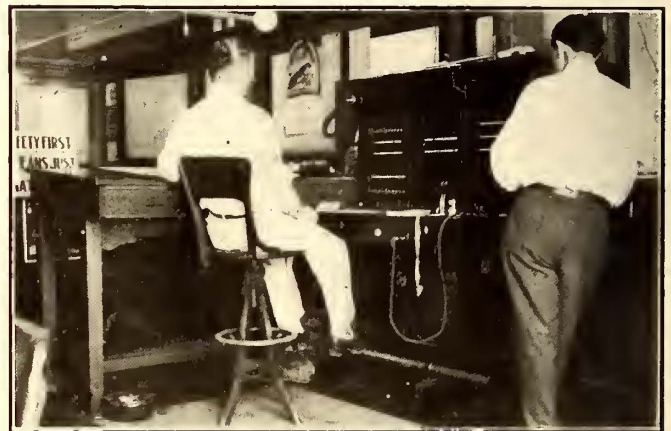
Following rains it may be desirable to slow down the running time by adding say one minute on a fifteen-minute headway. This is readily accomplished by the time instruction which the dispatcher gives to succeeding cars at any given terminus. To guide each man he gives out the revised round-trip time and headway so that the car man can figure his new time-points accordingly.

Saturday and Sunday night service is left entirely to the dispatcher, through the road inspectors, as to when it is desirable to pull off or add cars on any line. The inspectors merely telephone the load conditions to the dispatcher, who acts accordingly.

The convenience of the telephone for setback operation is illustrated by a condition which arose on the West End line on Thursday, May 13. The street was

being paved at one end of the line, and many delays were caused by the use of temporary track and the congestion of foreign vehicles which could use no other place but the track. All cars were made equally late. As the schedule headway was fifteen minutes the cars were set back a half-space, or seven and one-half minutes, at 5:37 p. m. and another half space at 7:22 p. m. Of course, the same result would have been accomplished with one full-space setback at 5:37 or perhaps at 6:07, but this would have caused all cars to drag the line at the period of heaviest riding. Consequently, the half-space setback was used, as described, the second half-space being made when traffic was not so important. On other like occasions the conditions before the first setback have been restored by later advance of the same amounts of time.

The most frequent source of delay is due to the breakdown of foreign vehicles where only one car is affected. In cases of this kind the delayed car is generally allowed to proceed until caught by the car fol-



TELEPHONE DISPATCHING—BOARD IN USE AT SAN ANTONIO, TEX.

lowing. When this occurs the car with the least passengers transfers its load (usually to the car ahead) and turns back at the last meeting point. When it is impossible to turn back both cars because of a heavy load on each, the cars are permitted to go to the end of the line, and a special car, designated a "pull-out," is taken out of the car station to fill the gap in town and to the opposite end of the line. It may be added here that all San Antonio lines are routed from one side of the town through the business district to the opposite side of the town. The lines are not necessarily true radii, as they make several bends in their course, especially in the business district.

Still another schedule feature of telephone dispatching is the conversion of short-line cars into full-run cars when load conditions unexpectedly demand it. As soon as such cars have been ordered to proceed to the end of the line, the dispatcher orders out additional cars to maintain the original headway on the short-line section.

Another field for the telephone is found in the ease of securing additional transfers, tickets or change if the conductor runs short. The conductor telephones his wants to the dispatcher advising when his car will pass

Form 720-11-14-3m
SAN ANTONIO TRACTION COMPANY
 DISPATCHER'S ACCIDENT REPORT

Date 191... Time.....

Car... Line... Direction.....

Location.....

Motorman..... Conductor.....

Nature of Accident.....

No. of Passengers on Car..... in Vehicle.....

No. Seriously Hurt on Car..... in Vehicle.....

Names of Injured.....

Address.....

Advised	Time
Chief Spt.	
Dr.	
Amalgamist	

Dispatcher.....

downtown headquarters. The supplies are then delivered by messengers.

TROUBLE REPORTS

The telephone is also used by the trainmen to report not only on car troubles but also on line and track defects. These matters are handled on standard forms which show the disposition made by the dispatcher and by the department concerned.

A still more important form of report, which is reproduced, is that relating to accidents. The almost instantaneous knowledge

representatives from the executive office to get to the scene of trouble at once. Minor accidents involving only slight damage to property are not reported until the car reaches the terminal.

One interesting feature of the company's accident practice is that the conductor is frequently ordered to remain with the injured person. In the meantime the motorman handles the car alone to the end of the trip, thereby avoiding car blockades and delays to passengers.

One "trouble shooter" and one traffic inspector are always on hand at the main office to take care of contingencies.

REPORTS FROM INSPECTORS

The dispatcher also keeps in regular touch with the road inspectors who must report their whereabouts to him at least once an hour, oftener if possible. The dispatcher from these calls plots squares showing when an inspector reported from a given line. By glancing at the sheet one can readily see whether the inspectors are spending too little or too much of their time on given routes. Of course, the fact that the inspectors report at frequent intervals enables the dispatcher to assign any of them to special service. A typical example of the use of inspectors is afforded by stating the conditions under which they were employed to supervise traffic during the "Battle of Flowers" week in April. In addition to the usual number of inspectors in the downtown district, special men were placed at five important corners where telephones were installed to keep the dispatcher in touch with the location and progress of parades; also to keep the regular inspectors

SAN ANTONIO TRACTION CO.
 DISPATCHER'S ORDER SHEET

DATE..... 191...

NAME	CAR NO.	LINE	TIME	TRANSFER NO.	HALF FARE	CHARGE	REMARKS
						25	
						25	
						25	
						25	
						25	
						25	

DISPT.....

TELEPHONE DISPATCHING—RECORD OF CONDUCTORS' REQUESTS FOR SUPPLIES RUN SHORT

advised of the dispatcher's orders concerning the shifting of routes and the turnbacks made necessary by the parades. This made it possible to keep up continuous service to the very last minute and to resume it as soon as possible.

SERVICE GANGS AND CARS

Contact with the line and track workers in the field is also greatly improved by means of the telephone dispatching system, mainly by requesting trainmen to deliver certain messages to the workers along their route.

Even the sand car is dispatched by telephone, as it can thus be used to the best advantage as reports on track conditions may indicate. The wrecker also reports to the dispatcher for orders immediately after clearing up any job in hand. In general, all service cars and gangs are subject to telephone control.

OTHER BENEFITS

The telephone dispatching system has not only effected the improvements in service noted but has also been of value to the general public in other ways. It has facilitated especially the handling of lost articles. Again, in the case of flooded track, it is now possible to answer inquiries more quickly and more intelligently than before so that patrons will know just how they can best reach their destinations in the absence of regular routing facilities.

The Galesburg (Ill.) Street Railway has opened Highland Park, near that city, to the public. Amusements for children received special attention. The park is equipped with a large dining-room for banquet purposes. At Highland Lake, adjacent to the park, the company has developed attractive swimming pools, chutes and springboards. The Galesburg *Daily Mail* spoke editorially in a very complimentary manner of the public work which the company is doing and urged out-of-town shoppers to plan picnics in this park as a part of their sight-seeing while in Galesburg.

FORM T 210 1-15'3M
SAN ANTONIO TRACTION CO.
 TO SUPT. OF TRANSPORTATION
 TROUBLES REPORTED ON..... 191.....

CAR NO.	LOCATION	LINE	TIME	NATURE OF TROUBLE	REPORTED BY	TO WHOM REPORTED	TIME	DELAY	FINAL ACTION

TELEPHONE DISPATCHING—JOINT REPORT BY TRAINMAN AND DISPATCHER ON TELEPHONED TROUBLE

The trainman's section is shown at the left of this blank, the dispatcher's section at the right

The Collection of Traffic Data

The Items to Be Included and the Method and the Frequency of Their Collection—Preliminary Work,
Length of Period of Observation and Data to Be Taken in the
Field—Conclusions to Be Drawn

BY F. W. DOOLITTLE, DIRECTOR BUREAU OF FARE RESEARCH, AMERICAN ELECTRIC RAILWAY ASSOCIATION

The frequency and the regularity with which traffic studies were made in the past varied considerably. In 1910 information from twenty-four companies indicated that eight made such studies daily, three twice per week, three once or twice per month, two upon complaints, and eight at irregular and indefinite intervals. A report¹ made at that time suggests the following factors which may be said to control the frequency of such studies and the seasons at which they should be made:

1. Size of the property.
2. Character of the territory served.
3. Rapidity of its growth.
4. Density of traffic.
5. Business conditions.
6. Season changes.

The report further points out that in order to secure full advantage of fluctuations in traffic and to anticipate public complaints the interval between such studies should be short. In this connection it is of interest to quote the following two paragraphs:

"*Passenger counts.*—That there should be periodical developments of records of passenger traffic with comparatively short intervals intervening."²

"The committee wishes to recommend that all member companies make daily records of passenger business by trains in interurban operation, feeling that such records are necessary statistics, not alone for proper construction of schedules and time-tables, but as well for the purpose of comparison with past results (the 1910 report shows eighteen companies out of fifty-seven making such a comparison) and as essential factors in developing estimates of future operation."²

Since traffic conditions vary not only with the seasons of the year, but also with the days of the week,³ many who have studied the matter believe that it pays to make a separate traffic study for week days, Saturdays and Sundays, since the termination of even a small part of the service and for a short time only may mean the saving of many car-miles. Touching on this matter, C. M. Larson says:⁴

"Such a record is necessary for week days, for Saturdays, and for other seasons of the year when the traffic is not of the same magnitude. There are, of course, variations in traffic due to weather conditions. These can usually be determined by general observations and the necessary steps taken for the required variation in the service."

In a paper presented in March, 1914, before The Milwaukee Electric Railway & Light Company's section of the American Electric Railway Association on "The Purposes of a Street Railway Traffic Survey," E. J. Archambault says:

"The traffic count that is carried on in an extensive

manner is generally taken during the late autumn and winter months, because it is then that the peak loading is most pronounced and hardest to handle. Other checks, however, are constantly made at all times of the year. It is obvious that this is necessary since the demand is constantly on the increase as a rule, and also that changes are brought about by local conditions along various lines, which affect the loading of other lines as well."

It is interesting to note in this connection that the 1914 Detroit, as well as the 1910 and 1912 Philadelphia, traffic surveys were all made in the autumn of the respective years. The Detroit survey was made by Barclay Parsons & Klapp.⁵ The first Philadelphia survey was made by Ford, Bacon & Davis⁶, and the second by the Department of City Transit, Philadelphia, with Ford, Bacon & Davis as consulting engineers. To quote from the latter report:⁷

"The survey extended over a period of five weeks from Oct. 14, 1912, to Nov. 18, 1912, which period was selected as representing most nearly normal traffic conditions in Philadelphia."

Quite naturally the periods of heaviest riding throughout the year, the week, and the day have received the greatest amount of attention, but if the traffic survey is to accomplish for any company all the good that it can, it should indicate plainly the relation existing at all times between the amount of transportation furnished and the amount required.

PRELIMINARY WORK

The extent of data to be collected in a street railway traffic study is variable, depending upon how comprehensively it is desired to analyze the transportation problem. Most recent traffic studies consist of a systematic series of inspections and observations in which an actual passenger count is made and the movements of cars and passengers are recorded by inspectors or field agents stationed at selected pertinent points, or riding on cars, or both. In addition other observations of a somewhat general nature are often made. These will be referred to later. Traffic experts are fairly well agreed as to those points on each line of an electric railway system at which a passenger count should be made, and generally a preliminary survey is made to determine them, although occasionally they can be located by a rather casual inspection.

R. M. Feustel, in his report on the 1913 Winnipeg traffic survey, gives an account⁸ of the preliminary work, and other recent studies, such as those in Milwaukee, Cincinnati, Philadelphia, etc., follow similar methods of procedure in laying out the work.

"Inspectors were placed on every car on some lines,

¹1910 Proceedings of the Transportation & Traffic Association of the American Electric Railway Association, pp. 256a and 264. (ELECTRIC RAILWAY JOURNAL, Oct. 14, 1910, pp. 822 and 824.)

²1911 Proceedings of the Transportation & Traffic Association of the American Electric Railway Association, p. 506. (ELECTRIC RAILWAY JOURNAL, Oct. 13, 1911, p. 836.)

³See article by F. W. Doolittle in ELECTRIC RAILWAY JOURNAL, May 15, 1915, p. 926.

⁴C. M. Larson—"A Street Railway Traffic Survey"—*Municipal Engineering*, February, 1914. (ELECTRIC RAILWAY JOURNAL, Jan. 24, 1914, p. 177.)

⁵Barclay Parsons & Klapp—Report on Detroit Street Railway Traffic and Proposed Subway, January, 1915, p. 57. (ELECTRIC RAILWAY JOURNAL, April 3, 1915, p. 664.)

⁶Ford, Bacon & Davis—Report on Philadelphia Service and Equipment. (ELECTRIC RAILWAY JOURNAL, June 17, 1911, p. 1065.)

⁷A. M. Taylor—"The Solution of a City's Transit Problem"—*Electric Journal*, October, 1914, p. 516. (ELECTRIC RAILWAY JOURNAL, Jan. 10, 1914, pp. 76-79.)

⁸R. M. Feustel—Report on Winnipeg Street Railway Service—Public Utilities Commission of Manitoba, 1913. (ELECTRIC RAILWAY JOURNAL, April 18, 1914, p. 865.)

on every other car on other lines, and on every third car on the larger lines. They were kept on the car during the entire day, from the time the car left the carhouse in the morning until late in the evening. Points were chosen along each line, approximately four blocks apart, and the inspector recorded the number of passengers on the car when passing these points and the time of passing. These data gave an accurate record of loading conditions on the different lines, both as to geographical location and as to the time loading occurred. The observations taken covered at least two representative days of travel on each line, and if these two days checked satisfactorily one against the other the data were considered sufficient. If, however, for any special reason the loading was eccentric, additional observations were taken until a normal record was had. An examination of data taken indicates that the travel throughout the day could be divided into rather characteristic periods. The record plotted shows the average of all the observations taken, and each of the characteristic periods was plotted separately into what might be called 'car-loading' curves. These plainly showed the average load carried by the car for each period over the entire length of line. The points where the total number of passengers on the car was noted included all regular transfer points along the line as well as the other important traffic stops. * * * From the car-loading curves for each line the point of maximum loading was determined. Other points along the line were selected so that in most cases several street observations were taken on each line simultaneously. The inspectors who had become familiar with car loads were then stationed at these points to record cars and passengers."

The following special features were shown by these preliminary observations:

1. Variations of traffic in both directions for the different periods of the day.
2. Territory in which the pick-up of passengers is made.
3. Location of through territory in which comparatively few passengers are discharged or taken on.
4. Location of unloading territory.
5. Duration of time in which the overloading occurs.
6. Effect of certain transfer points on car loading.

The following preliminary observations were made by Ford, Bacon & Davis in their 1910 study on "Philadelphia Service and Equipment":⁹

- "1. Preliminary car riding by inspectors from July 12 to Sept. 1, to determine: (a) Characteristics of traffic. (b) Principal time points.
- "2. Preliminary rush-hour street observations between 4 p. m. and 7 p. m. from July 15 to Aug. 26 to determine: (a) The number of passengers carried past or away from each important point. (b) Regularity of schedule. (c) Car loading."

The practice followed by companies making studies with their own forces is generally less complicated than that indicated by the above references. This has resulted from the fact that the former studies have usually been made for the purpose of answering specific questions as to conditions at definite points, while the latter have sought to obtain information concerning all lines and routes on the same basis. A report made in 1910 shows that out of eighteen companies reporting, eleven used points of maximum load for observations. In addition, certain other points along the line were chosen in order to get roughly the general characteristics of the line.¹⁰

⁹Ford, Bacon & Davis—Report on Philadelphia Service and Equipment. *ELECTRIC RAILWAY JOURNAL*, June 17, 1911, p. 1065.
¹⁰1910 Proceedings of the Transportation & Traffic Association of the American Electric Railway Association, p. 256a. (*ELECTRIC RAILWAY JOURNAL*, Oct. 14, 1910, p. 822.)

"Similar observations should be made at such other points along the line as may be determined by circumstances. The principal purpose of these latter observations would be to furnish a basis for turning of cars which it is not necessary to operate the entire length of the line."¹¹

An extension of the above method to cover every stop along a line may be found in the so-called "boarding and leaving" tabulation method, reported in use by the Boston Elevated Railway and the Public Service Railway Company of New Jersey¹² and used by Barclay Parsons & Klapp in the 1914 Detroit traffic survey.¹³ It consists of having the checkers ride on a certain proportion of cars along a line and record the number of passengers getting on or off the car at each stop. This method was also used by Ford, Bacon & Davis in their 1910 Philadelphia traffic study.¹⁴ Observers were on one car in every eight along each line for twenty-four hours and recorded the number of passengers getting on or off the car at each stop, together with the time the car passed. The lines were counted by selected groups, related or adjacent lines being counted together. The count extended from Aug. 29 to Sept. 22, but no observations were taken on Saturdays, Sundays or holidays.

Recent traffic studies, particularly those in Milwaukee, Cincinnati, St. Louis and Winnipeg, have demonstrated that the point of maximum load is approximately the same for traffic in each direction—that is, for in-bound cars in the morning and for out-bound cars in the evening; that these points may be considered to follow roughly a line about the congested section; that between the point at which maximum loading first occurs and the point at which it ends the number of passengers is approximately constant, and that there is a point on every line at which the company is justified in terminating part of its service, since few passengers live near the end of the line and the waste of car-miles in order to make a turn is considerable.¹⁵

LENGTH OF PERIOD OF OBSERVATION

The period of time to be covered by the count on any line at any point is fairly well agreed upon, considering the variation in local conditions and the divergent points of view of those having traffic studies in charge. A recent paper¹⁶ comments thus:

"Unless special inspection is made for the rush hours only, the point of maximum loading is covered by an inspector at all times of the day from about 6 a. m. to about midnight. Frequently surveys are made which cover the complete twenty-four hours. This is done only where a question arises about the owl service."

Another says:¹⁷

"The count should cover a long enough period to obtain normal results with twenty-four hours as a minimum."

¹¹C. M. Larson—"A Street Railway Traffic Survey"—*Municipal Engineering*, February, 1914. (*ELECTRIC RAILWAY JOURNAL*, Jan. 24, 1914, p. 177.)

¹²"Recent Practice in Traffic Counts," D. J. McGrath, *ELECTRIC RAILWAY JOURNAL*, Dec. 26, 1914, p. 1385.

¹³Barclay Parsons & Klapp—Report on Detroit Street Railway Traffic and Proposed Subway—January, 1915, pp. 57 and 148. (*ELECTRIC RAILWAY JOURNAL*, April 3, 1915, p. 664.)

¹⁴The work was divided into two classes:
 "1. The continuous riding of lines from one terminus to another, recording the number of passengers loading and unloading at every street corner, the time from point to point, the number of passengers in the cars at various points, transfer conditions and a few other special items peculiar to individual lines.

"2. Additional trips on all lines through the congested district. * * *"

¹⁵Ford, Bacon & Davis—Report on Philadelphia Service and Equipment—*ELECTRIC RAILWAY JOURNAL*, June 17, 1911, p. 1065.

¹⁶Purposes of a Street Railway Traffic Survey," E. J. Archambault, The Milwaukee Electric Railway & Light Company.

¹⁷C. M. Larson—"A Street Railway Traffic Survey"—*Municipal Engineering*, February, 1914. (*ELECTRIC RAILWAY JOURNAL*, Jan. 24, 1914, p. 177.)

Line _____

At				Weather			
EAST		NORTH		WEST		SOUTH	
Run Number	Route	Time	Pass.	Run Number	Route	Time	Pass.

Checked by _____

Remarks _____

Electric Ry. Journal

COLLECTION OF TRAFFIC DATA—FORM I—NOTEBOOK RULING FOR FIELD DATA USED BY CHICAGO SURFACE LINES

The reports of many of the recent traffic studies show that twenty-four hours was the minimum time spent at each point. In some cases observations at a point covered a period of several days. A surface car traffic study in the Chicago business district, made in 1909 by the bureau of engineering of the Department of Public Works,¹⁷ covered a twenty-four-hour period. The same amount of time was then spent in a study of the elevated lines. In their 1910 Philadelphia general traffic survey, Ford, Bacon & Davis¹⁸ used a twenty-four-hour period as a minimum upon any one line. In the Winnipeg survey "from two to four days' counts were taken on each line in order to obtain average results."¹⁹

When the points of observation and the period over which data are to be taken have been determined, observers are stationed to collect the required data.

DATA TO BE TAKEN IN FIELD

There is, as has been indicated, considerable divergence in practice between the items recorded in different surveys. This is due to varying local conditions, both as to the character of traffic and as to the purposes of

¹⁷ELECTRIC RAILWAY JOURNAL, May 14, 1910, p. 867.

¹⁸ELECTRIC RAILWAY JOURNAL, June 17, 1911, p. 1065.

¹⁹R. M. Feustel—Report on Winnipeg Street Railway Service—Manitoba Public Utilities Commission, 1913. (ELECTRIC RAILWAY JOURNAL, April 18, 1914, p. 865.)

Standard 2-1/2 x 7-5/8

Bound _____ Slip No. _____

Div. _____

Day _____ 191 _____

Tallied at _____

Time	Run	Car	No. of Pass.	Headway	Sign

Name _____ Badge _____

Address _____

Electric Ry. Journal

COLLECTION OF TRAFFIC DATA—FORM II—TALLY SLIP USED BY NEW YORK RAILWAYS

the study, and to the organization of the traffic survey department. It is the usual, although not universal, practice to record all cars in each direction at all observation points along each line, the data for traffic in the two directions being preferably kept separately on the opposite pages of a notebook. It is standard practice on the Chicago Surface Lines to employ a notebook ruled as shown in Form I. The New York Railways uses "tally slips" (Form II) which are conveniently handled and from which figures for fifteen-minute periods are entered on Form III for report to the superintendent of transportation. The Milwaukee Electric Railway & Light Company uses Forms IV, V and VI for collecting and summarizing its traffic data.

In general the forms furnished to observers provide for taking the following information:

1. Name of line.
2. Point of inspection.
3. Origin, destination and direction of car observed.
4. The car number.
5. The run number.
6. The time of arrival and departure.
7. The number of passengers on car.

Standard 7-15/16 x 10-1/2

NEW YORK RAILWAYS COMPANY
Office of Superintendent of Transportation.

Tally of _____ Cars New York _____ day, _____ 191 _____

Bound _____ at _____ Bound _____ at _____

Weather _____ Rail _____ Average seating capacity per car _____

Time	Cars	Seating capacity	Pass.	Excess or shortage of seat capacity per car		Cars required to give seats	Cars	Seating capacity	Pass.	Excess or shortage of seat capacity per car		Cars required to give seats
				Excess	Shortage					Excess	Shortage	

REMARKS

Copy to Gen'l Supt. of Transportation _____

Copy to Division General Foreman _____

Superintendent of Transportation _____ *Electric Ry. Journal*

COLLECTION OF TRAFFIC DATA—FORM III—REPORT TO SUPERINTENDENT OF TRANSPORTATION USED BY THE NEW YORK RAILWAYS

RECAPITULATION OF TRAFFIC CHECK

Line _____ Date _____

TRAFFIC CHECK

Car Number	Time Arriving	Total Passengers	Total every 15 minutes		
			Passengers	Seats	Cars

Date _____
 Line _____ Checked at _____
 Direction _____ From _____ .M. to _____ .M.
 Weather _____ Checked by _____
Electric Ry. Journal

PERIOD

From	To
6:00	6:15
6:15	6:30
6:30	6:45
6:45	7:00
11:00	11:15
11:15	11:30
11:30	11:45
11:45	12:00

Electric Ry. Journal

COLLECTION OF TRAFFIC DATA—FORM V—RECAPITULATION OF TRAFFIC CHECK FOR THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

COLLECTION OF TRAFFIC DATA—FORM IV—TRAFFIC CHECK USED BY THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

On the last point the practice is not uniform. Some cards require an estimate of the total number of passengers on a car as it passes the observation point. Others specify the number of passengers on the car when arriving and when leaving the observation point. The number getting on and off at each observation point has also been recorded occasionally.

In Cincinnati²⁰ the following information as to passengers was required:

1. Total passengers on car as it arrives and as it leaves.
2. Number of passengers standing in front and rear vestibules.
3. Number of passengers standing in car body.
4. Number of passengers boarding and leaving car.
5. Group or type of passengers: (a) Wealthy or professional; (b) middle type and shoppers; (c) laboring people.

In determining the number of passengers on a car, practice has shown that close estimation of the number from the street on the basis of seating capacity (known by the inspector for each type of car) by adding for those standing and subtracting for vacant seats is a sufficiently accurate method—95 per cent accuracy being attained by the inspectors as shown by check during the recent traffic survey in Milwaukee by the Railroad Commission of Wisconsin.²¹

In estimating the number of passengers it is cus-

²⁰R. M. Feustel—Report on Winnipeg Street Railway Service—Manitoba Public Utilities Commission, 1913. (ELECTRIC RAILWAY JOURNAL, April 18, 1914, p. 865): "Checking was continued rigidly. . . . The car number and the time being taken each was a check on every other, as the car could be traced then from one end of line to the other. This work was then again checked against the car counts (preliminary study) taken from same corner, and a very substantial agreement was had."

R. W. Harris—Report on Cincinnati Traffic Conditions, 1912. (ELECTRIC RAILWAY JOURNAL, Nov. 2, 1912, p. 956): "Experience in collecting data of this character has shown this method (estimating from street) to be most accurate. In order to ascertain the correctness of the information thus collected, checkers were put on cars and an accurate count was made of a number of cars being observed by field inspectors. Considering the entire amount of data, the check indicates, on the whole, that the count on the street is 95 per cent accurate."

Date _____ Weather _____
 Date _____ Weather _____
 Date _____ Weather _____

The Milwaukee Electric Railway and Light Company

SUMMARY OF TRAFFIC CHECK

Checked by _____ Day _____ Line _____
 Checked by _____ Day _____ Place _____
 Checked by _____ Day _____ Direction _____
 Checked by _____ Day _____ From _____ To _____

15 Min. Period	Date	Actual Passengers			Actual Seats			Actual Per Cent		Allowed Per Cent Load Factor	Actual Seats Necessary	Number of Cars Arriving		Car Demand	Headway
		By days	Average 15 Min.	Average 30 Min.	By days	Average 15 Min.	Average 30 Min.	Load Factor				By days	Avg.		
								15 Min.	30 Min.						
6:00 to 6:15															
6:15 to 6:30															
6:30 to 6:45															
11:30 to 11:45															
11:45 to 12:00															

Electric Ry. Journal

COLLECTION OF TRAFFIC DATA—FORM VI—SUMMARY OF TRAFFIC CHECK FOR THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

tomy to allow for those voluntarily standing.²² The proportion to which this preferential standing may extend is well brought out by an investigation by the Wisconsin Railroad Commission covering many thousands of observations²³ and showing that with a full carload as high as 20 per cent of the seating capacity represents standing by preference. The extent of preferential standing varies, of course, with local conditions, among which may be noted type of equipment, rules, class of passengers, time of day, and length of ride.²⁴ Probably there is a considerable number of smokers who would rather stand if allowed to smoke, and, when there are vacant seats, it is well to consider these.

The number of passengers on a car has been recorded in the past in several ways—either the actual number estimated or, for instance: light, medium, heavy (Wisconsin Railroad Commission); very light, light, full, crowded, overcrowded (1910 committee on construction of schedules and time-tables of the American Street & Interurban Railway Association); or as no load (less than six), comfortable load (eight or less standing), eight to twenty standing, more than twenty standing (St. Louis Public Service Commission), etc.

In addition to recording all of the above described data, the following additional items are usually considered to be of sufficient value to warrant their collection:

1. Weather conditions throughout day.
2. Abnormal occasions such as ball games, etc.
3. General traffic conditions at observation points, both pedestrian and vehicular.²⁵

Traffic may be classified as vehicular and pedestrian, and again as: few; considerable but causing no delay; considerable and causing much delay.²⁶

The transportation department of the old Metropolitan Street Railway, New York, classified delays to cars of five minutes or more as follows:²⁷

1. Blocking by vehicles.
2. Carelessness of employees.
3. Miscellaneous car trouble.
4. Accidents.
5. Plow trouble.
6. Electrical car trouble other than plow trouble.
7. Electrical transmission trouble.
8. Mechanical defects (cars).
9. Faulty track.

²²Bion J. Arnold—Report on Traffic Situation in San Francisco, 1913 (ELECTRIC RAILWAY JOURNAL, Jan. 11, 1913, p. 63): "Allowance must be made, especially in San Francisco, for the existing fact that many passengers stand by preference even when seats are vacant."

²³Railroad Commission of Wisconsin, 13—W. R. C. R.—156.

²⁴R. W. Harris—Report on Cincinnati Traffic Conditions, 1912 (ELECTRIC RAILWAY JOURNAL, Nov. 2, 1912, p. 956): "The number of preferential standing passengers for any car load is peculiar to the conditions existing in each locality. In Madison, Wis., 21 per cent of any load will stand by preference; in La Crosse, 15.5 per cent; in Lincoln, Neb., 14 per cent; in Milwaukee, 19 per cent, and in Cincinnati, 15.5 per cent."

²⁵R. B. Stearns, vice-president and general manager The Milwaukee Electric Railway & Light Company, made the following statement in the summer of 1914: "Since smoking on the cars in the Milwaukee system has been discontinued and pay-within systems of folding doors and closed platforms adopted, a recent recalculation of the number of passengers standing by preference would indicate approximately 5 per cent as compared with 19 per cent a few years ago when smoking was permitted and all the cars were operated with open platforms, front and rear."

²⁶Bion J. Arnold—San Francisco Transportation Report on Traffic and Service—December, 1912 (ELECTRIC RAILWAY JOURNAL, Jan. 11, 1913, p. 64): "One very serious cause of the increased difficulties of giving adequate service is the interference of vehicle traffic. . . . A very material improvement, however, has resulted from the institution of traffic regulations in this city (San Francisco) by the traffic squad of the police department, with results that heavy and slow moving vehicles are being gradually encouraged to seek and follow less congested thoroughfares, which has greatly facilitated passenger movement."

²⁷R. W. Harris—"A Method for Determining the Adequacy of an Electric Railway System"—Proceedings of American Institute of Electrical Engineers, 1910. (ELECTRIC RAILWAY JOURNAL, July 9, 1910, p. 80.)

²⁸ELECTRIC RAILWAY JOURNAL, June 25, 1910, p. 1088.

10. Fires.
11. Caused by outside lines.
12. Miscellaneous trouble.
13. Due to outside construction.
14. Due to obstruction in slot.

In order that any traffic study may furnish information of the greatest value to the officers of a transportation company, it must determine as far as practicable the causes of the variations in traffic demand. To do this it is necessary to note many items which may at first seem superfluous. It should be borne in mind that while the primary purpose of traffic studies is to permit the making of scientific schedules, there is frequent opportunity to use the information derived from such studies in prognosticating the future, in meeting complaints, and in stimulating traffic at times and places such as will make the increased traffic profitable.

The steps which must be taken in any community to determine the characteristics of the various lines will necessarily vary, but the following suggestions cover the field in a general way and have formed the basis of inspector's reports in various surveys:

1. Divide line into characteristic sections, and discuss each under the heads: (a) Class of passengers; (b) time of travel; (c) probable destination.

2. Locate various origins of passengers along line and obtain destination and probable route (factories, etc.).

3. State transfer points and give idea as to number (in percentage) of passengers leaving car from which transfer is made, transferring to other lines. If cars on more than one route operate over line, make separate estimates of interchange of traffic.

4. Determine attitude of public as regards service given by the particular line (casual conversation).

5. Make a few specific observations (record counts) of movements of passengers (seated to vestibule and vice versa) in the car as it approaches a stop in downtown and outlying districts.

6. How does standing by preference vary with time of day, class of passengers, district, etc.?

The method used in the 1912 Philadelphia traffic survey differed in many respects from all of the preceding and might be of comparative interest, though its ultimate purpose was somewhat different from most of the herein mentioned studies. To quote from the report:²⁸

"The present flow of traffic between all sections of the city was determined by a traffic survey made by the following novel and practical method."

A brief summary follows:

1. A program was prepared from schedules in effect on the Philadelphia Rapid Transit Company lines providing for: (a) The counting of passengers on about one car in every five (eighteen-hour) cars operated; (b) about four lines a day were to be covered.

2. Two experienced conductors (borrowed from the company and properly instructed and aided) were placed on each car: (a) The first, stationed at the entrance, properly filled out and presented an identification slip to each passenger with a request to keep same until collected; (b) the second, stationed at the exit, collected such slips and noted on them, after inquiry, the passengers' destination.

3. The count slips were printed tickets, somewhat larger than street car transfers, were numbered serially and supplied in pads of 100. Differently colored slips were used for each of four general directions of travel.

4. At end of each half trip all slips collected for it

²⁸A. M. Taylor—"The Solution of a City's Transit Problem"—Electric Journal, October, 1914, p. 516. (ELECTRIC RAILWAY JOURNAL, Jan. 10, 1914, pp. 76-79.)

were inclosed in an envelope giving the following information. (a) Number of envelope corresponding to the number of half trips counted; (b) name of collector; (c) date; (d) name and number of line being counted; (e) direction; (f) time of beginning of half trip; (g) number of slips inclosed; (h) delays; (i) unusual traffic movements, and (j) other notes.

5. The envelopes containing slips were turned in after midnight each day, and were then sent to the Statistical Service Company. Here the information contained on slips was transferred to twenty-four column Hollerith cards, which were then electrically sorted and recorded.

6. No count was made on holidays, Saturdays or Sundays.

7. Checks were made by repeating the count on several lines. These recounts were found to agree in a satisfactory manner with the originals.

8. The data recorded by the Statistical Service Company were returned to the survey office, where they were further analyzed and charted.

RECORDING DATA

"Results are plotted into curves from which it can be readily seen wherein service is defective and recommendations for changes made accordingly."

This comment on the practice of the Board of Supervising Engineers, Chicago Surface Lines, may well serve both as a statement of present general practice and as a recommendation to all engaged in the accumulation of traffic data. Such curves simply represent a summary of observations, but for the great majority of those dealing with such matters the graphic representation of data is far more quickly interpreted than numerical tabulations.

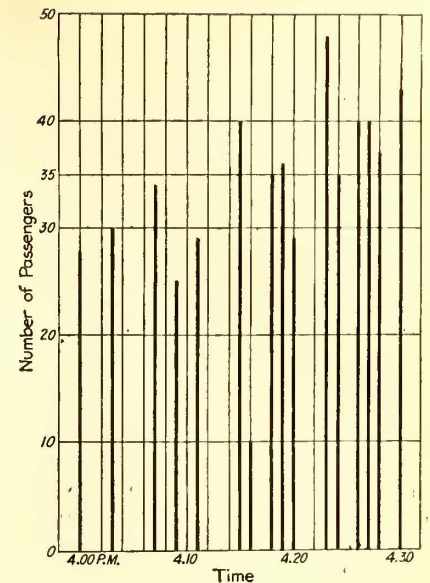
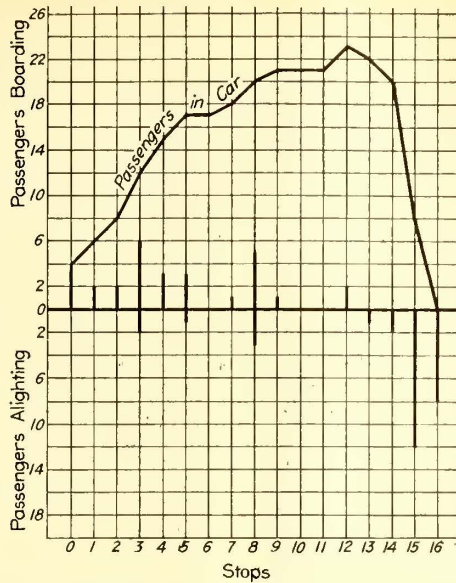
A few typical curves together with the data from which they are drawn will be illustrated. An observer on a car noted passengers boarding and alighting during a run of sixteen blocks, as shown by Table I. Fig. 1 shows this information graphically.²⁹ Data for, say, fifteen or thirty-minute periods can be combined readily and drawn in the same manner, or from street observations as to number of passengers on the car the car loading line can be drawn.

The variation in traffic throughout the day at any point may be shown by a diagram similar to Fig. 2. Here an inspector stationed at one point throughout the day reports the data shown in Table II. Such a

²⁹When the stops are laid off on the base line to the scale of their distances apart in miles, the area under this curve represents passenger miles, and divided by the total passengers "on" gives the average length of ride. The maximum ordinate will generally be less than the total "ons." The area between a horizontal line representing seating capacity and that part of the curve lying above the seating capacity line represents "standing passenger miles."

TABLE I—SHOWING DATA NOTED BY OBSERVER AND USED IN FIG. 1
Car No. 100
Passengers

Street	Boarding	Alighting	In Car	Street	Boarding	Alighting	In Car
0	4	..	4	9	1	..	21
1	2	..	6	10	..	..	21
2	2	..	8	11	..	..	21
3	6	2	12	12	2	..	23
4	3	..	15	13	..	1	22
5	3	1	17	14	..	2	20
6	..	..	17	15	..	12	8
7	1	..	18	16	..	8	0
8	5	3	20				



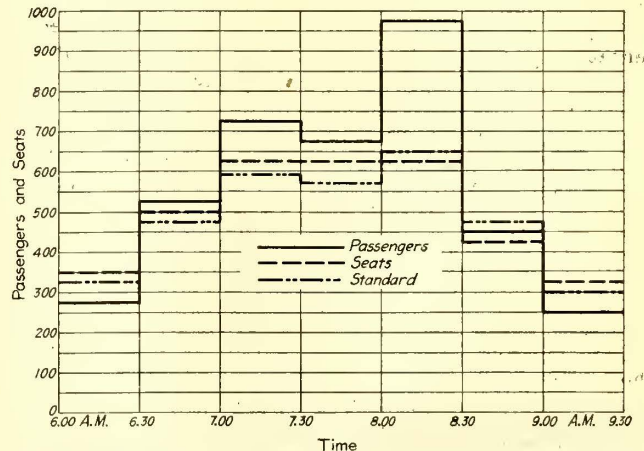
COLLECTION OF TRAFFIC DATA—FIGS. 1 AND 2—SHOWING GRAPHICAL PRESENTATION OF BOARDING AND ALIGHTING DATA AND OF TRAFFIC VARIATION THROUGHOUT DAY

diagram as Fig. 2 serves to indicate whether or not unusual loading is due to distortion of headway, and also, by the use of a line showing seating capacity, points out the relation between excess seats and standing passengers for the particular point on the line.

Of general application and frequent use, the diagram reproduced in Fig. 3 combines several important features. An observer records for each car the number of passengers aboard and the time of passing the point of observation. The seating capacity of cars being known, summaries are made (see Form VI, summary sheet of the Milwaukee Electric Railway & Light Company), and the results plotted as indicated. By plotting on the same figure the seats required by company

TABLE II—SHOWING DATA FOR TRAFFIC VARIATION AT CERTAIN POINT AS USED IN FIG. 2
Main Street at Twentieth
Southbound

Time	Car Number	Passengers	Time	Car Number	Passengers
4.00 p. m.	1260	24	4.19 p. m.	1247	36
4.03 p. m.	1240	30	4.20 p. m.	1253	29
4.07 p. m.	1229	34	4.23 p. m.	1242	48
4.09 p. m.	1262	25	4.24 p. m.	1223	35
4.11 p. m.	1271	29	4.26 p. m.	1218	40
4.15 p. m.	1230	40	4.27 p. m.	1212	40
4.16 p. m.	1231	10	4.28 p. m.	1226	37
4.18 p. m.	1254	35	4.30 p. m.	1261	43



COLLECTION OF TRAFFIC DATA—FIG. 3—GRAPHICAL PRESENTATION OF DATA SHOWING PASSENGERS ABOARD, TIME, SEATING CAPACITY AND STANDARD SEATING REQUIREMENTS

standards, or by franchise standards or those of commissions, the sufficiency of the service can be quickly judged.

Other diagrams than those here illustrated will readily suggest themselves and will permit the setting forth of the tabular data in ways best fitted to the problem under examination.

SUMMARY

It is impossible to indicate other than very general conclusions with regard to the frequency of the collection of data. It may be concluded, however, that this is to an extent automatically determined by conditions already enumerated but that in order to secure full advantage of fluctuations in traffic and to anticipate public complaints, the interval between such studies should be short. Moreover, such studies should be made not only for week days but also for Saturdays and Sundays, and not only for rush periods but for non-rush periods as well. Furthermore, in order to estimate peak conditions accurately, some traffic studies should always be made in the late autumn and winter months.

The type of property will have an important bearing on this question. Following the classification proposed in a previous article in this series, published in the *ELECTRIC RAILWAY JOURNAL* of June 19, the varying requirements of different companies may be roughly stated as follows:

For the larger companies, all lines should be subjected to a twenty-four-hour study covering week days, Saturdays, Sundays and holidays, and representing also traffic conditions throughout the various seasons of the year. The size of the department which it is necessary to maintain to make these studies will depend upon the frequency with which it is desired to complete the study of all lines in the system and upon the number of lines it is possible for the department to consider at a time.

For the companies of medium size, a twenty-four-hour general study should be made periodically and eighteen-hour studies on the heaviest lines in rotation.

For the small companies, an eighteen-hour general study, supplemented with special data concerning the points of maximum loading on certain lines during rush hours, will be sufficient.

No definite conclusion can be drawn as to the extent of data to be taken in any traffic study except that the more comprehensive the study made, the greater the value of the information secured. Stated very generally, however, experience indicates the following general procedure:

A preliminary study, covering a number of representative car trips during the different periods of the day and ascertaining the number of passengers at different points along the route, should be made for each line to determine the points of future observation. The points of maximum load and a number of others bringing out the characteristics of the traffic on the line should be used as these points of observation, together with points at which there are cross-overs which may be used for short routing. A car-loading curve, based on the preliminary observations, will help to locate the desired points. The period of time covered by the observations on any one line at any one point should be long enough to give normal results, with twenty-four hours as the minimum.

Inspectors should be stationed at each observation point and should record accurately the following data for every car moving in either direction.

1. Name of line.
2. Point of inspection.
3. Day and date.

4. Weather.
5. Origin, destination and direction of car.
6. Car number.
7. Run number.
8. Time.
9. Number of passengers on car.

The last-named item should be estimated on the basis of seating capacity, by adding for those standing and subtracting for vacant seats (seating capacity of all types being known by inspectors). Allowance should be made for those voluntarily standing, varying from 5 per cent to 20 per cent, according to conditions. In addition to the above data, any other pertinent remarks should be made, such as: ball game, street traffic light, medium, heavy, etc.

A general survey of each line indicating the following should be made:

1. Class of passengers: (a) Business and professional; (b) middle type and shoppers; (c) laboring people.
2. Time of travel.
3. Probable origin and destination (factories, etc.).
4. Transfer points and their effect.
5. Attitude of public as regards service on the particular line.
6. Other pertinent data.

It is possible to reach more definite conclusions concerning the extent of data to be taken and the manner of its determination, by grouping companies in classes as has been previously done in discussing the organization and the frequency of studies. Adopting this plan, the following paragraphs take up the question of method in greater detail.

It is neither necessary nor practicable to study the loading of every car at every point of a trip. It is desirable, however, and the larger companies will obtain this information, to know the average number of passengers getting on and off each car at every point for twenty-four hours of the day and for various days and periods of the year. This information should be obtained by a sampling process—that is, by taking certain cars and certain points at one time and other cars and other points at other times. It will be found that the traffic characteristics of the various car trips will be very nearly alike from day to day, so that it will be possible to combine data concerning one car line taken to-day with that taken concerning another car line to-morrow, provided, of course, no unusual circumstances arise.

For companies of medium size, the number of passengers getting on and off each car at important traffic points previously determined should be noted, and for the smaller companies an estimate should be made of the number of passengers on each car at the point of maximum loading during rush hours.

At the beginning of any traffic study, all the lines should be listed and the general characteristics of the territory they serve should be recorded. The relation of these lines to each other will determine to a certain extent the order in which they will be studied. The general characteristics of the traffic on each line can be determined from conductors' trip reports and from a few rides of inspection prior to the beginning of the collection of specific data.

Each observer should be carefully instructed as to the observations which he is to make and he should be furnished with convenient forms ruled and with printed headings. It is very necessary that every effort should be made to place the observations on a comparable basis, inasmuch as the data from many observers are combined to make the final determination of the sufficiency of service on any line.

In addition to the data concerning the number of passengers on cars at various points, together with the identification of the car by route and time, the observer should record information concerning street traffic, unusual occasions, weather, etc., in order that the extreme variations may be eliminated from the statistical analysis. It is generally advisable also to determine the diversity of loading. For this purpose the passengers in each car passing a given point, for say fifteen-minute periods throughout the day, should be determined and the relation of the maximum to the average should be computed. Certain typical forms for use in collecting and recording this information have been shown.

After these data have been assembled they can be made of greatest value by being represented graphically. There are three general types of curves which it is found helpful to prepare from the traffic data collected. The first is a curve on the horizontal axis of which is laid off the various streets passed in a car trip. Parallel to the vertical axis and above the horizontal axis there is laid off a line proportional in length to the number of passengers boarding the car at each street, and below the horizontal axis, a similar line representing the number of passengers leaving the car at each street. By computing the cumulative difference of passengers on and off, the curve showing the number of people on the car at each street can be drawn.

The second typical curve shows the number of passengers on each car passing a given point and the time at which the car passed the point. The vertical lines representing the number of passengers on the car are drawn at horizontal distances representing the time, and a line connecting the upper extremities of the vertical line represents the loading at any point throughout the period of study. The distance between the lines indicates, of course, the headway of cars and whether or not unusual loadings were due to irregular spacing of cars.

The third general type of curve is one which is plotted for any given point on a line showing, for each fifteen or thirty-minute period during the time under observation, the number of passengers carried by the point, the number of seats furnished and the number of seats which should be furnished in order to conform to the company's rules or to regulations laid down by some controlling body.

Another article will take up the analysis of these curves and their application to the problem of constructing time-tables—which is, of course, the immediate purpose of the traffic survey. There are other ways, however, in which the traffic survey department can be of value to those in charge of the property, and all data should be further analyzed for suggestions as to means of stimulating traffic on such lines and at such times as will make it a profitable addition to the business. There are many questions which the traffic survey department is in a position to investigate and shed light upon, and it should be an able ally of the traffic department.

The United Gas & Electric Company, the Louisville & Southern Indiana Traction Company, and the Louisville & Northern Railway & Light Company, New Albany, Ind., are behind a plan which will provide a monster auditorium in Glenwood Park, the outing park in Indiana, between New Albany and Jeffersonville and across from Louisville. This is a popular picnic ground, a chautauqua ground, camp meeting ground, etc. Incidentally it is signed up for picnics of one kind or another and other attractions for practically all of the summer, and the three railway lines mentioned will get the business.

New Haven Operating Results

In Several Written Discussions on W. S. Murray's Paper on Main Line Electrifications the Relative Costs of Power for Steam and for Electric Operation Were Taken Up

In a paper presented before the Franklin Institute and reported in abstract in the *ELECTRIC RAILWAY JOURNAL* for Jan. 30, W. S. Murray, consulting engineer New York, New Haven & Hartford Railroad, gave figures covering the cost of construction and operation for the electrified division of the New Haven Railroad and discussed the general principles of successful steam-railroad electrification. Several written discussions of the points brought out by Mr. Murray were presented at the meeting, and these have become available for publication through the *Journal of the Franklin Institute*, being given in abstract below.

Alfred W. Gibbs, chief mechanical engineer, Pennsylvania Railroad Company, contended that 1 lb. of coal burned under the boiler of a central power plant would not develop twice the drawbar power that the same amount of coal would produce when burned in a locomotive firebox. He cited the record of twenty-seven tests on one locomotive in the testing plant at Altoona. The tests showed that the coal consumption per drawbar horsepower ranged from 2.5 lb. to 5 lb., twelve of the tests showing rates between 2.5 lb. and 3 lb. These are the rates when the locomotive is running, and added to them are certain stand-by losses at terminals. The power station expense, as given by Mr. Murray at 0.69 cent per kilowatt-hour, including fixed charges, taxes and insurance of 0.18 cent, evidently did not include a charge for obsolescence. The fixed overhead charge should be nearly double the figure given, or say, 0.35 cent or 0.4 cent per kilowatt-hour.

George R. Henderson considered that uniformity of traffic is just as important as density of traffic because the peak loads can only be smoothed out when the traffic is uniform, the importance of this being measured by the fact that the power-house and transmission lines cost in the order of \$100 per kilowatt. Mr. Henderson considered that the relative fuel consumption for steam and electric locomotives of 50 per cent mentioned by Mr. Murray was due to the comparison with the old type of saturated-steam locomotives. Modern steam engines fitted with super-heaters would change this ratio to, say, 65 per cent.

E. H. McHenry, McHenry & Murray, New Haven, spoke of the growing tendency toward the consolidation of the best features of all of the divergent systems into one system of greatest combined merit. The so-called war of the systems was already nearly at an end.

C. Renshaw, Westinghouse Electric & Manufacturing Company, considered that, owing to ten years' experience in construction and operation, the New Haven electrical plant could be reproduced to-day for not more than 60 per cent of its original cost.

F. E. Wynne, Westinghouse Electric & Manufacturing Company, called attention to the figure of \$15,000,000 given as the expenditure for electrifying the New Haven Railroad to date, this indicating that the expenditure has been \$120,000 per unit of motor power and \$30,000 per mile of single track. Complete electrification of the New York-New Haven division will be accomplished without additional expenditure for trolley construction, and consequently these unit figures eventually will be somewhat changed. The estimated reproduction cost of the installation at 60 per cent of the original cost indicates that the total construction may be made for less than \$70,000 per unit of motor power, while the cost per mile of single track will be about \$20,000. With

regard to the results secured in connection with energy consumption, these check closely the accuracy of calculations made in connection with the service, thus illustrating the fact that energy consumption with electric operation can be very closely predetermined where trains are operated on a steam railroad basis with definite schedules and definite stops.

Philip Torchio, New York Edison Company, then spoke of the fact that power companies, by averaging the power demand from a great diversity of users, reaped economic advantages in the production of power which the railroad cannot secure under independent generation. The saving in investment in power stations, substations and transmission lines may represent a sensible item in the costs of railroad electrification.

W. A. Del Mar, New York, considered that the results submitted in the paper would have been more valuable if they had been based upon a complete year rather than upon a record for two months only. He asked whether the \$15,000,000 expenditures for the installation as mentioned by Mr. Murray included the cost of reducing telephone disturbances and of altering the right-of-way to conform with electrical requirements. Mr. Del Mar was appalled at the development charges amounting to 40 per cent of the entire investment, which were to be inferred from the statement that the present system could be replaced for 60 per cent of the original cost. An interesting feature about the installation had been the development from the complex to the simple and mechanical details, and vice versa in the electrical features. He asked whether the mileages upon which the unit costs were based included yard switching and light locomotive mileage, as these two items might easily amount to 15 per cent of the total. He spoke favorably of results obtained by watt-meters on locomotives.

R. H. Wheeler, Mackenzie, Mann & Company, Ltd., Montreal, stated that a form of electric power which may be standardized for all classes of train service was vitally necessary. He considered that the d.c. motor was especially desirable, but it could be used only in connection with the mercury arc rectifier in case the overhead line was energized with alternating current. This imposed a serious handicap in both weight and control complication. However, by placing the rectifier in the roadside substation and supplying the overhead wire with power at 3000 volts direct current, the desired essentials of transmission economy and standardization of motor-power equipment were obtained. This second standard was offered to emphasize Mr. Murray's definition of the successes arising from a choice of energy which can be standardized.

CLOSURE BY MR. MURRAY

In closing Mr. Murray stated that the fixed charges mentioned in his paper as 1.8 mills per kilowatt-hour were in error and should be changed to 2.9 mills, the latter figure being based upon an 11 per cent rate on the total investment involved, carrying with it interest, insurance, depreciation and taxes. The total cost, therefore, for energy would become 0.8 cent per kilowatt-hour instead of 0.69 cent, the rate mentioned in the paper.

Realization of the suggestions regarding the uniformity of traffic is, he said, largely accomplished by the electrical movement of freight as well as passenger trains, as the maximum power demand for the former can be made to follow at the time of minimum demand for the latter. By plotting the combined load curve of the New Haven Railroad's passenger, freight and switching services without any rearrangement of the schedules as they are made up to-day, a load factor of 75 per cent is secured. With regard to fuel saving, if

the economy of generating units remained fixed it would be fair to grant Mr. Henderson's point that the ratio of coal consumption should be changed from 50 per cent to 65 per cent. On the other hand, the improvement in over-all efficiency of the generating plant is easily keeping pace with that of steam locomotive, and, granting this, there are no other constants or variables which will tend to alter the ratio of 1 to 2 in favor of the fuel economy of electricity versus steam.

With regard to the transfer of steam locomotive power to different divisions of a road where congestion may require it, it was easily conceivable that a division could be electrified with economy without including the financial credit due to the steam locomotive replaced, thus automatically providing steam locomotives for the congested districts and leaving the electrical apparatus to be operated at very high load factor.

The increased reliability of operation with electricity which had been referred to was based upon the engine mileage per failure. A fair average for steam locomotive operation might be cited as 5000 miles per engine failure whereas electrical operation certainly should be as high as 12,000 miles, and in a number of instances on the New Haven it has been as high as 18,000 miles per engine failure. Of course, maintenance and repairs on electric locomotives should be compared to those of steam upon the basis of equal service and weight on drivers.

With regard to the coal consumption cited by Mr. Gibbs as applying to steam locomotives, Mr. Murray emphasized the necessity for considering the stand-by losses in a comparison between steam and electric power, these stand-by losses not being included in Mr. Gibbs' figures for steam locomotive coal consumption.

In answer to Mr. Del Mar's questions, Mr. Murray said that the expenditures made to reduce telephone interference and for altering the right-of-way to conform with electrical requirements were included in the general figure of \$15,000,000 for the cost of the entire installation. However, experience has indicated a method of laying out the transmission and distribution systems whereby automatic compensation for telegraph and telephone services can be secured for a very nominal amount. The so-called high development charges appearing in the New Haven installation were in reality due to reductions of cost of material in many cases. In 1907 large high-tension insulators cost \$63 each while to-day with three times greater factor of safety the price has been reduced to \$7.

With regard to the mileages upon which were based the unit costs given in his paper, Mr. Murray stated that these included both passenger and freight service but did not include yard switching, which is provided for by engines designed especially for that purpose. Light mileage of locomotives was included for the mileages of road engines. The train mileages did not include the mileage of light locomotives, but these had been recorded and were included in the total locomotive mileage, including the total unit cost per locomotive-mile both in freight and passenger service.

The point made by Mr. Del Mar with regard to the negligible error of meter registration on locomotives was interesting, and so far as Mr. Murray had been able to determine the meters on the New Haven locomotives have been accurate and valuable adjuncts in the determination of the general distribution of power.

Employees of the Illinois Traction Company at Champaign, Ill., have perfected a permanent organization for an I. T. S. band, and weekly rehearsals are being held. The company gives the use of a room on the third floor of its new office building at Champaign for this purpose.

Safety-First Committee Meets

Prominent Railway Officials Discuss Precautionary Measures at First Meeting of the Transportation Committee of the Safety First Federation of America

Policies and activities for the ensuing year regarding uniform street traffic regulation were discussed at the first meeting of the transportation committee of the Safety First Federation of America on July 13, at the Federation's headquarters, 6 East Thirty-ninth Street, New York. The meeting was presided over by C. Loomis Allen, president of the American Electric Railway Association and chairman of the transportation committee.

The field of work which has been assigned to the transportation committee covers a wide scope in regard to both steam and electric railway operation, as indicated by the following subjects, which were selected at the organization meeting at Detroit for consideration by the committee:

1. Near-side stop for street cars.
2. Type of cars in regard to entrances and exits.
3. Uniform street regulation governing the operation of jitney buses.
4. Uniform signs and signals at grade crossings (steam and electric lines).
5. Educational campaign outlining the dangers of grade crossings and trespassing on railway property.
6. Suggestions offered by the street traffic committee at the meeting held in Detroit on June 4.

The meeting in New York was attended by several prominent railway executives and operating officials, many of whom have been designated to serve upon the committee by organizations affiliated with the Safety First Federation. In addition thereto, representatives of other organizations concerned in various forms of transportation were in attendance. The following executive officers of the Federation were present either at the business sessions or the luncheon which was later tendered to the committee by President Kingsley: D. P. Kingsley, president of the Federation and of the New York Life Insurance Company; John Gillespie, third vice-president and police commissioner of Detroit; C. L. Bernheimer, treasurer of the Federation and president Safety First Society of New York, and F. H. Elliott, general secretary. The members of the transportation committee present included the following: Chairman, C. Loomis Allen, president American Electric Railway Association, Syracuse, N. Y.; W. E. Cann, assistant to general manager Detroit United Railway, representing the Safety First Society of Greater Detroit; R. W. Meade, president Fifth Avenue Coach Company, representing the Safety First Society of New York City; J. K. Punderford, vice-president and general manager The Connecticut Company, New Haven, Conn., representing the New Haven Chamber of Commerce; J. T. Moffet, superintendent of transportation Washington Railway & Electric Company, Washington, D. C., representing the Washington Safety First Association; F. L. Hubbard, assistant to the general manager Toronto Railways, representing the Ontario Safety League; F. W. Bacon, vice-president Kentucky Traction & Terminal Company, Lexington, Ky.; J. W. Crawford, supervisor of claims Philadelphia Rapid Transit Company, representing the Philadelphia street traffic committee, and H. B. Potter, assistant to the second vice-president Boston Elevated Railway, representing M. C. Brush, who was not able to be present. The members of the committee not in attendance were H. Spoehrer and Richard McCulloch of St. Louis, George Keegan of New York,

T. C. Powell of Cincinnati, C. R. Myers of Indianapolis, and E. G. Connette of Buffalo. Among the others present were E. B. Burritt, secretary American Electric Railway Association, and G. A. Walters, secretary to the police commissioner, Detroit.

BUSINESS MEETING

F. H. Elliott, general secretary of the Federation, opened the meeting by presenting a general outline of the present development of the Safety First Federation and the work which it proposes to do in future. The Federation, Mr. Elliott stated, was organized last February. Its membership includes at present all of the safety-first organizations except two in the country, representatives of public service commissions, chambers of commerce in various cities and states, organizations concerned with transportation and various public-spirited citizens. No effort has yet been made to develop a large membership list. The purpose of the new organization is to direct work entirely to problems of public rather than of industrial safety. One of the direct results of the February meeting was the preparation of a safety-first text-book for children. This book, a few preliminary copies of which are now printed, contains rhymes and jingles accompanied by four-color illustrations calculated to impress children with the idea of caution in avoiding the dangers of street cars, automobiles, fire and water. Mr. Elliott spoke of the suggestions which were recommended for general use at the meeting of the street traffic committee in Detroit on June 4-5. These suggestions were mentioned on page 1137 of the ELECTRIC RAILWAY JOURNAL for June 12.

The business of the present meeting, Mr. Elliott stated, was to consider in a preliminary way all transportation matters regarding safety in preparation for the first annual convention of the Safety First Federation of America, to be held at Detroit on Oct. 19, 20 and 21. In commenting on the near-side stop Mr. Elliott alluded to its success in New York as shown by the report of the Public Service Commission for the first six months of its operation. At present there is but one New York newspaper which is agitating against it. Apparently the only difficulty met is that of having to board and alight in winter from the rear ends of cars in an un-snow-swept part of the street. This objection raised the question of whether the position of entrances on cars could be standardized.

C. Loomis Allen stated that standardization of car equipment had received careful consideration by the American Electric Railway Association and standards of certain kinds had already been adopted. While he doubted whether it would be possible to adopt standard cars he maintained that the committee could do many things that make for real safety. It could demonstrate the advantages of the near-side stop by citing its successful use in other cities. It may take time to convince railways and public service commissions of the advantages obtained thereby.

W. E. Cann, assistant to the general manager Detroit (Mich.) United Railway, said that after fifteen months of experience with the near-side stop, he wished to go on record as favoring it. This system has met with almost universal favor in Detroit. The only contention against it was that of having to alight in dirt or

snow. For that matter, however, crosswalks were apt to be as dirty as the rest of the street. Moreover, the increasing use of trailers had removed any advantages which the far-side stop may have had, because with trailers all entrances could not be opposite the crosswalk. Mr. Cann spoke favorably of the use of trailers in Detroit. He considered the jitney movement not a business proposition but the result of the hard times. Nevertheless, its regulation is undoubtedly needed. He believed in the great necessity of an educational campaign on the dangers of grade crossings. During the week-end of Independence Day six people were killed at grade crossings in Detroit. In one of these cases he knew there was absolutely no excuse. No attention whatsoever was paid to the whistle of the train by the driver of the automobile. An educational safety campaign could be largely handled by the local newspapers. Mr. Cann stated that the signals of traffic policemen absolutely govern the cars in Detroit. Fire siren whistles also are held as sacred as a red flag on the railway. He hoped that the use of siren whistles on automobiles could be confined to fire-department vehicles, so that the public would be put on its guard whenever the whistle was heard. He thought that there ought to be signs showing the proximity of fire department stations.

J. W. Crawford, supervisor of claims Philadelphia Rapid Transit Company, described the safety zones used in that city. They are defined by rope barriers, held in uprights.

J. K. Punderford, vice-president and general manager The Connecticut Company, New Haven, Conn., explained that it would be unnecessary, so far as his own railway was concerned, to put through laws enforcing some of the present suggestions for large cities because his property reached only small cities. However, he was decidedly in favor of requiring all teams to show lights at night. A law regulating the encroachment of vehicles on tracks should also be desirable. A written examination for motormen had recently been adopted by his company and he believed it was in the interests of safety. The questions relate to safety in operation. Near-side stops are being made at certain street intersections. The laborers of the company are used to clean off the streets in winter where the near-side stop is used, otherwise the cleaning off probably would not be done. Mr. Punderford thinks that the possibility of standardized car equipment as regards entrances is hardly more than Utopian. A good innovation recently ordered by the Public Service Commission for all electric railways in Connecticut has been the installation of uniform signs where street car tracks emerge from a private to a public highway. These signs are erected diagonally and bear the words "Railway Crossing." He also described an arrangement made by the company with the fire department in New Haven by which the department apparatus, in going to fires, would use certain designated streets. At the intersections of these streets with the railway lines signs are posted and a full stop of the cars is required.

F. W. Bacon, vice-president Kentucky Traction & Terminal Company, Lexington, Ky., described the educational campaign which his railway had conducted in issuing to school children small buttons bearing the words "I stop before I cross the track" and signs for teamsters and merchants to put on their vehicles, "We stop before we cross the track." Mr. Bacon suggested as an additional traffic recommendation the question of regulating slow-moving vehicles on street car tracks. If horse-drawn vehicles could be eliminated from the tracks the movement of traffic could be greatly facilitated and small interruptions prevented. Country people were special offenders in this respect. They

were apt to stop their buggies for conversation while on the track. In regard to safety signs his railway has made a special effort to drive home the idea of safety by placarding the whole line with special warning signs at every road and lane intersection and in the near vicinity of livery stables and garages.

H. B. Potter, assistant to the second vice-president Boston (Mass.) Elevated Railway, spoke of the difficulty of adopting standardized traffic rules for irregular streets, as in Boston, which are said to have been laid out from the original cow paths. His company has installed many near-side stops. Each locality, however, has to be considered separately. It would be inexpedient, for example, to install two near-side stops where two streets cross the tracks at close intervals. This innovation should be installed slowly, otherwise the American public, conscious of its inalienable rights, will start an agitation to revert to the old practice. Mr. Potter believed that it would be a good thing if the Federation could bring about standard rules for steam and electric road grade crossings. Better co-operation between the steam and electric roads was needed. Steam railroad men are apt to adopt the big brother attitude toward their electric railway contemporaries.

Mr. Potter thought that safety-first campaigns were very difficult to launch by the railways alone, because the public was apt to suspect ulterior motives. In the recent campaign in Boston the co-operation of the newspapers was obtained. The press announced generous prizes to children who could compose the best poems on "Safety First." This movement was taken up with enthusiasm by many schools. In many cases the teachers had pupils learn the poems. The railway, however, wanted to conduct a wider campaign. Advertisements on safety first were posted conspicuously on inside cars and on billboards. This movement was successful largely because it was supported by the Chamber of Commerce.

Richard W. Meade, president Fifth Avenue Coach Company, New York, said that the jitney bus was a forerunner of a transportation system that was certain to increase in this country in proportion to the improvement in roads and motor vehicle construction. The bus system in London is an example of wonderfully efficient operation. The shops there are a model of mechanical perfection. If bus operation is possible in England it is also possible in the United States. The Federation can be of much assistance in drafting regulations for safety which shall be fair and just to all interests.

At the suggestion of Mr. Allen, two sub-committees were appointed for the purpose of preparing reports for the transportation committee in anticipation of the safety convention in the fall. These sub-committees included a committee on municipal regulation, composed of W. E. Cann, J. T. Moffet, J. W. Crawford and H. B. Potter, and a committee on State and federal regulation composed of J. K. Punderford, R. W. Meade, F. W. Bacon and E. G. Connette.

A luncheon at the Republican Club followed the morning meeting and in the afternoon sessions of the two sub-committees were held. At the luncheon Darwin P. Kingsley, president New York Life Insurance Company and of the Safety First Federation, spoke of the aims of the safety organization. The safety-first movement, Mr. Kingsley said, was the natural outgrowth of the intensive life of to-day. He referred to the large number of fatalities in New York and said that one of the highest aims of the safety-first organization should be to educate the public in the hope of diminishing these accidents. The public was largely to blame for a great many of them and yet was always ready to condemn public utility corporations without awaiting investiga-

tions. The safety-first movement is not purely humanitarian, however, but is a good, sound business proposition. The need of regulating traffic, for instance, was graphically illustrated at the time of the recent police parade in New York City. Soon after the traffic police were withdrawn to parade a condition reigned which approached chaos. The more intensive the life we lead the more necessary is extended government control.

Railway Motor Commutation and Flashing

R. E. Hellmund Discusses the Problems of the Design of Direct-Current Motors from the Standpoint of Commutation

In the current issue of the *Electric Journal* R. E. Hellmund of the Westinghouse Electric & Manufacturing Company has an elaborate article on the causes of flashing and sparking in electric railway motors. Some of the important points are abstracted below.

Improved commutation of itself is of little advantage to a railway company except as it brings with it reduced maintenance cost. Commutator wear is reduced as is evidenced from the fact that the sale of replacement commutators by manufacturers has practically ceased since the introduction of commutating-pole motors. Improved commutation further means reduced wear of carbons and reduced quantities of carbon and carbon dust inside the motor. Such dust accumulations often cause insulation breakdowns. Good commutation further avoids roughening of the commutator which is usually followed by vibration, leading to wear and tear in the brush-holder parts. It also prevents commutator blackening, which leads to the breaking down of the insulation between segments.

The commutating pole has made possible the carrying of heavy overloads on railway motors, permitting higher rates of acceleration and therefore more economical operation, and in some cases making it possible to use two-motor in place of four-motor equipments. It has also made field control possible as well as the design of direct-connected motors for voltages higher than 600, and for use with very small wheels with armature diameters correspondingly small.

Commutating conditions cannot be made altogether ideal for several reasons. Ideal commutation requires a commutating-pole flux changing in proportion to the load, which in turn requires unsaturated magnetic poles. On account of space limitations the iron parts of motors cannot be made as heavy as would be required for this purpose. Further, it is not advisable to design armatures with a large number of small and flimsy teeth and a large number of weak coils, giving numerous chances for insulation breakdown. The preference is for large slots which lead to certain irregularities in commutation. Again, it is not possible to secure the best ratios between armature diameter and length from the commutation standpoint.

Flashing in railway motors is the formation of electric arcs just as in an arc lamp. In the latter the carbons are brought into contact and subsequently drawn apart. After the arc has been established a comparatively small voltage will maintain it. In order to obtain flashing in a railway motor, it is necessary, first, that an arc be established and, second, that this be maintained long enough to cause a flash around the commutator, either extending part of the distance from brush to brush or the entire distance, or a distance around part of the commutator and from thence to ground. Flashing can be prevented by avoiding the formation of the arc and by keeping the voltage between commutator segments so small that an arc cannot be maintained between them. Improving commutation reduces

flashing, but even with commutating poles arcs will occur. Brushes may be thrown away from the commutator as a result of a jar, and one of the most successful means for preventing flashing from this cause is the use of a comparatively high pressure on the carbons. In motors having good commutation satisfactory results can be obtained with brush pressures of from 3 to 5 lb. per square inch, although a somewhat increased pressure does not materially increase the losses and wear. This pressure is not always a sufficient safeguard against jumping of brushes. It seems, therefore, in many cases advisable to use pressures in excess of 5 lb. per square inch, a good rule being to apply an initial brush pressure of 5 lb. per square inch, decreasing it slightly if there is no trouble from flashing and increasing it from 6 lb. to 7 lb. per square inch if flashing proves troublesome. It has even been found necessary to raise the pressure as high as 9 lb. per square inch in some cases, but in these the increase in brush and commutator wear was quite noticeable. Jumping of the carbons is the most frequent cause of sparking in commutating-pole motors.

Sparking occurs also in commutating-pole motors under abnormal running conditions, due to the fact that with sudden changes in current the commutating flux does not immediately respond to these changes. Any interruption and re-establishment of power will, in a series motor, always cause temporary arcing and spitting at the brushes.

The above statements explain why the commutating poles have not eliminated the first cause of flashing altogether. Even with the commutating pole it is necessary to design motors so that there is not much voltage between commutator segments. There is, however, a limit to the reduction in the number of commutator bars and the corresponding reduction in the number of turns between bars due to the limit of practicable width of the bar.

Some few commutating-pole motors are more subject to flashing than most of the more popular non-commutating-pole design. The reason for this is that when the limitation in design regarding the allowable voltage between segments in non-commutating-pole motors was removed by the development of the commutating-pole type, some designers were led to bring out motors with strong armatures and weak fields, as well as with many armature turns between segments. These motors were very liable to flash, in fact they would flash-over at high speed at almost every bad rail joint. However, it would not be fair to hold this against the commutating-pole motor. Again, in motors properly designed for flashing a small amount of sparking at the brushes in normal operation does not have any harmful influence upon the flashing. This is especially true of the very small arcs at times observed at the brushes of commutating-pole motors, which produce but a limited amount of vapor and require a large voltage to maintain them. This condition follows from the fact that, as the commutating pole is not a safeguard against the establishment of arcs at the brushes under all circumstances, it is necessary to keep down the voltage which tends to carry the arc over.

Ventilation of motors should have a good effect upon flashing and sparking because the ventilation tends to remove carbon and copper dust from within the motor and to keep the motor dry inside. It further removes hot metal vapors which may exist on account of sparking or incipient flashes.

There are two conditions of operation under which almost any rationally designed motor is liable to flash. First, motors are at times subjected to very high over-voltages, for example, in third-rail installations where, when a heavy load is suddenly taken off the line, voltage

rises up to two or three times the line voltage. It would hardly be possible to design commercial motors which would stand this under any condition of load without flashing over now and then. However, the damage caused to an up-to-date motor by flashing under over-voltage conditions is usually negligible, because the high-voltage surges are usually of very short duration. The damage caused by voltage surges through insulation break-downs may, of course, be quite serious. A second cause of flashing and which often results in serious damage to the motor is the practice of throwing the reverse handle of a four-motor equipment, that is "bucking the motors." With the motor connections established under these conditions it is possible for the motors to pick up as generators under practically short-circuit conditions. The rush of current is so great and the building up of the flux so rapid that the induced voltages are very high, and together with the effect of field distortion nearly always cause a severe flash-over if the motor is running at fairly high speed. The practice of throwing the reverse handle while running should not be tolerated except possibly in order to avoid accidents and damage more serious than the burn-out or break-down of a motor.

Electric Railway Earnings

Analysis by Mr. Doolittle Shows Relative Stability of Earnings from Electric Railway Operation

Continuing the studies of electric railway earnings which were published in the *ELECTRIC RAILWAY JOURNAL* of Jan. 23, page 183, and of March 13, page 506, F. W. Doolittle, director of the bureau of fare research of the American Electric Railway Association, has compiled the accompanying table to show the results of economic disturbances during 1913 and 1914 upon the several industries mentioned. Eight of the first nine items included therein are derived from electric railway figures.

TABLE SHOWING COMPARATIVE RESULTS OBTAINED IN SEVERAL INDUSTRIES DURING 1913 AND 1914

	1914 in per cent of 1913
1. Electric railways—net earnings—South.....	104.41
2. Electric railways—gross earnings—South.....	104.19
3. Electric railways—gross earnings—United States (263 companies).....	100.68
4. Electric railways—gross earnings—East.....	100.58
5. Electric railways—net earnings—East.....	99.74
6. Electric railways—gross earnings—West.....	99.69
7. Agriculture—farm crop value—United States.....	99.60
8. Electric railways—net earnings—United States (263 companies).....	99.57
9. Bank clearings—amount—West.....	97.41
10. Electric railways—net earnings—West.....	96.79
11. Steam railroads—net earnings—West.....	94.52
12. Steam railroads—gross earnings—West.....	94.50
13. Steam railroads—gross earnings—South.....	93.72
14. Building permits—value—West.....	93.58
15. Steam railroads—gross earnings—United States.....	93.46
16. Bank clearings—amount—South.....	93.29
17. Steam railroads—gross earnings—East.....	92.31
18. Building permits—value—United States.....	91.86
19. Building permits—value—East.....	91.66
20. Steam railroads—net earnings—United States.....	91.61
21. Bank clearings—amount—United States.....	90.64
22. Bank clearings—amount—East.....	89.89
23. Steam railroads—net earnings—East.....	89.82
24. Steam railroads—net earnings—South.....	86.17
25. Building permits—value—South.....	85.76
26. Steel production—tons.....	75.50
27. Iron production—tons.....	74.20
28. Cotton crop—value.....	63.00

The exhibited data argue, of course, not the relative profitableness of the traction industry but its relative stability. No business operating from year to year under constantly increasing costs and furnishing continually more and better service for a fare which is vastly less when measured in terms of the material and labor it goes to purchase than it was twenty years ago, is likely to be very profitable. The fact that it requires the investment of \$5 to \$7 to produce \$1 of gross revenue annually is a further indication that large profits cannot be expected generally. The electric railways of

the United States carry ten passengers for every one carried by steam railroads. In cities of 8000 population and over, the average individual rides more than 250 times each year. This use is an integral part of the lives and habits of many millions of people, and it is not strange to find it maintained during periods when other habits are changed. Electric railways are an economic necessity and the service they furnish cannot be accumulated or postponed. The further growth of a city is dependent upon the growth of its transportation facilities. The money for these facilities must be obtained in competition with other industries, and it can be obtained only by the willingness to pay a fair return. The essential stability of the volume of traffic operates, when rates are reasonable, to fix this rate of return below that which must be offered to investors in businesses more speculative in their nature, but unless stability of earnings accompanies stability of traffic, the community loses this advantage which its own habits can create.

West Virginia Association Organized

The Public Service Utilities Association of West Virginia, which includes in its membership electric railways, electric light and power and water works companies, held its first meeting in Charleston on June 15 and 16 and effected permanent organization by the adoption of a constitution and by-laws and the election of permanent officers, as follows: President, Herbert Markle, general manager Appalachian Power Company, Bluefield, W. Va.; first vice-president, G. O. Nagle, general manager Wheeling Traction Company; second vice-president, Mentor Hetzer, general manager Moundsville Water Company; third vice-president, James Imboden, general manager West Virginia Light & Traction Company, Charleston, W. Va.; secretary and treasurer, W. C. Davisson, vice-president West Virginia Water & Electric Company, Charleston, W. Va.; executive committee, W. C. Mathews, president Virginia-Western Power Company, Clifton Forge, Va.; Herbert Markle, G. O. Nagle, Mentor Hetzer, O. B. Welch, vice-president and general manager Williamson Light & Power Company, Williamson, W. Va.; W. L. Foster, general manager Beckley Electric Light & Power Company, Beckley, W. Va.; H. S. Newton, general manager Ohio Valley Electric Company, Huntington, W. Va.; E. W. Alexander, general manager Charleston-Dunbar Traction Company, Charleston, W. Va.; W. A. Maxwell, general manager Logan Heat, Light & Power Company, Logan, W. Va.

The object of the association is to promote the interests of public utility companies in the State along educational and political lines.

Lectures to Employees

Periodical lectures to employees on proper relations with the public have been found to be very helpful in reducing complaints to a minimum on the lines of the Twin City Rapid Transit Company, Minneapolis, Minn. A. W. Warnock, general passenger agent and manager of the publicity department, visits each of the company's six carhouses every three weeks and delivers a fifteen minutes' talk to the extra trainmen and as many of the old employees as can attend. Usually the subject discussed relates to public complaints received during the period between the lectures. The cause of the complaint, its disposition and methods of preventing similar complaints in the future are discussed. Complaints afford a new subject for each lecture, and often being of a personal nature, are more interesting than would be a general discussion.

ANNUAL CONVENTION
SAN FRANCISCO
OCTOBER 4 to 8, 1915

American Association News

ANNUAL CONVENTION
SAN FRANCISCO
OCTOBER 4 TO 8, 1915

H. G. McConnaughy, Director of Transportation for the Convention, Announces the Appointment of Trainmasters for Different Sections of the Country—Program and List of Speakers for Convention
Being Compiled—Activity of Various Association Committees

TRANSPORTATION ARRANGEMENTS FOR THE CONVENTION

H. G. McConnaughy, director of transportation for the convention, has announced the appointment of J. C. McQuiston, manager Westinghouse department of publicity, East Pittsburgh, Pa., as trainmaster of the Blue Special train; Frank H. Gale, advertising manager General Electric Company, Schenectady, N. Y., as trainmaster of the Red Special train, and L. E. Gould, Western manager ELECTRIC RAILWAY JOURNAL, Chicago, as trainmaster of the White Special train. The Red Special train will leave New York about Sept. 23 by way of the New York Central & Hudson River Railroad, thence to Chicago, and thence to St. Paul and Minneapolis over the Great Northern to Glacier Park, Spokane, Seattle, Portland and San Francisco. The Blue Special train will leave a day or two later over the Pennsylvania Railroad by way of Pittsburgh, Indianapolis, St. Louis, Kansas City and Denver, then through the Royal Gorge to Salt Lake City, Ogden and Lake Tahoe to San Francisco.

After the convention the Blue Special will follow the Red Special, visiting the Yosemite Park, Los Angeles, San Diego and Grand Canyon, then via Kansas City and St. Louis to New York. The White Special will be an especially fast train which will make the run for the convenience of those who cannot participate in the earlier tours. It will be a going trip only and will start from Chicago.

Western members who desire to make reservation on the White Special should do so through L. E. Gould, ELECTRIC RAILWAY JOURNAL, 1570 Old Colony Building, Chicago. Reservations for either of the other trains or reservations from Eastern members who wish to take the White Special from Chicago, and requests for information connected with the tours should be made through H. G. McConnaughy, director of transportation, Room 1002, 165 Broadway, New York City, except that members in New England can make reservations through H. E. Reynolds, chairman transportation committee for the New England territory, Bay State Street Railway, Boston, Mass.

The printed itineraries covering all special trains are now on the press and will be ready for mailing within the next week. The delay in getting these out has been caused by changes suggested by the Railway Association and the necessity of rearranging some of the details in connection with the tours. Every detail covering all tours has been carefully worked out, and arrangements at all points covering hotels, side trips as planned and shown in the itineraries have been completed. The ladies and children accompanying each party will have special care and attention. A maid, who will be at their service at all times, will accompany each train.

The requests received by the transportation committee for the different tours have been so heavy that it will be absolutely necessary for the members to make their reservations as soon after the receipt of itineraries as possible, as the number of people who can be accommodated on each special train is limited. Consequently, all assignments will be made in the order in which requests are received.

SPEAKERS AT THE SAN FRANCISCO CONVENTION

The office of the secretary of the American Electric Railway Association is busily engaged in completing the program for the convention in October. A feature will be addresses by a number of distinguished men. These will be in addition to the regular program of reports and papers upon matters of technical interest to the industry. The list of addresses is not completed yet, but a sufficient number of definite promises have been secured to mark the convention this year as an important one in the annals of the association. Several of these special features were announced by Secretary Burritt this week.

The address of welcome will be given by Hiram W. Johnson, Governor of California.

Ex-senator Jonathan Bourne, Jr., will speak on government ownership, a subject which his years of experience in the business of government at Washington peculiarly qualify him to discuss. While United States Senator from Oregon, Mr. Bourne, besides being the author of the parcel post law, was one of the most efficient forces in the national movement for the construction of good roads, and in other matters of countrywide importance. He is one of the most brilliant and forceful writers and speakers in America.

Another address of great interest at the present time will be on "The Fundamental Principles of the Valuation of Electric Railways" by Bion J. Arnold. Besides the office of chief engineer and chairman of the Board of Supervising Engineers, Chicago Traction, which Mr. Arnold has occupied since its establishment under the ordinance of 1907, Mr. Arnold has been consulting engineer of the Public Service Commission, New York City, on matters connected with subway and street railway properties; consulting engineer Detroit United Railway, consulting engineer for the cities of Pittsburgh, Providence, Los Angeles, San Francisco, Toronto, Cincinnati and Kansas City, Mo., member of the electric traction commission of the New York Central Railroad and president of the A. I. E. E. and has held other important offices.

Jesse W. Lillienthal, president of the United Railroads of San Francisco, will speak on "Welfare Work," a subject to which he has given a great deal of attention both before and since his election in 1913 as chief executive officer of the electric railway system in San Francisco. For fifteen years prior to his going to California he was one of New York City's most distinguished lawyers, and has occupied a place no less eminent at the San Francisco bar, of whose association he is the senior vice-president. He is also a director in many of the corporations that have played an important part in the industrial upbuilding of the Pacific Coast.

A fourth address will be given by Ivy L. Lee, recently executive assistant Pennsylvania Railroad and now a member of the personal staff of John D. Rockefeller. A number of Mr. Lee's addresses on different phases of the subject have appeared in previous issues of this paper, and he was the author of an article on "Principles Underlying Publicity" in the issue of Oct. 10, 1914. He will speak in San Francisco on "Putting Publicity Theories into Practice."

TRANSPORTATION STANDARDS

The new committee on standards of the American Electric Railway Transportation & Traffic Association met on July 14-15 and organized. There were present L. H. Palmer, chairman, C. V. Wood, Alexander Jackson and J. N. Shannahan. The committee formulated rules of procedure for the adoption of standards by the Transportation & Traffic Association, this being intended for submission before the 1915 convention. The form of procedure follows very closely, in so far as it is applicable, that of the Engineering Association. Provision is made in it only for two grades, (1) standards, and (2) recommended methods and practices, the former to include such recommendations of the association as bear its formal approval as standard. The latter grade will include all other definitely approved recommendations. The committee also drew up a syllabus covering the existing standards of the association, and it is expected that this will be issued in the early part of next year.

STANDARD STYLE FOR SPECIFICATIONS

A subcommittee of the committee on standards of the American Electric Railway Engineering Association, consisting of A. S. Richey, chairman, J. H. Hanna and S. H. Spalding, representing E. R. Hill, met last week and drafted tentative regulations to govern the style of specifications adopted by the association. These proposed regulations are intended for submission to the committee on standards at its meeting during the latter part of the month, and if approved at that time they will be presented before the association at the 1915 convention.

COMMITTEE ON BUILDINGS AND STRUCTURES MEETS

A meeting of the Engineering Association committee on buildings and structures was held in New York on July 7 with the following in attendance: C. S. Bedwell, Newark, N. J., chairman; H. G. Salisbury, Toronto, Ont.; R. C. Bird, New York, N. Y.; J. H. Frank, Philadelphia, Pa.; William Roberts, Akron, Ohio, and H. G. Throop, Syracuse, N. Y. A proposed form of contract for general construction work was revised and approved by the committee and will go to the committee on standards for approval as recommended practice. The general specification stands practically as it was except that the agreement portion has been greatly shortened and specific clauses have been added to cover the owner in matters relating to protection against mechanics' liens and actions for damages under the workmen's compensation law.

The sub-committee on the proper provision for expansion and contraction in concrete structures, together with provision for waterproofing joints, presented an illustrated report giving engineering data on the subject and suggested provisions as covered by the assignment. The report was approved for presentation to the association for discussion, with the expectation that the work would be continued.

The sub-committee on fire protection rules reported itself as being in accord with the National Board of Fire Underwriters in regard to the rules on the use of soldering and other heating equipment. The committee presented extracts from the Underwriters' building code as they apply to construction employed in electric railway buildings, with the idea of bringing out discussion on the recommendations.

A new sub-committee on the construction and design of substations submitted a report which the general

committee recommended for presentation to the association along with the rules for standard construction prepared by the Board of Fire Underwriters. The committee will submit a plan showing an ideal substation of specified size and also rules and recommendations for details of fireproof construction.

BUREAU OF STANDARDS FOR INTERURBAN RAILWAYS

Ways and means by which a new bureau of standards may be established among interurban railways which are members of the American Electric Railway Association was the purpose of a conference held at Fort Wayne, Ind., the session being attended by James J. Brennan, Fort Wayne & Northern Indiana Traction Company; A. A. Schlessinger, Terre Haute, Indianapolis & Eastern Traction Company; J. A. Kelsey, Union Traction Company of Indiana; M. J. Kehoe, Ohio Electric Railway, and E. J. Burdick, Detroit United Railway. These men were representatives of the Central Electric Railway Association and they form a committee to confer with a committee from the American Electric Railway Association to ask the latter body to adopt a standard of operating interurban trains on the lines of the members of the C. E. R. A. which will be uniform.

Meeting of Canadian Electric Railway Association

The annual meeting of the Canadian Electric Railway Association was held at the Chateau Frontenac in Quebec on June 21 and 22. After the opening address by President C. B. King, manager London Street Railway, Secretary-Treasurer Acton Burrows, managing director *Canadian Railway and Marine World*, gave a detailed report covering the association's activities during the year and a wide variety of other topics. W. F. Graves, chief engineer Montreal Tramways and chairman of the special committee on the proposed standardization of steel rails for electric railways, presented a report which was referred to the new executive committee.

Copyrighted papers, to be distributed only to officials of member companies, were read as follows: "Development of Tourist Traffic on Observation Cars," by R. M. Reade, superintendent city division Quebec Railway, Light, Heat & Power Company; "A Proper Accident Department," by C. L. Wilson, assistant manager Toronto & York Radial Railway; "Jitney Competition," by E. P. Coleman, general manager Dominion Power & Transmission Company; "Coasting," by A. Gaboury, superintendent Montreal Tramways; "Economy in the Electric Railway Repair Shop," by E. A. W. Turbett, mechanical superintendent Quebec Railway, Light, Heat & Power Company, and "Methods to Minimize Fire Risks and Secure Reduction of Premiums," by J. H. Ryan, New York.

Officers for the ensuing year were elected as follows: President, James D. Fraser, director and secretary-treasurer Ottawa Electric Railway; vice-president, E. P. Coleman, general manager Dominion Power & Transmission Company; honorary secretary-treasurer, Acton Burrows. The new executive committee includes: A. Eastman, vice-president and general manager Windsor, Essex & Lake Shore Rapid Railway; A. Gaboury, superintendent Montreal Tramways; H. G. Matthews, general manager Quebec Railway, Light, Heat & Power Company; M. N. Todd, president Galt, Preston & Hespeler Street Railway; C. L. Wilson, assistant manager Toronto & York Radial Railway.

COMMUNICATION

Motor Ventilation

KANSAS CITY, Mo., July 10, 1915.

To the Editors:

There have been several interesting and instructive articles on the advantages and limitations of ventilated motors published in the ELECTRIC RAILWAY JOURNAL within the past few months. Before the appearance of these articles the receivers of the Metropolitan Street Railway Company of Kansas City had contracted for fifty four-motor equipments of the ventilated type for cars which have since been delivered, and it has been suggested to the writer that perhaps the street railway operators generally may be interested in knowing what considerations affected the choice of these motors.

It is recognized that the service conditions under which motors are expected to perform have an important bearing upon the design selected, and as the conditions under which motors operate in the two Kansas Cities are very severe there are hereinafter given the service requirements under which the new motors are expected to perform, as well as the circumstances which guided the Board of Control of the Kansas City properties in deciding upon the selection of the ventilated type of motor for service under these conditions.

The specifications under which the motors were purchased set out the service conditions under which the equipment would be required to operate as follows:

Weight of empty motor car completely equipped without motors and gears and gear cases.....	32,500 lb.
Average load of passengers and crew.....	4,500 lb.
Maximum load of passengers and crew.....	18,000 lb.
Typical run.....	Troost Avenue
Length of round trip.....	10.6 miles
Morning rush-hour running time (excluding two-minute lay-over time).....	66 minutes
Mid-day running time (excluding two-minute layover time),	63 minutes
Evening rush-hour running time (excluding two-minute lay-over time).....	68 minutes
Average trolley voltage.....	525 volts
Average stops per round trip.....	.77
Average length of stop.....	9 seconds
Diameter of wheel.....	30 in.
Maximum grade.....	9 1/2 per cent
Other excessive grades.....	{ 800 ft. of 8 per cent grade 4300 ft. of 3 1/4 per cent grade 3100 ft. of 5 per cent grade
Average rate of acceleration and braking.....	1.75 m.p.h.p.s.

In addition, the manufacturer was required to guarantee that after continuous running, including both the morning and evening rush, carrying during the total time the average loads above indicated and also including two successive round trips during evening rush with loads of 80 per cent of the maximum indicated over the entire out-bound trip only, no part of the motors would show a temperature rise exceeding 70 deg. C. above the temperature of the surrounding air, excepting the commutator, which might show an 80 deg. rise.

As a result both of the bids received and of detailed investigation into the whole subject, as applying to local conditions, the following conclusions were drawn:

1. There is a very perceptible decrease in weight by use of the ventilated type of motor.
2. That the service or continuous capacity of the ventilated motor was from 40 per cent to 50 per cent above that of the non-ventilated motor, having the same one-hour rating, assuming that the proper balance of design exists in each.
3. That on a basis of the same continuous capacity, the cost of the total equipment of the ventilated motor type was from 20 per cent to 25 per cent less than that of the non-ventilated type of motor.
4. That the temperature was maintained more uniform throughout the motor in the ventilated type.
5. Owing to the elimination of hot spots, the maintenance of the ventilated type should be materially less.

As to the objections, the fact that water might enter the ventilated type of motor and put it out of commission was raised as a serious objection, in that we have many stretches of track located in low spots, subways, etc., subject to overflow, and were this objection well taken we would not have been able to use the ventilated type. However, it has been our experience that the non-ventilated type of motor being also provided with drain holes in the bottom of the frame cannot be operated through water with the current on. In other words, so far as the damage from water is concerned it is virtually on the same plane as the ventilated type of motor. The second objection was that of the possibility of dust accumulating in the air passages, preventing the dissipation of heat and causing ultimate breakdown. This condition was found to be more inherent to the duct type of armature, and difficulty was not expected from this source, as the motor was so designed as practically to eliminate dust pockets. Good maintenance demands that motors of all types should be regularly blown out and cleaned, and we expect to remove all possible difficulty by giving the motors the care they should receive when on the pits. It was also stated that snow would cause trouble, but we believe the design of the motor is such as to make it exceedingly difficult for even a slight amount of snow to enter, or only so little as would cause no trouble.

Therefore, so far as the bids received were concerned and in view of the guarantees given, it was our experience that we could get a lighter motor of greater service capacity with less maintenance cost at a 20 per cent to 25 per cent decrease in price. There could hardly be a question as to the choice made under these circumstances.

PHILIP J. KEALY.

Specifications for Track Material

At the recent convention of the American Society for Testing Materials specifications were presented to cover heat-treated high-carbon-steel splice bars. These conform quite closely to the recommended specifications for untreated hard-steel splice bars of the American Electric Railway Engineering Association, except, of course, as regards the heat treatment. The practical points of difference in the two specifications are that the A. S. T. M. provide for a check analysis from finished bars by the purchaser if desired, with an increase in the phosphorous content of 25 per cent over the ladle analysis; that the bend-test arcs are 50 per cent greater in the A. S. T. M. specifications, and that a variation in size of hole of only 1/32 in. is allowed by the A. S. T. M. Provision is made for the retreatment of bars that failed in tests, one or more heat treatments being allowed.

At the same convention specifications were presented for heat-treated steel track bolts, and a revision was submitted for the existing standard specification of the A. S. T. M. for yellow-pine bridge and trestle timbers, this applying to solid members and not to composite members.

The Boston Elevated Railway has converted a small open car into a traveling display of scenes in parks on or near the local system and will operate the equipment over many routes during the coming months. On each side of the car are mounted three oil paintings illustrating scenes at Norumbega, Franklin, Marine and Lexington Parks, with large maps showing the location of these breathing spaces as well as the Blue Hills and Middlesex Fells. The canvases call attention to the natural and artificial attractions at these outing places. In place of the usual destination signs the car carries the designation "Trolley Outings."

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.)

Experimental Open-Car Reconstruction in Atlantic City

BY GEORGE F. FABER, GENERAL SUPERINTENDENT ATLANTIC CITY & SHORE RAILROAD

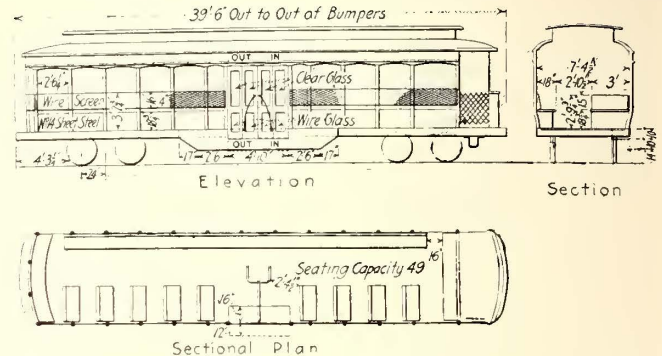
Two old-style, open, running-board cars were remodeled by this company for this season's traffic into center-entrance cars as shown in the accompanying illustrations. The open-car feature was retained as an absolute necessity in a seashore resort like Atlantic City, where the principal attraction to visitors, as far as car riding is concerned, is a ride down the coast in some kind of an open car. By the adoption of the plan described below it would seem possible to get every advantage of the pay-as-you-enter method of car collection and additional protection from accident hazard without sacrificing any of the advantages of the old type of car excepting seating capacity.

While it is not claimed that this construction is an entirely novel one, there are some features different from those previously described in the columns of the ELECTRIC RAILWAY JOURNAL.

The remodeled cars were twelve-bench cars, 39 ft. 6 in. over bumpers in length, 7 ft. 10 $\frac{1}{2}$ in. over side-posts in width, the floor level being 2 ft. 10 in. above the rails. They were equipped with double trucks, 25 ft. 6-in. on centers with 30-in. wheels. The trucks were of the Brill 27G type.

In remodeling, one side sill was dropped at the center to provide three step heights, 10 in., 10 in. and 14 in. respectively. A drop girder was added to stiffen the sill. On one car we put a Prepayment Car Sales Company door with step-controlling mechanism, and on the other a J. G. Brill Company equipment. On each car a conductor's stand was located as shown in the drawing. In arranging for the seating, as shown, the rear bulkhead was removed and only the seat behind the front bulkhead was retained. The two plans used in inclosing the sides for a height slightly more than 3 ft. above the floors are shown in the accompanying half-tones. In one a sheet-steel sheathing was applied for half this distance and a substantial screen for the remainder. In the other the screen was used alone. The former plan gives a more finished appearance to the car, while the latter allows a somewhat better circulation of air.

A specially-arranged spring seat is provided for the



RECONSTRUCTED OPEN CARS—DETAILS OF ENTRANCE, SEATING, ETC.

motorman which is removable when not in use. The register is operated by the conductor by means of a foot-lever-control mechanism running under the car floor. A Consolidated Car Heating Company buzzer system permits the passengers to signal to the conductor, who in turn signals to the motorman by means of a bell operated from a push-button arranged handily on the operating stand.

Conditions in Atlantic City are such that a larger car than that now in use could be operated to advantage, conditions being favorable to trailer operation, although the company does not favor such operation at present. While it is true that a larger seating capacity is desirable, it must be remembered that the Atlantic City season is short and the traffic very variable, so that a smaller type of car used in numbers to suit the traffic can always be operated to advantage. After all, a good, safe, service car with as many of the features of the open-bench car as can be obtained is what is most needed.

The Atlantic City & Shore Railroad has a large number of near-side cars in which the "in-and-out" plan is used, while on the experimental cars the "all out" and "all in" plan is used. The result is that there is a little confusion this summer on the part of passengers. This confusion was unavoidable, however, in the carrying on of the present experiment. The center-entrance plan was devised partly to avoid confusion and extra walking on the part of the passengers which would have resulted had the rear-entrance and front-exit plan been adopted. This would have been prefer-



RECONSTRUCTED OPEN CARS—REMODELED CAR WITH SCREENS ONLY



RECONSTRUCTED OPEN CARS—REMODELED CAR WITH STEEL SHEATHING

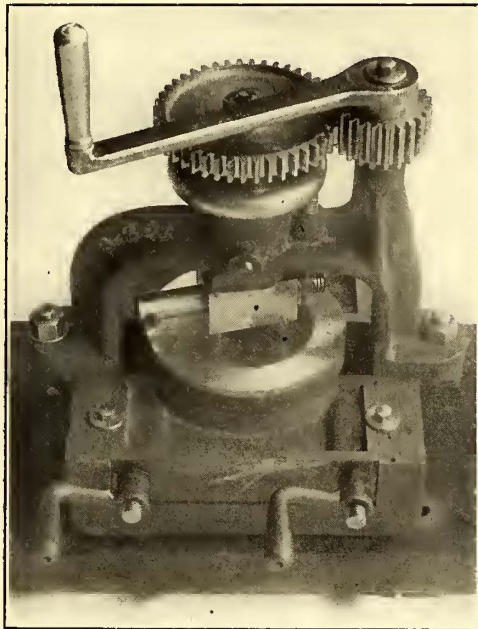
able in many ways but it would not have worked in well with the use of near-side cars.

From the experience with the reconstruction of the two samples the cost records show that if the cars can be put through the shops in lots of ten the cost of remodeling each car will not be more than \$550. These cars will be run during the present season experimentally before plans for remodeling additional ones are worked out.

Motor-Bearing Trimmer

BY E. L. STEPHENS, MASTER MECHANIC, LOS ANGELES (CAL.) RAILWAY

Having adopted a standard babbitt-lined motor bearing, special forms have been made by the Los Angeles Railway for use in rebabbiting them. All bearings are trimmed and oil-grooved before they leave the shops for the different divisions. However, owing to our company having a gage of only 3 ft. 6 in., we have no room



MOTOR BEARING TRIMMER USED AT LOS ANGELES

for an axle collar. Hence it is necessary to face all wheels hubs for a motor brass collar bearing. As there is a slight variation of the distance between the motor and wheel hub, the motor brass collar cannot be completed for service at the shops. This slight variation is overcome by using a home-made motor-bearing trimmer, with which every division is furnished. This shop kink consists of a self-centering clamp attachment which holds the bearing firmly, and attached thereto is a rotary automatic self-feeding cutter which is operated by hand, to trim the collar to any desired length. This little machine eliminates all lathe work, and as it is automatic it can be operated by any employee. Its operation is such that the trimming of a pair of bearings can be completed on this trimmer in less time than it would take to center the bearings on a lathe.

Record time was made by the Chattanooga Railway & Light Company, Chattanooga, Tenn., in replacing the old cables on the Lookout Mountain incline. Heretofore several days have been required to complete the installation of the new cable. This year the exchange was made in two days. The cables have to be renewed about every two years.

Railway Motor Gearing

BY W. L. ALLEN, COMMERCIAL ENGINEER R. D. NUTTALL COMPANY, PITTSBURGH, PA.

As a result of the presentation of a paper by the writer on "Railway Motor Gearing" at the recent meeting of the Central Electric Railway Association, abstracted at length in the issue of the ELECTRIC RAILWAY JOURNAL for June 26, page 1201, a number of questions have been asked. In the belief that the answers to these questions may be of interest to railway men other than those who propounded the questions, these answers are given with the questions in the following paragraphs:

Question No. 1.—How will the railways which purchase gearing to specifications know whether the material so purchased meets the specifications?

Answer.—The railways with inspection and testing departments can arrange to have all material on order tested and inspected before shipment. In that case the manufacturer must provide the proper facilities for such testing and allow the inspectors free access to his plant at all times during the course of manufacture of the material. Properties not having such testing departments can have this work done for them by commercial testing laboratories, or can secure from the manufacturers test reports covering any materials shipped on their orders. If the number of pieces on order is sufficient to warrant a physical test, the report should show the physical properties of the piece selected to represent the lot, while the surface hardness of each piece can be identified by a serial number plainly stamped on each gear and pinion appearing in the report. For example, a typical test report might be as follows:

Customer's order No.....	
Date.....	
Invoice No.....	
SERIAL NUMBER	SURFACE HARDNESS
518-363	555 Brinell
518-364	532 Brinell
518-365	555 Brinell
Test Taken *518-366	512 Brinell

If a physical test is made, the serial number of the gear or pinion from which the test piece was machined and the physical properties should be shown as follows:

Test Taken * Serial Number 518-366	Surface Hardness 512 Brinell
Ultimate tensile strength.....	125,425 lb. per sq. in.
Yield point	85,500 lb. per sq. in.
Elongation in 2 in.....	16.4 per cent
Reduction of area.....	41.9 per cent

Question No. 2.—Will the purchase of gearing to specifications increase the cost of this gearing?

Answer.—Each variation in the chemical composition of the steel used in the manufacture of gearing, or in the temperatures and duration of heating and cooling during heat treatment, or in fact any variation in the process, tends to produce non-uniformity in the resultant material. To insure against such non-uniformity the progressive, conscientious manufacturer has found that it is necessary constantly to test his product in practically the way described in the C. E. R. A. paper. The sale to specifications, therefore, should only require the additional work made necessary by the reporting of this test information to the railway and should not increase the purchase price of such gearing. It will, however, have a tendency to increase the cost of production of the unscientifically manufactured material, which increase will be more than compensated for in the increase of the life and efficiency of this class of material.

Question No. 3.—Will the purchase to specifications relieve the gearing manufacturer of his responsibility for breakage or poor life?

Answer.—The equitable adjustment of claims and

complaints, which is of as much value to the purchaser as to the seller, requires first determining the exact cause of failure. The purchase of gearing to trade names, without a comprehensive knowledge of the characteristics of the material on the part of the purchaser, is apt to produce an unsatisfactory situation in the event of failure, due to the natural tendency of both parties involved to feel that the failure lies within the other's sphere. On the other hand, when supplies are purchased to specification the determining of the cause of failure is greatly simplified by following a natural course of inquiry. If, for instance, the unsatisfactory material failed to meet the specifications, placing the responsibility is not difficult. If it meets the specifications, the failure may be due either to defective installation, operation or maintenance, or to a wrong application of the particular grade of material in the specific service. By a process of elimination an investigation may show that the failed material was only an isolated case due to some error as in the above list, or it may show that some inherent weakness exists in operation or maintenance methods which can be entirely corrected. If there should be an epidemic of such failures in a specific service and caused by operating conditions not possible of change, such an investigation may develop the fact that a grade of gearing of greater strength, toughness or surface hardness must be used.

Now, while an elaborate investigation is impracticable in each instance, the intelligent consideration of the above outlined phases of gearing operation and maintenance conducted by the manufacturer, together with the operator, cannot fail to educate the manufacturer as to the service to which his material must be subjected, as well as permit the operator to learn the requirements of gearing for his service. This mutual education will undoubtedly greatly minimize failures and increase possible economy through wise selection, as well as provide the necessary data for satisfactory adjustment. It would seem, therefore, that rather than relieve the manufacturer of his responsibility, purchase to specifications increases this responsibility and in reality leads to his rendering a service to the railway of unlimited value in the selection of that grade of gearing best suited to the specific service in question.

One-Man Cars at San Francisco

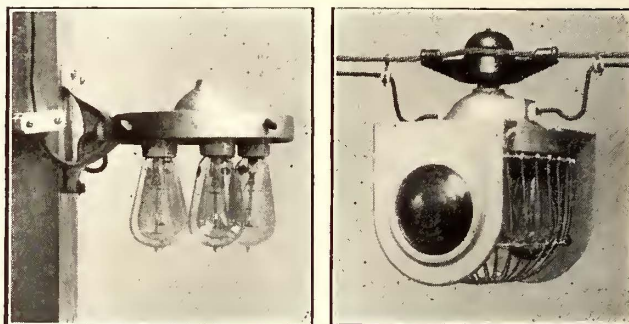
The United Railroads of San Francisco now has in operation three double-truck and six single-truck cars in one-man service. All are used on outlying lines where the receipts average less than \$1 per car-hour. New cars were not bought for this service, old rolling stock being rebuilt for the purpose. The principal changes made in the double-truck cars were the locking of the rear platform, the installation of folding steps and air-operated mechanism for opening and closing the sliding doors. The same changes were made on the single-truck cars except that hand-operated mechanism was installed for the doors. The double-truck cars are fitted with Johnson fare boxes, while the single-truck cars have the customary register mechanism with overhead rod connections. The fenders at each end of the cars are lowered at all times, and double poles and bases also are provided so that the car operator need not leave the car when changing the running direction.

The first one-man cars were installed about two years ago, the service being gradually increased to the number previously mentioned. The company contemplates the conversion of the Pacific Avenue cable line, using seven cars, to one-man operation after the Panama-Pacific Exposition has been closed. Like the other one-man cars they will be rebuilt at the company's shops.

Out-Door Light Clusters

Because of the demand for light clusters that will stand all kinds of weather the G. E. Painter Company, Baltimore, Md., has brought out a number of improved designs of the five-lamp and single-lamp types which can be fitted with enamel signs and signal lenses for crossings, stations and similar locations where light is needed. All of them are made of cast iron of about 3/16-in. thickness, and as they are heavily galvanized they should have long life. The bodies are fitted with porcelain Edison receptacles, held in place by brass screws so that they can easily be replaced in the event of breakage.

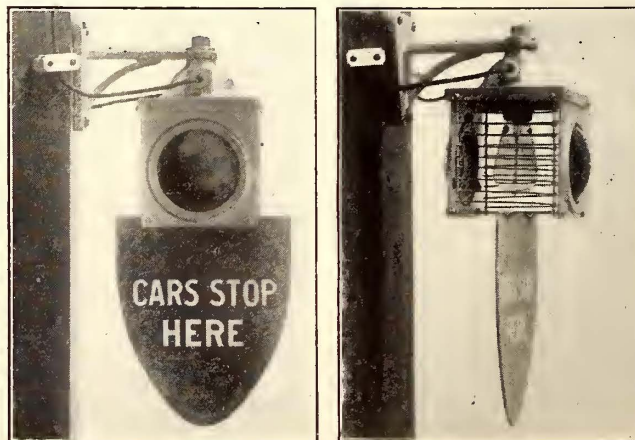
The receptacles for the five-light clusters are connected in series to suit the 550-volt railway current, and are so arranged that they cannot become short-circuited or grounded by rain and snow, or damaged by lightning. In case it should be desirable to change the cluster to



SIDE-SUSPENDED FIVE-LIGHT CLUSTER AND TOP-SUSPENDED TYPE WITH LENSES AND LAMP GUARD

the three-light or four-light type, so as to use lamps from the series of five for other purposes, it is an easy matter to make the necessary connections without "bridging" the cluster receptacles.

The lens holders or shields for the clusters are also made of galvanized cast iron, these being arranged to suit 4 1/2-in. semaphore lenses, and porcelain enamel signs as shown in the accompanying illustrations, can be attached as desired. The holders or shields are held in position by means of brass screws, and the drilling is such that either one or two lens holders can be used in connection with the clusters. The lens holders are arranged to be placed on one of the three sides of side-supported clusters, and on four sides of the top-suspended type to suit the different conditions, but when two holders are used they must be placed opposite to each other, as the shield extends more than one-fourth around the body of cluster. The top-suspended clusters



SINGLE-LIGHT SIGNAL WITH LENSES AND SIGN

may be hung either from a bracket or from a span wire, as most convenient, the side-suspension type being specially designed for attachment to a wall or pole.

Universal Register for Electric Railway Service

Ohmer's "Universal" register is the latest fare-protecting device manufactured by the Ohmer Fare Register Company. It has been built in response to the growing and insistent demand for an indicating and recording fare register which will handle all denominations of cash fares, whether the amounts be in odd pennies or



VIEW OF UNIVERSAL TYPE OF REGISTER

not, and which will also register all tickets, mileage tickets, etc., according to their actual cash value.

The use of the register will permit inter-urban railway companies at any time to change their fare rates quickly and without the necessity of any change in the register mountings or mechanism. The register can also be used interchangeably on any division or can be operated even over the lines of another company

without any mechanical readjustment whatever.

Notwithstanding its large capacity, the machine itself is compact in appearance and is simple and positive in operation. Any cash fare or ticket value from 1 cent to \$9.99 inclusive can be quickly registered and simultaneously indicated and the amount thus indicated cannot be changed until a fare of a different denomination is registered.

With this register tickets are recorded in two ways—as a ticket in the "ticket" column, and as cash in the "cash" column. These two registrations are made simultaneously and with no more trouble than a single registration, in fact, the operation really is a single registration. The turn-in is checked also in two ways, the number of tickets received being checked against the ticket column and the cash value of the tickets received being checked against the cash column. In this case the tickets are counted in as so much currency and according to their actual cash value. This method of registration and checking is the same in the case of mileage tickets. The strips lifted are registered as tickets and the cash value of each strip is added to the cash column by the register. The balance in the cash column after deducting all ticket values is the actual cash collected by the conductor.

Special attention should be given to the thoroughness and accuracy of the check secured by this method of registration and its effectiveness in preventing substitution of any kind. The register indicates exactly the kind of fare being registered and also its value, and the public indication is very plain and absolutely unmis-takeable.

The new design contains a number of improved features not found in the earlier types of Ohmer registers and these make it absolutely foolproof. Among these are the following: At the completion of each conductor's run all printing counters are turned back to zero with the exception of the total passenger and total cash

counters. This provides a check between the records of successive conductors, and between the closing figures of one day and the opening figures of the next. The register cannot be operated unless the detail counters are previously turned to zero. The conductor then takes an imprint with his identification key in the register. His identification key is locked in the machine with the registration of the first fare, and it cannot be removed until he has taken a final imprint to close his day's report. Neither can the conductor operate the register after he has turned the total passenger indicator to zero unless he takes an imprint of the fares registered up to that time.

A record sheet from the new register is shown in the accompanying illustration. From this will be seen the large amount of useful data contained in the small space. The time, the direction, the train or trip number, the date, and the conductor's and inspector's identification key numbers are regular Ohmer features and are self-explanatory.

The register from which this record is taken is mounted to record pass, transfer, ticket and cash. Reading from left to right the last print made by conductor 237 at 12.30 p. m. (the fourth line from the bottom) it appears that he registered sixteen passes, twenty-two transfers and sixty-seven tickets and cash or cash values amounting to \$64.80, the latter being found by deducting the first from the last print in the total cash column. The deduction in the total passenger column shows that there were carried a total of 119 passengers. By deducting the total number of paper collections from the total passengers the number of cash-

TIME	DIRECTION	TRAIN NO.	PASS	TRANSFER	TICKET	TOTAL CASH	REGISTER NO.	TOTAL PASSENGER	DATE	IDENTIFICATION
3 30P	W	53	0 0 0	0 0 0	0 0 0	\$96 35	4 4	0 28 3	JUL 16	INS5
3 30P	W	53	0 1 1	0 1 1	0 3 0	\$96 35	4 4	0 28 3	JUL 16	276
2 00P	E	53	0 0 5	0 0 6	0 3 8	\$95 89	7 6	0 21 5	JUL 18	276
12 30P	W	53	0 0 0	0 0 0	0 0 0	\$95 52	9 6	0 15 9	JUL 18	276
12 30P	W	53	0 1 6	0 2 2	0 6 7	\$95 52	9 6	0 15 9	JUL 16	237
11 00A	E	53	0 1 2	0 1 0	0 3 0	\$95 18	5 6	0 10 0	JUL 16	237
9 30A	W	53	0 0 0	0 0 0	0 0 0	\$94 88	1 6	0 0 4 0	JUL 18	237
9 30A	W	53	0 0 0	0 0 0	0 0 0	\$94 88	1 6	0 0 4 0	JUL 18	INS5
						\$64 80	0	119		

VIEW SHOWING TYPICAL REGISTER RECORD FOR TWO CONDUCTORS

paying passengers is ascertained, which in this case is 14. In general the register has been built for practical utility and to produce a condensed report, rather than for elaborate headings and unnecessary data which would necessitate more complicated and a less easily operated machine.

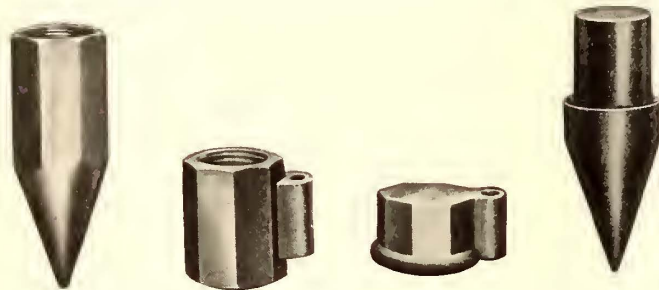
In the operation of the register no ticket can be registered unless a cash value is also registered and indicated, the cash indication appearing adjacent to the word "ticket." For example, if a ticket valued at \$1.61 is registered the indicator reads "Ticket \$1.61." If the amount collected is actual cash the indicator reads "Cash \$1.61" and the register is locked against operation if the indicator is made to read "ticket" or "cash" with no cash amount following. Where "Pass" or "Transfer" are registered and no cash value is assigned the indicator simply shows "Pass" or "Transfer" and the space for the cash indication remains blank. All indications appear in the face of the register and are duplicated in various parts of the car by the auxiliary

indicators so that every passenger becomes immediately aware of each transaction. The auxiliary indicators are plain and easily read and follow the full reading of the register. The operating rod is equipped with sets of grips at convenient intervals and the process of selecting the fare to be registered is quickly and easily accomplished.

Ground Fittings for Lightning Arresters

The Electric Service Supplies Company has recently extended its line of Garton-Daniels ground fittings to include material for both $\frac{3}{4}$ in. and 1 in. pipe, and to take the various standard sizes of wire and cable used for grounding lightning arresters, pole and station apparatus, overhead ground wires, etc.

The brass cap shown in the accompanying illustration is furnished with a lug for soldering to the ground wire from the arrester. Certain types are furnished drilled to accommodate $\frac{1}{4}$ -in. cable for grounding overhead ground wires. The pipe couplings are used for connecting two sections of ground pipe. They are particularly useful where the practice of the operating company calls for the extension of the ground pipe 8 ft. or 10 ft. up the pole, and under these conditions it is readily seen how much more convenient it is to drive first an 8-ft. length into the earth and then couple on



GROUND POINTS, COUPLING AND CAP FOR LIGHTNING ARRESTER CONNECTIONS

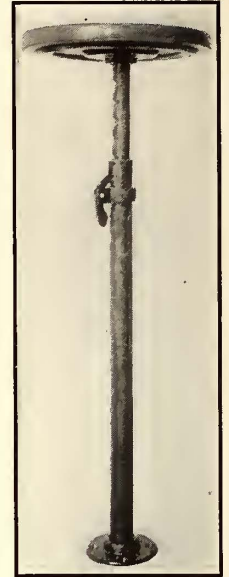
the extension, than it would be to drive a 16-ft. length. The brass couplings, as illustrated, are employed in grounding lightning arresters on electric railway systems to accommodate either the wire or the free end of a stub-end terminal bond in tying in the lightning arrester ground to the rail.

The ground pipe points are of malleable iron, heavily galvanized. The external type of ground point is generally to be preferred. It is of slightly greater diameter than the pipe and in driving opens a hole in the earth of a diameter slightly greater than the diameter of the pipe. This decreases the friction on the surface of the pipe as it is being driven, and allows the pipe to be easily driven to the proper depth without danger of bending or splitting. After driving, the earth gradually closes in tightly around the pipe, and in an hour or so a thoroughly efficient and reliable ground is secured.

Internal ground points are designed with a head suitably proportioned to fit snugly inside an iron pipe. Their external diameter is the same as that of the pipe. They may be used only in soft earths because the point, being of the same diameter as the pipe, does not open up the earth for its driving. The friction that is exerted on the outside of the pipe renders driving to the proper depth very difficult because the pipe itself will in many instances bend or open up. Where the soil is soft internal points may be used, but where there is much rock or clay in the soil external points should be used.

Quick-Acting Adjustable Seat for Motormen

The Railway Specialties Corporation, New York City, has brought out a new quick-acting adjustable seat for motormen which has been designed especially with regard to light weight, so that it can be transferred from one end of the car to the other with a minimum of effort. The adjustable feature of the seat is entirely new, and this permits raising it to any desired height merely by lifting it. The seat mast is notched, and a gravity dog is provided on the sleeve in which the mast slides, the point of the dog holding the mast in position by engagement with the notches on the mast. In order to lower the seat the gravity dog is touched, thus releasing it from the notch in which it is caught and permitting the seat to fall to its lowest position. The seat can thus be adjusted between a height of 24 in. and 31 in. from the floor. A dowel set in the side of the seat mast travels in a slot that is cut in the sleeve and prevents the seat from turning with relation to the sleeve. No other parts are involved in the construction so that its simplicity and ruggedness are obvious, the accompanying illustration showing these features to excellent advantage.



ADJUSTABLE SEAT FOR MOTORMEN

Combination Cable Insulator and Splicing Sleeve

A new type of insulator in combination with a splicing sleeve for underground cables has just been brought out by the Drew Electric & Manufacturing Company of Indianapolis. The device is especially valuable in reducing electrolysis troubles as it serves to destroy the conductivity of the cable sheath by dividing it into short sections insulated from each other. It also eliminates the danger of leakage at the splice and may be



CABLE INSULATOR PARTLY DISSEMBLED

used to excellent advantage in manholes at building entries, preventing the cable sheaths from collecting stray currents from the pipes or other cables on the same support. It may be used also to separate cables that are grouped near power-house switchboards.

The device consists of a high-grade porcelain tube, 12 in. long, with malleable castings leaded onto the ends. Each of the castings has a $\frac{3}{8}$ -in. gas-pipe plug hole in it, and on the center line are cast-brass tubes which fit the cable sheath and screw into the malleable castings. To install the device the brass end tubes are unscrewed and slipped over the ends of the cables that are to be spliced. The main body of the insulator is

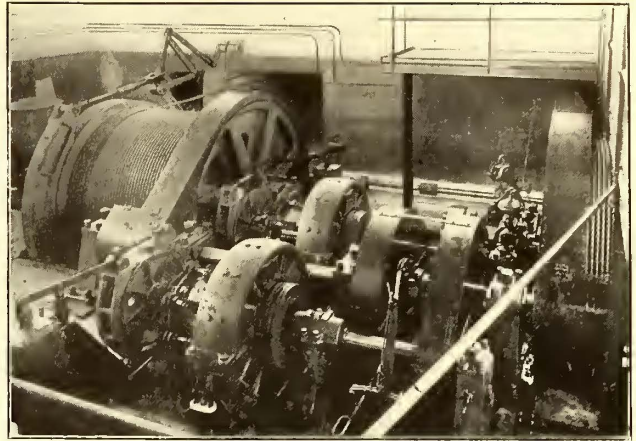
then slipped over one cable end and the splice is made in the usual manner. The insulator is then drawn over the splice, the brass end castings are screwed into place, and wipe joints are made between the ends of the brass castings and the cable sheath. The insulator is then filled with splicing compound through the gas-pipe plug holes and the plugs screwed into place, leaving the splice protected absolutely from mechanical or electrical damage. The weight of the complete device is 17 lb., and it is made to suit any size of cable.

Hamilton Electric Incline Railway

A complete electric hoist equipment has recently been installed by the Hamilton Mountain Park Company, Ltd., Hamilton, Ont., Canada, to operate its incline railway for transporting passengers, freight, automobiles, trolley cars, teams, etc., up the "Mountain," as it is called. This incline gives access to a large tract of land owned by the company at the top of the mountain and also to the fertile country beyond. The "Mountain" is really the Niagara escarpment, as the high bluffs behind Hamilton are prolongations of the heights at Queenstown, over which the Niagara River originally flowed before cutting back the gorge to the present falls, the difference in elevation between the general level of the city and the plateau back of the bluffs being 325 ft. The railway was formerly operated by a steam-hoist equipment, but this had become inadequate to handle safely and quickly the rapidly increasing traffic, and had to be replaced with electric equipment which was furnished throughout by the Canadian General Electric Company, Ltd.

ELECTRIC HOIST

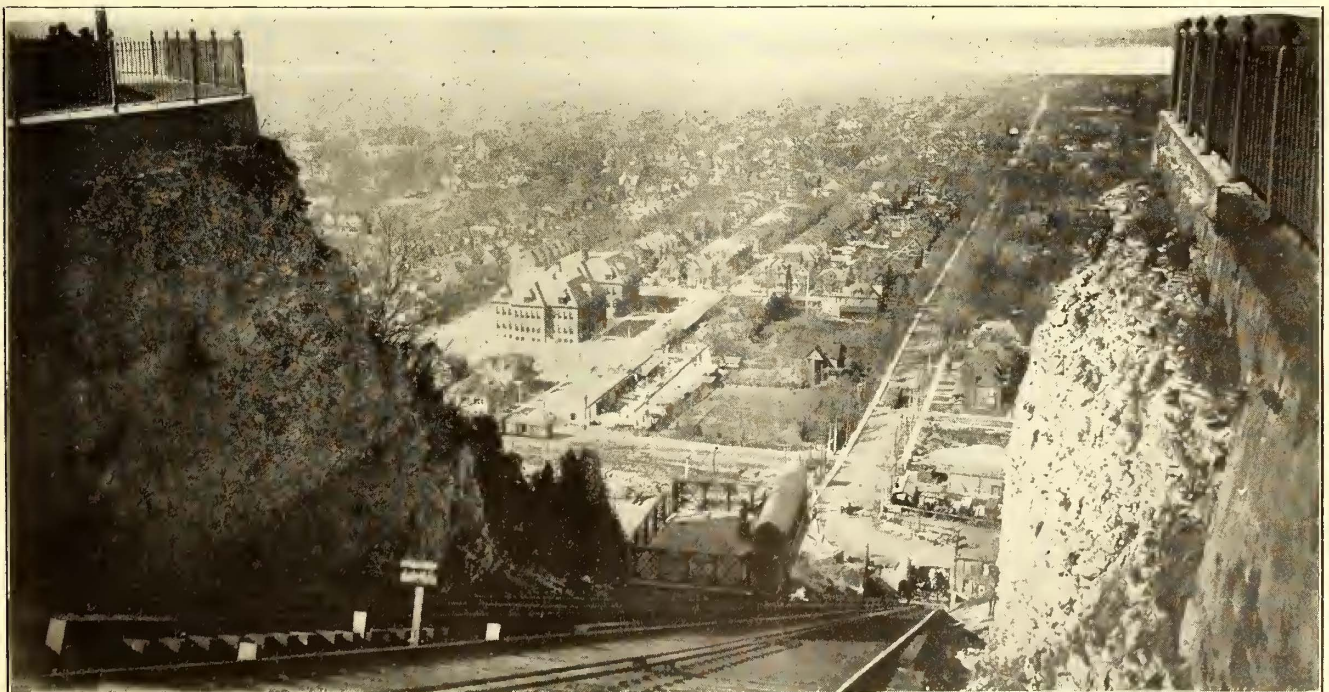
In this arrangement a special double fixed-drum, double-gear electric incline hoist, built by the Lidgerwood Manufacturing Company, New York, operates two large platform cars in balance on an incline 800 ft. long with a grade of 40 per cent. Each car weighs 30,000 lb. and runs on tracks having a gage of 12 ft. 1½ in., the distance center to center of the tracks being 20 ft. 3 in. The average load on the cars is about 20,000 lb., reaching a maximum of 30,000 lb.



HOIST MOTORS, SOLENOID BRAKES AND FLYBALL GOVERNOR

The time required for making a single trip is ninety seconds, and the rest period between trips is three minutes. Attached to each car are two ropes of 1⅝-in. diameter, one of these being used for hauling the car, and the other for the purpose of safety. The average rope speed during the run is 585 ft. per minute.

The hoist is located in a house part way up the slope and the control is placed in an operator's cabin at the level of the summit. The main rope from the right-hand car is wound over the top of the right-hand hoist drum. The main rope from the left-hand car is wound underneath the left-hand hoist drum. The safety rope from the right-hand car is led over suitable deflecting sheaves to the top of the left-hand drum, and that from the left-hand car is wound over suitable deflecting sheaves to the bottom of the right-hand drum. Each of these sheaves is 7 ft. in diameter. There are four head sheaves and four deflecting sheaves. The former are arranged vertically so as to carry the hoist ropes and safety ropes in a direct line from the cars; the deflecting sheaves are placed horizontally at such an angle that the rope will be led in a direct line either to the top or bottom of the hoist drums, as the case may be.



VIEW FROM TOP OF HAMILTON MOUNTAIN PARK ELECTRIC INCLINE

The reason for reeving the safety ropes as outlined is that in case of an accident to the left-hand side of the hoist, the safety rope on the left-hand car would take care of it properly, being wound on the right-hand drum. The same thing would apply if the other drum of the hoist should become disabled; that is, the main ropes and the safety ropes from each car lead to opposite drums. Further advantage is gained by the fact that each drum is equipped with an independent double-acting brake, and in case either of the main ropes should fail, the safety rope will hold the cars. Furthermore, the safety rope, if called upon to take the load, will be controlled by all the automatic brake features in exactly the same manner as when the load is being handled by the main ropes. In actual operation the length of the safety ropes is slightly more than that of the main hoist ropes, thereby relieving the safety ropes of any hoist stresses other than those required to keep the ropes themselves in motion.

OPERATION AND SAFETY APPLIANCES

The operator's cabin is fitted with an electric controller and two hand-brake levers. The levers will not be used ordinarily, as the hoist is equipped with solenoid brakes operating on the motor shaft. The hand brakes, therefore, need be used only for locking the cars at the top and bottom positions or for cases of emergency. In starting a run the operator releases the drum-post brakes by the hand levers, puts his foot on a small foot pedal located at the bottom of the master controller, and then, by moving the handle of the controller either to the right or to the left, as the case may be, will start the cars, automatic acceleration to the normal rope speed being provided. At a predetermined point on the incline the controller will be automatically turned to such a position that the speed will be cut down to one-tenth of the normal and finally be turned to the off position, thus setting the solenoid brakes and bringing the cars to rest. Should the operator become disabled during a run, he will of necessity remove his foot from the foot pedal, thereby cutting off the current and bringing the cars to rest.

In case the cars should stop short of their landing positions, due to the automatic overwinding mechanism, there are available two or three points on the controller so that the operator can bring them to their proper positions. Should the cars fail to stop, due to the fault of the controller, an overwinding device is attached which will shut off the current and set the solenoid brakes. Should the speed of the cars exceed the normal by a predetermined amount, an overspeeding device is so arranged that it will trip a weight of 570 lb., which will set the drum-post brakes. This overspeeding device, or governor, is of the flyball type, and it will be caused to operate by an excessive speed, whether due to the motor or a breakage of the hoist parts. The emergency weight may also be tripped manually from the cabin.

Power is supplied in the form of three-phase, twenty-five-cycle alternating current, and for changing this into direct current there has been installed a motor-generator set of sufficient capacity to supply the average demand of the hoist, plus some surplus for charging a large storage battery. The direct-current end of the machine is rated at 165 amp. continuously at 550 volts, the latter being the floating voltage of the battery, and it is designed with a special drooping characteristic by means of a reversed series field for the purpose of throwing load fluctuations on the battery. A small percentage of the load fluctuations falling on the machine will lower its voltage to such an extent that the battery must discharge and furnish the balance of the momen-

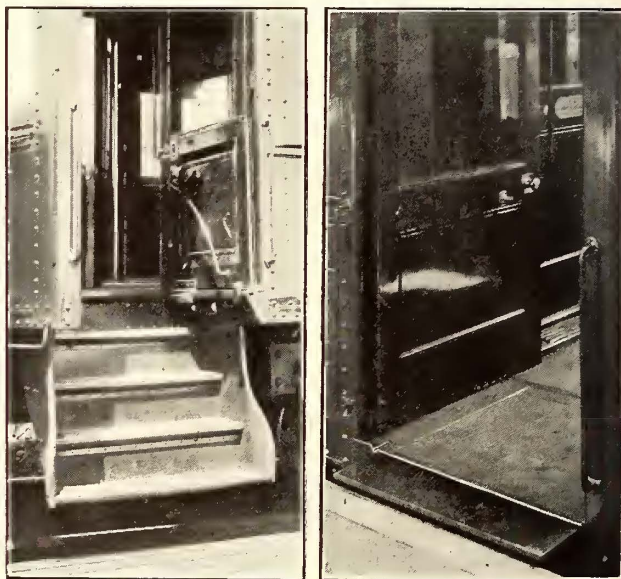
tary demand. The regulation is, therefore, inherent in the design of the machine, and is entirely automatic. The hoist is driven through two gear reductions by a General Electric 180-hp. motor which is specifically designed to stand such voltage variations as come from a storage battery when it is frequently charging and discharging. A reserve 180-hp. motor and solenoid brake are provided.

STORAGE BATTERY

The storage battery was built by the Electric Storage Battery Company of Philadelphia. Its capacity is 200 amp. for one hour on a continuous discharge, and the makers estimate that it will operate the hoist under the average load conditions for nearly two hours with the power supply entirely cut off. Under normal conditions, with the motor-generator supplying the average load, the battery does not become exhausted, but receives back sufficient charge during the period of rest between trips to make up for the discharge while the hoist is in operation.

Extensible Trapdoor for Passenger Cars

The Pennsylvania Railroad Company has built at New York Terminal, Manhattan Transfer, Rahway and North Philadelphia high station platforms, and has under construction at the present time similar platforms at Wilkinsburg and Johnstown, on its Pittsburgh Division, this being in line with the policy of obtaining the best of railroad features. The advantages of the high platform are, of course, obvious, but a difficulty has arisen in connection with it where the station is located on a curve, because a gap then exists between the



VESTIBULE TRAPDOOR IN RAISED AND EXTENDED POSITIONS

ends of cars and the platform edge. In consequence, the company has equipped for trial a steel vestibule car with an extensible trapdoor as shown in the accompanying illustrations which is designed to bridge this gap. The design is patented by Ellwood H. Sickels of Narberth, Pa.

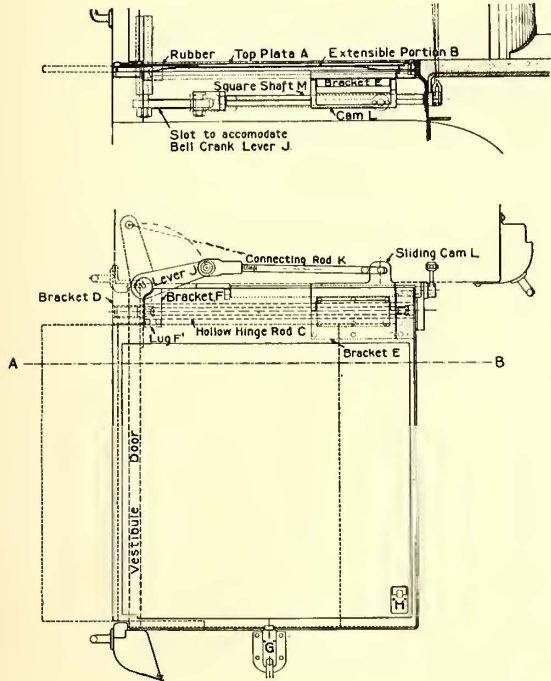
In operation when the trap is down, the opening of the vestibule door causes the sliding portion to extend, and the closing of the vestibule door retracts it. This arrangement is ideal in view of the fact that the extension of the trap is required simultaneously with the opening of the door, and, as the vestibule door is re-

quired to be closed when the train leaves the station, the trap is necessarily returned at the same time. Furthermore, the physical effort required to open the vestibule door is utilized to extend the trap.

There are, however, certain times when the trap should not extend when vestibule door is opened, as in the case when trap is to be raised so that the steps can be used or when the brakeman opens the door while the train is moving. To provide for this necessary feature, an ingenious, but still quite simple, arrangement is provided by which the connections can be thrown out of gear through the operation of a small handle set flush in the side of the vestibule at a convenient height. It is

The operating device consists of the bell crank lever *J*, which is attached to the vestibule door, the connecting rod *K* and cam *L*, which slides on the square shaft *M*. When the shaft *M* is tilted to place the sliding cam *L* in "off" position, the opening of the vestibule door causes the cam merely to slide on the shaft without any effect on the extensible portion of the trap. The shaft *M* is tilted by means of a small knob on the end of a vertical rod which is attached to a lever arm on the end of the square shaft, the knob being located in a recess at a convenient height in the vestibule wall. When the square shaft is thus tilted the sliding cam comes up in back of bracket *E*, on the trap, so that when the door is opened the sliding part of the trap is extended. The sliding cam is designed so that whether in "on" or "off" position, the front finger of the cam is always in position to hold the extensible part of the trap, so that it is absolutely impossible for the trap to be out with the door closed. Also, the trap is arranged so that it cannot be raised when extended, thereby preventing the obstruction of the handrail at the side of the car.

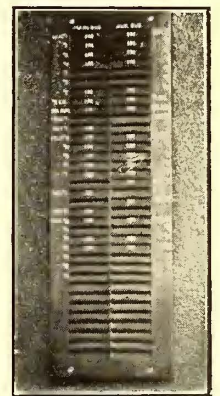
The trap is designed with a uniform extension to take care of the gap at platforms built on as sharp a curve as 6 deg. On lighter curves the extension may overlap the platform an inch or two, the station platform, of course, being kept at the height of a small step below the floor of the car.



PLAN AND SECTION OF EXTENSIBLE TRAP DOOR

Indicator Board for Disconnecting Switches

At the Manchester Street generating station of the Rhode Island Company, in Providence, R. I., a convenient indicator board is utilized to show incoming operators the positions of disconnecting switches between the various generators, rotaries, transformer units, etc., and the main and auxiliary buses. The board consists of a panel about 3 ft. long and 10 in. wide, carrying about thirty-six wooden strips indicating whether a particular knife switch is in or out of circuit. The strips can be slid in and out with ease, and whenever a disconnecter is opened or closed, a notation is made to correspond on the board. In this way any operator coming on duty knows at a glance just what switches are open or closed, and does not have to rely upon another's memory or upon loose paper memoranda. The remote-controlled oil switches in the station are equipped with the usual pilot lights, but when disconnectors of the knife type are opened or closed no electrical indication is feasible, and the maintenance of such a bulletin board is a decided convenience. In this station all the disconnecting knife switches are equipped with locking devices which prevent their being blown open by magnetic reactions in case of a short-circuit or severe overload on any given feeder. The switches are mounted in concrete cells provided with wired-glass covers, so that inspection is greatly facilitated.



INDICATOR BOARD

not necessary to provide extra trainmen to attend to the operation of the trap, because when the small hand lever is set in proper position (which is done by the brakeman before the train reaches the station) the opening of the vestibule door, whether accomplished by trainman or passenger, will cause the trap to be extended. Owing to the fact that the top plate does not slide, it is, of course, impossible for passengers to be thrown by the movement of the extension. Furthermore, it is impossible for passengers to stand on the trap while the door is being opened.

The trap is, in outward appearance, like the ordinary trap, and consists of a rubber-covered top plate and the extensible portion which is built in the familiar paneled pattern, and acts as a support for the top plate. The two parts are hinged on a hinge rod so that they act together when trap is raised for the use of the steps. The hinge rod is hollow and accommodates the flat springs which are adjusted at the usual bracket, to obtain the proper tension to raise the trap. The extensible portion of trap is supported by means of a bracket (marked *E* on the line cut) which slides on hinge rod, and also by means of lug *F'*, attached to top-plate bracket *F*. When the trap is extended, owing to the fact that it is supported at one side on lug *F'*, and at the opposite side on the usual angle-iron ledge, the extended portion cannot deflect when passenger steps on it. The usual spring catches, marked *G* and *H*, are used respectively to hold trap down when door is closed and to hold it up against vestibule door when trap is raised for use of steps.

The Interborough Rapid Transit Company proposes to install at the Fourteenth Street subway station platform for southbound express trains five additional space-filling devices, similar to the one already in service. The device is a movable platform edge which automatically fills the gap between the trains and the curved platform, and has been described and illustrated in the ELECTRIC RAILWAY JOURNAL.

News of Electric Railways

CHICAGO ARBITRATION AWARD

Summary of Award to the Surface Men Made by the Arbitrators on July 16

Mayor Thompson and State's Attorney Hoyne informally announced the arbitration award to the men on the Chicago Surface Lines on July 16, granting an increase in the minimum wage from 23 to 25 cents for the first year of the contract and 26 cents for the second year. The maximum wage is increased from 32 cents in the sixth year to 35 cents in the fourth year. This scale is to be increased to a 36-cent maximum in the second year of the contract. The award to men outside of the train service is not announced. The railway reiterates its intention to abide by the decision of the arbitrators. Mr. Sheehan, representing the company on the board, will submit a minority report. The Chicago Elevated Railways not being bound to accept the award intends to conduct another arbitration.

Final arguments by both sides were made on July 9. To preserve the principle of arbitration both the railway companies and the men agreed to shorten the period required to submit evidence and the arbitrators agreed to render their decision promptly.

Dissatisfied with the manner in which the men presented their case, all the witnesses having been officials or committeemen of the union, the Mayor requested the railways to furnish him with the names and addresses of all employees. In round figures this list included 10,000 names and addresses, and from these the Mayor invited 360 to call at his office and discuss the need of increased wages and better working conditions.

On July 7 Mr. Weatherwax was cross-examined regarding the various positions he had held with the company. Mr. Weatherwax stated that he began service as a boy at day wages, and now received \$10,000 a year as superintendent of transportation. He was also questioned regarding the wages of receivers at the car stations, and an effort was made to show that those who were taken into the union received more than those who were outside. In the dispatching system practically all switchboard operators were old trainmen. The question of vacations to clerical help and not to trainmen was also raised.

Several division superintendents' testimony was to the effect that working conditions had greatly improved and that five minutes was sufficient time for the conductors to turn in.

Thomas Blakely, superintendent of supply cars, explained the duties of the motormen working for him. He said that they rarely assisted in loading or unloading a car; they ran slowly, and were not required to stop as often as passenger cars, therefore could hold their place on a line without speeding. These motormen also had regular hours and were not required to wear uniforms. They were not on the street during rush hours, and were seldom asked to run their cars into the downtown district.

Edward W. Anger, general carhouse foreman, explained the duties of the various grades of repairmen. He stated that no particular skill was required in making running repairs. All heavy repairs were made at the shops. Most of the carhouse repairmen were ordinary laborers without previous training. Temporary promotion created bad feeling when the men were returned to their former positions. He said that to give up the right to use judgment in the promotion of men would interfere with good results. Promotion based on efficiency did not open the door to favoritism. Regarding the three grades of pay that carhouse repairmen receive, Mr. Anger stated that the men acquired skill with experience, and should be paid for it.

President Busby again took the stand on the evening of July 7, to introduce and explain a number of exhibits. These included tabulations of passenger-car miles and hours, etc. Another exhibit showed the relative cost of living in Chicago as compared with other cities. In this Chicago was taken as a basis, with 100 per cent. St. Louis was given 100.13 per cent, Detroit 100.20 per cent, Cleveland 105.59 per cent, New York 117.32 per cent, Pittsburgh 117.92 per cent, Philadelphia 119.46 per cent, Bos-

ton 127.86 per cent. Mr. Busby stated that these figures were compiled from an analysis of Bulletin 156, United States Department of Labor. He also introduced an exhibit showing \$45,713 a year as the cost of additional time under the new agreement for fall-backs and dinner reliefs. If five minutes additional turn-in time was given, the cost to the company would be about \$65,000 a year. Concerning the 37,143 accidents referred to earlier in the hearings, Mr. Busby stated that these included only 8400 liability cases, 600 of which went to suit. He also accounted for the fatal injuries to twenty-two employees mentioned in Mr. Mahon's testimony. He said that an examination of the records showed that some of these men were not on duty, others were injured through their own carelessness, and the remainder through negligence of fellow employees. He also introduced an exhibit to show that the number of accidents attributable to trainmen according to years of service was on a constant decline.

Mr. Busby next offered testimony regarding the finances of the company. He said that brokerage profits of all companies in eight years past were \$3,679,000, whereas the discounts were \$4,839,000, an excess of \$1,160,000. The 10 per cent construction totaled \$7,358,000, and after deducting the excess, a net of \$6,198,000 was left. He explained that 6 per cent of this amount went to the railways company and was applied against excessive indebtedness over purchase price and 40 per cent to the City Railway for disbursement as profits. He also stated that the average return to the companies on the purchase price of all roads for the past seven years was 6.52 per cent. Mr. Busby quoted from the daily reports of receipts since Feb. 1, 1915, and showed that the income so far this year was about \$460,000 behind a like period in 1913.

In recross-examination of Mr. Busby, the preparations made for resuming service in the recent strike were outlined. Mr. Busby said that thousands of experienced men were ready to go to work, and that 25,000 such men had been offered to him within forty-eight hours after the strike was declared. He said that he had arranged for a sufficient number to resume operation and was ready to board and lodge them. He did not care to state what he expected to pay them.

At a short morning session on July 8, the representatives of the employees announced that they would not put any rebuttal witnesses on the stand, but had arranged to argue their case at once. After a short session the hearings adjourned until July 9, when final arguments by Counsel Miller for the companies, and Counsels LeBosky and Alschuler for the employees were presented. Immediately following these the arbiters began to review the evidence.

SEATTLE-RENTON PURCHASE BY CITY ABANDONED

The City Council of Seattle, Wash., has decided to abandon plans to take over the Seattle, Renton & Southern Railway by condemnation proceedings within city limits, and to repeal an ordinance passed in October, 1911, providing for the prosecution of the condemnation suit. The condemnation case is now in the United States Supreme Court, and Assistant Corporation Counsel Ralph S. Pierce will move its dismissal. Both the Superior Court and State Supreme Court held that the city of Seattle had the right to condemn the railway, but an appeal was taken by Scott Calhoun and Joseph Parkin, receivers of the company. It is proposed now to turn attention to the improvement of Rainier Avenue in order to dispose of all other litigation prior to the calling to trial in the United States District Court of the suit of the Seattle, Renton & Southern Railway and its receivers against the city, seeking an order from the court to restrain the city from changing or in any way interfering with the present grades of Rainier Avenue. In an opinion handed down some time ago the Federal Court ruled that the Seattle, Renton & Southern Railway had a legal right to its franchise, which the Council holds has been revoked. Councilman Dale, who has been active in carrying on negotiations for the acquisition of the line by the city, said recently: "I believe that since the voters have authorized a bond issue to purchase, parallel or condemn

a railway in Rainier Valley, the Council should keep faith with the voters and carry out the intent of the proposition authorizing the issuance of bonds."

The Council recently defeated a bill to purchase the railway on the terms offered by the receivers.

CLEVELAND TERMINAL AND SUBURBAN FRANCHISES GRANTED

The City Council at Cleveland, Ohio, took favorable action on the evening of July 12 on the franchises asked by the Cleveland, Akron & Canton Terminal Railroad and the Cleveland & Youngstown Railroad.

Under the franchise of the Cleveland, Akron & Canton Terminal Railroad the company is empowered to build an electrically operated, four-track subway under East Fifty-fifth Street from the lake to the southern city limits. The company is headed by Ohio C. Barber, Barberton, Ohio, well known throughout the country as the match king. The vote was twenty to five. As has been stated before, the franchise covers a period of seventy-five years. The minority members demanded a statement as to what interests were back of this proposition and demanded a bond guaranteeing that work would be begun on it within two years. Mr. Barber insisted, however, that his plans were all for the benefit of the city and if the people did not want the improvement he would abandon it before he would be tied down with conditions and requirements which he considered useless. Mayor Newton D. Baker supported Mr. Barber.

Under the franchise of the Cleveland & Youngstown Railroad, passed by a vote of nineteen to six, the company is empowered to establish a freight terminal near Broadway, S. E., about forty streets being vacated for the purpose. An amendment requiring that the terminal be operated by electricity was defeated, as were twelve other amendments proposed by the opponents of the measure. Councilman Bernstein insisted that action on the franchise be delayed until an agreement had been secured from the other railroads that they would build a new union station on the lake front. He also alleged that the New York Central Railroad was behind the company, although the attorneys for the New York Central had stated at the committee meetings that this was not so. The company was organized to build a rapid transit road for the entrance of both steam and electric railways to a point near the retail business district and to furnish service to a district on the hills southeast of Cleveland which is rapidly developing as a high-class residence section.

KANSAS CITY-CLAY COUNTY \$1,500,000 VERDICT TO BE APPEALED

By gradual elimination the suits against the Kansas City, Clay County & St. Joseph Railway, operating between Kansas City and St. Joseph, Mo., and between Kansas City and Excelsior Springs, Mo., have been narrowed to one, that brought by the Interstate Railway for \$2,000,000, in which a verdict for the plaintiff for \$1,500,000 was awarded in the Jackson County Circuit Court on July 1, as noted in the *ELECTRIC RAILWAY JOURNAL* of July 10, page 78. Motion for a new trial in this case will be heard on Aug. 2. If the motion is denied, an appeal will be taken.

In the district north of Kansas City many different sets of options for the construction of interurban railways were secured at different times during the last twelve years. Most of the options were allowed to die, or were automatically extinguished by the failure of the companies to do the work required by law to the extent of 10 per cent of the capital stock in two years and completion of the road in ten years. It is alleged that only the Kansas City, Clay County & St. Joseph Railway had ever paid for rights-of-way, so that the present operating interurban is said by its owners to have the only effective rights to any options on its right-of-way.

Among projected interurbans in the district was the Kansas City-St. Joseph Electric Railway. This company secured options between St. Joseph and Kansas City, Mo., and did a small amount of work on the right-of-way above Dearborn. The line was to extend southward from St. Joseph to Kansas City. Another projected line was north-

bound from Kansas City to the north Missouri line, and some work was done on that right-of-way by the Interstate company. One of the earlier suits involving the right-of-way was brought by the Interstate company four years ago against the Missouri River & Camden Railway. This suit was dismissed without coming to trial. After the Kansas City, Clay County & St. Joseph Railway had begun operating, suit for \$200,000 damages was brought against it by the Kansas City-St. Joseph Electric Railway on the charge that the defendant had taken possession and was using land on which it had active options. This suit involved the right-of-way southward from St. Joseph about half-way to Kansas City. Later the Interstate company brought suit for \$2,000,000, making the same charge, this suit involving the right-of-way northward from Kansas City about half-way to St. Joseph. The Interstate case came to trial first. After the trial had begun, the suit of the Kansas City-St. Joseph Electric Railway was dismissed, and evidence was introduced in the Interstate case to show that the Kansas City-St. Joseph line had sold its rights to the Interstate company. This situation put the Interstate company in the position of having a presumptive series of options on the entire right-of-way of the Kansas City, Clay County & St. Joseph Railway between Kansas City and St. Joseph.

Ernest D. Martin, one of the plaintiffs and a promoter of the Interstate company, testified that he had renewed many of the original options with the consent of the property owners, while many of the property owners testified that they had never given their consent to such renewal.

The verdict for the flat sum of \$1,500,000 was signed by nine jurors. Two jurors favored a smaller sum, and one held out for a verdict for the defendant.

Receivers have been appointed for the Kansas City, Clay County & St. Joseph Railway, as referred to elsewhere in this issue.

EMPLOYEES RAP ARBITRATION

Men Say Pleas of Company Impoverishment and Law of Supply and Demand Make Arbitration a Farce

At a meeting on July 7 of the joint conference board representing the sixteen divisions and 4200 employees of the Bay State Street Railway, Boston, Mass., it was decided that in future no arbitration proceedings would be agreed to by the men unless it was stipulated in advance that the factors of the company's financial condition and the "law of supply and demand" would be eliminated from all consideration in the proceedings. The following is the text of the resolution adopted:

"In the future no arbitration shall be held unless it is a fair arbitration. The Bay State Street Railway enjoys its franchise and the right to make money from the public, and except for the public it would not exist. The company is constantly reminding us of what we ourselves well know about the interest of the public in the operation of its cars. We realize that a failure to arbitrate and a strike might result in great inconvenience to hundreds of thousands of people, and a strike is not lightly undertaken. There never has been a strike on this system.

"The public should be reminded, however, that the company takes advantage of our recognition of the public interest by using against us in arbitration the law of supply and demand, and its financial condition. By agreeing to arbitrate we lose the only weapon we have to meet both these arguments, and unless they are both eliminated in the future we think arbitration, so far as we are concerned, will be a farce.

"After many years of hard work and the presentation of our claims concerning both these factors, many boards of arbitration have recognized the force of the argument that the law of supply and demand could only be invoked against us if we were given a fair chance to try it out, and as Chairman Storrow of the Boston Elevated Railway board of arbitration said, the only way in which it could be really tested would be to have a strike and see whether or not the company could at once secure the necessary number of competent men to prepare and operate its cars.

"If a street railway or other public service corporation was in the hands of a receiver because of its inability to pay interest on its bonds and people still wanted to ride,

no one would say that the wages of the men should be inadequate because of the financial condition of the company. We again call the attention of the public to the award of Chairman Storrow of the Elevated board of arbitration concerning finances, in which he agreed that the contention of the men should prevail and that the financial condition of the company should not be taken into account in fixing wages. The expense of a thorough financial investigation and the disadvantage at which we are placed in making such an inquiry are altogether too great to warrant us in again including it as a subject matter of consideration by a future board of arbitration."

ALBANY DIFFERENCES STILL UNSETTLED

On July 15 the question of jurisdiction between the unions on the lines of the Hudson Valley Railway and the United Traction Company, Albany, N. Y., remained unsettled. C. F. Hewitt, general manager United Traction Company, still insists that the conferences be open and that the newspaper men be permitted to attend them. He says that W. D. Mahon, president of the Amalgamated Association, who arrived in Albany on July 14, assured him at a conference in Detroit in May, at which Warren S. Stone, representing the steam brotherhood, was present, that the dispute between the Amalgamated and the Brotherhood as to who would operate the lines would be held in abeyance until the September convention of the Amalgamated association.

The men issued a statement in which they said their committees were explaining the situation to Mr. Mahon. They said that there are involved the working agreements of four divisions on the properties of the Hudson Valley Railway and the United Traction Company and grievances and complaints affecting the New York State Railways. President Horace E. Andrews of the New York State Railways is said to have expressed his willingness to take up at once the complaints affecting that company.

REFUSAL TO REOPEN BOSTON ARBITRATION

Classification Under Boston Elevated Award Must Stand Until May 1, 1916

James J. Storrow and his associates on the board of arbitration that settled the wage dispute between the Boston Elevated Railway and its union employees in 1913, have refused, in a decision handed down on July 8, to reopen questions in the original award over which a misunderstanding has come between the road and its men. The board was appealed to last December to interpret its rulings on classifications in the "L" shops. A difference of opinion had arisen as to whether or not men in a lower-paid class are entitled to the same rate of pay of a higher-paid class if they are doing the same character of work as men in the higher-paid class. In its conclusion the board, consisting of James J. Storrow, James L. Richards, representing the company, and James H. Vahey, representing the men, said:

"Whether the company intends to hold a deserving man back or not, this system, in our judgment, has this effect. We think that no large corporation can be gifted with the stock of wisdom needed to administer with justice such a highly complex system. There should be a reasonable number of gradations, but we find in general that the present number is excessive. We have therefore sought in fixing the new scale of wages substantially to reduce these classifications, as appears in the schedules which have been annexed.

"For example, we have reduced the classification of blacksmiths from twelve to six. But this has an important effect upon wages. The only way these excessive classifications can be reduced is to give some men more increase than others so as to level up the differences. If we gave every blacksmith 6 per cent increase in pay, there would still be the same twelve classes of blacksmiths.'

"If the union is now free to raise this question again by a further examination of the character of the work being performed by the men under the present classification, it can only be for the purpose, at least in effect, of further reducing the number of these classes, or at least accomplishing a substantial portion of this result by taking a

substantial proportion of the men out of one class and putting them into a higher class than that determined for them by the board of arbitration.

"Our conclusion is that this whole question of classification was raised in the arbitration proceedings and definitely determined in the award resulting from these proceedings, and that the question cannot properly or fairly be reopened before the expiration of the period for which the original award was made effective, namely, not prior to May 1, 1916."

Mr. Vahey, who concurred with the decision of his colleagues, issued a statement setting forth his exact position in the controversy and lauded Mr. Storrow, asserting that the chairman was in no way to blame for the conditions which exist.

PROGRESS WITH TOLEDO TENTATIVE FRANCHISE

At a meeting of the franchise committee of the City Council of Toledo, Ohio, on July 9, Henry L. Doherty, chairman of the board of directors of the Toledo Railways & Light Company, expressed the belief that a clause should be inserted in the tentative draft of the franchise now in preparation that will allow the company to name its own rate of fare pending the fixing of a permanent rate at the end of the proposed try-out period, if the earnings should fall below 4 per cent. Councilman Dotson suggested that if a rate is not agreed upon within ninety days from the close of the period the matter should be submitted to a board of arbitrators or the courts. Mr. Doherty said that if the city insisted upon control of the operating rate, it should be responsible for any possible losses as the result of the establishment of a rate too low. The present draft provides that when the return on the investment falls to 4 per cent there is to be a readjustment of fares under the terms of the agreement.

The probable rerouting of cars and abandonment of any lines found to be unprofitable were also discussed at this conference. In regard to appraising the property, Mr. Doherty said that if three impartial men were selected an agreement could be reached with them without submitting the matter to a board of arbitration. The property should be valued as it now stands, with any betterments which are made added to this.

Mr. Doherty submitted an amendment to the clause relating to the municipal bond ordinance initiated and passed last August. Mr. Dotson insisted that nothing be placed in the draft to indicate that it supersedes the municipal ordinance. He also argued that all franchise values should be excluded from consideration in making an appraisal of the property.

Mr. Doherty objected to the transfer provisions of the draft, especially the portion relating to transfers on transfers. He said that he believed the people of Toledo wanted good service and good cars rather than low fare. The idea, then, would be to simplify the system so far as possible.

Frank R. Coates, president of the Toledo Railways & Light Company, and Rathbun Fuller, attorney for the company, were present at the conference, but there were few people in the lobby.

At a conference on the afternoon of July 14 between Henry M. Doherty and Messrs. Redd and Dotson of the special franchise committee of the Council, Mr. Doherty announced that if the committee insisted upon the company purchasing 20 per cent of the municipal railway bonds, in case the city should at any time conclude to purchase the property, there would be no need of negotiating further. Only a cash transaction can be considered. He also informed the members that the company was entitled to a full attendance of the members of the committee when the proposed franchise is discussed.

The provision of the franchise relating to the bonds is that they shall be taken at par and accrued interest. It is said by some that a better price should be secured for the bonds.

A tentative agreement was reached to the effect that the section of the draft which provided that "the city of Toledo by adopting this ordinance shall not waive any of its rights which it may have by virtue of the ordinance adopted on Aug. 4, 1914," be eliminated. This is the municipal ownership bond ordinance.

DIRECTORS APPROVE DETROIT SALE

At a meeting of the directors of the Detroit United Railway, Wednesday, July 14, the proposed purchase agreement covering the company's property within the one-fare zone was approved. This agreement provides that the city, if authorized by a 60 per cent vote of the electorate, shall assume operation of the city lines, the price to be fixed by the Circuit Court of Wayne County. The directors decided to submit the new proposition to the stockholders, and an adjourned meeting of the latter has been called for Aug. 2.

On July 14 J. C. Hutchins, president of the Detroit United Railway, sent a letter to the stockholders reviewing the purchase proposals. This he concluded as follows:

"After several weeks of negotiation, the following plan was approved, viz.:

"The city personally to assume the payment of outstanding mortgages up to the claimed limit of its power under the constitution and laws of the State of Michigan, viz.: 2 per cent of the assessed value of the taxable property within the city, which would amount to approximately \$11,000,000, and the balance, up to the limit of the price that would be fixed by the Circuit Court, by the creation of a sinking fund out of the earnings of the property to be taken over by the city, and so arranged that with the amount personally assumed by the city, the mortgage indebtedness referred to, up to the limit of the price fixed by the court, shall be paid in 1932, when the company's consolidated mortgage indebtedness matures, and any excess in price above the amount of outstanding mortgage indebtedness is to be secured in the same way and be payable at the same time.

"The proposed contract, modified as to the method of fixing the price to be paid for the property and the method of securing the payment of this price, you will recognize is materially different from the proposal originally made and upon which many of the stockholders sent their proxies, and while these proxies by their terms are unlimited and would authorize their use in voting upon the final proposition now to be acted upon, the holders are unwilling to use such proxies until all the stockholders, and especially those who gave such proxies, are advised as to the contract that is to be finally acted upon.

"The proposed modified contract has been fully considered in all its aspects by our board of directors in connection with existing conditions, and it has approved of such contract and unhesitatingly recommends to the stockholders the approval of the same.

"An adjourned meeting of the stockholders will be held at the company's office in Detroit on Aug. 2, at 3.30 p. m. for the purpose of considering such modified contract, and unless in the meantime advised to the contrary by the stockholders who gave the proxies referred to, the holders will feel, after this notice, warranted in voting the stock covered by such proxies in approving such modified contract and authorizing the board of directors and officers of the company to take such further steps in the direction of having the same carried into effect as may be necessary or proper.

"The contract cannot become binding on the city until approved by 60 per cent of the voters of the city voting upon the proposition at an election to be called for that purpose."

STRIKE DECLARED IN RHODE ISLAND

A strike of the union employees at the Rhode Island Company, Providence, R. I., was declared at midnight on July 14. Questions at issue between the company and its men had been the subject of negotiations for some time past, and all of the requests of the men had either been waived, settled or agreed upon except the question of wages. This the committee representing the union had agreed to submit to arbitration. The break came over the arbitrary stand taken by the representatives of the men with respect to the method of choosing arbitrators to consider this question.

Some time ago the company suggested to the men that the old schedule of wages be restored. The committee representing the union suggested that the old agreement, which expired on June 1, 1915, be continued for a period of two years with an additional clause providing that the company should discharge from its service or suspend employees who were members of the association until all sums due to the association had been paid. This was agreed to by both

sides, with the understanding that the wage question should be decided by arbitration.

The men in the service of the Rhode Island Company now receive 28½ cents an hour after three years' service. They asked for 35 cents an hour as a maximum scale. The wage for the first six months is 23 cents an hour. The men asked 30 cents for the first six months. They also desired to eliminate the present system of graded rates. They maintained that a man is efficient after the first year's service and that he should receive the maximum wage at the end of the first year.

Curtailed service was established by the company on all the main city lines on July 15, but it was announced that the service would be suspended after 7 o'clock. A few minor disturbances were reported on the first day. More than 2400 men are said to be affected by the strike order, which also extends to the employees of the power houses.

Completion of Electrification Celebrated.—The first electric train over the London & Port Stanley Railway, London, Ont., which has just been electrified, started from St. Thomas at 6.30 p. m. on June 30 to Port Stanley, carrying a number of guests from London and St. Thomas, invited by Sir Adam Beck to celebrate the opening of the road.

Northern White Cedar Association Outing.—On June 25 the Northern White Cedar Association began its annual mid-summer outing, the members departing in a special car via the Northern Pacific Railway from Minneapolis, Minn., for Beaudette, Minn. From Beaudette the party was conveyed by a fleet of six launches to a camp on Sabaskong Bay, Lake of the Woods, approximately 60 miles north. The party remained there for four days, making a number of exploration and inspection trips to points of interest.

No Decision in Old Dominion Case.—The judgment in favor of the Westinghouse Electric & Manufacturing Company against the Washington & Old Dominion Railway obtained in the Circuit Court of Loudon County, Va., was not set aside by the Supreme Court of Virginia as stated in the issue of the ELECTRIC RAILWAY JOURNAL of June 19. The action taken was simply the routine procedure of issuing a writ of error to review the decision of the lower court. The case was appealed by the railway company and will be heard by the Supreme Court of Appeals next fall.

New York Compensation Law Constitutional.—On July 13 the Court of Appeals of New York upheld the constitutionality of the workmen's compensation law on three questions raised in suits brought to make the test. Judge Nathan Miller wrote the opinion in the cases of Marie Jensen against the Southern Pacific Company, a Kentucky corporation, and of William Alfred Walker against the Clyde Steamship Company. In the Jensen case, which was for causing death, it was asserted by the company that the statute was not intended to apply to employment in interstate or foreign commerce. The awards were affirmed.

Fifty-Mile Canadian Line to Be Electrified.—Martin N. Todd, general manager of the Lake Erie & Northern Railway, Brantford, Ont., and president of the Galt, Preston & Hespeler Railway, has confirmed the report that the Lake Erie & Northern Railway is to be electrified for the whole fifty-two miles from Galt to Port Dover. Mr. Todd expects cars to be running on the Galt-Brantford line by October, and to Port Dover by November. It is likely that Hydroelectric power will be used with substations at Galt, Brantford and Simcoe. It is stated that the two lines will shortly be amalgamated, with through electric railway service ultimately from Berlin to Port Dover.

Bids for Rails, Ties, Ballast, and Track Accessories Wanted.—Bids for about 35,000 tons of open-hearth rails were opened on July 16 by the Public Service Commission for the First District of New York, and between that date and Aug. 4 bids will be received for about 3000 tons of rolled manganese rails, more than 1,000,000 tie plates, about 356,000 cu. yd. of broken stone ballast, and about 30,000,000 ft. of ties and timber. This material will be sufficient to equip about 230 miles of single track. The city-owned lines in the dual system cover about 260 miles of single track, but the track materials for about 30 miles in the Fourth Avenue subway in Brooklyn and the Centre Street loop subway in Manhattan have been purchased.

Financial and Corporate

ANNUAL REPORT

Tennessee Railway, Power & Light Company

The combined statement of operations of the Tennessee Railway, Power & Light Company, Memphis, Tenn., for the calendar year 1914 (all power sales to distributing and railway companies controlled and other inter-company transactions being eliminated), is as follows:

Gross earnings	\$3,762,387
Operating expenses and rentals.....	1,959,183
Net earnings	\$1,803,204
Taxes	311,806
Net earnings after taxes.....	\$1,491,398
Interest, etc.	1,094,420
Net income	\$396,978
Dividends paid on stocks of constituent companies not owned	109,048
Balance	*\$287,929

*Of this balance \$1,628 accrues to stock of constituent companies not owned.

The constituent companies had accumulated earnings from May 1, 1912, to Jan. 1, 1914, of \$210,610, which, added to the above balance for 1914, showed a total of \$498,539 from which dividends on the preferred stock of the Tennessee Railway, Light & Power Company were paid on March 1 and June 1, 1914, amounting to \$306,336, leaving a balance of \$192,203. The two principal causes for the unsatisfactory showing for the year 1914 were first, the depression in business which particularly affected industrial centers like Nashville and Chattanooga and resulted in economy in the use of electric light and power and street railway service. The European war increased this depression and its bad effect on financial and industrial conditions prevented the closing of several large power contracts. Second, the worst drought experienced in Tennessee since 1904 (the previous low record year), reduced the amount of hydro-electric power available for sale and forced the company to operate its steam plants to a much larger extent than ordinarily necessary, thereby greatly increasing operating expenses. This drought was broken in December. The prospects for 1915 indicate an improvement in every way. The large construction work has been completed, and very little will be required for capital expenditures during the year.

The 1914 operating figures for the controlled Nashville Railway & Light Company and the Chattanooga Railway & Light Company are shown below:

	Nashville Railway & Light Co.	Chattanooga Railway & Light Co.
Gross earnings	\$2,240,307	\$1,085,096
Operating expenses	1,159,523	616,966
Net earnings	\$1,080,784	\$468,130
Taxes	194,209	82,757
Net earnings after taxes.....	\$886,575	\$385,373
Interest	499,670	339,408
Surplus	\$386,905	\$45,965
Passengers carried	43,673,934	16,384,356
Kilowatt-hours sold	25,214,365	12,567,439

NO PRESENT DIVIDEND FOR THIRD AVENUE

The stockholders of the Third Avenue Railway, New York, are not to have a dividend on their shares before September at the earliest unless the directors of the company go over the heads of their special committee. The company's earnings for the year ended June 30 were made public on July 14, and at the same time it was announced that the special committee had decided to drop its inquiry into the question of whether a dividend was advisable, leaving it for a full board to take up at their meeting in the autumn, when the pamphlet report will be ready.

For the fiscal year just ended the company's gross operating revenues were \$10,885,768, an increase of \$27,552. The operating expenses decreased \$27,590, and taxes increased \$3,922. There was an increase of \$5,912 in non-operating income and interest charges, and the sinking

Action on Norfolk Franchise.—The joint committee of ten and the representatives of the Virginia Railway & Power Company have agreed upon the three franchises which will be submitted to the City Council of Norfolk, Va., for approval and passage. Three ordinances will be framed and submitted to the Council, perhaps during August. The provisions of the grants include six tickets for a quarter, to be sold in thirty places and on the cars after three years; universal transfers; school tickets with an age limit of twenty-one years; taxes at the rate of 1½ per cent on the gross earnings for three years and 2 per cent thereafter; the substitution of six tickets for a quarter for labor tickets on the Bay Shore Line, and service from 6 a. m. to midnight, with owl service when the business justifies.

New Haven Recovery Suit Dismissed.—A suit of minority stockholders to recover \$102,000,000 from former and present directors of the New York, New Haven & Hartford Railroad, who were charged with responsibility for alleged improper expenditures of funds, was dismissed by the Supreme Court of Massachusetts on July 8. William G. Rockefeller, Lewis Cass Ledyard, James S. Elton and Charles S. Mellen were among the defendants. The decision, which was written by Chief Justice Pugg, said in part: "It is an implied condition of becoming a stockholder in a corporation that its general policy shall be determined by the holders of a majority of the stock and that disagreements as to its dominating policy and as to details of its management shall be settled by its stockholders, and recourse cannot be had to the courts to adjust differences of this sort. It is only from actual necessity, in order to prevent a failure of justice, that a suit in equity for the benefit of the corporation can be maintained by a stockholder."

Summer School of Scientific Management.—The Pennsylvania State College will conduct a summer school of scientific management during the two weeks beginning Aug. 9. This summer session is planned for the accommodation of works managers, superintendents, heads of cost, stores, purchasing, planning, and production departments, and members of such departments. The time is restricted to two weeks to meet the needs of employees whose vacation period is limited to that time. The mornings of the session will be devoted to lectures and discussions on industrial organization and scientific management under the leadership of Prof. Hugo Diemer, head of the department of industrial engineering at the Pennsylvania State College. The afternoons will be devoted to applied methods of scientific management under the direction of W. H. Tabor. The shops of the Pennsylvania State College have been especially provided with means for teaching and demonstrating applied methods of scientific management. The fee for the course is \$15.

Perpetual Franchise Issue Before New York Constitutional Convention.—Two votes have already been taken by the New York Constitutional Convention committee on legislative powers, of which William Barnes is chairman, on a proposal to erect a constitutional prohibition against perpetual franchises. Both times the proposal has been defeated. The votes were taken in connection with a proposal presented by Seth Low, New York, at the request of the Citizens' Union. Mr. Barnes has appointed a sub-committee to draft an amendment to meet the sentiment in his own committee. The proposal of Mr. Low would prohibit municipal authorities from granting franchises in perpetuity. It would provide for indeterminate franchises, but would permit municipal authorities to resume control of the franchise on terms to be defined in the original grant. On July 14 William M. Ivins urged that in the recapture of franchises by municipalities provision should be made for paying the retiring corporation a fair return on the money expended in operation and sufficient compensation to make up for the loss of the franchise.

PROGRAM OF ASSOCIATION MEETING

Colorado Electric Light, Power & Railway Association

The thirteenth annual meeting of the Colorado Electric Light, Power & Railway Association will be held at Glenwood Springs, Col., on Sept. 23, 24 and 25.

fund, etc., took \$13,083 less, so that the net income amounted to \$696,521, an increase of \$70,215.

During the year the company spent for improvements a total of \$1,009,931 not included in the income account. This was met by the net income for the year of \$696,521, by a decrease of \$62,416 in the balance of current cash, by \$172,738 borrowed from the depreciation account, by \$26,083 from the sale of obsolete property and by some other small adjustments.

The usual 2½ per cent semi-annual interest on the adjustment income bonds was voted at the meeting of the directors on July 14. It is payable on Oct. 1.

In a statement given out by President Whitridge, it was announced that the directors had decided to establish a system of pensions in connection with the employees' association.

REFEREE HOLDS COMPANY LIABLE

United Railways of St. Louis Liable for Claims Against Predecessor Company to Extent of \$10,139,681 for Unpaid Subscriptions on Latter's Stock

A report filed in Judge Taylor's division of the Circuit Court by Referee Charles W. Bates upon the creditors' bill of J. Brooks Johnson against the United Railways of St. Louis and other stockholders in the St. Louis Transit Company, holds that the defendants are liable for judgments held against the transit company by the plaintiff, also for interest at the rate of 6 per cent since the judgments were rendered and court costs.

The defendants are declared to be liable individually to the extent of the difference between what they paid for stock of the St. Louis Transit Company and its par value, in satisfying the judgments, which were purchased by Johnson from persons who had won personal injury suits against the St. Louis Transit Company. These judgments originally aggregated \$27,044, in addition to which the plaintiff seeks interest and court costs.

In setting forth the extent to which individual stockholders in the St. Louis Transit Company are liable, Referee Bates holds that only \$41 was paid to the St. Louis Transit Company for each share of its stock, par value \$100, thus leaving \$59 per share unpaid. There is said to remain unpaid on the 171,859 shares of stock of the St. Louis Transit Company held by the United Railways of St. Louis, \$10,139,681. In case the referee's report is approved by the lower court and upheld by the higher courts, the United Railways of St. Louis and other defendants would be obligated to pay only such claims as were found to be owing by the St. Louis Transit Company prior to its absorption by the United Railways. Attorneys for the United Railways have already filed a bill of exceptions.

COMPANY CLAIMS SURPLUS

United Railroads of San Francisco in Application for Rehearing Denies Allegations of Commission and Asserts Inability to Set Aside Improvement Funds

The United Railroads of San Francisco has filed an application with the California Railroad Commission for a rehearing of the case in which the commission ordered the company to set aside \$550,000 a year from income for improving its system and in which it also directed the company to make certain changes in its system of accounting. This decision was abstracted in the *ELECTRIC RAILWAY JOURNAL* of May 22.

The company questions the jurisdiction of the commission, especially in the announcement that instead of a surplus the company has a deficit in its profit and loss account. It says:

"We do not understand that your board has authority to marshal liabilities, determine legal or equitable priorities or appropriate assets, or to re-draft or reframe the company's books of account so as to show a deficit when we earnestly and honestly believe, and have been so advised by counsel and accountants, that this company was within the law when it reduced its capital stock, compromised doubtful claims, reduced its liabilities in the amount of money actually paid into the sinking fund and set up in a surplus

account this money actually paid to the trustee, thus wiping out the deficit which your board has said exists."

The company goes on to say that it suffered a property loss in excess of \$1,200,000 in the fire and earthquake, that it reduced its capital stock by this amount and its property account by \$1,600,000, and charged the surplus with \$1,200,000. The surplus was then credited with the net amount in excess of \$400,000, and the result was that the capital stock and surplus were reduced \$1,600,000 and the property account was reduced in like amount, which transactions the company believes correct from a legal and accounting point of view.

The company states that it will need its revenue from all sources for the payment of its operating expenses, taxes, sinking funds and interest, and that it will not be able to set aside \$300,000 annually for three years, as ordered by the commission, as a special fund in bank to be used for extensions and additions. The company also declares that because of causes beyond its control which affect its revenues, it will not have the ability to set aside \$45,833 a month within fifteen days after the first of each month following July 15.

MAINE COMMISSION REPORT

The sixth annual report of the Board of Railroad Commissioners of Maine contains returns from the four-teen electric railways in that State. The total mileage of street railways in operation on June 30, 1914, was 494.27 miles, an increase for the year of 9.18 miles. The gross assets of the several companies on that date were \$33,661,037, while the gross liabilities and the capital stock totaled \$32,869,742. The total amount of dividends declared during the year was \$341,599, an increase of \$113,122. The average dividend rate was 2.71 per cent. The combined reports of earnings for the year showed the following figures: Gross income, \$3,744,069; operating expenses, \$1,956,124; taxes, interest and other charges, \$1,226,426; net income, \$561,519; reserves and special charges, \$123,815; dividends paid, \$341,599, and surplus, \$96,105. During the year eight persons were killed and eighty-four were injured.

NEBRASKA STATE RAILWAY COMMISSION

The seventh annual report of the Nebraska State Railway Commission for the year ended Nov. 30, 1914, contains the usual general review of the commission's activities during the year and the details of complaints, orders, decisions and reports made to and issued by the commission. The gross earnings from operation for all companies during the year amounted to \$3,764,667, and the total operating expenses to \$1,882,751, while the net income from operation was \$1,907,589. Interest paid totaled \$695,123; taxes, \$293,865; dividends, \$539,366; depreciation reserves, \$294,605, and additions and betterments, \$568,464. At the end of the year the surplus was \$91,158. The total number of fare passengers was 68,234,000 and the total number of revenue car-miles run was 13,016,501.

Barcelona Traction, Light & Power Company, Barcelona, Spain.—The holders of the first mortgage fifty-year 5 per cent bonds of the Barcelona Traction, Light & Power Company at a recent meeting in June approved the proposed readjustment plan described in the *ELECTRIC RAILWAY JOURNAL* of Feb. 27 and May 1. A preliminary consent by the London holders was noted in the issue of May 29. H. F. Parshall, formerly chairman Central London Underground Railway, will have charge of operation, and E. R. Peacock, formerly vice-president Dominion Securities Corporation, Ltd., of financial arrangements.

Birmingham, Ensley & Bessemer Railroad, Birmingham, Ala.—The Cunningham independent bondholders committee of Boston in a recent circular stated that under an agreement dated June 14 between it and the New York committee of bondholders (C. H. Zender, chairman), the bonds deposited with the American Trust Company, Boston, have been re-deposited with the Empire Trust Company, New York, depository for the New York committee. This makes a total of about \$2,500,000 of bonds deposited with the latter committee, which assumes the expenses incurred by the Cunningham committee in its investigation into the company's affairs. This action will not curtail the Cun-

ningham committee's desire for an accounting in case of a deficiency judgment in the foreclosure proceedings.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y.—On July 7 Justice Brown of the State Supreme Court appointed George Bullock receiver of the Buffalo & Lake Erie Traction Company in the foreclosure suit instituted by the New York Trust Company, mortgage trustee. C. K. Beekman, counsel for the bondholders' committee, stated that the appointment was necessary in order to finance certain betterments through the sale of receiver's certificates.

Columbus, Delaware & Marion Railway, Cincinnati, Ohio.—Judge Kinkead on July 3 refused to authorize the Columbus, Delaware & Marion Railway to issue \$150,000 of receiver's certificates to meet obligations falling due on Aug. 1. He authorized the receiver, however, to execute notes for one year or less to pay expenses amounting to \$55,000. The court instructed the receiver to pay interest on all bonds in order to enable the consolidated bondholders to take such steps within a reasonable time as they may wish to reorganize and lift the receivership.

Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo.—Judge Bird in the Jackson County Court on July 12 sustained the plea of the Interstate Railway for receivers for the Kansas City, Clay County & St. Joseph Railway and appointed Edward J. Corrigan and Bayliss Steele to act as such. The application was made to protect the judgment for \$1,500,000 damages recently rendered the Interstate Railway for the taking of right-of-way on which it held options. This judgment is practically arrested pending action on motion for a new trial on Aug. 2. A more detailed explanation of the situation involving these companies is published on page 119 of this issue. On July 14, after an agreement between counsel, Judge Bird rescinded his appointment of Messrs. Corrigan and Steele and named I. D. Hook and J. G. L. Harvey as receivers. Mr. Hook is son of United States District Judge William C. Hook. The agreement reached covers the continuation of the regular operating force of the company.

Michigan United Railways, Jackson, Mich.—New York interests connected with the Michigan United Railways and the Commonwealth Power, Railway & Light Company deny that there is any truth in the rumor that they are preparing to make a bid for the Père Marquette Railway when it is sold at foreclosure next autumn, for the purpose of electrifying it and adding it to their system.

San Francisco (Cal.) Municipal Railways.—In May, 1915, the cash receipts of the San Francisco Municipal Railways from all sources were \$185,707, which, less transfer deductions of \$2,392 and operating expenses of \$107,177, leaves a balance in favor of operation of \$75,138. In June receipts are reported to have been \$199,261. If the average for the first five days of July is maintained, the receipts for that month will amount to more than \$225,000.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—A recent circular issued by the San Francisco-Oakland Terminal Railways, explaining the default in the payment of interest coupons maturing during July, states that a committee of security holders has been organized for the purpose of studying the financial problems of the company, formulating plans for subserving the large values recognized by the California Railroad Commission and bringing about whatever readjustment may be necessary in order to put the finances of the company on a permanently sound basis. The committee has secured the co-operation of San Francisco and Oakland bankers, who have agreed to buy these interest coupons for the full face amount less the income tax. The Mercantile Trust Company, San Francisco, representing ten or twelve banks, has offered to purchase the coupons from the first consolidated thirty-year 5 per cent bonds, and also from all the other issues of the system accruing in July, provided the selling bondholders agree that the coupons shall be given prior rights under the several mortgages as against the principal of the bonds and any interest not yet matured.

Western New York & Pennsylvania Traction Company, Olean, N. Y.—W. R. Page, president Western New York & Pennsylvania Traction Company, and associates have taken an option on the line of the old Buffalo & Susquehanna Railway from Wellsville to Buffalo. If the option is exercised it will be done independently of the electric railway.

West Virginia Traction & Electric Company, Wheeling, W. Va.—On June 1 the West Virginia Traction & Electric Company issued and sold \$1,500,000 of two-year 6 per cent gold notes, as stated in the ELECTRIC RAILWAY JOURNAL of June 9. Of these notes \$1,250,000 has been used to purchase \$1,250,000 of 5 per cent three-year convertible gold notes due on July 1. On this latter date the mortgage and deed of trust dated July 1, 1912, covering the first refunding and extension mortgage thirty-year gold bonds, dated July 1, 1912, and due on July 1, 1942, was cancelled and in its place there was created a mortgage and deed of trust dated July 1, 1915, under which there is a total authorized issue of \$25,000,000 par value of first refunding and improvement mortgage thirty-year gold bonds dated July 1, 1915, and due on July 1, 1945. There has been issued and deposited as collateral for the \$1,500,000 of two-year 6 per cent gold notes before mentioned \$1,875,000 of these first refunding and improvement mortgage thirty-year gold bonds.

York (Pa.) Railways.—The directors of the York Railways have declared a dividend of 2½ per cent on the \$1,600,000 of 5 per cent cumulative preferred stock for the half year ended Nov. 30, 1914, payable in cash on July 30 to holders of record on July 20. The previous dividend was paid in 5 per cent scrip.

DIVIDENDS DECLARED

Charlottesville & Albemarle Railway, Charlottesville, Va., semi-annual, 3½ per cent, preferred.

Denver & Northwestern Railway, Denver, Col., quarterly, one-half of 1 per cent.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., quarterly, 1½ per cent, preferred.

New Hampshire Electric Railways, Haverhill, Mass., 2 per cent, preferred.

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

York (Pa.) Railways, \$1.25, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., May, '15	'15	\$36,149	*\$20,356	\$15,793	\$10,993	\$4,800
1 " " '14	'14	37,864	*19,771	18,093	11,068	7,025
5 " " '15	'15	149,187	*89,483	59,704	54,772	4,932
5 " " '14	'14	153,696	*86,268	67,428	54,853	12,570
GRAND RAPIDS (MICH.) RAILWAY						
1m., May, '15	'15	\$92,056	*\$70,070	\$21,986	\$13,739	\$8,247
1 " " '14	'14	107,265	*70,215	37,050	13,344	23,706
12 " " '15	'15	1,243,271	*\$84,955	408,316	162,557	245,759
12 " " '14	'14	1,299,642	*\$81,997	467,645	159,828	307,817
HAGERSTOWN & FREDERICK RAILWAY, FREDERICK, MD.						
1m., May, '15	'15	\$36,782	*\$21,823	\$14,959	\$9,415	\$5,544
1 " " '14	'14	33,928	22,680	11,248	8,450	2,798
11 " " '15	'15	398,284	232,819	165,465	103,159	62,306
11 " " '14	'14	369,619	239,735	129,884	118,176	11,708
HUDSON & MANHATTAN RAILROAD, NEW YORK, N. Y.						
1m., May, '15	'15	\$462,256	*\$194,341	\$267,915	\$211,767	\$56,148
1 " " '14	'14	473,462	*194,762	278,700	208,969	69,731
5 " " '15	'15	2,324,164	*971,742	1,352,422	1,056,629	295,793
5 " " '14	'14	2,384,930	*982,610	1,402,320	1,040,169	362,151
LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO						
1m., May, '15	'15	\$114,031	*\$74,255	\$39,776	\$36,055	\$3,721
1 " " '14	'14	120,750	*76,599	44,143	35,322	8,821
5 " " '15	'15	505,339	*356,430	148,909	179,927	†31,018
5 " " '14	'14	530,903	*354,944	175,959	176,251	†292
NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.						
1m., May, '15	'15	\$175,513	*\$107,102	\$68,411	\$42,248	\$26,163
1 " " '14	'14	192,144	*112,818	79,326	41,338	37,988
12 " " '15	'15	2,199,969	*1,289,261	910,708	492,029	418,679
12 " " '14	'14	2,236,642	*1,405,187	831,455	483,680	347,775
NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO						
1m., May, '15	'15	\$323,324	*\$191,317	\$132,007	\$51,524	\$80,483
1 " " '14	'14	323,036	*191,808	131,228	50,660	80,568
5 " " '15	'15	1,424,675	*900,768	523,907	255,962	267,945
5 " " '14	'14	1,403,920	*860,110	543,810	250,815	292,995
PORTLAND (ME.) RAILROAD						
1m., May, '15	'15	\$84,316	*\$55,932	\$28,384	\$22,877	\$5,507
1 " " '14	'14	86,427	*52,946	33,481	20,177	13,304
12 " " '15	'15	1,046,804	*646,372	400,432	260,713	139,719
12 " " '14	'14	1,046,716	*650,100	396,616	238,632	157,984
PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.						
1m., May, '15	'15	\$446,149	*\$253,738	\$192,411	\$188,440	\$3,971
1 " " '14	'14	538,473	*257,288	251,185	183,643	67,542
12 " " '15	'15	5,794,271	*3,149,446	2,644,825	2,207,287	437,538
12 " " '14	'14	6,739,779	*3,553,244	3,386,535	2,103,753	1,282,782

*Includes taxes. †Deficit.

Traffic and Transportation

THE JITNEY BUS

California Supreme Court Upholds San Francisco Ordinance Ruling—Georgia Commission's Plan for Regulation

The San Francisco jitney bus ordinance has been declared valid by the Supreme Court of California. The matter was brought before the court by a writ of habeas corpus issued in behalf of Paul Cardinal, a jitney bus driver, arrested in May and charged with violating those provisions of the measure which require a bus driver to qualify in a bond or insurance in the sum of \$10,000 and also pay a license fee. The court dismissed the writ and remanded Cardinal into custody. In his writ Cardinal, through his attorney, attacked the ordinance on the ground that it was discriminatory in that it attempted to regulate by bond and other requirements an automobile driver who charged no more than 10 cents fare. The Supreme Court holds that the ordinance is a reasonable exercise of the police power vested in cities for the protection of citizens and that laws made by virtue of such power are not to be set aside by courts unless they are found to be unreasonable and unjust. The court sees no unjust discrimination in the not-more-than-10-cents-fare classification for the reason that such low fare puts the jitney driver in competition with the street car and tempts him to run at a high rate of speed to make his profit. It holds that the jitney business is one which, if negligently conducted, would be fraught with danger to passengers in the jitney buses and to persons in the public streets, and therefore particularly subject to special regulation.

The injunction sought by associated jitney-bus operators in Atlanta to restrain the Georgia Railroad Commission from proceeding further with its announced program of prescribing rules and regulations for the buses as common carriers was denied on July 10 by Judge W. D. Ellis of the Fulton Superior Court. No arguments were heard, the court having before it the petition of the jitney-bus operators and the answer of the Railroad Commission. The latter's position was that it had applied no rules, those which had been published being merely tentative and subject to discussion and permanent order at the hearing set for July 13 by the commission. The jitney-bus men indicated they would appeal to the Supreme Court from the decision of Judge Ellis, and the latter therefore granted a supersedeas allowing twenty days for such action to be taken. The commission's announced hearing, set originally for July 13, is stayed meanwhile. Some weeks ago Judge Ellis denied the jitney-bus men's petition to enjoin the city of Atlanta from enforcing its ordinance taxing them and regulating them under its police powers. This has been argued on appeal in the State Supreme Court.

Offering to establish auto-bus lines in East Bakersfield, Cal., and for Beale Park, A. G. Wishon, general manager of the San Joaquin Light & Power Company, appeared before the City Council of Bakersfield, Cal., urging that some action should be taken toward the elimination of jitney bus competition with the electric railway. He suggested that the jitney lines, as well as the auto-bus lines, to be placed in service by the street railroad, should be regulated, placed on certain routes and the public be given guarantees of service. In East Bakersfield he proposed that the street railroad bus lines should serve Baker and Niles Streets, making schedules so that connections would be made with the street cars. Transfers would be issued from the street cars to the auto-buses and vice versa, making a 5-cent fare over the entire route, the city's autos to run as late as the cars operated. In the Beale Park district it was proposed that the auto-bus service connect with every other car.

Andrew Linn Bostwick, librarian of the municipal reference branch of the St. Louis library, has devoted the July issue of the St. Louis Public Library *Monthly Bulletin* to the subject: "The Regulation of the Jitney Bus—A Discussion of City Ordinances." The publication is a welcome addition to the growing list of pamphlets which have as their major purpose the recording of the rise and regulation of the jitney.

The Mayor of Charleston, W. Va., has signed the ordinance passed by the Council of that city to regulate the jitney. The license fee is fixed at \$24 for each machine. The jitney is described in the ordinance as a vehicle which carries passengers for hire at less than 10 cents each. The bond is fixed at \$2,500 for each car.

Jitney buses will be declared common carriers and placed under State regulation if a bill introduced by the committee on corporations in the Wisconsin Senate becomes a law. The bill provides that jitney owners must file with the State Railroad Commission a schedule of their rates, service, and routes, and if they are approved by that body, and on the filing of a bond of \$5,000 for payment of damages for personal injuries to passengers, the jitney men shall be entitled to permits to operate, subject to the supervision of State regulating authorities.

In applying to court for an injunction to restrain the enforcement of the jitney ordinance enacted in Pottsville, Pa., the owners contended that compliance was impossible. The ordinance requires jitney owners to get a certificate of public convenience, but the Public Service Commission has notified them that it will not issue such certificates at present, as the statewide regulation of jitneys is a matter which will be taken up with great care. The ordinance imposes a tax of \$100 on each vehicle between Pottsville and Schuylkill Haven, which is claimed to be excessive. Decision was reserved.

The Board of Aldermen of Hartford, Conn., on July 19 will consider the jitney regulatory ordinance drawn up by the ordinance and police committee. The measure provides for the licensing of jitney operators by the chief of police at \$10 each for one year, revocable for failure to comply with the provisions of the ordinance. Not more than two passengers in excess of the seating capacity are to be carried. The routes must be conspicuously posted on the machines. The tentative draft does not contain any bond regulation.

The Bristol (Tenn.) Traction Company is planning to install several motor-buses to traverse the principal residence streets not on the lines of the company, gather up passengers and transfer them to the regular cars, at the usual fare.

By furnishing one bond covering thirty-two jitneys, a local jitney association at Louisville, Ky., has complied with the terms of the law and is preparing to put that number of cars in operation, it is stated.

Councilman T. H. Bolton of Seattle has prepared a jitney ordinance which would require a city license or permit for each jitney driver, compel jitney operators to follow certain routes during certain hours of the day and night, make it unlawful to charge a higher fare than that specified in the ordinance and designate points at which passengers may be loaded and unloaded.

Officials of the Tacoma Jitney Bus Association have sworn out warrants for the arrest of fifteen automobile drivers who carried passengers for charge to the race track during the recent automobile races held in that city on July 3, 4 and 5. The warrants charge the drivers with operating without licenses. The prosecuting attorney's office announced that warrants would be issued for approximately thirty Seattle drivers, who operated motor trucks to the Tacoma speedway on the dates named, without a State license to carry passengers. The State law fixes the maximum penalty of \$500 for each passenger carried in cases of such violations.

Motor-buses operating at a fare of 3½ cents have been introduced on North Monroe Street, Spokane, Wash., by the Green Security Company, which has five ten-passenger machines in service. J. W. Green, president of the company, promises a 2½-cent fare for North Monroe Street in the next few weeks, when two new forty-two-passenger cars and two thirty-one-passenger cars are delivered from St. Louis. Mr. Green is quoted as follows: "We began to issue books of 100 tickets for our first auto-buses at \$3.50, thus reducing the fares purchased in this lot to 3½ cents. For those who do not care to invest in 100-book ticket we have another special rate ticket of twenty-five for \$1. I wish to deny that the Green Security Company is being backed by the Washington Water Power Company, which operates the local electric railways."

COMMISSION SUBSERVIENT TO LEGISLATURE

New York Commission Lacks Power to Increase Rates Beyond Legislative Maximum

Refusing to permit the Ulster & Delaware Railroad to increase its mileage book rate from 2 to 3 cents a mile the Public Service Commission for the Second District of New York City on July 7 made one of the most important statements of principle since the passage of the public service commissions law in 1907. The majority of the commission holds that notwithstanding the broad rate-making powers granted by the Hughes statute and its subsequent amendments, the commission has not the power to permit a rate to be increased above a maximum set by the Legislature. Chairman Van Santvoord in the prevailing opinion, concurred in by Commissioners Hodson and Irvine, points out that should the commission assume that the power to permit such increases had been delegated to it by the passage of the public service commission law, not only the mileage-book law involved in the present case but such other statutes as the 3-cent maximum fare law, possibly even the 80-cent gas law for New York City, and other similar enactment might be in effect repealed by the commission's decisions. In an extended review of all the statutory sections involved he fails to find that the commission, either expressly or impliedly, has been granted such power.

Commissioner Emmet and Commissioner Carr dissent. Mr. Emmet holds that had not the Legislature intended to take the rate-making power out of the "often bungling" hands of the Legislature and place it for expert determination absolutely in the jurisdiction of the commission the whole battle of Governor Hughes for the regulation of public utilities would have been vain. As the power to lower rates irrespective of legislative enactment is expressly granted in the public service commissions law, Mr. Emmet finds that the power to raise rates is implied beyond reasonable doubt. Were this power to raise rates to afford a reasonable return on investment in accordance with the facts disclosed in each case not implied, Mr. Emmet holds that the intent of Governor Hughes and the Legislature which passed the law would have been anything but the distribution of even-handed justice, to the railroads as well as to the public.

The Supreme Court of Missouri, as quoted in the opinion of Commissioner Carr, has held that the Public Utility Commission of that State, by a statute delegating to it the rate-making power in the same words as does the Hughes law, was empowered to set aside the 2-cent fare law of that State. He holds that the mileage-book law of New York State is in effect but a legislative guide for the railroads which come under it until the rate which it prescribes can be passed upon by the Public Service Commission.

The mileage-book law was passed in 1895 and the commission holds that it was not repealed when the public service commissions law was enacted in 1907. On the contrary, it is pointed out that when the consolidated laws were enacted in 1910 the public service commissions law was made chapter 48 of the consolidated laws and the mileage-book law in its then precise form was made chapter 49 of the consolidated laws, the chapter numbers at least indicating that the mileage-book law, re-enacted thus subsequently to the public service commissions law, specifically escaped the effect of the clause in the public service commissions law repealing all other statutes contrary to itself.

The mileage-book law provides that wherever a railroad more than 100 miles in length sells regular tickets for more than 2 cents a mile up to the legal maximum of 3 cents a mile it must sell a mileage book at 2 cents a mile. The Ulster & Delaware Railroad pleaded that this was not a rate on which it could earn a fair return within the law and asked for permission to increase the rate to 3 cents a mile under the general rate-making powers of the commission. It was opposed by the State Council of the United Commercial Travelers and by the municipal authorities and civic bodies along the lines of the road. While the majority opinion seems to concur with the dissenting one in that the railroad on a basis of fair return is entitled to an increase and admits that in such a case the commission has a power to grant an increase, it holds that this power to increase does not extend to increases above a statutory maximum.

The direct question as to whether the commission has the power to raise rates in contravention of these older statutes has never been raised in New York State before, and the decision of the commission will undoubtedly be carried to the court of last resort for final determination. Not only the Ulster & Delaware Railroad but every railroad company in the State whose lines are more than 100 miles long and which has been incorporated since the passage of the mileage-book law or which has since that date been formed by consolidation of previously organized corporations and sells regular tickets for more than 2 cents a mile is now limited to 2 cents a mile for its mileage rate.

THIRTEEN KILLED IN GORGE

Of Eighty-four Passengers on Derailed Car Not One Escaped Injury

On the evening of July 8 a double-truck open car of the International Railway, Buffalo, N. Y., crowded with passengers, most of whom were women and children, skidded over the slippery rails in a heavy rain storm and dashed down the steep incline near the foot of the grade from Brock's monument overlooking the lower gorge of the Niagara to the boat landing at Queenstown, Ont., and after jumping the rails crashed into a tree and telegraph pole and partly overturned.

Of the eighty-four passengers on the car none escaped injury. Thirteen were killed and more than threescore were so badly injured that it is expected some will die. The accident was one of those unavoidable affairs caused partly by the weather and partly to the mad rush of the excursion party to board the car which was the first of four to leave the monument, thus greatly overcrowding the trolley despite the efforts of the crew who urged a number to take the three following cars down the steep incline through the lower end of the gorge. Every effort was made by the motorman to keep the overloaded car under control. Preliminary investigations by the Dominion government and by representatives of the railway company show that the brakes were securely set; that the power had been reversed and that every effort was made by the motorman to stop the trolley from skidding over the slippery rails caused by the rain storm.

The passengers were members of two Toronto, Ont., Sunday school excursion parties who had spent the day in the gorge in the vicinity of the monument overlooking the great gorge of the Niagara. The boat on which they were to cross Lake Ontario from Queenstown was to leave at 7.15 o'clock in the evening. Four cars were sent to the monument from the Whirlpool carhouse and the first car left the monument for the return trip at 6.40 o'clock, twenty-five minutes before the boat was scheduled to clear. It had been raining and the entire party tried to board the first car for the boat. The car was of the large open type with fourteen cross-seats, with a seating capacity of five on each seat, and with a running board on the river side of the car. Every seat was taken and the passengers crowded into the available standing room between the seats, while some stood on the running board despite the efforts of the car crew to persuade them to wait for the other three cars which were to follow within a few minutes.

The car was started while passengers were still trying to climb aboard. It was kept under control from the monument down to the Lewiston Bridge spanning the river between Queenstown, Ont., and Lewiston, N. Y., and here it was brought to a stop to allow the conductor to throw a switch leading from the main line to a spur track running along the Canadian side of the river to the boat landing. The worst of the grade had been covered up to this point. After turning the switch the conductor collected the remainder of the fares and gave the motorman the signal to proceed.

From this point the car gained momentum, and despite the efforts of the motorman to check the speed the car skidded, entered the last curve, which is a right-angle turn, and jumping the rails, crashed into a tree, which knocked every support from under the roof on one side of the car, and then struck a pole and partly overturned.

As soon as the car left the rails the conductor jumped. He hurried to Queenstown about an eighth of a mile away

and summoned aid. The roof collapsed on the passengers. Of the thirteen who died many were killed outright. The others died while being removed to the hospitals at Niagara Falls, Ont., and Toronto, Ont.

Investigation showed that both trucks left the rails; that the brakes worked and held the wheels; that the sand box was half full of sand; that the controller was reversed; that the car skidded over the slippery rails at a great speed before it struck the sharp curve which sent it into the air and toppled it over into the ditch. The grade from the monument down to the point where the car stopped so as to allow the conductor to turn the switch is much greater than at the point where the accident occurred.

Officials say this is another bit of evidence that shows the value of controlled entrance and exit cars. The car crew was powerless to check the mad rush of the excursion party to board the car. It is pointed out that if the car had been of the new controlled-entrance type, only as many passengers as could be seated would have been allowed aboard. This would have prevented overcrowding and the car might have been kept under control.

This is the first accident of a serious nature on the gorge line in years. The line from Niagara Falls, Ont., to Queenstown along the Canadian river bank is owned by the International Railway, and while operated as a part of the Great Gorge Route Company is not owned by the latter, which operates and owns the line through the American Gorge. The accident was not on the gorge route, but on a spur track leading from the main line to a boat landing. The rails and ballast were found intact after the disaster.

WASHINGTON BUS REFUSED INCREASE IN FARES

The Metropolitan Coach Company, now in the hands of a receiver, applied recently to the Public Utilities Commission of the District of Columbia for permission to increase its rate of fare from the present rate of six tickets for 25 cents to a flat rate of 5 cents per ride, contending, among other things, that it was unable to continue to furnish service under the present rate of fare. An investigation was made and a formal hearing was held on May 20. At the hearing the representative of the Metropolitan Coach Company reiterated the request, and referred the commission to the annual reports of the company for information concerning its finances. No objection to the increase in fare was made at the hearing, nor has any written protest been received. The company owns no unincumbered real property, and such expenditures as it has made for garage and plant facilities have been made upon leased land. The company owns six coaches, the cost price of which was \$3,749 each, making a total cost price of \$22,494. There is a balance still due thereon of \$2,894. The commission estimated the fair value of the property of the company at \$11,000. In its opinion the commission said:

"Since the company, during a large part of the calendar year 1914, was operating over a longer route than at present, and was operating four large buses which have since been disposed of, the operating conditions of the company for 1913 approximate more nearly to the present conditions than do those for the year 1914, and therefore the report of the company for the year 1913 is selected for purposes of comparison. The net operating revenue for that year was \$1,080. Assuming that the revenue passengers will number the same as in 1913, the annual revenue will be increased by \$4,172 over that year by an increase of fare to 5 cents, and assuming that the operating expenses will remain the same as in 1913, the annual net operating revenue will be \$5,252.

"Assuming the life of the coaches to be six years, the company should be setting aside annually for depreciation \$3,750, and, assuming yearly taxes at 1½ per cent on a valuation of \$11,000, the company should provide \$165 annually for taxes. This total annual charge of \$3,915, with a net operating revenue of \$1,080 when operating under the conditions for the year 1913, would leave a deficit of \$2,834, but with a net operating revenue of \$5,252 when operating under the same conditions except for an increase of fare to 5 cents, it would leave a gross income less operating expenses and taxes of \$1,337. However, the service furnished by the company is unsatisfactory. There are not enough coaches to handle the traffic, the condition of the

present coaches is poor, and the schedules filed with the commission by the company are not being regularly maintained. These conditions have been repeatedly brought to the attention of the company. In view of these facts, the commission is of the opinion that while a 5-cent flat rate of fare would be just and reasonable if reasonably satisfactory service were furnished by the company, it is not justified under the present conditions."

The commission has denied the petition of the company to increase its rate of fare to a flat rate of 5 cents and has announced that it will give further consideration to a petition for an increase in fare after reasonably satisfactory service has been established by the company.

EFFECT OF LOW FARES AT VANCOUVER

As announced in the *ELECTRIC RAILWAY JOURNAL* for May 15, the British Columbia Electric Railway inaugurated on May 10 an eight-tickets-for-25-cents rate for non-transfer rides in Vancouver and Victoria. This reduction from the 5-cent fare, made primarily on account of jitney competition, resulted by the following month in an increase of 25 per cent in Vancouver passenger travel and 3 per cent in revenue. At the same time the revenue per car-mile has remained practically stationary. The principal travel area of Vancouver is a 3-mile zone around the center of the city.

On May 17 the company also inaugurated a reduction of interurban fares on its lines between Vancouver and Westminster by changing the round-trip rate from 50 cents to 35 cents. The routes vary in length from 12 miles to 17 miles, so that the fare is practically 1 cent per mile. The reduction in this case produced a large increase of through travel, the increase in passengers being 9 per cent and in revenue about 20 per cent. The increased travel in both cases has been at the expense of competing jitneys.

SAN FRANCISCO INJUNCTION INOPERATIVE

An injunction against the Municipal Railways, San Francisco, Cal., was issued on July 6, as reported in the *ELECTRIC RAILWAY JOURNAL* of July 10, page 76, to prevent the city from operating cars running direct to the exposition over the lower Market Street tracks. The city, however, secured a twenty-four-hour stay of the injunction, and later a further delay of two days and a reassignment of the case to another judge. This means that the cars will continue to handle the exposition traffic until there are further developments. Meantime city officials are trying to establish the right of the municipal lines to the business that will be lost if the injunction is served. Thomas A. Cashin, superintendent of the Municipal Railways, has estimated that the exposition traffic over the municipal lines will be cut 50 per cent if the direct cars from the ferry have to be taken off. On this basis the loss would be about \$150,000 per annum. On the strength of this estimate the bond of the United Railroads was fixed at \$110,000.

REGULATION OF JITNEY ASKED IN INDIANA

A petition and brief was filed on July 13 with the Public Service Commission of Indiana by the Terre Haute, Indianapolis & Eastern Traction Company, seeking to require that the operation of jitney buses in the State of Indiana shall be subject to the regulation of the Public Service Commission as in the case of other common carriers, and that the owners of such vehicles shall be compelled to obtain franchises to operate them as common carriers. While the petition of the company specifically refers to conditions in Terre Haute, Ind., where it operates the city lines as part of its system, and where the competition of the jitney buses has become quite a factor, the request is made that the order of the commission shall cover every city in the State.

The company, through its attorneys, sets forth that the owners of jitney buses have held themselves out to the public as common carriers, and with this understanding solicit business on the basis of transporting passengers from one place to another within the city for a 5-cent fare. The same points are also reached by the cars of the traction company. The company says that the owners of the jitney buses are obtaining without any regulation or license the business for which the company is compelled to maintain expensive lines of street railroad. The owners of

such automobiles operate only at times when profitable, and thus are not required to maintain service at a loss as is the traction company. They are thus depriving the company of legitimate revenue which is needed to pay the expenses of improving the right-of-way of the company. This expense in Terre Haute amounted to \$150,000 for the past two years, and taxes amounted to approximately \$30,000 per annum. The fact that jitney buses as common carriers do not provide a flagman to protect the automobiles at railroad crossings is mentioned in the petition.

The Public Service Commission has appointed July 22 as the date when a hearing will be held in the Senate chamber of the State capitol at Indianapolis on the matter of regulation of jitney buses by the commission.

INCREASE IN FARE ALLOWED

The increase in the interurban fares of the Idaho Traction Company beyond Randall on the southern division and Collister on the northern division has been allowed by the Public Utilities Commission of Idaho in a decision just handed down. The commission, however, has refused to permit an increase in the fares on the Hill Crest loop and Collister and Cole school lines, has refused to permit an increase in the price of commutation tickets, and has refused to allow an increase in the 1-cent a mile fare charged on school children's tickets.

The commission based its opinion and order on the book valuations of the company. The total valuation of the properties of the company is shown by the commission from the books to be \$2,640,285. This includes 85.54 miles of road, all terminals, stations, equipment, paving, etc.; also the Pierce Park and Natatorium properties. The total operating revenue, including \$7,940 net earnings from the Natatorium, amounted to \$366,984 for last year. The total operating expense amounted to \$267,370 and the net revenue to \$99,614. This does not provide any allowance for depreciation, which, the commission says, should be about \$30,000. The earnings of the company for the year, not counting depreciation, amounts to less than 4 per cent. By making the allowance for depreciation and calculating the earnings as permitted under the order, the net will be a little better than 4 per cent. The commission some time ago granted a reduction in the power rate to be charged the company by the Electric Investment Company. This will result in a saving of about \$14,000 additional.

Taking the present one-way rates within the 5, 10, 15, 20-cent, and other limits, the following increases are allowed: 25 cents one way, now 45 cents round trip; 30 cents one way, now 55 cents round trip; 40 cents, now 75 cents; 45 cents, now 85 cents; 50 cents, now 90 cents; 55 cents, now \$1; 60 cents, now \$1.05; 65 cents, now \$1.15; 70 cents, now \$1.35; 80 cents, now \$1.45; 85 cents, now \$1.50. The first figure named in each instance is the fare charged one way. The figure named in the second instance is the round-trip fare to be charged under the increase.

TENNESSEE JITNEY DECISION APPEALED

The city of Memphis has appealed from the decision of Judge A. B. Pittman of the Third Division of the Circuit Court in the jitney case, mentioned on page 41 of the issue of July 3. The case will probably be heard by the Supreme Court of Tennessee early next September. The case came before the Circuit Court through a writ of habeas corpus, charging unconstitutionality of the act on jitneys for the violation of which the relator, S. B. Ryals, was held in restraint of his liberty. Judge Pittman declared unconstitutional Sec. 3 of the act, which required a bond of not less than \$5,000 for every jitney car operated. He did not pass on Secs. 1 and 2 of the act, which declared the jitneys to be common carriers and made it illegal for them to operate until they had been licensed by the city authorities and which also empowered the city authorities to fix the terms and conditions upon which jitneys may operate.

Uniformity in Car Operation Desired.—The City Council at Cleveland, Ohio, has adopted resolutions providing for the appointment of a committee to investigate the manner and method of payment of fares on the city railway lines and the manner and method of entering and leaving the

cars. The idea of Council is to establish uniform methods in both particulars.

Car Capacity Order Rescinded.—The Health Department of New York has officially suspended the operation of its order limiting the number of passengers on the cars of the Third Avenue, the Flatbush-Seventh Avenue, the Smith Street, the Graham Avenue and the Gates Avenue lines of the Brooklyn Rapid Transit Company. The order of the board fixed the maximum carrying capacity of the cars at one and one-half times their seating capacity.

Cincinnati Service Crippled by Storm.—Street car and interurban railway service in Cincinnati, Ohio, and near-by towns in both Ohio and Kentucky was crippled for hours by the heavy wind and rain storm which passed over that section on the evening of July 7. No great damage was done to the properties of the Cincinnati Traction Company and the Cincinnati, Newport & Covington Street Railway, but the streets were strewn with debris from unroofed and wrecked houses and buildings, rendering it impossible for the cars to make their way safely over the lines until the tracks could be cleared. Interurban lines were tied up for a time for the same reason.

Efficiency Awards of \$23,269 in Washington.—Following a custom inaugurated by the Capital Traction Company, Washington, D. C., seven years ago, \$23,269.50 was distributed recently among 196 motormen and 160 conductors who, for the year ended June 30, have lived up to the regulations of the company and had records for efficiency that entitled them to share in the benefits of the generosity of the company. Sixty motormen and twenty-five conductors, who have served the company ten years or longer, were each presented with \$100. Fifty-five motormen and thirty-three conductors, five years in the employ of the company, received \$75 each. Fifty-three motormen and sixty-five conductors, who came in the two-year class, received \$50 each, and twenty-eight motormen and thirty-seven conductors, who have been on the merit roll for a year, were awarded sums varying from \$27.08 to \$47.88. Since the merit system was started by the Capital Traction Company, in 1909, \$139,610 has been distributed among the conductors and motormen as an award for faithful and efficient service.

Free Transportation in Manila.—The question as to whether members of the city police force of Manila, P. I., are entitled to free transportation on the lines of the street railway has been the cause of a recent controversy between the Manila Electric Railroad & Light Company and the city of Manila, according to a newspaper dispatch dated June 5. It appears that the company insists on the collection from the city of \$1,150 alleged to be due as the result of the illegal enjoyment by policemen of free rides on the company's cars between Sept. 15, 1914, and April 15, 1915. A decision of the Supreme Court is said to have made compulsory the conspicuous display by policemen of their badges of office in order to be entitled to free transportation on the cars. The company contends that this ruling was not complied with during the period named and that in consequence it lost in uncollected fares the amount demanded from the city. On the other hand the city is suing the company for \$21,000 for fares paid by police officers the last eight years, during which period it is claimed they were entitled to free transportation.

Union Men Sign Lexington Participation Plan.—Several concessions made by the Kentucky Traction & Terminal Company, Lexington, Ky., to its union trainmen have resulted in their signing virtually the same three-year contract as that already signed by the non-union trainmen individually. The union's demand for a closed shop was rejected absolutely by the company, and the open shop principle, now in force, will be continued. The union men, however, may wear their union buttons, a privilege denied under the former contract, and may maintain a bulletin board at headquarters. The shopmen receive a flat increase of 1 cent an hour. Wages of the trainmen, union and non-union, will be governed by the condition of the contract heretofore described in the *ELECTRIC RAILWAY JOURNAL*, by which the company sets aside a fixed percentage of its earnings to pay damage claims, the residue to be divided among the men as an increase, in addition to a 1-cent general increase effective on July 15 with the new contract. The company has agreed to provide the men with seats.

Personal Mention

Mr. E. Burt Fenton has been appointed manager of a new publicity department for the various properties operated by W. S. Barstow & Company, New York.

Mr. G. S. Henry has resigned as general superintendent of the Chicago & Milwaukee Electric Railroad, Highwood, Ill. A successor to fill this vacancy has not been appointed.

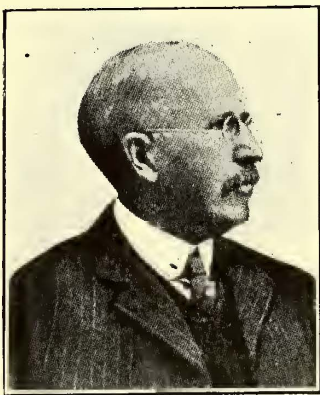
Mr. William M. Guy, who recently accepted the appointment of general traffic manager of the London & Port Stanley Railway, London, Ont., electrification of which has just been completed, tendered his resignation on July 3 to return to the service of the Pere Marquette Railroad, for which he has been chief clerk in London for years.

Mr. Irving M. Frost, for three years a director of the Rutland Railway, Light & Power Company, general manager of this concern, and also general manager of the Western Vermont Power & Light Company and the Pittsford Power Company, has forwarded his resignation to W. S. Barstow & Company of New York City, corporate managers of these companies.

Mr. G. R. G. Conway has resigned as chief engineer of the British Columbia Electric Railway, Vancouver, B. C., to enter consulting engineering practice in the East. He was honored at an elaborate farewell banquet at the Hotel Vancouver on June 28, tendered by the company, and highly complimented in a cablegram from the board of directors in London, England. He will continue relations with the company as its consulting engineer.

Mr. John F. Trumbull, formerly chief clerk to the chief engineer of the New York, New Haven & Hartford Railroad, has been appointed chief engineer of the Public Utilities Commission of Connecticut, succeeding Mr. C. C. Elwell, who resigned several months ago to become a member of the commission. Mr. Trumbull was graduated from Sheffield Scientific School, Yale University, in 1902, and has engaged continuously since that time in railroad work on the forces of the International Railroad of Mexico, those of the Connecticut Company and the New York, New Haven & Hartford Railroad.

Mr. James Dewar Fraser, secretary-treasurer of the Ottawa (Ont.) Electric Railway, was elected president of the Canadian Electric Railway Association at the annual meeting of the association held in Quebec on June 21 and 22. Mr. Fraser is a son of the late Andrew Fraser, of Martintown, Glengarry. He spent his youth in Glengarry and entered the employ of W. McClymont & Company, Ottawa, lumber dealers, in 1871, as an accountant and a telegraph operator. He remained with this company until 1882. He was then appointed secretary-treasurer of the Ottawa City Passenger Railway and continued in that position until 1891, when the company was merged with the Ottawa Electric Street Railway as the Ottawa Electric Railway. He has been secretary-treasurer of the company ever since and in 1913 was elected a director of the company. He is also an officer of the Ottawa Car Company, Ltd., and the Wallace Realty Company, Ltd.



J. D. FRASER

OBITUARY

O. W. Jasper, Sr., one of the engineers engaged in the construction of the Northern Electric Railway, Chico, Cal., died recently at Sacramento, aged fifty-seven years. He was born at Wheatland, Cal., and was graduated from the University of California in the class of 1881. Mr. Jasper was well known on the Pacific Coast. He had been engaged in various important railroad engineering projects of the West.

Construction News

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

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

RECENT INCORPORATIONS

East Georgia Railway, Savannah, Ga.—Chartered in Georgia to build an electric or steam railway from Glenville, north via Hagan to Adabelle, about 30 miles, with an extension from Hagan to Claxton. Capital stock, \$212,000. Headquarters, Savannah. Incorporators: H. P. Talmage, C. J. Baldwin and E. Leffler. [April 3, '15.]

FRANCHISES

Los Angeles, Cal.—On July 7 the Council of Los Angeles sold to P. D. Cornelius, president Malabar District Improvement Association, the franchise for the extension of the Brooklyn Avenue line on Evergreen Avenue to the east city limits for \$100. The franchise will be turned over to the Los Angeles Railway at once without charge so that the extension may be built.

Los Angeles, Cal.—The Pacific Electric Railway has asked the Council for a franchise to double track its line to San Pedro via Gardena.

East St. Louis, Ill.—The East St. Louis & Suburban Railway has asked the Council for a franchise to extend its lines in East St. Louis to Nineteenth Street and Baker Avenue.

Lafayette, Ind.—The Lafayette & Northwestern Railway, through its failure to file a written acceptance with the auditor of Tippecanoe County, has forfeited the franchise granted by the Council on Aug. 7, 1914. [April 3, '15.]

Henderson, Ky.—The Evansville, Henderson & Owensboro Railway will ask the Council for a twenty-year franchise to operate its cars on the city streets, and proposes to construct interurban lines to Owensboro, Morganfield and Providence, Ky., if granted the franchise.

Haverhill, Mass.—The Bay State Street Railway has received a franchise from the Council to relocate its tracks on Main Street, between Fourth Avenue and Kenoza Avenue; on Water Street, east of Haverhill Street, and on Lincoln Avenue at the City Farm.

Haverhill, Mass.—The Massachusetts Northeastern Street Railway has received a franchise from the Council to relocate its tracks for 240 ft. on Main Street and also at the curves into White Street and to Kenoza Avenue.

North Andover, Mass.—The Bay State Street Railway has asked the Council for a franchise to extend its double tracks from Merrimac Street, North Andover, over the new Shawsheen Bridge into Sutton Street.

Corpus Christi, Tex.—The Council of Corpus Christi has passed the franchise applied for by J. H. Caswell to construct a railway from Corpus Christi to Ward Island. The franchise will be voted on by the people on July 30. [June 10, '15.]

TRACK AND ROADWAY

Marin County Electric Railway, Mill Valley, Cal.—The Railroad Commission of California has issued an order authorizing this company to pay a sales commission of 15 per cent on the portion of its stock remaining unsold, such commission to be paid only when stock has been fully paid up. The company was authorized on Nov. 23, 1914, to issue and sell 185½ shares of stock at the par value of \$100 a share for the purpose of constructing a railway in Sausalito. [July 10, '15.]

Peoria & Chillicothe Electric Railway, Peoria, Ill.—Surveys of this company's line from Peoria to Chillicothe have been completed and the promoters are now ready to go ahead with the financing of the proposition. It is expected that the construction will be begun within a short time. [March 13, '15.]

Kankakee & Urbana Traction Company, Urbana, Ill.—This company is making surveys for the extension of its line from Ludlow to Paxton. A natural grove about midway between these points will be developed into a park by Paxton capitalists.

Sterling, Dixon & Eastern Electric Railway, Dixon, Ill.—This company has about completed the extension of its line in Dixon north on Crawford Avenue from Fellows Street to the grounds of the Illinois State epileptic colony.

La Salle County Electric Railroad, Ottawa, Ill.—Stockholders of this company have been called to meet on Aug. 17 to authorize the completion of the line between Ottawa and Mendota. O. D. Weaver, Jr., 37 South Wabash Avenue, Chicago, Ill., president. [May 22, '15.]

Union Traction Company of Indiana, Anderson, Ind.—A number of important changes have been made by this company at Anderson, including heavier rails and bridges for interurban traffic and a change in the routing of interurban cars in and out of the city. The company has placed 90-lb. rails on all of its right-of-way on Madison Avenue and Sixteenth Street, and the bridge at Sixteenth Street near Locust Street has been rebuilt of heavier material.

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—This company has received an extension of time from the Board of Public Works of Indianapolis to Sept. 15 in which to begin the construction of a line on West Tenth Street from Bismarck Avenue to Tibbs Avenue. The time for completion is now set for Dec. 1.

Winona Interurban Railway, Warsaw, Ind.—A report from this company states that it has a good proposition for an amusement company for next year. Correspondence may be addressed to J. C. Schade, assistant treasurer.

Hutchinson (Kan.) Interurban Railway.—A report from this company states that it expects to construct $\frac{3}{4}$ mile of new track in Hutchinson.

Orleans-Kenner Electric Railway, New Orleans, La.—Operation has begun on this company's line from New Orleans to Kenner. E. A. Stanford, New Orleans, president. [Feb. 6, '15.]

Winnipeg (Man.) Electric Railway.—This company is building a 1-mile extension of its tracks on Marion Street, St. Boniface, to the Union Stock Yards. Plans are also being made to reconstruct $\frac{1}{2}$ mile of track on Osborne Street from Kylemore Avenue to River Park.

Boston (Mass.) Elevated Railway.—This company will extend its Hardware Square-Central Square line to the Kenmore Street entrance of the Boylston Street subway via Pearl Street, Brookline Street, Cottage Farm Bridge, Commonwealth Avenue and Beacon Street. The line, which is now operated from Hanover Street to the Cottage Farm bridge via Massachusetts Avenue and Pearl Street, will be run between Hanover Street and Central Square.

Holyoke (Mass.) Street Railway.—On account of the increase in traffic from Holyoke to the Chicopee Falls section, this company is double-tracking its line from the Holyoke-Willimansett Bridge to Margaret Street.

Union Street Railway, New Bedford, Mass.—A petition has been presented to the Board of Aldermen of New Bedford to have the tracks of the Union Street Railway on Dartmouth Street moved to the center of the street. The railway is willing to change its tracks provided the city resurfaces the street.

Worcester (Mass.) Consolidated Street Railway.—Work has been begun by this company relaying its tracks on Main Street from Lincoln Square to Chandler Street. The rails weigh 126 lb. to the yard.

Worcester & Warren Street Railway, Worcester, Mass.—Citizens of West Brookfield have presented to the Council a petition for the relocation of this company's tracks on Main Street, West Brookfield.

Metropolitan Street Railway, Kansas City, Mo.—The city commissioners have awarded a contract to the American Bridge Company to construct a 1500-ft. viaduct at Eighteenth Street, Kansas City, Kan., over the yards of the Rock Island Railway. The viaduct will be a steel and concrete structure with roadbed for wheel traffic, car tracks and sidewalks. The cost, which is estimated at \$115,000, will be shared by the Rock Island Railway, the Union Pacific Railroad and the Metropolitan Street Railway.

United Railways, St. Louis, Mo.—Plans are being made by this company to extend its Tower Grove line on Arsenal Avenue and Ivanhoe Avenue, St. Louis.

Springfield (Mo.) Traction Company.—This company plans to extend its State Street line from New Street to Fort Street and south on Fort Street to Grand Avenue, Springfield.

Moncton Tramways, Electric & Gas Company, Ltd., Moncton, N. B.—This company plans to construct an extension of its line on Bonaccord Street from Main Street to Church Street, about one mile.

Public Service Railway, Newark, N. J.—This company has made application to the Board of Public Utility Commissioners of New Jersey for permission to abandon its line in the borough of Kenilworth extending from a point at Westfield Avenue and Grand Street, near Aldene station, to South Twentieth Street and Boulevard, New Orange. As an alternative to abandoning the line the company asks permission to operate for a single fare of 5 cents for a ride anywhere on the road without giving or receiving transfers from any other line with which the Kenilworth line is connected.

Trenton, Lakewood & Seacoast Railway, Trenton, N. J.—Representing himself and a number of other bondholders of the Trenton, Lakewood & Seacoast Railway Company, George O. Vanderbilt, Princeton, has applied to the Board of Public Utility Commissioners of New Jersey to reopen the proceedings under which the board authorized the company to issue \$190,000 of bonds and \$85,000 of stock. The contention of Mr. Vanderbilt is that the permission granted by the board would permit the exploitation of an over-issue of bonds for the purposes to which the proceeds are to be devoted, and that the result would be to depreciate the value of outstanding bonds. The petition set forth that a competent engineer employed by the bondholders had estimated that only \$135,000 would be required to construct 10 miles of line between Lakewood and Point Pleasant. [June 26, '15.]

Binghamton (N. Y.) Railway.—The Public Service Commission for the Second District of New York has ordered the Binghamton Railway to extend its lines from the present terminus to the northern village line of Port Dickinson.

Brooklyn (N. Y.) Rapid Transit Company.—The Public Service Commission for the First District of New York has received a report from the chief engineer giving the footings of the bids which were opened on July 9 for the installation of tracks on the New Utrecht Avenue elevated railroad in Brooklyn. This is a city-owned line, connecting through Thirty-eighth Street with the Fourth Avenue subway, and running over the route of the so-called West End line to Coney Island. The steel structure is nearly completed, and the commission will soon let the contract for the installation of tracks. Steel rails and other track materials for this line have been already purchased by the commission, and the bids opened July 9 were for the laying of ties, tracks and doing all other work required to put the railroad into operating condition except the work of installing the third-rail and electrical signal apparatus, which will be done by the New York Municipal Railway Corporation as a part of the equipment under the dual system contracts. The work will cover only the elevated part of the line, beginning at about Thirty-eighth Street and Tenth Avenue and extending through New Utrecht Avenue, Eighty-sixth Street and Stillwell Avenue to a point near Avenue Y. The three lowest bids were as follows: Ward & Tully, Inc., \$71,355; Joseph A. McElroy, \$75,183.20, and W. F. Jordan, \$78,525.

Buffalo & Depew Railway, Depew, N. Y.—This company reports that during August and September it expects to build 4000 ft. of track along Ellicott Road and Central Avenue to the passenger station of the New York Central Railway, Lancaster. It has just completed rebuilding 850 ft. of double track on Genesee Street. The company expects to continue the work of rebuilding and ballasting its track during the entire summer.

***Tiffin, Ohio.**—Chicago and New York financiers are interested in a proposition to build a railway between Tiffin and Bucyrus. Much territory for the right-of-way has been offered free of charge. The most favorable route is one via Ocoola, Lemert, Benton, Plankton and Melmore.

Berlin & Northern Railway, Berlin, Ont.—This company reports that it is extending its line $\frac{1}{2}$ mile from Bridgeport.

London (Ont.) Street Railway.—This company is reconstructing its single track on Ridout Street from Horton Street to Garfield Street, 4000 ft., with 80-lb. A. S. C. T. rail, supplied by the Algoma Steel Company.

Sarnia (Ont.) Street Railway.—This company is in the market for $\frac{1}{2}$ mile of rails, trolley wire, ties, etc., for use in the construction of an extension of its line from the corner of Christiana Street and St. Clair Street to Clifford Street, Sarnia.

Toronto (Ont.) Civic Railway.—The Mayor and the Board of Control of Toronto have received assurance from the Ontario government that if the work of constructing a permanent civic line on Bloor Street is proceeded with legislation will be forthcoming at the next session, provided the expenditure does not exceed \$125,000. The rails for the line are on the ground and the application was made to the government following the discovery that the city had not received approval for the project. Work on the line, which has been at a standstill for weeks, will now be resumed.

Johnstown & Somerset Street Railway, Johnstown, Pa.—Grading has been begun on the Johnstown end of this company's line from Kelso southward. Owing to a controversy over the rights-of-way through Boswell, it is probable that the line will extend along the edge of the borough instead of through the heart of the town. Plans are being considered to extend the line from Somerset to Berlin, where connection could be made with Meyersdale. G. C. Winslow, general manager. [May 15, '15.]

Philadelphia, Pa.—Bids are desired until Aug. 16 by A. M. Taylor, director Department of City Transit, Philadelphia, for the construction of concrete column foundations and piers for about 26,000 ft. of elevated railway on Front Street, Kensington Avenue and Frankford Avenue, known as Contract 501. Plans and specifications are on file at Room 748 Bourse Building, or may be secured on a deposit of \$10, pending return.

Scranton & Binghamton Railroad, Scranton, Pa.—This company reports that it plans to construct an extension of its lines from Foster to Brooklyn, about five miles.

Montreal (Que.) Tramways.—This company is changing the location of its tracks on Notre Dame Street between First Avenue and Dominion Park to the center of the street and is building an extension of 1.1 miles. The line between Dominion Park and Bernard Avenue, about 4.3 miles of single track, is also being reconstructed. The company has just built about 1 mile of single track from the "Y" at Bernard Avenue to the westerly limits of Montreal East. The rail being used is No. 97 L-399 section.

Rhode Island Company, Providence, R. I.—Arrangements are being made by this company for the laying of tracks on Fountain Street, Providence, and it is expected that cars will be running from Aborn Street to Exchange Place during August.

Chattanooga (Tenn.) Traction Company.—Work has been begun by this company on the construction of a new line on Second Street between Walnut Street and Broad Street, which will connect with the belt railway.

Knoxville Railway & Light Company, Knoxville, Tenn.—This company has begun a considerable amount of improvement work in connection with the city's paving operations. In most cases creosoted ties imbedded in concrete are being used, with a concrete-wearing surface between the rails and on the outside. Wood blocks have been laid on Gay Street. The Cumberland Avenue line will be rebuilt from Ninth Street to the city limits. Plans are being made to build an extension of its line from Fountain City to Smithwood, 1 mile.

Brownsville (Tex.) Street Railway.—Following the granting of a franchise for the extension of its lines, this company has announced that it will establish storage-battery cars on its lines in Brownsville. Service, which was suspended three months ago, will be resumed with the arrival of new equipment in a month. The extension will be made to effect a connection with the Rio Grande Railway to Point

Isabel. It is reported that the company plans an interurban service to the coast towns.

Corpus Christi Railway & Light Company, Corpus Christi, Tex.—This company announces the expenditure of \$100,000 on extensions and improvements to its line. Two of the most important of these extensions are a line about 3 miles long following the bluff line of Nueces Bay to a new residential section of the city and an extension from Epworth-by-the-Sea, the present terminus, to the Nueces County Causeway, about 1 mile.

Dallas Consolidated Electric Street Railway, Dallas, Tex.—This company has practically completed the double-tracking of its line on Bryan Street, Dallas.

Fort Worth & Denton Interurban Railway, Fort Worth, Tex.—It is reported that this company plans to begin work soon on the construction of its proposed railway from Fort Worth to Denton.

Beaumont, Liberty & Houston Traction Company, Houston, Tex.—Surveys have been made of this company's proposed line from Beaumont to Anahuac and Houston. J. H. McCracken, general manager. [May 29, '15.]

Petersburg & James River Railway, Petersburg, Va.—A report from this company states that construction on its proposed railway from Petersburg to City Point will be begun about July 19. The line will consist of $9\frac{1}{2}$ miles of single track, standard gage. Power will be supplied by the Virginia Power Company. J. Walter Long, 110 Bollingbrook Street, Petersburg, president. [June 12, '15.]

Princeton (W. Va.) Power Company.—Operation has been begun to the foot of South Walker Street on this company's line leading toward Bluefield. Work on the extension of the line up Brush Creek Valley is proceeding rapidly.

SHOPS AND BUILDINGS

United Traction Company, Albany, N. Y.—It is reported that officials of this company, the Schenectady Railway and the Albany-Southern Railway will meet in the near future for the purpose of promulgating plans for jointly erecting a terminal station in Albany. It is planned to have a terminal station that will be suitable to all three companies, and to which the companies can jointly contribute for erection and maintenance. The cost of the terminal has been taken into consideration and although no specifications have been drawn, it is estimated to be more than \$100,000.

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont.—This company plans to construct a station at Niagara-on-the-Lake, Ont., the terminus of its line from St. Catharines to the Niagara River. The structure will be 47 ft. x 25 ft., with an open shed 48 ft. x 20 ft. The building will be of stone up to 5 ft., the balance being shingle construction. The shed will be carried on pillars resting on stone pedestals 5 ft. high. Oak wainscoting with metallic side walls and ceiling will be used for the interior of the building.

Springfield (Ohio) Railway.—During the past year this company has expended about \$300,000 in erecting its new carhouse at East Street and Clifton Street, Springfield, and improving its power plant. The contract price of the new carhouse was \$90,000, exclusive of equipment. The old power plant has been practically rebuilt. New engines and dynamos have been installed and two new boilers are now being put in place. The cost of the improvements being made at the power plant is estimated at \$185,000. Two old frame carhouses on adjoining grounds have been torn down and a third one reroofed for use as a supply room.

Toronto (Ont.) Civic Railway.—The Toronto Board of Control has recently asked for bids for the machine shop equipment of this company's new carhouse at Danforth Avenue, consisting of a 14-in. lathe, 150-ton wheel press, shaper, radial drill, vertical drill, 3000-lb. portable crane, double emery stand, vise, hack saw and a 35-hp. induction motor.

Charlottesville & Albemarle Railway, Charlottesville, Va.—This company reports that the contract has been awarded to the King Lumber Company and work has been begun on the construction of its office building and substation in Charlottesville. The company has also purchased a 200-kw. rotary converter.

Manufacturers and Supplies

ROLLING STOCK

London (Ont.) Street Railway is having a number of its old cars remodeled at Preston, Ont., for pay-as-you-enter service.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., is considering the adoption of pay-as-you-enter cars. One car has been changed for a few weeks' experimental trial.

Michigan Railway Company, Kalamazoo, Mich., has ordered two more all-steel, 70-ft. limited parlor cars from the St. Louis Car Company for the Kalamazoo-Grand Rapids line.

Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., has this month placed in service four interurban cars built by the Cincinnati Car Company, the details of which, as compared with the cars formerly placed in service, are as follows: length, 59 ft., with truck centers 37 ft. instead of the previous 35 ft. 6 in.; seating capacity, sixty-eight instead of sixty-four persons; aisles 4 in. wider; smoking-car seats finished with fabrikoid instead of leather; fabrikoid curtains; flat window glass instead of curved in curved rear ends of cars; outside door for motorman; prism instead of leaded glass above windows; steel window sash; all double windows; larger toilets; Baldwin trucks; Peter Smith heaters; quadruple equipment Westinghouse 100-hp. motors for operation on 600 volts or 1200 volts; double-end Type H.L. control Westinghouse air-brakes, of the straight and automatic.

TRADE NOTES

U. S. Metal & Manufacturing Company, New York, N. Y., has been appointed railroad sales agent for the injector sand-blast apparatus manufactured by J. M. Betton.

Westinghouse Traction Brake Company, New York, N. Y., has received orders for air-brake equipment for the eight cars recently ordered by the Corpus Christi Railway & Light Company, Corpus Christi, Tex., and the six cars ordered by the New York & Queens County Railway, New York, N. Y.

F. W. Roth, who was formerly secretary and director of the J. N. Johns Manufacturing Company, has been recently appointed general manager of the Railway Specialties Corporation, 29 Broadway, New York City. This concern is manufacturing a motorman's new quick-action, adjustable seat.

Wasson Engineering & Supply Company, Milwaukee, Wis., has just shipped a repeat order for ten air-operated trolley bases to the Michigan United Traction Company, Jackson, Mich. These trolley bases are to be used on the new all-steel, high-speed cars of the Michigan Railway, running on the 2400-volt, third-rail line between Kalamazoo and Grand Rapids, Mich.

Esterline Company, Indianapolis, Ind., has just closed a record-breaking month for its graphic meter sales. In addition to a large list of industrial companies, the following electric railways have purchased instruments during the month of June: Public Service Commission of Indiana, utility watt-meter and volt-meter; Terre Haute, Indianapolis & Eastern Traction Company, ammeter; Virginia Railway & Power Company, Norfolk, Va., watt-meter.

Southern Car Company, High Point, N. C., was erroneously noted in the ELECTRIC RAILWAY JOURNAL of June 10 as having received an order from the Little Rock Railway & Electric Company, Little Rock, Ark., for three buses. The name of the purchasing company should have been the Argenta (Ark.) Railway, which operates on the north side of the Arkansas River. The buses will be used for the transportation of passengers from the cars of the Argenta Railway over the bridge into Little Rock to the cars of the Little Rock Railway & Electric Company, and vice versa.

ADVERTISING LITERATURE

Kernchen Company, Chicago, Ill., has issued a folder describing its siphonage ventilators.

Railway & Industrial Engineering Company, Pittsburgh, Pa., has issued a folder on its suspension lightning arrester.

Walter A. Zelnicker Supply Company, St. Louis, Mo., has issued a sheet describing its car mover for moving heavily-loaded cars.

Sprague Electric Works of General Electric Company, New York, N. Y., have issued a folder on their "Spragueduct" enameled conduit.

Beaudry & Company, Inc., Boston, Mass., has issued a catalog describing its hammers for light and heavy railroad machine and general forging work.

Chicago Pneumatic Tool Company, Chicago, Ill., has issued Bulletin E-36 superseding No. E-29, which describes and illustrates its Duntley electric grinders.

General Electric Company, Schenectady, N. Y., has issued a catalog describing its various types of street-lighting brackets and center-span fixtures for mazda lamps.

Titanium Alloy Manufacturing Company, Niagara Falls, N. Y., has issued a catalog which contains various magnified sectional views and lists of the composition of its alloys for aluminum and other standard bronze castings.

Dielectric Manufacturing Company, St. Louis, Mo., has issued a booklet on its various types of paint varnish and insulating compounds. The booklet contains tables and data relating to the insulating qualities of these various materials.

Trussed Concrete Steel Company, Youngstown, Ohio, has issued a folder describing a remarkable test which led to the installment of its United steel sash in the plant of the Edison Company. In the test two window sashes were placed on opposite sides of a brick furnace. The furnace was then subjected to a fire of unusual intensity for 35 min. In addition to this ordeal a stream of water from a 3-in. hose was played on the sash structure. After neither test was any sign of weakness discernible.

Stone & Webster Engineering Corporation, Boston, Mass., constructing engineers, have issued a tastefully prepared booklet which describes pictorially the numerous shops, factories, warehouses, mills, offices, educational buildings, power stations, etc., recently constructed by this company. The work includes a wide variety of construction problems which in most instances had to be met within brief time limits. Among the illustrations are included those of hydroelectric power stations of the Mississippi River Power Company and the Pacific Light & Power Corporation.

Westinghouse, Church, Kerr & Company, New York, N. Y., has issued a sheet which contains a potpourri of illustrations of buildings designed and constructed by this company. To show the scope of this work the illustrations are so arranged as to give the appearance of a bird's-eye view of a large city. Such a city, it is said, would cost \$50,000,000. There would be only thirty-three cities as large in the whole United States. To present the idea of size in other ways the sard states that all the wage earners of Hartford, Conn., could find employment there; over 56,000,000 sq. ft. would be under roof; the building and materials made over 1,000,000 tons of freight, which to haul at once would require a solid train 530 miles long.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued Leaflet No. 3823, describing the construction and operation of rotary converters of the commutating-pole type. A number of construction details are illustrated including a diagram of the brush-lifting device. A number of installation views are also shown. Leaflet No. 3760 describes a.c. remote hand-control switchboards. The leaflet goes into detail in describing the application of this type of switchboard together with the different methods of mounting, such as frame, wall, ceiling, etc., and a typical wiring diagram is given of the connections. Leaflet No. 3820 describes Westinghouse a.c. heavy duty slip-ring motors, type CW. This motor is especially adapted for constant and varying speed applications where continuous service and strong starting effort are required, and where squirrel-cage motors would not be adaptable. Large squirrel-cage induction motors are described and illustrated in Leaflet No. 3787. These motors and their features, adapting them for heavy work, are thoroughly described and illustrations are given of the detail parts.