

# Electric Railway Journal

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## RECALLING PLANT STATISTICS

An engineer's ability to remember plant dimensions and the sizes and capacities of apparatus under his charge is not much of a test of his fitness to hold his position, but, for a little thing, a poor memory as to essential details unquestionably plays its part in giving a bad impression of an operating man on superficial acquaintance. Even at the cost of repeated efforts, it pays to remember such data as the general dimensions of boiler and engine rooms, the exact ratings, main dimensions and speeds of prime movers, height and diameter of the stack, dimensions of the more important pumps, capacity of the coal pocket and a few other "bird's-eye" statistics that visitors often inquire about. All of these data can, of course, be extracted instantly from a loose-leaf book, but useful as such a book is, it should not be allowed to become an entire substitute for the engineer's personal recollections. Prompt and accurate answers to questions about the plant indicate a live interest in its service with an alert and responsive mind, and defects in this direction are decidedly worth eliminating.

## COASTING AND RUNNING TIME

When coasting recorders are first installed by a railway company its chief aim is to decrease the cost of energy and of brakeshoes. But experience has shown that the savings possible in another respect are far greater than either of these items. After the recorders have been in service for some months the men have approached the maximum percentage of coasting. Now, assuming the absence of severe down grades, this percentage of coasting is a good measure of the slack in the schedule running time. For example, if a line runs 35 per cent to 40 per cent coasting time it is evident that by a longer period of energy-using time the running time will be decreased. If a condition of this kind is developed on a line with, say, fifteen-minute headway and few cars the running time might be reduced to permit possibly a thirteen-minute headway with the same number of cars. In this case it might be found more profitable to get maximum coasting than to speed up the line, as the headway improvement might not be enough either to get more business or to cut out one car. On the other hand, if the line is operated on a five-minute headway a reduction of coasting time under conditions of maintained coasting ability would be far more likely to permit a reduction in the number of cars. Of course, some slack must always be allowed in any schedule, but when coasting regularly exceeds, say, 30 per cent, the economy of fewer cars for the same headway as before must greatly exceed the extra cost

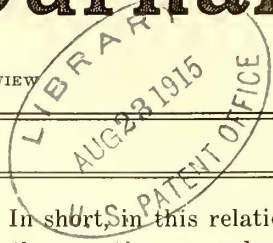
of energy and brakeshoes. In short, in this relation of coasting to running time the coasting recorder has proved an even greater means of economy in practice than in theory.

## SPECIFICATIONS AND PROGRESS

The increasing activity of the American Electric Railway Engineering Association and other organizations concerned with applied technology in preparing detail specifications of materials and appliances is a sign of the times. These are the contributions of the large roads to the small ones and are an evidence of a highly commendable spirit of co-operation. They constitute the text-book of the technical departments of the industry. They result from the combined efforts of user and manufacturer. Specifications are simply definitions of good usage in their field, and their purpose is not primarily to prevent manufacturers from foisting unsatisfactory products upon customers but rather to indicate the quality which is most suitable, that is to say, most economical, under given conditions. Specifications should lean toward a somewhat better quality than is absolutely necessary so that they may exert an influence in the direction of progress. This practice also provides a factor of safety and a reserve capacity. While specifications make dry reading, it is the manifest duty of the members of the Engineering Association to study those which have been laboriously prepared by their representatives in the committees and to apply them as far as possible. There will be an unusual opportunity for preconvention assimilation this year.

## BEAM-TYPE TRACK FOUNDATION IMPROVED

While the old style, beam type of track foundation has been abandoned by most street railway companies the conclusion must by no means be drawn that improvements which overcome the disadvantages of this old type will not resurrect it. In this issue of the ELECTRIC RAILWAY JOURNAL E. R. Horton, Jr., of the Southern Public Utilities Company, is quoted as describing a type recently installed by that company. Improvements in his construction include an 8-in. plate under the rail base, intended to spread the track loads over a wider area on the beam and consequently to reduce or possibly to eliminate the tendency of the concrete to pulverize under traffic vibration. The reinforcement at the bottom of the beam should also prevent its breaking up under track loads when the sub-foundation is properly prepared. Hook bolts used to fasten the rail also serve to bind the beam and the rail together vertically. The hooks pass around the reinforcements in the bottom of the beam, hence provide a secure an-





chorage. Another feature in this construction is the provision of reinforcing channels under the joints in addition to the 8-in. plate under the rail. Wooden washers on the anchor bolts below this bearing plate provide for shrinkage in the concrete when it sets. Under track loads these washers will compress until the space beneath the bearing plates has been closed. It is quite possible that this form of construction will prove satisfactory on light traffic lines, and it may be that the improvements in the beam construction would give it merit under comparatively heavy traffic. In any event this foundation construction is worth watching to determine its serviceability.

### TRANSMISSION LINE PROGRESS

Since the security of a transmission system depends chiefly on the performance of the line it is imperative to take every possible step toward securing continuity of service by suitable construction. In the case of traction lines in particular, the loss of power even for a short time works disaster. It not merely cuts off the load but disorganizes the system for a much longer time than that covered by the mere interruption. It therefore behooves the engineer to look a little way ahead and see what can be done to render the electrical supply more secure.

Taking up the situation as it stands, the three elements in line construction are the poles, the wires and the insulators. As regards the first-named there seems little doubt that, more and more, steel must be the material as it is now in a large number of cases. But when a steel line fails it is likely to fail rather badly, and, looking ahead, the indications are that whenever practicable one should not trust even to a single well-designed tower line but for many transmissions should provide a complete duplicate tower line. To do this economically means higher voltages than those commonly employed because the size of the members in the supporting structure must be determined by the stresses put upon it. A good deal of the work in the past has been on the basis of using public rights-of-way in such cases, and these have generally been fitted for modest voltages only. At present, when private rights-of-way are becoming common, there seems to be no good reason why the voltage should not be higher and hence the wires which have to be carried considerably lighter than they now average. As Dr. Steinmetz wisely remarked in a recent discussion, the insulator is no longer the weakest point in the line, and there is no good reason from the standpoint of insulation why the general average of working voltage could not be doubled with positive advantage. Given a light line, the conditions of supporting it become very much relieved so that it should be possible to use fairly long spans on lighter supporting structures than are now usual.

As regards the line itself experience has shown that failure of the wires, except from short-circuits, is a very unusual contingency. Break-downs, when they occur, are commonly at the supports, and the wires

themselves are not at fault. As a rule, even under the most severe conditions, when storms cause the failure of many electrical circuits, transmission lines come through all right. As regards the insulators, there is no difficulty now in taking care of 50,000 or 60,000 volts as easily as half this pressure was handled a few years ago. The suspension insulator has saved the day for high voltages, and on more modest ones such as those mentioned renders it easy to get a large factor of safety. Lightning is the most serious danger to be considered, and it seems to have been sufficiently well demonstrated that not even well-installed ground cables can entirely relieve transmission lines from this particular risk. The use of arc extinguishing devices seems to offer a very considerable measure of relief and deserves more extensive use than at present.

The general line of progress then would seem to be the employment of rather high voltages with duplicate main supply lines, suspension insulators giving a large factor of safety, and persistent study of methods of lessening the danger from lightning which at present is dominant.

### A YEAR OF THE DEPARTMENT ON "EQUIPMENT AND ITS MAINTENANCE"

When the subscribers to a periodical become contributors in large numbers direct evidence is afforded that they are active rather than passive readers. This condition indicates that degree of intimacy between readers and editors which is essential if the paper is to serve its clientele in a truly successful way. From this point of view the editors of the *ELECTRIC RAILWAY JOURNAL* view with satisfaction the record of the department on "Equipment and Its Maintenance." This department now numbers in its widening circle of contributors more than a hundred men who are directly engaged in using and bettering electric railway equipment.

With the first issue of the *ELECTRIC RAILWAY JOURNAL* for 1914 the practice of segregating short articles on details of equipment practice was inaugurated. Allowing a half-year for the promotion or accelerating period we may consider that the new department was well under way by the end of June, 1914, and therefore completed a year of mature life a few weeks ago. An examination of the pages devoted to this department will show how fully the results justify the effort to secure descriptions of those devices and methods which have produced maintenance economies or aided equipment reliability.

During the period mentioned signed articles from ninety-five writers, located in sixty-one cities in twenty-two States and five foreign countries were published. Omitting the numerous descriptions of recent manufacturing developments there were 217 signed and eighty-six unsigned editorial and contributed articles in the following divisions of the electric railway field: Shops and shop practices, eighty-two, or 27 per cent; car equipment, fifty-four, or 17 $\frac{3}{4}$  per cent; track and paving, forty-five, or 14 $\frac{3}{4}$  per cent; power generation and



distribution, thirty-seven, or  $12\frac{1}{4}$  per cent; transportation kinks, twenty-nine, or  $9\frac{5}{8}$  per cent; overhead and return circuit, twenty-seven, or 9 per cent; cars and car construction, twenty, or  $6\frac{5}{8}$  per cent, and records and costs, nine, or 3 per cent. In addition every new device of interest to railway men, of which information could be obtained, was carefully described. No expense has been spared in the effort to give the man in the shop, on the line and the track or in the power house, the information which he needs but finds it difficult to get.

A comparison of the above data with the tabulated results of an analysis of readers' preferences, printed on page 52 of the issue of this paper for Jan. 2, 1915, indicates that the supply of articles follows closely the desires of the readers. The canvass made last year showed that a very considerable portion of the readers take great interest in the department on equipment and maintenance, although at that time it was still in its infancy.

It is obvious that this department of the paper more than any other must depend upon the co-operation of those who benefit from its work. Its future is in the hands of its friends. The editors look forward to the time when each of several hundred successful equipment men will send in, as a matter of course, short descriptions of every new "stunt" which makes their own work lighter. With the field work of its own staff supplemented in this manner, the ELECTRIC RAILWAY JOURNAL well may claim that it is in the closest touch with every worth-while development of electric railway operation.

#### INFLUENCE OF AUTOMOBILES IN DENVER

The actual figures submitted with the exceptionally thorough traffic analysis that is outlined on another page of this issue by Roger W. Toll, chief engineer Denver Tramway Company, have a value that is largely local; at the same time, the inferences that may be drawn from them can hardly fail to be of general interest. The most striking feature is, of course, the fact that the automobile and bicycle combined appeared to have gained during the year almost exactly what the street cars lost. Compared with the preceding year, the net decrease in total traffic, including pedestrians, was 1.2 per cent, but, strange to say, there was practically an equal decrease in the number of pedestrians, so that the total number of riders of all classes actually remained the same as on the corresponding count during the preceding year.

The gain for the automobile was equivalent to about 8 per cent of the street car passengers, and the increase was caused by three factors, namely, an increased number of trips per day, an increased number of passengers per trip, and an increased number of automobiles in service. Although the latter factor is the largest of the three, its importance is minimized by the fact that the bulk of the street railway traffic is, of necessity, drawn from that part of the population which does not

own automobiles and never will do so unless unforeseen reductions in the cost of their maintenance and housing take place.

The thing that is important is that the use of individual automobiles is evidently extending. If this extension is caused by an increase of those who ride principally for entertainment and would not patronize the street cars if automobiles were not available, there is nothing very alarming about the movement. On the other hand, if these riders are drawn from the ranks of the railway's patrons, the result will be a diminution of receipts that will ultimately become a very serious matter.

However, every figure in the Denver analysis is in support of the first-mentioned possibility, and therein the results are distinctly encouraging. It is apparent from the report that the travel for purely business purposes (not for amusement), included in the 1915 totals of the Denver traffic, is less than in 1914, the condition being due, no doubt, to the business depression accompanying the European war. Evidence to this effect will be found in the decreased total travel, in the decreased number of men on freight vehicles, and above all, in the marked decrease in the number of pedestrians. Consequently, the total number of riders of all classes should have decreased also under the influence of these abnormal circumstances.

The fact that the total number of riders actually remained constant can be ascribed only to non-business riders in automobiles. In short, it appears to be unlikely that the increased use of the automobile, as recorded, came about by anything other than joy-riding, so that after all, the gasoline vehicle could not have been a basic cause of the street railway's traffic loss. As a matter of fact, the 9 per cent loss of the street railway might well be considered as a natural sequence of the 4 per cent decrease in pedestrians, and, although the decreased walking might appear to indicate an increased riding habit, it could do so only in times of business prosperity that would be accompanied by a great increase in total travel in and out of the business district.

Among the other interesting items that appear in the analysis is that of a 10 per cent increase in the use of the bicycle. We had been of the opinion that this form of locomotion had become a negligible consideration, yet in Denver it appears to serve some 5 per cent of the traffic, a figure which may be otherwise expressed as a number equal to no less than one-fifth of the number of pedestrians. The freight automobile also shows up in an interesting light, as the increase for the year was offset by the retirement of roughly the same number of horse-drawn trucks, about four of the latter making way for three of the former. From the figures, the rate of replacement of horse-drawn trucks by automobile trucks appears to be less than 10 per cent per year, and if this is the case in general, the gasoline truck can hardly be such a gold mine as it is pictured by some of its advocates.



# Safety of Trains on the Chicago Elevated

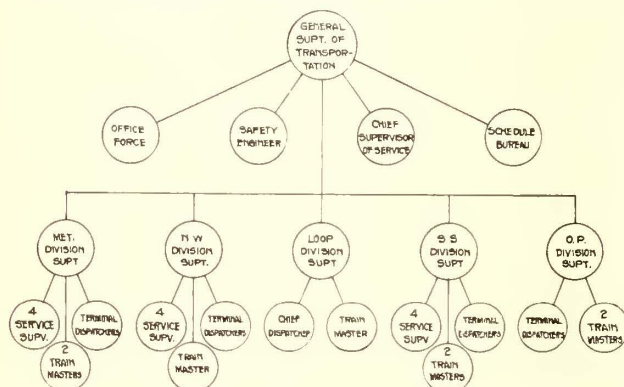
The Organization of This Property Has Been Built Around the Safety Idea—Special Fitness for Safe Train Operation Governs the Selection of All Employees

More and more interest is taken by the traveling public in the protective measures provided by transportation companies. This is justly so and, in recognition of this fact, a general outline of that part of the organization of the Elevated Railroads of Chicago, Ill., bearing most directly on the safety of their patrons is given.

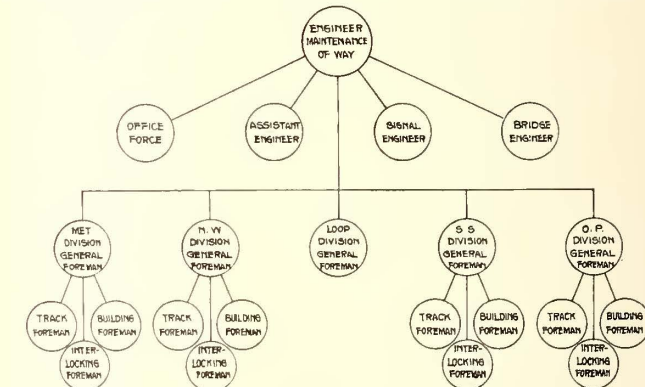
The Elevated Railroads of Chicago transport 170,000,000 people annually, hence the responsibility for their welfare and safety is not a light one, a fact which is thoroughly appreciated by both the management and the employees. They believe that safety is, after all, largely a matter of the personal equation, and to get the proper results great care is exercised in the selection of men for each responsible position. After that, the make-up and routine of the organization enters very largely into the kind of results that are obtained.

the dispatching of trains are stationed at each of the terminals. All of these transportation officials have been promoted through the ranks, the dispatchers and service inspectors being selected from the motormen and switchmen classes and the superintendents and trainmasters from the dispatchers. A chart of this organization is shown in one of the illustrations.

Selecting and training the rank and file of the transportation department also receive careful attention. The first step to obtain employment on the Elevated Railroads after being tentatively appointed as an extra trainman, is the physical examination by the medical examiner, Dr. H. E. Fisher, whose methods have been described in detail in the *ELECTRIC RAILWAY JOURNAL*, issues of June 26 and Aug. 7, 1915. An extra trainman is instructed for a period of one week by an experienced conductor in the proper handling of gates,



SAFETY ON CHICAGO ELEVATED—ORGANIZATION CHART OF TRANSPORTATION DEPARTMENT



SAFETY ON CHICAGO ELEVATED—ORGANIZATION CHART OF MAINTENANCE OF WAY DEPARTMENT

Accordingly, a description is given of the operating and maintenance departments, their relation to the special work of the safety engineer and his committees, and the work of the medical department as it bears on the safety both of employees and passengers.

## TRANSPORTATION DEPARTMENT ORGANIZATION AND METHODS

First in the public mind, so far as safe operation is concerned, is the transportation department because it is this department with which the public is in closest contact. The head of this department is M. J. Feron, general superintendent of transportation, who has been twenty years in the service, having started as a switchman and advanced from dispatcher, trainmaster and division superintendent to his present position. Previous to entering the service of the Elevated Railroads Mr. Feron was for several years in the operating department of the Chicago & Northwestern Railroad.

Under the general superintendent, there are five division superintendents in direct control of train operation in their respective parts of the city. Each of these division superintendents has his office and corps of assistants at a convenient point on the division. The assistants of the division superintendents are the day and night trainmasters and the service inspectors. There are four to each division, and to supervise the operation of the trains and the crews, they are kept on the road continually. Dispatchers who are in immediate charge of the motormen and trainmen and

bell signals and calling stations. He must serve as an extra trainman for two or three years before he is given a regular run. To break in as conductor, the trainman is taken to the yards and shops and instructed in the mechanical and electrical features of the equipment. To break in as motorman he must make a more detailed study of the equipment, after which he is required to spend about three months in learning to handle a train and to read signals in actual operation. At the end of this time the extra trainman is certified by the instructing motorman, after which he is finally examined by the trainmaster and division superintendent to determine his fitness. If these various tests are passed satisfactorily, the student is eligible to work as an extra motorman.

An applicant may break in as a switchman or towerman, providing that he shows sufficient aptitude for this work to give his superiors confidence that he will make good. In either of these classes he is instructed by a regular towerman or switchman, certified and finally examined by the trainmaster and the superintendent. A towerman also must be examined regarding mechanical and electrical details of a plant by the division interlocking foreman. From the foregoing, it will be appreciated that much attention is given to schooling prospective employees. Moreover, after a man is considered qualified for the service, he is closely supervised by the department and a permanent record of his work is kept for reference. In this connection it is interesting to show a list of the periods of em-



ployment of the regular motormen and conductors who have been in the employ of the Elevated Railroads of Chicago for periods varying from five to twenty-three years:

Period of Employment	Motormen	Conductors
Less than six years.....	114	247
Six to ten years.....	149	102
Ten to fifteen years.....	97	21
Fifteen to twenty years.....	57	5
Twenty to twenty-three years.....	417	375
Total number at present employed.....	417	375

#### WAY DEPARTMENT ORGANIZATION AND WORK

Public interest is next attracted to the maintenance of way department, which maintains the tracks, structure, signals and buildings in proper condition for the operation of trains. At the head of this department is B. J. Fallon, engineer maintenance of way, who has been eight years with the Elevated Railroads in this capacity, and eight years in the engineering department of the Chicago, Burlington & Quincy Railroad. Immediately under him is an assistant engineer, who has been in the service ten years, and a signal engineer who supervises and inspects all signal and interlocking work, who has also had ten years' experience with the signals. The way department staff also includes a bridge engineer, who supervises and inspects the elevated structure, bridges and buildings.

A general foreman is in charge of the men in the maintenance of way department on each one of the five divisions of the elevated lines. He has full supervision of all the work of this department and inspects the condition of the property periodically. The physical property under this foreman is divided into the following three classes; track work, structure and buildings, and interlocking and signal devices. An experienced foreman is in charge of each class on each division, and he in turn is aided by competent assistant foremen.

All electrical work, including the maintenance and installation of electrical circuits and the third-rail, is handled by a separate department. This is under the electrical engineer, who with his assistant has jurisdiction over the division electrical foremen. There are about sixty men engaged in the work of the electrical



SAFETY ON CHICAGO ELEVATED—VIEW AT JUNCTION SHOWING HEAVY EXTRA GUARD RAILS AND FIRST-AID STATION SIGN

department, outside of power houses and substations. These, together with the regular force of the maintenance of way department, comprise about 300 men. This number is increased by approximately 200 men during the months from April to November, when most of the construction and rehabilitation work is done.

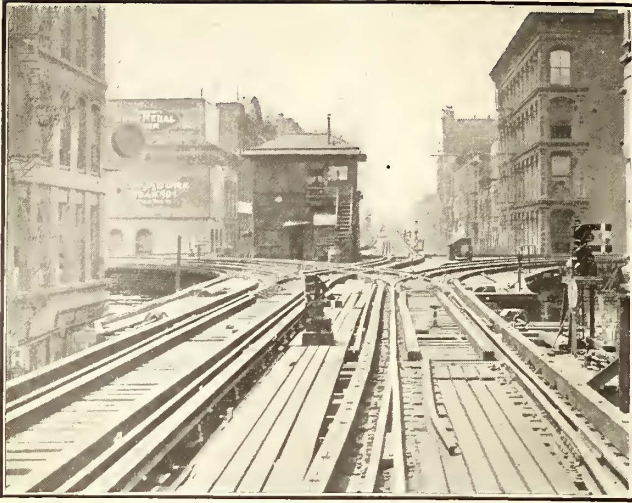
At each track junction on the Elevated Railroad system a modern interlocking plant has been installed. These plants protect all train movements on tracks through the junctions, and are so constructed that the failure of any part of the apparatus automatically stops all traffic on the tracks controlled by the plant. All of these plants are under the direct inspection of experienced interlocking repairmen, one or more being stationed at each important junction.

Each of the five elevated railroads is divided into track sections, and a number of section men or track walkers are regularly assigned to each. These men continually walk and inspect their track sections and make all light repairs necessary for safe operation. Extensive repairs and renewals are made by track con-



SAFETY ON CHICAGO ELEVATED—VIEW OF CROWDED TRANSFER PLATFORM AND BRIDGE. ALSO SHOWS CLOSE TIE SPACING





SAFETY ON CHICAGO ELEVATED—VIEW OF SIGNAL AND TRIP IN STOP POSITION

struction gangs. During the last several years the Elevated Railroads have maintained a large force of extra men to improve the various physical features of the property. Tie renewals are constantly necessary and in addition, as shown in one of the illustrations on page 303 of a crowded loop platform, the ties have been placed unusually close together. This was done throughout the Union Loop to deaden noise and at the same time it resulted in a perfectly safe track without the use of tie plates. Incidentally at all platforms where crowds assemble during the morning and evening rushes several guards are stationed to safeguard the public.

The loop junction at Fifth Avenue and Lake Street, illustrated on page 303, shows a special outer guard rail of very heavy construction. This has been provided along track special work to keep inside the outer guard rails any cars which may be derailed. Another of the accompanying illustrations of the same junction shows a track trip installed beside the semaphore signal. In case a train fails to stop at this signal the trip sets the air brakes. The signal set at danger, the track trip and the diverting track terminating at a bumping post installed each side of a bridge are also shown in one of the illustrations. In case the bridge is open and a motorman runs by the signal, the train will take the diverting track and at the same time the brakes will be thrown into "emergency" by the track trip. The foregoing protective devices are typical of the unusual precautions taken within the last few years by the Elevated Railroads of Chicago to avoid accidents. This is true not only of the operation of trains, but the principle has been applied to every department of this railroad.

#### THE SAFETY ORGANIZATION

The management of the elevated railroads was quick to recognize the value of the safety-first movement, and a number of years ago perfected a permanent safety organization. Experience soon demonstrated that satisfactory safety work could only be accomplished by forming special organizations and committees to supplement and co-operate with the regular operating organization. All safety work is under the supervision of J. H. Mallon, safety engineer. He is aided by a central committee composed of two department heads and himself. In addition, there are four division safety committees working in conjunction with the central committee. The chairman of these division committees is the division superintendent. He is aided by the division general foreman of the way department, and the

other committee members are the division general foreman of the shop department, the supervisor of service and a representative from the claim department. Thus a diversity of viewpoints is brought to bear on all safety problems.

All of the safety committees hold weekly meetings at which they discuss suggested improvements, and the causes of accidents that may have occurred, while from time to time inspections are made. A record is kept of each committee meeting. These records are exchanged with the other committees and in this way all committees may benefit. Safety suggestions are submitted to the department heads or the general manager for action.

Each month the central committee publishes a "Safety Bulletin," which keeps constantly before the men the principles of safety. The articles contained in these bulletins are written by employees and department heads. To supplement the bulletin, the safety engineer periodically gives lantern slide lectures, both for employees and the public.

Perhaps the most unique and helpful feature of the safety work of this company is a carefully prepared "Safety Rule Book." This is given to each employee upon entering the service, along with a safety-first button which is worn quite generally. The safety rule book is a compendium of the findings of the safety organization since its inception. Through it the new employee may benefit by the experience of his predecessors. The contents of this rule book are revised and extended from time to time to keep it up to date. It was carefully compiled by the department heads so that not only is the motorman able to see at a glance the rules for the safe handling of a train, but the line-man has before him the rules for safe handling of live conductors. The back of the rule book contains complete first-aid instructions. In the maintenance of way, shop and electrical departments, these rules are read and discussed periodically.

#### SAFETY IN THE MEDICAL DEPARTMENT

The medical department plays an important part in safeguarding and assuring the patrons of the Elevated Railroads of Chicago that every possible precaution is taken for their safety. The public scarcely realizes the results that are accomplished by the safety movement or the vast amount of detail necessary to assure the success of a crusade for the protection of human life. The company surgeon believes that it is essential that a public service company employ only men and women who are physically fit and not handicapped by poor



SAFETY ON CHICAGO ELEVATED—VIEW OF DIVERTING TRACK AND SIGNALS AT A CHICAGO RIVER BRIDGE



health or physical defects. Transportation or railroad work is hazardous at best and for that reason it is especially necessary to have men in charge of the operation of trains who will assure the maximum degree of safety to the thousands of passengers intrusted to their care.

To guard against physical defects being either the direct or indirect cause of accidents, the medical department was organized. When an applicant seeks a position in any of the departments, he is obliged to undergo a thorough physical examination to ascertain whether he is physically equipped to bear the responsibilities which will devolve upon him. In the train service every employee and applicant has his sight, hearing, color sense and physical condition carefully examined. Only those men are employed who have successfully passed the medical examination, hence equal the standard set by the medical department.

Perfect sight is essential to safe train movements, as a trainman must be able to see long distances perfectly to interpret signals. At night the safety of train operation is largely controlled by the signal lights, and for that reason it is necessary that an employee have perfect color vision or perception. Unfortunately, it is a fact that the two colors that are most often confused by people who are color blind are the two principal colors used for train operation, viz., red and green. The public quickly appreciates the great care that must be exercised in examining trainmen for this condition, as it is the chief factor in assuring safety at night.

Trainmen must have perfect hearing to be efficient, a fact so readily recognized that further comment is unnecessary. To insure safety in operation, railroads can hold no place for men with weak hearts or any heart disease. Quite frequently the heart fails at the critical moment when a trainman should have full possession of all of his faculties. All employees are examined every two years, and all new men are examined at the time of entrance into the service. Every employee in every department except the office force and the ticket agents receives a physical examination, and each department has a set of standard physical requirements.

The medical department has organized and had in practical operation for two years a first-aid-to-the-

ELEVATED	
<b>SAFETY FIRST</b>	CHICAGO, .....191..
This is to certify that I, .....,	
was called to the office of the Superintendent of the Metropolitan West Side Elevated Railway Company on the ...day	
...191.. and instructed as to the safe and proper way to run	
my train when working as motorman.	
I was positively forbidden by the Superintendent to ever	
take a train out on the road, from any yard or terminal, before	
testing the brakes on my train, and I was instructed that I	
must be positive and sure brakes are working properly on all	
cars on my train before starting out with same.	
He also called my especial attention to the danger of round-	
ing curves at a higher speed than that designated on Speed	
Boards placed at the entrance to all curves.	
My attention was also called to the extra caution I must	
take when operating over the road in foggy, thick or stormy	
weather, and I thoroughly understand that I must always	
operate my train, and have it under such control, that I am	
positive I can stop in the distance I can see.	
This especially so, in foggy weather, or when my view is	
obstructed from any other cause.	
Signed in presence of.....	
This.....day of ....191..	

#### SAFETY ON CHICAGO ELEVATED—RECORD OF CAUTIONING TRAINMAN

injured system. Regardless of all the safety-first measures adopted there will be accidents, and to meet these emergencies the first-aid system was inaugurated. It includes more than 100 first-aid stations located at frequent intervals over the entire mileage. At each station is a complete surgical and medical outfit containing all the necessary supplies required to give aid. Each station is designated by a red cross in a white circle conspicuously displayed. In connection with the first-aid system it was necessary to train employees in the rendering of intelligent first aid. More than 400 employees of the Elevated Railroads have received lectures and practical demonstrations in giving first-aid treatment, and the work of these men during the past two years has been instrumental in saving a number of lives and in preventing complications in injuries.

From the foregoing the valuable work accomplished by this class of procedure may be readily observed. It assures passengers on the elevated trains that the men in charge are in good physical condition and that their health is constantly under observation. It also assures the public that in time of accident when injuries may occur there are at hand the necessary first-aid supplies and employees competent to render the necessary relief until a physician arrives.

### Standards for Graphic Presentation

The joint committee on the above subject, comprising representatives of sixteen national societies and the United States Bureau of Standards, has prepared a preliminary report which is being published by the American Society of Mechanical Engineers, by which the committee was organized. The committee makes a number of suggestions regarding the preparation of diagrams and illustrates these by means of typical diagrams. The purpose of these suggestions is to foster the development of as uniform a style in the making of diagrams as is possible. This will increase the legibility of diagrams and will tend to promote the use of graphical presentation of data. The suggestions in general conform to usual good practice which they merely attempt to codify. Sample suggestions are these: "For a curve the vertical scale, whenever practicable, should be so selected that the zero line will appear on the diagram. If the zero line of the vertical scale will not normally appear on the curve diagram, the zero line should be shown by the use of a horizontal break in the diagram. The zero lines of the scales for a curve should be sharply distinguished from the other co-ordinate lines." Copies of the report can be secured from the A. S. M. E. office, 29 West Thirty-ninth Street, New York, N. Y., at 10 cents each.

#### THE METROPOLITAN WEST SIDE ELEVATED RAILWAY COMPANY

CHICAGO.....191..

#### INSTRUCTION BLANK

Motorman..... Badge No. ....

Mr..... student motorman, has been assigned to you to be instructed in the duties of a motorman. You must see that the student thoroughly understands the operation of a train in accordance with the rules and regulations of this Company, and is fully acquainted with all conditions, a knowledge of which is necessary for safe operation.

You will be in charge of the train and will be responsible for its safe operation.

You will permit the student to operate the train only when in your judgment it is safe to do so.

You will keep close by your student so as to be able to act quickly.

When following train ahead closely, or approaching signals, keep right at the student's elbow.

Keep a specially close watch when the rail is bad.

I have instructed student motorman..... badge No....., in the safe operation of a train in service, and have fully acquainted him with all signals, speed limits, station stops, and general conditions existing on the..... branch.....191.. Signed.....

I have received instructions from the motorman whose name appears above in the safe operation of a train in service, and have been fully advised as to all signals, speed limits, station stops and general conditions existing on this railroad.....191.. Signed.....

Mr. J. A. Jarvis,  
Asst. Superintendent.

Dear Sir:

I have examined the student whose name appears above, and am fully satisfied that he is competent to operate a train with safety and according to rules and regulations of this Company.....191.. Signed.....



# Operating Cost and Shifts in Service

Cost of Service Should be Considered in Making Schedules—Increased Rush-Hour Service Causes Higher Unit Costs—Standard Is Greatest Good to Greatest Number

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

The peculiarities of traffic, and the various methods used to determine them with the idea of using the information in the construction of time-tables, were discussed at some length in a previous article.\* Before proceeding with a further discussion of schedules, however, it will be well to consider in some detail the fact that the "car-hour" is not a basic unit of cost. It is obvious that while the average cost of operation per car-hour may be \$2.75, it will cost a company very much more than \$27.50 to place ten cars in service for an hour at the time of the evening rush. This fact, which is evident upon a consideration of the factors entering into cost, is made the basis of the present article, in which it is shown that the schedule which provides for the smallest number of standing passengers is not a schedule which keeps constant throughout the day the relation between seats and passengers. In other words, a standard for car loading permitting more passengers per car during rush hours than at other times is justified on the grounds of the greatest good to the greatest number of passengers.

In the example which is here worked out, it is shown that, owing to the high cost of rush-hour service, the use of a lower standard of car loading at that time permits a saving of 350 car-hours, which, with advantage to the patrons and at the same cost to the company, can be replaced by 890 car-hours during other periods of the day—a gain of 540 car-hours for the use of the passengers. The net result in the case assumed is the seating of 16,950 more passengers out of a total of 300,000 riding.

The first step is the determination of the cost of operation per car-hour at different periods of the day, operating expenses and depreciation, taxes and return on investment being taken into account. When a detailed study is undertaken of each element of cost, the effect of the occurrence of a large part of the riding during two short periods of the day—or "concentration of traffic"—is strikingly evident. The increased unit costs following increased service during the rush hour arise from a number of facts, among which are:

1. Operating expenses for platform labor are materially increased per car-hour run where additional service is furnished for short periods. Under usual operating conditions, only a limited number of men can be secured for rush-hour service at the usual rates, in anticipation of advancement to full day runs. Additional inducements must be made in order to secure labor for a few hours per day. The operating conditions of the company do not readily present other types of employment by which such labor can be employed during non-rush hours in order to secure a full day's work.

2. Rush-hour service creates a peak on the generating plant and the cost per kilowatt-hour for electrical energy for cars is much increased during such peak periods. Investment in necessary generator and transmission capacity must lie idle during the greater portion of the day and in readiness for rush-hour service. The ordinary fixed charges upon such investment cannot be spread over the company's output, as would be

the case where the service furnished had a demand uniform throughout the twenty-four hours.

3. The liability to accident during rush hours is proportionately greater than during non-rush hours, owing to the congested condition of the streets and the haste of passengers at these periods.

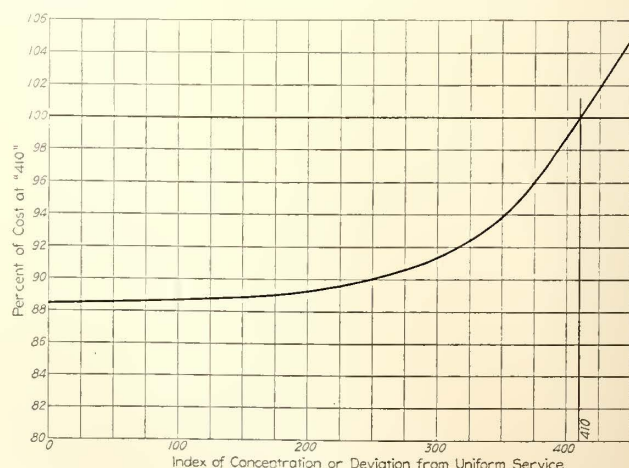
4. Investment in additional cars, car-housing facilities and car-handling facilities, being idle during the non-rush hour period of the day, fixed charges upon such investment are accordingly higher per unit of service during the rush hours.

The results of this study of costs may be stated in two ways. In the first place, Table I shows for a hypothetical urban electric railway the costs per car-hour at different periods of the day and the cost for each increase in the number of car-hours per hour. For instance, an increase of 3650 car-hours over the service rendered from 6 a. m. to 7 a. m. costs \$6 per car-hour, and a similar increase from 160,600 car-hours between 6 p. m. and 7 p. m. to 164,250 car-hours between 5 p. m. and 6 p. m. costs \$11.50 per car-hour. This illustrates very forcefully the fact that in the construction of time-tables attention cannot be confined to car-hours to the

TABLE I—SHOWING INCREMENT COSTS FOR CAR-HOUR

Period of Day	Car Hours per Hour per Period of Day	Increment in "Car-Hours per Hour"	Total Costs per Hour per Period of Day	Increment in Total Costs	Cost per Car-Hour for Period of Day	Costs per Car-Hour for Each Increment in Car Hours per Hour
12 a. m.—5 a. m.	6,570	.....	\$17,322	.....	\$2.635	\$2.635
5 a. m.—6 a. m.	41,975	35,405	101,778	\$84,456	2.420	2.385
8 p. m.—12 p. m.	70,445	28,470	170,436	68,658	2.420	2.410
9 a. m.—4 p. m.	77,745	7,300	189,612	19,176	2.440	2.620
7 p. m.—8 p. m.	99,280	21,535	248,676	59,064	2.510	2.745
8 a. m.—9 a. m.	118,625	19,345	323,059	74,383	2.725	3.840
4 p. m.—5 p. m.	122,275	3,650	340,673	17,614	2.785	4.825
6 a. m.—7 a. m.	127,750	5,475	366,206	25,533	2.870	4.655
7 a. m.—8 a. m.	131,400	3,650	388,058	21,852	2.958	6.000
6 p. m.—7 p. m.	160,600	29,200	573,459	185,401	3.570	6.350
5 p. m.—6 p. m.	164,250	3,650	615,449	41,900	3.735	11.500

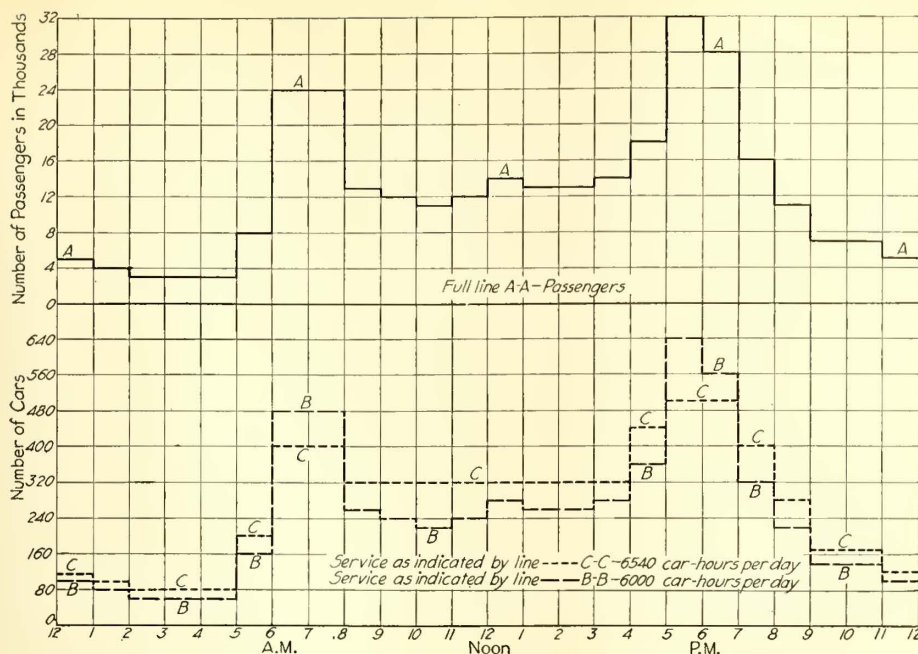
Note.—This table is based on one year's operation.



TRAFFIC SURVEY—FIG. 1—SHOWING INDEX OF CONCENTRATION OR DEVIATION FROM UNIFORM SERVICE

\*ELECTRIC RAILWAY JOURNAL, July 17, 1915, page 34.





TRAFFIC SURVEY—FIG. 2—SHOWING HOURLY RELATION BETWEEN PASSENGER TRAFFIC AND SERVICE ON TWO DIFFERENT BASES

exclusion of the time of day at which they occur. Reduced to its simplest terms, the proposition gains force. Compare the cost of operating twenty-four cars between 5 p. m. and 6 p. m. with the cost of operating one throughout the twenty-four hours. This seems too elementary to warrant statement, but it has been so often overlooked, in attempts to regulate service by those unacquainted with the facts, as to make its inclusion here important.

The second way of stating the results of the studies of costs above referred to involves a measure of the concentration of the service rendered as shown by the cars in service at different hours of the day. Assuming as the zero of concentration, from which to measure, a schedule which is uniform throughout the twenty-four hours, it is obvious that 10 per cent of the service is rendered in 10 per cent of the time, 20 per cent of the service in 20 per cent of the time, 70 per cent of the service in 70 per cent of the time, etc. Taking the schedule of cars in use on the lines of a typical company, it was found that in one hour, or  $4\frac{1}{6}$  per cent of the time, only 1 per cent of the car-hours occurred; in the six hours when the fewest cars were in service, or 25 per cent of the time,  $7\frac{2}{3}$  per cent of the car-hours; in 75 per cent of the time,  $52\frac{2}{3}$  per cent of the car-hours, etc. This is shown more fully in Table II. The use of this means of measuring concentration and its relation to cost assumes of course the same general distribution of traffic throughout the day as indicated in Fig. 2.

The sum of the numbers used to measure the amount by which the service varies from uniformity or the in-

TABLE II—SHOWING PERCENTAGE RELATION BETWEEN TIME AND CAR HOURS

Per Cent of Time	Per Cent of Car-hours	Difference	Per Cent of Time	Per Cent of Car-hours	Difference
4 $\frac{1}{6}$	1	3 $\frac{1}{6}$	54 $\frac{1}{6}$	30 $\frac{1}{3}$	23 $\frac{5}{6}$
8 $\frac{1}{3}$	2	6 $\frac{1}{3}$	58 $\frac{1}{3}$	34 $\frac{2}{3}$	23 $\frac{2}{3}$
12 $\frac{1}{2}$	3	9 $\frac{1}{2}$	62 $\frac{1}{2}$	39	23 $\frac{1}{2}$
16 $\frac{2}{3}$	4 $\frac{1}{3}$	12 $\frac{1}{3}$	66 $\frac{2}{3}$	43 $\frac{1}{3}$	23 $\frac{1}{2}$
20 $\frac{5}{6}$	6	14 $\frac{5}{6}$	70 $\frac{5}{6}$	48	22 $\frac{5}{6}$
25	7 $\frac{2}{3}$	17 $\frac{1}{3}$	75	52 $\frac{2}{3}$	22 $\frac{1}{3}$
29 $\frac{1}{6}$	10	19 $\frac{1}{6}$	79 $\frac{1}{6}$	58	21 $\frac{1}{6}$
33 $\frac{1}{3}$	12 $\frac{1}{3}$	21	83 $\frac{1}{3}$	64	19 $\frac{1}{3}$
37 $\frac{1}{2}$	15	22 $\frac{1}{2}$	87 $\frac{1}{2}$	72	15 $\frac{1}{2}$
41 $\frac{2}{3}$	18 $\frac{2}{3}$	23	91 $\frac{2}{3}$	80	11 $\frac{2}{3}$
45 $\frac{5}{6}$	22 $\frac{1}{2}$	23 $\frac{1}{2}$	95 $\frac{5}{6}$	89 $\frac{1}{3}$	6 $\frac{1}{2}$
50	26 $\frac{1}{3}$	23 $\frac{2}{3}$	100	100	0

Total difference or index of concentration..... 410

dex of concentration is 410. A company with a less pronounced peak load would show a smaller figure and one with a peak greater than normal a larger figure than this as a measure of its deviation from uniformity. Fig. 1 shows the results of a series of computations along this line.

The application, to a particular case, of the data from which Fig. 1 was drawn is shown in Fig. 2. The line A-A represents passengers and the line B-B cars in service at each hour. It will be observed that the line B-B follows proportionately the variations in the line A-A, keeping constant the relation between service and traffic. Table II, based on the data from which the line B-B was drawn, shows the deviation from uniformity to be 410. Assuming that 6000 car-hours distributed as indicated by the line B-B exhaust the financial ability

of the company to provide service, it will be found by reference to Fig. 1 that if service can be so distributed as to reduce the deviation from uniformity from 410 to 325, the cost per car-hour will be but 92 per cent as great and consequently the number of car-hours which the company is financially able to supply will be 6000 divided by 0.92, or 6540. Service on this basis is shown by the line C-C.

It is of interest to note that the 160 car-hours in the morning and the 190 car-hours in the evening, 350 in all, have been replaced with 890, leaving a net gain of 540 car-hours. The distribution of car-hours indicated by the line C-C is the more common, but it is immaterial to the company whether, under the conditions stated, 6000 or 6540 car-hours are provided each day. Such redistributions of car-hours as are frequently

TABLE III—SHOWING RELATIVE SERVICE FURNISHED UNDER PLANS INDICATED BY LINES C-C AND B-B IN FIG. 2

Hour	Number of Passengers	Line C-C in Fig. II Index of Concentration, 324.7 Cost Factor, 92		Line B-B in Fig. II Index of Concentration, 410 Cost Factor, 100	
		Number of Cars	Number of Seated Passengers	Number of Cars	Number of Seated Passengers
12—1 a. m....	5,000	118	4,820	100	4,100
1—2 a. m....	4,000	100	4,000	80	3,270
2—3 a. m....	3,000	80	3,000	60	2,450
3—4 a. m....	3,000	80	3,000	60	2,450
4—5 a. m....	3,000	80	3,000	60	2,450
5—6 a. m....	8,000	200	8,000	160	6,550
6—7 a. m....	24,000	400	16,350	480	19,630
7—8 a. m....	24,000	400	16,350	480	19,630
8—9 a. m....	13,000	313	12,800	260	10,630
9—10 a. m....	12,000	313	12,000	240	9,825
10—11 a. m....	11,000	313	11,000	220	9,000
11—12 a. m....	12,000	313	12,000	240	9,825
12—1 a. m....	14,000	313	12,800	280	11,450
1—2 a. m....	13,000	313	12,800	260	10,630
2—3 a. m....	13,000	313	12,800	260	10,630
3—4 a. m....	14,000	313	12,800	280	11,450
4—5 a. m....	18,000	440	18,000	360	14,720
5—6 a. m....	32,000	505	20,650	640	26,170
6—7 a. m....	28,000	505	20,650	560	22,900
7—8 a. m....	16,000	400	16,000	320	13,100
8—9 a. m....	11,000	270	11,000	220	9,000
9—10 a. m....	7,000	170	6,950	140	5,720
10—11 a. m....	7,000	170	6,950	140	5,720
11—12 a. m....	5,000	118	4,820	100	4,100
Total .....	300,000	6,540	262,540	6,000	245,400
			87.5% of total		or 81.8% of total



desired by patrons should be considered, however, as depending upon the ability and willingness of the patrons to pay for them, and when there is no other determining factor on the basis of the greatest good to the greatest number.

On the assumption that the line *C-C* represents service sufficient to provide a seat per passenger from 8 a. m. to 4 p. m., it will be of interest to note the relative service furnished under the two plans indicated by the lines *C-C* and *B-B*, as measured by the percentage of passengers seated at the point of maximum loading. Under the method of procedure previously outlined, Table III has been computed and it is found that the advantage of lower off-peak costs has been utilized to seat about 17,000 additional passengers out of 300,000, or 5.6 per cent.

In all the above computations, it is assumed that the average length of ride is the same throughout the day, and that the same routing is employed under both schedules. This permits the quality of service to be measured by the number of passengers standing at the point of heaviest loading. A more critical analysis would consider in addition the miles ridden by standing passengers.

The foregoing is set forth in some detail as furnishing a mental background which is very necessary if the maker of time-tables is not to be drawn into unwise and expensive deviations from what his company can do in the way of providing car-hours without being neglectful of the interests of the capital which makes the transportation industry possible.

## Railway Co-operating to Beautify Towns

Along the Louisville & Eastern division of the Louisville & Interurban Railway there are several suburban towns in which the "community beautiful" movement has been receiving attention. The town of Anchorage, for instance, engaged a landscape architect to make plans for it, while the people harbor a desire to see the railway replace its present station with something more to their liking. O'Bannon's, Pewee Valley and Crestwood, also have their own particular movements. In so far as it is possible the railway is co-operating. R. H. Wyatt, freight and passenger agent of the company, described what the company had done at O'Bannon's to satisfy the people. The station there was located for purely utilitarian purposes. When the landscape gardening fever struck the community Mr. Wyatt was visited by a delegation of citizens who suggested that the station be faced differently. It was agreed that the commuters were right, and a gang of men with jack-screws and rollers relocated the station in a way that met the idea of the landscape artists. Planting around the station grounds and grading of unequal places, etc., is making progress. It is felt that co-operation with the local residents wherever possible is good business for the traction company.

The Fort Wayne & North Indiana Traction Company, Fort Wayne, Ind., is holding safety-first meetings for employees in which recreation, entertainment and instruction are provided. The day employees were taken to Robinson Park recently for an evening outing. James M. Barrett, president of the company, was the principal speaker at this meeting. A meeting was held in the Holman Street carhouse at 12.30 o'clock midnight for the night employees, at which S. W. Greenland, general manager of the company, made an address. Similar meetings will be held by the company at Lafayette, Ind., and Logansport, Ind.

## Operation of Safety Zones in Kansas City

"Safety zone" standards were recently set up on several of the downtown crossings of Kansas City, Mo. Their use is being tested, as well as the methods of placing them. Temporarily, they are placed 7 ft. from the nearest rail, and about 50 ft. apart, in pairs, defining a zone within which persons boarding or leaving cars may be safe from vehicle traffic, as shown in the accompanying illustration. It is likely that lines may be painted on the pavement defining the safety zones, and extending to the sidewalks so as to indicate more clearly to pedestrians crossing the road the exact straight course they should take. There is still some confusion among motor car drivers, because of the ordinance prohibiting automobiles from passing a car taking on or discharging passengers, and requiring the automobiles to stop 10 ft. from such a car. The new rules will allow automobiles to pass standing cars, but probably at slow speed. Some streets are so narrow that automobiles cannot safely pass the cars, and in these streets they are being allowed to follow the cars through the zones on the tracks. There was opposition from the police to the installing of the standards, because of the problem of their care at night. However, the police are temporarily caring for the standards,



KANSAS CITY SAFETY ZONES IN OPERATION

removing them to the sidewalks at night, and replacing them at 8 a. m. It is possible that the standards may be discarded when the lines showing the zones are painted. The present standards are about 5 ft. high, on bases about 16 in. in diameter, with circular white-painted signs on top, bearing the following wording: "Safety Zone," "Load," "Stop." The face "Stop" stands at the point where the motorman stops the front end of the car. The face "Load" is at the rear end. The reverse of each standard bears the words "Safety Zone."

The crossings at which the safety zones can be established, the width of the zones, and the regulations as to motor car and vehicular traffic are now the subject of study by the experts of the board of control. So far the public has shown timidity about standing in the zones, and an almost unconquerable inclination to wait until the last minute, as under previous conditions, before approaching the car. It is believed, however, that when patrons learn to reach the safety zones by way of the street crossings, and that it will be reasonably safe there while they wait for the car, traffic will be very greatly expedited. The recent growing tendency to disembark by the front doors is an important factor in promoting the utility of the zones, since passengers can immediately mingle with the pedestrian stream at the crossings.



# Traffic Investigation in Denver

Counts of All Vehicles and Pedestrians Passing Into and Out of the Business District Showed a Marked Increase of Automobile and Bicycle Traffic Notwithstanding an Actual Decrease in the Total Traffic Compared with That of Last Year

BY ROGER W. TOLL, CHIEF ENGINEER DENVER TRAMWAY COMPANY

In order to obtain information as to the relative importance of the various methods of city transportation in Denver, a traffic investigation was conducted in May, 1915, under the direction of John A. Beeler, vice-president Denver Tramway Company, as a supplement to the investigation of the year before which was reported in the *ELECTRIC RAILWAY JOURNAL* for Aug. 29, 1914, page 380. As it was desired to investigate traffic conditions on Sunday as well as on a weekday, the recent investigation covered two days, namely, Sunday, May 9, and Tuesday, May 11. The weather was good on both of these days, and the results obtained represent typical traffic conditions.

The basis of the investigation was a count of all persons and vehicles entering and leaving the business district of the city upon the dates selected, the assumed boundaries including the greater part of the retail and wholesale districts of the city as well as a portion of the railroad terminal yards. Observations were taken under the direction of J. D. Rich of the engineering department, and the data collected were also compiled by him. Through the valued co-operation of W. M. Casey, W. H. Seip and J. L. Adams of the transportation department, trainmen were secured as observers, and because of their interest in the work and conscientious attention to duty, the results obtained are accurate and reliable.

It was desired to make a complete count of all traffic entering and leaving the entire district in a single day, and as the number of available observers was limited, it was necessary to use a long shift. Thirty-nine men were on duty for a continuous eighteen-hour period from 6 a. m. until midnight. In order to provide for meals and short rests, a relief, consisting of four men, was maintained from 9 a. m. until midnight. Each relief man was assigned to a certain number of the observers, each of whom he relieved three times during the eighteen hours for a period of one-half hour.

Thirty-eight thoroughfares cross the assumed boundaries of the business district. In the case of a few streets with very light traffic, one observer could record the traffic on two streets, but as a rule a man was stationed at each street entering the district, and, owing to particularly heavy traffic, two simultaneous observers were placed at each of the four busiest locations, and by dividing the work reliable results were secured. Observations were recorded in half-hour periods throughout the eighteen-hour day. To make the data comparable to the data on street car passengers, children under six years old were not counted.

## NUMBER OF PERSONS INBOUND AND OUTBOUND

Table I shows the number of persons entering and leaving the business district by each method of transportation, exclusive of street cars, on Sunday, May 9, and Tuesday, May 11, respectively. The excess of inbound pedestrians over outbound pedestrians was 5261, which agrees closely with last year's results and indicates that more people walk to business than walk home.

Table II shows a comparison of the Sunday and Tuesday traffic as to the total number of persons entering and leaving the business district, exclusive of street

car traffic. This table shows the large increase of passenger automobile traffic on Sunday, amounting to 41.6 per cent, and also the decrease of freight traffic, both automobile and horse-drawn, amounting respectively to 77.7 per cent and 83.8 per cent. The great decrease in bicycle traffic, amounting to 59.3 per cent, shows that most of the bicycles are not used for pleasure, but primarily either for transportation to and from work or for business purposes. A large part of the bicycles are used by messenger boys and delivery boys.

Table III shows a comparison of the records obtained last year and this year, relative to the total number of persons counted. An increase of 6.8 per cent is shown in the total number of persons entering and leaving the business district, exclusive of street car traffic. A considerable variation is to be expected from one day

TABLE I—INBOUND AND OUTBOUND STREET TRAFFIC—PERSONS

Means for Transportation	Sunday, 5/9/15		Tuesday, 5/11/15	
	Inbound	Outbound	Inbound	Outbound
Passenger autos.....	32,798	33,104	23,408	23,117
Freight autos.....	569	650	2,658	2,795
Motorcycles.....	2,227	2,248	2,072	2,115
Bicycles.....	4,221	4,323	10,393	10,558
Passenger horse-drawn vehicles.....	2,333	2,344	2,350	2,118
Freight horse-drawn vehicles.....	1,874	1,878	11,529	11,593
Pedestrians.....	53,155	48,331	54,081	48,820

TABLE II—SUNDAY AND WEEKDAY TRAVEL—PERSONS—1915

Means for Transportation	Sunday, 5/9/15		Tuesday, 5/11/15		Increase		Decrease	
	Persons	Per Cent	Persons	Per Cent	Persons	Per Cent	Persons	Per Cent
Passenger autos.....	65,902	34.7	46,525	22.4	19,377	41.6	.....	.....
Freight autos.....	1,219	0.6	5,453	2.9	.....	.....	4,234	77.7
Motorcycles.....	4,475	2.4	4,187	2.2	288	6.9	.....	.....
Bicycles.....	8,544	4.5	20,951	10.1	.....	.....	12,407	59.3
Passenger horse-drawn vehicles.....	4,677	2.5	4,468	2.2	209	4.7	.....	.....
Freight horse-drawn vehicles.....	3,752	1.9	23,122	11.1	.....	.....	19,370	83.8
Pedestrians.....	101,486	53.4	102,901	49.6	.....	.....	1,415	1.2
Total.....	190,055	100.	207,607	100.	.....	.....	17,552	8.5

TABLE III—COMPARISON OF WEEKDAY TRAVEL—PERSONS—1914-1915

Means for Transportation	Tuesday, 5/5/14		Tuesday, 5/11/15		Increase		Decrease	
	Persons	Per Cent	Persons	Per Cent	Persons	Per Cent	Persons	Per Cent
Passenger autos.....	30,804	15.9	46,525	22.4	15,721	51.0	.....	.....
Freight autos.....	3,735	1.9	5,453	2.9	1,718	46.0	.....	.....
Motorcycles.....	3,923	2.0	4,187	2.2	264	6.7	.....	.....
Bicycles.....	18,950	9.3	20,951	10.1	2,001	10.5	.....	.....
Passenger horse-drawn vehicles.....	4,710	2.4	4,468	2.2	.....	.....	242	5.1
Freight horse-drawn vehicles.....	25,344	13.5	23,122	11.1	.....	.....	2,222	8.8
Pedestrians.....	106,990	55.0	102,901	49.6	.....	.....	4,089	3.8
Total.....	194,456	100.	207,607	100.	13,151	6.8	.....	.....

to another, in the same month, due to weather and other conditions, and therefore too great weight should not be given to this increase in any general conclusion regarding the two years. However, a comparison of the results of the two days is very valuable. The total number of persons in passenger automobiles shows an increase of 53 per cent and the number of persons in freight automobiles increased 46 per cent. Much smaller gains are shown in the motorcycle traffic and bicycle traffic, while the horse-drawn traffic, both passenger and freight, and the pedestrians count have each decreased by a small percentage. The comparison, as a whole, shows a decided increase in automobile transportation.

The number of vehicles entering and leaving the



business district was recorded, as well as the number of persons in the vehicles. Table IV shows the vehicular count on May 9 and May 11, and Table V shows a comparison of the totals of the vehicle count on these two days, together with the average number of persons carried by each class of vehicle. The marked decrease in the use of freight vehicles, both motor and horse-drawn, is to be expected on Sunday. The large decrease in the use of bicycles, above referred to, may also be noted. The use of passenger horse-drawn vehicles also decreased on Sunday, showing that this class of transportation is used more for business purposes than pleasure.

The number of passenger automobile trips and motorcycle trips remained about the same, numerically, on Sunday as on the weekday count, but it was very evident that their use on Sunday was largely for pleasure trips. This is also indicated by the increased number of passengers per vehicle on Sunday for both autos and motorcycles. Incidentally, the number of vehicles of each class entering and leaving the business district in any one day should balance almost exactly, and Table IV furnishes a good indication of the degree of accuracy obtained in the traffic count.

Table VI gives a comparison between the vehicle counts obtained last year and this year. The total trips on Tuesday, May 11, this year show an increase of 12.7 per cent over the total trips of last year. The number of passenger automobile trips shows 38.6 per cent increase, and the number of freight automobile trips shows an even greater percentage of increase. Motorcycles and bicycles show small increases, but horse-drawn vehicles, both passenger and freight, show a decrease. These comparisons are closely analogous to the comparisons, for the two years, of the total number of persons, as shown in Table III. In each case, the number of passengers per vehicle is nearly the same for both years.

The passenger automobile is shown as the most numerous class of vehicle, with the bicycle in second place and the horse-drawn freight vehicle in third place. Last year the horse-drawn freight vehicle had first place, the bicycle second place and the passenger automobile third place.

The ratio of the motorcycle trips to the bicycle trips is 1 to 5.6 as compared with the ratio last year of 1 to 5.4. This indicates that the bicycle is holding its own as compared with the motorcycle. The ratio of the freight auto trips to the passenger auto trips is 1 to 6.1, as compared with the ratio of last year, which was 1 to 6.5. Of the horse-drawn vehicle trips, 86 per cent were for freight purposes, which is the same percentage as that of last year. Of the total vehicle trips, 31 per cent were for freight purposes, as against 35 per cent for last year. Contrary to last year's records, the automobile trips are in excess of the horse-drawn vehicle trips, being 37 per cent of the total number of vehicles, as compared with 30 per cent for the horse-drawn vehicles. Last year, these percentages were exactly reversed.

The accompanying chart shows graphically the number of persons entering and leaving the business district during each half hour of the day for each method of transportation on Sunday, May 9, 1915. This indicates that the Sunday peak for automobiles occurred at about 5 p. m., but that the peak for pedestrians was not reached until nearly three hours later.

#### CAR TRAFFIC

The best statistics that are available for comparison with street traffic are the figures of total passengers carried in the city, regardless of the business district. This comparison, while it is the best available, is on a

TABLE IV—INBOUND AND OUTBOUND STREET TRAFFIC—VEHICLES

Class of Vehicle	Sunday, 5/9/15		Tuesday, 5/11/15	
	Inbound	Outbound	Inbound	Outbound
Passenger autos.....	11,848	11,938	11,980	11,904
Freight autos.....	350	396	1,874	2,013
Motorcycles.....	1,653	1,665	1,786	1,830
Bicycles.....	3,898	4,245	10,388	10,503
Passenger horse-drawn vehicles.....	1,218	1,211	1,684	1,533
Freight horse-drawn vehicles.....	1,375	1,412	9,455	9,636

TABLE V—SUNDAY AND WEEKDAY TRAVEL—VEHICLES—1915

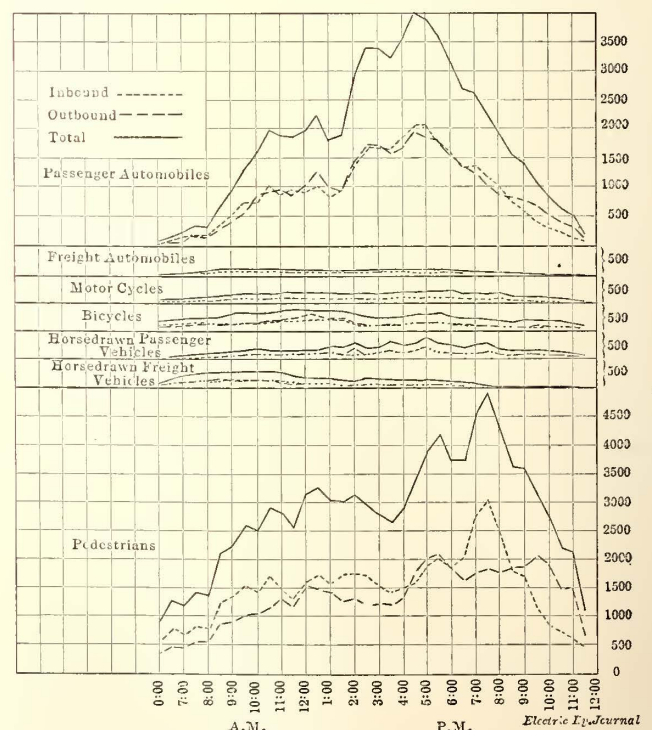
Class of Vehicle	Sunday, 5/9/15		Tuesday, 5/11/15		Increase		Decrease		Average Number of Persons per Vehicle	
	Vehicles	Per cent	Vehicles	Per cent	Vehicles	Per cent	Vehicles	Per cent	5/9/15	5/11/15
Passenger autos.....	23,786	57.7	23,884	32.0	98	0.4	2.77	1.95		
Freight autos.....	746	1.8	3,887	5.2	3,141	80.8	1.63	1.40		
Motorcycles.....	3,318	8.0	3,616	4.9	298	8.2	1.35	1.16		
Bicycles.....	8,143	19.8	20,891	28.0	12,748	61.1	1.05	1.00		
Passenger horse-drawn vehicles.....	2,429	5.9	3,217	4.3	788	24.5	1.93	1.39		
Freight horse-drawn vehicles.....	2,787	6.8	19,091	25.6	16,304	84.5	1.35	1.21		
Total.....	41,209	100.	74,591	100.	33,382	44.8	2.15	1.40		

TABLE VI—COMPARISON OF WEEKDAY TRAVEL—VEHICLES—1914-1915

Class of Vehicle	Tuesday, 5/5/14		Tuesday, 5/11/15		Increase		Decrease		Average Number of Persons per Vehicle	
	Vehicles	Per cent	Vehicles	Per cent	Vehicles	Per cent	Vehicles	Per cent	5/5/14	5/11/15
Passenger autos.....	17,212	26.0	23,884	32.0	6,672	38.8	.....	.....	1.79	1.95
Freight autos.....	2,630	4.0	3,887	5.2	1,257	47.8	.....	.....	1.42	1.40
Motorcycles.....	3,452	5.2	3,616	4.9	164	4.8	.....	.....	1.14	1.16
Bicycles.....	18,667	28.2	20,891	28.0	2,224	11.9	.....	.....	1.01	1.00
Passenger horse-drawn vehicles.....	3,459	5.2	3,217	4.3	.....	.....	242	7.0	1.36	1.39
Freight horse-drawn vehicles.....	20,747	31.4	19,091	25.6	.....	.....	1656	8.0	1.22	1.21
Total.....	66,167	100.	74,591	100.	8,424	12.7	.....	.....	1.47	1.40

somewhat different basis, since a certain proportion of the passengers carried on cars do not enter the business district. The car data, therefore, included all of that class of traffic in the entire city, while the street traffic data are confined to that crossing the boundaries of the business district.

The total passengers carried by the city cars on May 9 and 11 of this year were as follows: Sunday, May 9,



DENVER TRAFFIC—CHART SHOWING NUMBER OF PERSONS ENTERING AND LEAVING BUSINESS DISTRICT DURING SUNDAY



TABLE VII—COMPARISON OF RAILWAY AND STREET TRAFFIC—SUNDAY AND WEEKDAY  
Totals of Persons on Sunday, May 9, 1915, and Tuesday, May 11, 1915

Method of Transportation	Sunday, 5/9/15		Tuesday, 5/11/15		Increase		Decrease	
	Persons	Per Cent	Persons	Per Cent	Persons	Per Cent	Persons	Per Cent
Street cars	201,005	51.4	183,888	46.9	17,117	9.3	.....	.....
Passenger autos	65,902	16.8	46,525	11.9	19,377	41.6	.....	.....
Freight autos	1,219	0.3	5,453	1.4	.....	.....	4,234	77.7
Motorcycles	4,475	1.1	4,187	1.1	288	6.9	.....	.....
Bicycles	8,544	2.2	20,951	5.4	.....	.....	12,407	59.3
Passenger horse-drawn vehicles	4,677	1.2	4,468	1.1	209	4.7	.....	.....
Freight horse-drawn vehicles	3,752	1.0	23,122	5.9	.....	.....	19,370	83.8
Pedestrians	101,486	26.0	102,901	26.3	.....	.....	1,415	1.2
Total	391,060	100.	391,495	100.	.....	.....	435	0.1

TABLE VIII—COMPARISON OF RAILWAY AND STREET TRAFFIC—1914-1915  
Totals of Persons on Tuesday, 5/5/14, and Tuesday, 5/11/15

Method of Transportation	Tuesday, 5/5/14		Tuesday, 5/11/15		Increase		Decrease	
	Persons	Per Cent	Persons	Per Cent	Persons	Per Cent	Persons	Per Cent
Street cars	201,794	50.9	183,888	46.9	.....	.....	17,906	8.9
Passenger autos	30,804	7.8	46,525	11.9	15,721	51.0	.....	.....
Freight autos	3,735	0.9	5,453	1.4	1,718	46.0	.....	.....
Motorcycles	3,923	1.0	4,187	1.1	264	6.7	.....	.....
Bicycles	18,950	4.8	20,951	5.4	2,001	10.5	.....	.....
Passenger horse-drawn vehicles	4,710	1.2	4,468	1.1	.....	.....	242	5.1
Freight horse-drawn vehicles	25,344	6.4	23,122	5.9	.....	.....	2,222	8.8
Pedestrians	106,990	27.0	102,901	26.3	.....	.....	4,089	3.8
Total	396,250	100.	391,495	100.	.....	.....	4,755	1.2

1915, 201,005 passengers; Tuesday, May 11, 1915, 183,888 passengers.

As noted above, no observations were taken of the street traffic between the hours of midnight and 6 a. m. It is estimated that only 1 per cent of the total traffic for the twenty-four hours passes in and out of the business district during this six-hour period, so that the figures obtained for the street traffic represent 99 per cent of the total for the twenty-four-hour day.

Regarding the effect of weather conditions upon street traffic and car passengers, some observations were taken on two successive Sundays in May, the first being cold and windy and the second warm and mild. On the pleasant Sunday there was an increase of 11.1 per cent in the number of passengers carried on the street cars, and an increase of 32.8 per cent in the number of persons traveling by other methods.

It therefore seems that while the weather has a decided effect upon Sunday street car travel, its effect upon other methods of travel is still more pronounced.

Table VII shows a comparison of the total traffic on Sunday, May 9, and Tuesday, May 11, of this year. The number of passengers carried by the cars in the entire city is combined with the total street traffic in and out of the business district. An interesting coincidence is seen in the fact that the total number of persons traveling on these two days is almost identical. With the population of Denver in the neighborhood of 200,000, the above total represents an average of one trip in and out of the business district per person per day.

Table VIII shows a similar combination and comparison for Tuesday, May 5, of last year and Tuesday, May 11, of this year. As will be noted in this table, the total travel is 1.2 per cent less for 1915 as compared

with 1914, the car travel on these two days showing a decrease of 8.9 per cent for 1915, and the total street traffic showing an increase of 6.8 per cent over the previous year.

On Tuesday, May 5, 1914, the total number of persons carried on the street cars and in passenger automobiles was 232,598. Passenger automobiles carried 13.2 per cent and the street cars 86.8 per cent of this number. On Tuesday, May 11, 1915, the total number of persons carried by these two methods of transportation was 230,413, passenger automobiles carrying 20.2 per cent and street cars 79.8 per cent. On Sunday, May 9, 1915, the total number of persons carried by these two methods was 266,907, passenger automobiles carrying 24.8 per cent and street cars 75.2 per cent.

The number of persons carried by the street cars, expressed as a multiple of the number of persons carried by passenger automobiles, is as follows: Tuesday, May 5, 1914, 6.6; Tuesday, May 11, 1915, 3.9; Sunday, May 9, 1915, 3.1.

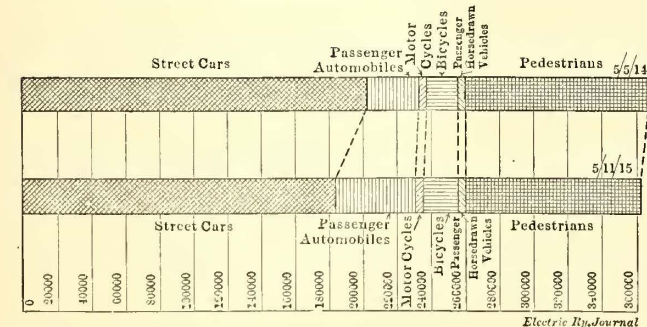
#### AUTOMOBILE TRAFFIC

It may be assumed that the number of automobiles in use in Denver at the time of the traffic count was the same as the number registered by owners at that time, namely, 6000. This is an increase of 1372 over the corresponding figures of 4630 for the previous year, the number of motorcycle licenses being 927 in 1914 and 944 in 1915.\* The vehicle count on Tuesday, May 11, showed the total number of automobile trips in and out of the city as 27,771. The percentage of trips made by freight automobiles was 14 per cent of the total automobile trips. Freight autos make more trips per day, in and out of the business district, than passenger automobiles do, and it is assumed that 7 per cent of the total autos are freight vehicles. This is consistent with the figures of the United States Census Bureau, that from 4 per cent to 7 per cent of the automobiles produced are for freight purposes. Therefore, the number of passenger automobiles in use in Denver is 93 per cent of 6000, or 5580. Roughly speaking, the average passenger automobile makes two round trips, or four single trips, per day in and out of the business district, and carries two people per trip, making a total of eight passenger trips per day. The exact figures for Tuesday, May 11, establish the average number of single trips per day at 4.27, the average number of passengers per trip at 1.95, and the average number of passengers per day at 8.35, as compared with 7.1 for last year. Both the number of trips per auto per day and the number of passengers carried have increased.

If this average rate of 8.35 passengers per day is maintained through the year, an auto would carry 3000 passengers per year.

Assuming the population of Denver at 200,000 and the number of passenger automobiles in use at 5580, there is an average of one auto to every thirty-six persons, or one to every eight families.

A "Denver Automobile Directory" has been published, containing the registration number, name and address of owner, and make of automobile, for all 1915 registrations up to March 13. This directory contains 5340 registrations, and it shows that the business district has the most dense ownership owing to the many machines owned by firms for business purposes, in either freight or passenger service. Of the 5340 autos, 1317, or 25 per cent, are Fords, the figures for the entire United States showing that 33 per cent of the cars in use are Fords. Comparison of a map showing distribution of population with one showing location of automobiles indicates that the distribution of automobiles is in general similar to the distribution of the population.



DENVER TRAFFIC—GRAPHIC COMPARISON OF WEEKDAY TRAVEL, EXCLUSIVE OF THAT IN FREIGHT VEHICLES

\*There are no jitneys in Denver. [Eds.]



# Mesaba Railway's New Repair Shops and Office Building

These New Buildings Replace Those Which Were Destroyed by Fire in November, 1913, and Contain a Number of Interesting Features—Details of Construction and Description of the Various Shops Are Given

BY GOTHARD SARGL, SUPERINTENDENT OF CONSTRUCTION CLEVELAND (OHIO) CONSTRUCTION COMPANY

After a year in temporary quarters following the disastrous fire which destroyed the shops and office building, the Mesaba Railway office and repair force is now housed in new quarters. Situated on the frontier of Minnesota, 80 miles north of Duluth, the nearest city of any size, the Mesaba Railway, a 35-mile interurban road, connects a number of villages and mine locations in the Mesaba Iron Range. The construction features of this road were described in the Jan. 10, 1914, issue of the *ELECTRIC RAILWAY JOURNAL* on page 68.

## REPAIR SHOP CONSTRUCTION DETAILS

Essentially the new layout conformed to the original plan in that the foundations of the original repair shop were used and a separate office and dispatcher's building constructed. In addition, a paint shop, also in a separate building and more than 60 ft. away from the repair shop, was also provided.

The new repair shop is a brick, steel and concrete structure, 86 ft. x 122 ft. in plan. This area is divided into a car-storage bay and repair and machine-shop bay a portion of which is given over for a storeroom and a heating plant. A 13-in. fire wall extending 3 ft. above the roof separates the car-storage bay from the repair-shop bay. Trackage in each of these sections provides for the storage of four cars, and all of the car-storage space in the repair-shop bay is constructed over repair pits.

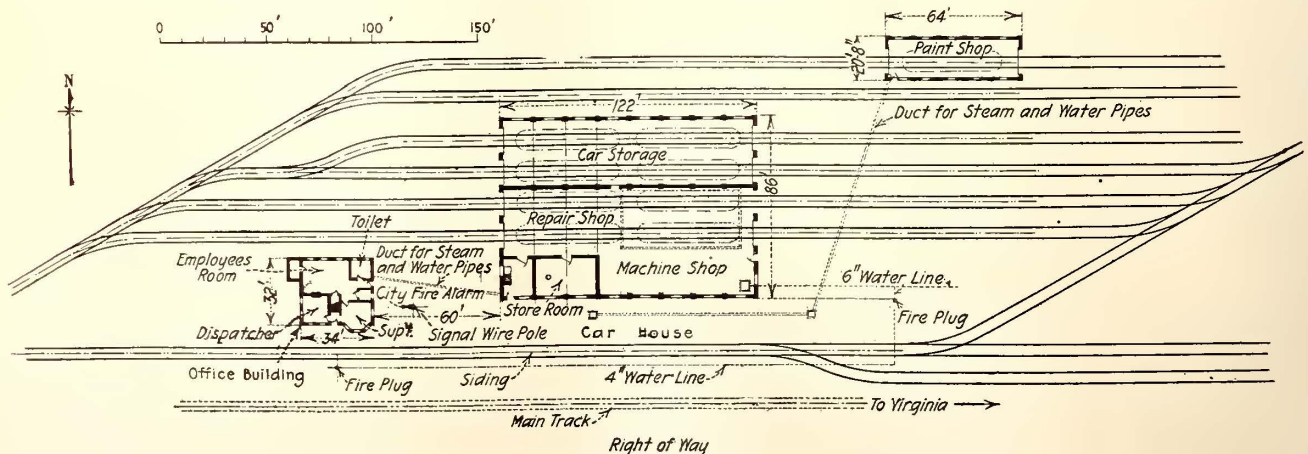
Following the fire the original pits were restored with timber which was permitted to remain in the new structure. These pits were extended, however, so that storage space was provided for four cars. The pits in this extension are of concrete construction, and it is contemplated that later the old wooden pits will be replaced with others built of concrete. Experience during the first winter in this extremely cold climate demonstrated that additional pit area was necessary to thaw out the cars. To minimize the time required to thaw out the frozen car equipment, however, radiation considerably in excess of that ordinarily required was installed on the pit walls.

Steel trusses supported on the brick walls span each bay, and in the intervals between these are concrete roof slabs reinforced with Ferroinclave and carried on steel purlins. These slabs are 1 $\frac{3}{8}$  in. thick, formed of 1 in. of concrete on the upper side of the reinforcement, 3 in. on the under side and covered with a five-ply tar and gravel roofing. Eight flat wire-glass skylight openings were provided in the roof along the fire wall to provide a uniform natural illumination in all parts of the building. A liberal spacing of windows in the side and end walls of the repair shop section insures ample natural illumination in all parts of the machine shop. The four car door openings at each end of the building are 12 ft. wide by 16 ft. 6 in. high and are equipped with Kinnear rolling steel doors. The openings in the fire wall between the two bays and those leading to the storeroom and boiler room are fitted with standard Underwriter's fire doors.

Three 2-in. hose connections with hose and racks were installed in the repair shop building, and two standard fire hydrants were provided in the storage yard adjoining the building. In addition to these a Gamewell fire-alarm box connected to the Virginia city fire alarm system was installed near the office building so that the city fire department may be called. Water is supplied to the fire-protection system through a 6-in. water main which connects to the city water system.

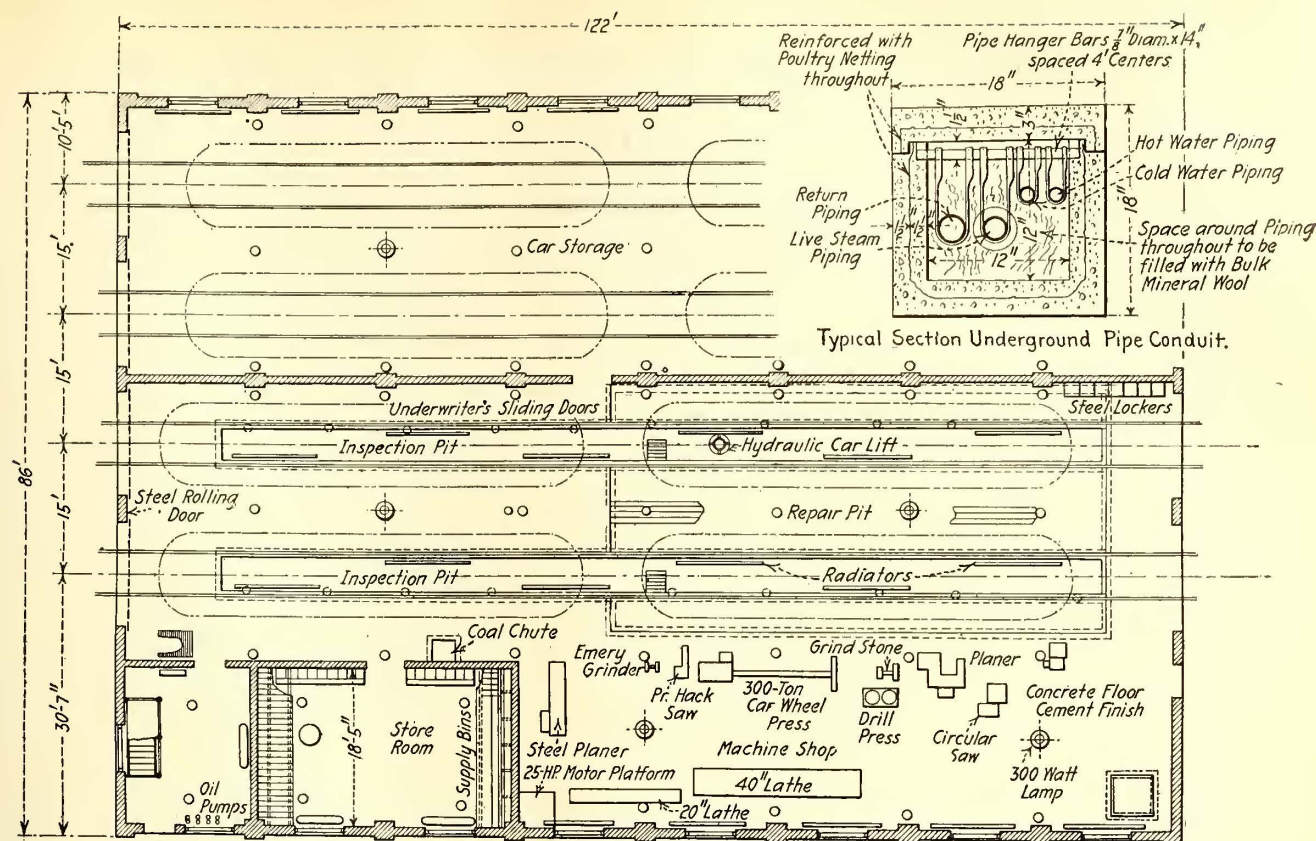
## ARRANGEMENTS OF SHOPS AND EQUIPMENT

Conveniently located in the repair-shop bay beside the repair pits in a space 25 ft. wide by 75 ft. long is the machine shop. This contains the usual machine tool equipment necessary to handle all repair work, all driven from an overhead line shaft which is belted to a 25-hp. three-phase, 600-volt induction motor. Energy is supplied to this motor through a three-phase line from the company's power house. The hoists in the repair shop include a hydraulic lift for handling armatures, motors and truck parts, and two 8-ton Yale & Towne chain blocks suspended from one of the roof trusses and used for lifting car bodies.



MESABA REPAIR SHOPS—GENERAL PLAN OF PROPERTY





MESABA REPAIR SHOPS—PLAN OF SHOPS AND SECTION THROUGH PIPE CONDUIT

Energy for lighting is obtained from the 600-volt, single-phase motor service which is stepped down to 110 volts through a  $7\frac{1}{2}$ -kva. transformer. All wiring in the carhouse is installed in conduit, and tungsten lamps on brewery cord drops furnish individual illumination. In addition to these six 300-watt nitrogen-filled lamps with Abolite shades were installed in the repair shop and car-storage bay for general illumination. All the lighting circuits are controlled from a cabinet situated in the passageway beside the storeroom.

Installed in the basement below the storeroom is a low-pressure heating plant of sufficient capacity to heat the repair shop, paint shop and office building, as well as the manager's residence, which is situated about 600 ft. from the carhouse. All radiation is of the wall type, except that in the storeroom and passageway, and is so installed on the walls and between the columns that the radiators occupy very little floor space. The radiation in the pits is fastened to the concrete walls and to the supporting timbers of the wooden constructed section. A hot water tank in the boiler room supplies the office and paint shop. In one corner of the boiler room four Bowser oil tanks containing lubricating and signal oils have been installed. These tanks are equipped with measuring pumps located on the main floor.

Situated about 60 ft. from the repair shop building is a brick and concrete paint shop, 20 ft. 8 in. x 64 ft. in size. The walls of this building are 9 in. thick with 4-in. x 26-in. pilasters, and the roof is a 3-in. reinforced-concrete slab supported on ten 9-in. I-beams and covered with a five-ply tar and gravel roof. Suitable ventilation is supplied by three Ohio Blower Company's 16-in., Swartwout, rotary ball-bearing ventilators. The size of this building is just sufficient to accommodate one car, one track of the yard lay-out passing through the building. The track entrances to this building are fitted with Kinnear steel rolling doors, and the window openings are equipped with Fenestra steel sashes glazed

with  $\frac{1}{8}$ -in. ribbed glass. Other construction details include concrete floors, wooden trolley trough and ten drop lights wired in conduit. Three attachment plug outlets on the side walls were supplied for extension cord connections.

#### OTHER FEATURES

The new office building is a two-story frame and brick structure situated 60 ft. from the car repair shop building. An unusual feature in the construction of this building was the provision of an entirely fireproof room to contain the dispatcher's equipment. This room is surrounded with 9-in. brick partition walls and has a reinforced-concrete ceiling and sub-floor. Openings from this room to the interior building are protected with Kinnear steel rolling fire doors. Added importance is given the protection of the dispatcher because his outfit includes a Simmen automatic railway signal dispatcher's board.

To protect the records of the road a 5-ft. 9-in. x 8-ft. 8-in. reinforced-concrete vault occupies one corner of the office building and extends the full height of the two floors. In connection with this vault it is interesting to note that the one now serving the first floor was formerly on the second floor of the original office building. At that time this vault was supported on steel columns and during the fire it fell from the second story to the ground. This caused no apparent injury and all the records in the vault were fully protected.

An interesting feature in connection with the electric wiring of the office building, as well as the manager's residence, is that the wiring provides for electrical heating. Separate circuits in conduit run from the lighting cabinet to baseboard receptacles in each office room. To these ordinary car bank-heaters are connected during the cold spring and autumn days when steam heat is unnecessary but some heat is required in the office and residence.



# Digest of Jitney Ordinances\*

Fundamental Provisions and Important Details of Ordinances for the Regulation of Jitney Traffic in American Cities Are Abstracted and Compared

BY CLYDE LYNDON KING, PH.D.

This digest was made from ordinances sent to The Utilities Bureau in response to a request made to the mayor of every city and town of considerable size in the United States. The ordinances used have all been received since June 15. The text gives as succinctly as possible the provisions found in the ordinances of the various cities, the names of which are, for each provision, given in the foot-notes.

A typical definition of the jitney or the motor bus, as regulated by these ordinances, is found in the jitney ordinance of Dallas, Tex. This ordinance makes subject to its provisions and the rulings of the authorities made thereunder "any automobile, auto truck or trackless motor vehicle engaged in the business of carrying passengers for hire within the city limits of Dallas, which is held out or announced by sign, voice, writing, device or advertisement, to operate or run, or which is intended to be operated or run, over a particular street or route, or to any particular or designated point or between particular points, or to or within any designated territory, district or zone." Many of the ordinances, as does that of Spokane, Wash., specifically exclude cabs, taxicabs, automobiles for hire, stages running on regular schedules and used exclusively for transporting passengers from points outside of the city, sight-seeing buses, hotel buses, hearses, ambulances, pall-bearers' vehicles, and railway or street cars.

The usual method by which regulation is assured is that of requiring the owner or operator of each such vehicle to secure a permit or license<sup>1</sup> as a prerequisite to the privilege of using the streets and other public places as a common carrier. As pay for this supervision, or as a source of revenue to the city, or both, license fees are required, though these are so evidently exorbitant in some instances as to raise the presumption that they are more a means for abolishing the jitney than regulating it.

## LICENSE FEES AND OTHER CHARGES

License fees are occasionally designated as definite sums to be paid annually, regardless of the seating capacity of the vehicle. In the larger majority of the ordinances, however, the amounts of the license fees are very properly based on seating capacity, as the relation between seating capacity and wear and tear on streets, as well as earning power, is quite direct. Where the ordinances require flat-rate license fees, the sums specified include: \$5,<sup>2</sup> \$10,<sup>3</sup> \$25,<sup>4</sup> \$30,<sup>5</sup> \$50,<sup>6</sup> \$60<sup>7</sup> and \$75.<sup>8</sup> In general, when based on seating capacity, the license fees range from \$25 for a car carrying five or less to \$200 for cars carrying more than sixteen.<sup>9</sup>

In addition to the annual license fees certain other charges incidental thereto are sometimes required. These charges are 50 cents,<sup>10</sup> \$1,<sup>11</sup> \$2<sup>12</sup> and \$2.50.<sup>13</sup>

## BONDS OR INSURANCE POLICIES

Bonds or insurance policies are often required as a protection against injury of persons or destruction of property. These bonds are usually conditioned, as in Utica, N. Y., that "licensees will indemnify and save harmless the city of Utica, N. Y., and its officers or agents, from any and all causes and actions, and the costs and expenses of defending same, growing out of the operation of motor-propelled vehicles . . . " and "satisfy any and all judgments by any person, firm or corporation for personal injury or property damage caused by the operation of said licensed vehicle, upon, in and over the streets and public places of Utica, N. Y."<sup>14</sup>

Not all the cities by any means require bonds or insurance policies.<sup>15</sup> The amounts of the bonds or insurance policies in the ordinances of two cities<sup>16</sup> are stated to be such as are "reasonable." The amounts designated in other cities include: \$1,000,<sup>17</sup> \$2,000,<sup>18</sup> \$2,500,<sup>19</sup> \$5,000<sup>20</sup>

teen to twenty-six, \$35; more than twenty-five, \$40; Oklahoma City, Okla., eight or less, \$50; eight to twelve, \$75; twelve or more, \$150; Syracuse, N. Y., five or less, \$75; five to ten, \$100; ten to fifteen, \$125; more than fifteen, \$150; Huntington, W. Va., four or less, \$50; five or more, \$75; Tulsa, Okla., \$5 for each passenger seat with a minimum of \$20; Schenectady, N. Y., as many times \$5 as number of passengers, with a minimum of \$25; Galveston, Tex., five, including driver, \$30; five to seven, including driver, \$35; more than seven, including driver, \$45; Grand Rapids, Mich., \$3.50 for each passenger, maximum fee, \$50, payable in advance; Louisville, Ky., eight or less, \$10; nine to fifteen, \$20; more than fifteen, \$25; Pasadena, Cal., five or less, including driver, \$30; more than five, less than eight, \$35; more than seven, less than sixteen, \$45; more than fifteen, less than thirty, \$55; thirty persons or more, \$75; Providence, R. I., \$5 per seat exclusive of driver's seat, maximum fee, \$50; if route extends into another town requiring license, fee of \$3 per seat; Little Rock, Ark., per month, five to seven, including chauffeur, \$3; eight to twelve, \$6; twelve or more, \$8; San Antonio, Tex., seven seats or less, \$25; each seat more than seven, \$3.50; Fresno, Cal., five or less, including driver, \$40; five or more, \$50; more than seven, less than sixteen \$60; more than fifteen, less than thirty, \$75; thirty or more, \$100; Portland, Ore., per month, seven or less, \$2; more than seven, \$2, and 25 cents for each seat in excess of seven; Long Beach, Cal., six or less, including driver, \$25; more than six and less than ten, \$30; more than nine and less than sixteen, \$35; more than sixteen and less than thirty, \$75; Fort Smith, Ark., \$20 per year, \$12.50 for six months, payable in advance; Tacoma, Wash., per month, five persons or less, \$1; more than five, 25 cents in addition to \$1 for each additional seat; driver's license, \$1; renewal of driver's license, \$1; transfer of license, 50 cents; Ogden City, Utah, not exceeding five, \$75; five to ten, \$100; ten to twenty, \$150, payable in advance; if route extends beyond limits of city license fee shall be \$25 per annum; driver must pay \$1 for permit and badge; Fort Worth, Tex., change of license, 50 cents; five or less, including driver, \$10; seven or less, more than five, \$20; more than seven, \$30.

<sup>10</sup> Pueblo, Col.; Tacoma, Wash. (for transfer of license); Fort Worth, Tex. (for changing license); Grand Rapids, Mich.; Oakland, Cal.

<sup>11</sup> Schenectady, N. Y. (driver's license); Providence, R. I.; Augusta, Ga. (for badge); Los Angeles, Cal.; Dallas, Tex. (for substituting one car for another, altering cars or losing license plate); Ogden City, Utah (\$1 for permit or badge).

<sup>12</sup> Birmingham, Ala.; Tacoma, Wash.

<sup>13</sup> Seattle, Wash., and Spokane, Wash. (renewal, \$1; reissue, \$1.50); El Paso, Tex. (for changing route or termini, \$2.50, and for examination, \$2.50).

<sup>14</sup> The ordinance of Louisville, Ky., requires that the bond be conditioned that the person injured or having his property damaged through defect or negligence in operation has a right to action; that the applicant pay all sums due the city, such as licenses, taxes, fines and forfeitures, and indemnify the city against any loss and damages for accidents.

<sup>15</sup> Salem, Mass.; Dallas, Tex., and Portland, Ore., do not, among others.

<sup>16</sup> Pine Bluff, Ark., and Fitchburg, Mass. (determined by Mayor or Board of Aldermen).

<sup>17</sup> Lansing, Mich. (conditioned on observing provisions of charter and ordinance and duties of common carrier).

<sup>18</sup> Little Rock, Ark., and Fort Smith, Ark.

<sup>19</sup> Fort Worth, Tex.; Austin, Tex. (\$2,500 to any one person, and \$5,000 for all damages on account of death or injuries of all persons occurring in one accident).

<sup>20</sup> Huntington, W. Va.; Louisville, Ky.; San Antonio, Tex.

\*Reprinted from *The Utilities Magazine*, July, 1915, by permission of The Utilities Bureau, Philadelphia, Pa.

<sup>1</sup> In Denver, Col., a franchise is required.

<sup>2</sup> Orange, N. J.; Battle Creek, Mich.; Staunton, Va. (the fee is \$6); Little Rock, Ark.

<sup>3</sup> Lansing, Mich. (\$5 for the second and \$2 for each additional vehicle); Warren, Pa. (hacks only—no jitneys).

<sup>4</sup> Ashtabula, Ohio; Ocean City, Passaic, N. J. (\$5.50 per year for automobile hacks); Fulton, N. Y.

<sup>5</sup> Norfolk, Va.

<sup>6</sup> Oakland, Cal.

<sup>7</sup> Pueblo, Col.; El Paso, Tex.

<sup>8</sup> Dallas, Tex.

<sup>9</sup> The license fees based on carrying capacity are as follows for various cities: Davenport, Ia., seven or less, \$25; seven, \$35; seven or more, \$50; Utica, N. Y., five or less, \$75; five to eight, \$100; eight to sixteen, \$150; sixteen or more, \$200; Augusta, Ga., five or less, \$25; five to seven, \$35; seven or more, \$50; Austin, Tex., five or less, \$50; seven or less, \$75; eight or more, \$100; Joplin, Mo., five or less, \$10; five to eight, \$15; seven to thirteen, \$20; twelve to seventeen, \$25; six-



and \$10,000.<sup>21</sup> Other cities base the amount of the bond or insurance policy on the carrying capacity of the respective cars.<sup>22</sup>

#### QUALIFICATIONS OF DRIVERS

Proper qualifications for drivers are assured in the great majority of ordinances by requiring at least that the application for the license or permit shall indicate for all chauffeurs the name, age, residence, address, previous addresses, length of residence in each, whether previously engaged in transporting passengers for hire, nationality, married or single, and experience in driving.<sup>23</sup> In addition to this a few cities definitely require testimony of two citizens, or other similar evidence, as to the moral character of the driver.<sup>21</sup> With one exception,<sup>25</sup> the age limits, if stated in the ordinances, are either eighteen years of age or more,<sup>26</sup> or twenty-one or more.<sup>27</sup> Occasionally the chauffeur is required to carry with him at all times an identification card, including his photograph,<sup>28</sup> while a number of ordinances particularly require that the chauffeur shall give evidence as to sober habits, or that he is not addicted to the use of liquors or drugs.<sup>29</sup> Occasionally there is a specific requirement that the chauffeur shall be able to speak the English language.<sup>30</sup> Written or oral examination is sometimes specifically required as to the driver's knowledge of the ordinances and traffic regulations of the city and state.<sup>31</sup> Very frequently the chauffeur must give evidence as to his ability to drive a car, and also evidence that he has no physical disabilities, such as being deaf, or partially deaf, near-sighted, etc.,<sup>32</sup> and occasionally must take a medical examination to show that he is not subject to epilepsy, vertigo, heart trouble, color-

blindness, or any other infirmity of body or mind which would disqualify him from serving as a driver of a public vehicle.

#### ROUTES AND TERMINI

It is a usual provision of the jitney bus ordinance to require that the operator shall set forth in his application or in his permit the route over which it is proposed to operate such motor bus and the terminal points of such routes, and to require, though less often, a map of the route or the designation of the particular street or streets over which the vehicle is to run.<sup>34</sup> In a few ordinances the routes and termini are to be indicated by signs only, the authorities not assuming any other control thereover.<sup>35</sup> Many of the ordinances requiring routes to be designated also require that the vehicles shall not depart from this route, and must go to the end of the route on each trip.<sup>36</sup> When routes must be specified before the permit or license to operate the bus is granted, authority is usually either reserved by the Council or delegated to specified city officials to change or modify the route at any time.<sup>37</sup> A few ordinances specifically make it unlawful to deviate from the route established, or, if deviation is necessary, the vehicle must return to the point of deviation as soon as possible and proceed in the direction the motor was headed before deviation.<sup>38</sup> In order to retain for the city one of the chief advantages of motor transit, mobility, certain ordinances particularly provide that buses may deviate from their designated routes for stated purposes.<sup>39</sup> Legible signs which can be read at a distance of 100 ft. or more are particularly required, setting forth the fare, the termini and the routes.<sup>40</sup>

How long the route shall be is not readily discernible on examination of an ordinance, as the length is usually expressed by names of streets. Austin, Tex., requires that they must average at least thirty blocks, and Davenport, Iowa, requires that when the route of a motor bus parallels a street-car line, its termini shall be that of the car line or beyond, unless the Council otherwise decides. In the cities where the routes over which the vehicle is to run must be specified in the application the proper authority would have the power to lengthen or shorten the route. Certain ordinances definitely provide that the route may be changed at any time by the Council, the Board of Police Commissioners, or other

(\$5,000 the maximum for one person, and \$10,000 for one accident); Memphis, Tenn. (for each car for one accident); Taunton, Mass. (\$5,000 for one vehicle and \$1,000 for each additional vehicle); Pasadena, Cal. (\$5,000 for any one person injured, and \$10,000 for all persons injured in any one accident); same in Long Beach, Cal., and Tulsa, Okla.; Duluth, Minn.; Syracuse, N. Y. (limited to \$15,000 for one accident); Oakland, Cal. (\$5,000 for any one person injured; \$10,000 for any one accident resulting in injuries to or death of more than one person); San Antonio, Tex. (a total of \$50,000 for five vehicles or less, or a total of \$100,000 for any number of vehicles in excess of five); Melrose, Mass.

<sup>21</sup> Pueblo, Col.; Oklahoma City, Okla.; Ogden City, Utah (if more than one car, \$20,000); Fresno, Cal.; El Paso, Tex. (\$10,000 for each car up to ten cars, and \$500 for each additional car).

<sup>22</sup> Grand Rapids, Mich., seven persons or less, \$10,000 for damages or accidents; \$2,000 for each passenger more than seven; up to \$10,000. Schenectady, N. Y., as many times \$1,000 as carrying capacity of car, but at least \$5,000. Ashtabula, Ohio, in lieu of liability insurance policy, a bond of \$3,000 for buses carrying nine persons or less, and \$5,000 for more than nine persons. Utica, N. Y., eight passengers or less, \$10,000; eight to sixteen passengers, \$15,000; sixteen or more, \$20,000.

<sup>23</sup> Ogden City, Utah; Dallas, Tex.; Lansing, Mich.; Davenport, Iowa; Spokane, Wash.; Austin, Tex.; Joplin, Mo.; Oklahoma City, Okla.; Birmingham, Ala.; Seattle, Wash.; Providence, R. I.; Fitchburg, Mass.; Grand Rapids, Mich.; Long Beach, Cal.; Louisville, Ky.; Los Angeles, Cal.; Duluth, Minn.; Oakland, Cal.; Pasadena, Cal.; Tacoma, Wash.; Schenectady, N. Y.; Fort Worth, Tex.; San Antonio, Tex.

<sup>24</sup> Davenport, Iowa; Spokane, Wash.; Joplin, Mo.; Seattle, Wash.; Galveston, Tex.; Grand Rapids, Mich.; Little Rock, Ark.; Oakland, Cal. ("worthy"); Schenectady, N. Y.

<sup>25</sup> Long Beach, Cal.

<sup>26</sup> Birmingham, Ala.; Austin, Tex.; Fresno, Cal. (and under fifty); Providence, R. I. (over twenty); Fitchburg, Mass.; Syracuse, N. Y.; Grand Rapids, Mich.; Little Rock, Ark.; Tacoma, Wash.; Portland, Ore.; El Paso, Tex. (and shall have lived in El Paso for six months).

<sup>27</sup> Davenport, Iowa; Ashtabula, Ohio; Spokane, Wash.; Pueblo, Col.; Seattle, Wash.; Augusta, Ga.; Schenectady, N. Y.; Melrose, Mass.

<sup>28</sup> Providence, R. I.; Grand Rapids, Mich.; Oakland, Cal.; Los Angeles, Cal.; Schenectady, N. Y.; Spokane, Wash.; Seattle, Wash.

<sup>29</sup> Dallas, Tex.; Spokane, Wash.; Austin, Tex.; Joplin, Mo.; Birmingham, Ala.; Seattle, Wash.; Galveston, Tex.; Schenectady, N. Y.; Fort Worth, Tex.

<sup>30</sup> Atlantic City, N. J. (read, also); Spokane, Wash.; Joplin Mo. ("properly understand the traffic rules and ordinances of the city"); Seattle, Wash.; Schenectady, N. Y. (read and speak).

<sup>31</sup> Los Angeles, Cal.; Hartford, Conn. (any "suitable" person with proper experience and character"); Harrisburg, Pa.; Atlantic City, N. J. (familiar with territorial limits and principal places); Spokane, Wash.; Birmingham, Ala.; Seattle, Wash.; Ogden City, Utah; Galveston, Tex. (thoroughly acquainted with all the streets and locations); Grand Rapids, Mich.; Portland, Ore.; Little Rock, Ark.; El Paso, Tex.

<sup>32</sup> Los Angeles, Cal.; Seattle, Wash.; Providence, R. I.; Dallas, Tex.; Davenport, Ia.; Austin, Tex.; Pueblo, Col. (requires one year's experience); Birmingham, Ala. (must be "experienced"); Fresno, Cal.; Grand Rapids, Mich.; Portland, Ore.; Little Rock, Ark. (requires six months' experience).

<sup>33</sup> Spokane, Wash.; Seattle, Wash.; Schenectady, N. Y.

<sup>34</sup> Los Angeles, Cal.; Dallas, Tex.; Utica, N. Y.; Orange, N. J. (routes designated by Mayor—only two lines are operating, each making three trips daily); Davenport, Iowa; Spokane, Wash.; Austin, Tex. (must operate at least thirty blocks); Oklahoma City, Okla.; Pueblo, Col.; Fresno, Cal.; Ogden City, Utah; Fitchburg, Mass.; Syracuse, N. Y.; Tulsa, Okla.; Galveston, Tex.; Augusta, Ga.; Grand Rapids, Mich.; Portland, Ore.; Louisville, Ky.; San Antonio, Tex.; Oakland, Cal.; Pasadena, Cal.; Tacoma, Wash.; Schenectady, N. Y.; Fort Worth, Tex.; Huntington, W. Va.

<sup>35</sup> New Orleans, La.; Hartford, Conn.; Joplin, Mo.; Providence, R. I. (license granted subject to prescribing of route).

<sup>36</sup> New Orleans (as announced on sign and "provided there is a passenger on said vehicle"); Los Angeles, Cal.; Dallas, Tex.; Davenport, Iowa; Spokane, Wash.; Austin, Tex.; Fresno, Cal.; Ogden City, Utah; Tulsa, Okla.; Galveston, Tex.; Portland, Ore. ("between the hours of 6 and 8 p. m. all motor buses shall be operated to outer terminus of their routes, but may turn back upon discharging the last inbound passenger, and between the hours of 4:30 and 7 p. m. all auto buses shall be operated to the inner terminus, but may turn back on discharging the last outbound passenger"). During all other hours must complete the trip); Oakland, Cal.; Spokane, Wash.; El Paso, Tex.

<sup>37</sup> Los Angeles, Cal.; Davenport, Iowa; Fresno, Cal.; Ogden City, Utah; Syracuse, N. Y.; Galveston, Tex.; Grand Rapids, Mich. (temporary change with application of superintendent of police); Portland, Ore.; San Antonio, Tex.; Pasadena, Cal.; Augusta, Ga. (licensee may change route by notifying treasurer of city); Fort Worth, Tex. (may be changed upon application by licensee).

<sup>38</sup> Los Angeles, Cal. (for more than three blocks); Spokane, Wash.; Fresno, Cal.; Tulsa, Okla.; Galveston, Tex.; Portland, Ore.; Oakland and Pasadena, Cal.

<sup>39</sup> Thus in Los Angeles they may deviate to transport passenger to and from any public demonstration or attraction, church or public school, or to designated points in the business district. In Grand Rapids they may go to the railroad station if route is within three blocks of any such station.

<sup>40</sup> New Orleans, La.; Hartford, Conn.; Providence, R. I.; Augusta, Ga.; Louisville, Ky. (routes only); Joplin, Mo. (fare only).



stated officer or officers. As one means of exterminating the jitney under the guise of regulating it, the routes required are sometimes so long as to be unprofitable. Transfer systems<sup>41</sup> may be or are compulsory.

The ordinances often require that applications for licenses shall show the number of hours per day which the vehicle will be operated and the schedule for such operations,<sup>42</sup> or require operation continuously between the hours designated in the license certificate.<sup>43</sup> Occasionally, however, eight hours of continuous service are required,<sup>44</sup> and rarely twelve,<sup>45</sup> or even sixteen<sup>46</sup> or more.<sup>47</sup>

#### SAFETY PRECAUTIONS

The safety precautions included in the ordinances either require the passengers to ride on the seats only,<sup>48</sup> or particularly prohibit riding on doors, dashers, fenders or running boards, or the protrusion of the body outside of the car.<sup>49</sup> It is occasionally provided specifically that the car must be brought to a full stop before crossing steam railway tracks.<sup>50</sup> These provisions, of course, are all in addition to the traffic and ordinance provisions as to speed limits, speed at intersections and cutting corners.

Other safety requirements are set forth in the various ordinances. Thus tire chains are required, especially in winter and wet weather.<sup>51</sup> It is likewise required in some cities, that the cars be equipped with non-skid tires.<sup>52</sup> When cars are to be run between sunset and sunrise, the cars must be provided with lights.<sup>53</sup> Various kinds of signs are required, such as giving the route,<sup>54</sup> termini,<sup>55</sup> fare,<sup>56</sup> license number,<sup>57</sup> name of operator<sup>58</sup> and carrying capacity of car.<sup>59</sup>

The provisions of these ordinances to assure a safe

vehicle run all the way from the prohibition of the use of dangerous cars<sup>60</sup> to requirement of inspection before use and during use, to see if running gear, brakes, chassis, wheels, etc., are safe.<sup>61</sup> Some ordinances specify the intervals at which such inspection shall be made.<sup>62</sup> General requirements are that cars shall be sanitary,<sup>63</sup> while Portland, Ore., requires that they be cleaned and fumigated at stated intervals.

#### RECEIVING AND DISCHARGING PASSENGERS

A number of ordinances specifically state that the motor vehicle must, in receiving and discharging passengers, draw up at the right-hand curb.<sup>64</sup> Requirements are also included that these vehicles must stop for this purpose at least 25 ft.,<sup>65</sup> 50 ft.,<sup>66</sup> 60 ft.<sup>67</sup> and 75 ft.<sup>68</sup> respectively from the near side of the intersecting street. Other cities specify distances of 10 ft.<sup>69</sup> and 20 ft.<sup>70</sup>

It is further specified, though rarely, that the vehicle must come as near to the curb as possible,<sup>71</sup> or come within 2 ft. of the curb.<sup>72</sup> One city, Pueblo, Col., requires that the bus stop in the middle of the block.

#### RESTRICTIONS AS TO OVERCROWDING

The ordinances of some cities restrict the number of passengers that can be carried to two, including the driver, in excess of the manufacturer's rating as to the capacity of the car.<sup>73</sup> In most of these cases children under seven years of age are excepted. One city, Oakland, Cal., allows one passenger in excess of the seating capacity. In many other ordinances the number of passengers that the car may hold is restricted to the number stipulated in the manufacturer's statement as to the car's capacity.<sup>74</sup> In these cases children under the age of five years are excepted. In the majority of cities where jitney ordinances are in operation it is specifically stated that but one person may ride with the chauffeur.<sup>75</sup>

#### OTHER POLICE REGULATIONS

A sign stating that the car is filled, visible at a distance of 100 ft., is required in Fresno, Cal. The number plate is to be displayed conspicuously in Utica,

<sup>41</sup> Syracuse, N. Y.

<sup>42</sup> Austin, Tex.; Oklahoma City, Okla.; Pueblo, Col.; Fitchburg, Mass.; Syracuse, N. Y.; Galveston, Tex.; Pasadena, Cal.; Tacoma, Wash.; Utica, N. Y.; San Antonio, Tex.

<sup>43</sup> Dallas, Tex. (except Sundays and in case of illness, accidents, etc.).

<sup>44</sup> Spokane, Wash. (each day of the year); Grand Rapids, Mich. (6 to 10 a. m.; 12 noon to 2 p. m.; and 5 to 8 p. m., with but one-half of buses on any route on Sunday); El Paso, Tex.

<sup>45</sup> Austin, Tex. (twelve hours consecutively, Sundays excepted, with reasonable time for meals and due allowance for delays and interruptions); Portland, Ore. (6 to 10 a. m. and 3 to 11 p. m., except in case of unavoidable accidents; 7.30 a. m. on Sundays); Fort Worth, Tex. (for twelve consecutive hours except Sunday).

<sup>46</sup> Davenport, Iowa; Fresno, Cal. (from 6 a. m. to 10 p. m.); Tulsa, Okla.; Schenectady, N. Y. (for six days per week).

<sup>47</sup> Ogden City, Utah (6.30 a. m. until midnight on a "regular schedule").

<sup>48</sup> Atlantic City, N. J.; Davenport, Iowa; Augusta, Ga.; Duluth, Minn.

<sup>49</sup> Ashtabula, Ohio; Dallas, Tex.; Utica, N. Y.; Harrisburg, Pa. (no ordinance); Hartford, Conn.; New Orleans, La.; Austin, Tex.; Oklahoma City, Okla.; Syracuse, N. Y.; Birmingham, Ala.; Portland, Ore.; San Antonio, Tex.; Tulsa, Okla.; Galveston, Tex.; Spokane, Wash.; Louisville, Ky.; Grand Rapids, Mich.; Providence, R. I.; Fresno, Cal.; Tacoma, Wash.; Pasadena, Cal.; Oakland, Cal.; Fort Worth, Tex.; Reading, Pa.; El Paso, Tex.

Policemen and firemen are excepted from the operation of these provisions by a number of these cities.

<sup>50</sup> Duluth, Minn. (stop at least 30 ft. from track); Joplin, Mo.; Grand Rapids, Mich.; Ogden City, Utah (electric cars or otherwise); Portland, Ore. (applies only to vehicles with capacity of more than fourteen passengers); Oakland, Cal. (except that orders of flagmen must be obeyed).

<sup>51</sup> Los Angeles, Cal.; Joplin, Mo.; Pueblo, Col.; Ogden City, Utah; Providence, R. I.; Oakland, Cal.

<sup>52</sup> Los Angeles, Cal.; Dallas, Tex.; Ogden City, Utah.

<sup>53</sup> Davenport, Iowa; Utica, N. Y.; New Orleans, La.; Joplin, Mo.; Oklahoma City, Okla.; Syracuse, N. Y.; Portland, Ore.; San Antonio, Tex.; Tulsa, Okla.; Dallas, Tex.; Galveston, Tex.; Spokane, Wash.; Grand Rapids, Mich.; Fitchburg, Mass.; Ogden City, Utah; Tacoma, Wash.; Pasadena, Cal.; Fort Worth, Tex.

<sup>54</sup> Utica, N. Y.; Los Angeles, Cal.; Augusta, Ga.; Oklahoma City, Okla.; Syracuse, N. Y.; Portland, Ore.; Dallas, Tex.; San Antonio, Tex.; Davenport, Iowa; Tulsa, Okla.; Galveston, Tex.; Spokane, Wash. (signs to be hung on both sides of car); Louisville, Ky.; Grand Rapids, Mich.; Ogden City, Utah; Providence, R. I.; Shreveport, La.; Tacoma, Wash.; Oakland, Cal.; El Paso, Tex.

<sup>55</sup> Los Angeles, Cal.; Augusta, Ga.; Joplin, Mo.; Austin, Tex.; Oklahoma City, Okla.; Dallas, Tex.; San Antonio, Tex.; Tulsa, Okla.; Galveston, Tex.; Louisville, Ky.; Grand Rapids, Mich.; Ogden City, Utah; Oakland, Cal.; Little Rock, Ark.; El Paso, Tex.

<sup>56</sup> Los Angeles, Cal.; Augusta, Ga.; Joplin, Mo.; San Antonio, Tex.; Grand Rapids, Mich.; Ogden City, Utah; Providence, R. I.; Shreveport, La.; Tacoma, Wash.; Oakland, Cal.; Little Rock, Ark.

<sup>57</sup> Hartford, Conn.; Los Angeles, Cal.; Austin, Tex.; Portland, Ore.; Atlantic City, N. J.; San Antonio, Tex. (copy of license to be displayed); Tulsa, Okla.; Galveston, Tex.; Spokane, Wash. (both sides of car); Pueblo, Col.; Louisville, Ky.; Grand Rapids, Mich.; Fitchburg, Mass.; Ogden City, Utah; Providence, R. I.; Fresno, Cal.; Shreveport, La.; Long Beach, Cal. (permit number also); Tacoma, Wash.; Pasadena, Cal.; Schenectady, N. Y.; Little Rock, Ark.; Davenport, Iowa.

<sup>58</sup> Austin, Tex.; Oklahoma City, Okla.; Tulsa, Okla.; Louisville, Ky.

<sup>59</sup> Grand Rapids, Mich. (sign front and rear—to be illuminated after dark).

<sup>60</sup> New Orleans ("no vehicle which is dilapidated, worn, or in other ways dangerous to passengers may be used").

<sup>61</sup> Atlantic City, N. J.; Seattle, Wash.; Little Rock, Ark.; Augusta, Ga.

<sup>62</sup> In Portland, Ore., and Providence, R. I., cars must be inspected at least once in thirty days, and in Dallas, Tex., once each week; El Paso, Tex., every two weeks.

<sup>63</sup> Augusta, Ga.; Joplin, Mo.; Little Rock, Ark.

<sup>64</sup> Harrisburg, Pa.; Hartford, Conn.; New Orleans, La.; Los Angeles, Cal.; Joplin, Mo.; Austin, Tex.; Grand Rapids, Mich.; Tacoma, Wash.; Utica, N. Y. (on streets with car service); El Paso, Tex.

<sup>65</sup> Birmingham, Ala.; Atlantic City, N. J.; Fitchburg, Mass.

<sup>66</sup> Hartford, Conn.; New Orleans, La.; Los Angeles, Cal. (75 ft. of a street railway on the street); Dallas, Tex. (not nearer than 50 ft. or farther than 100 ft. from intersection); San Antonio, Tex.; Duluth, Minn.; Providence, R. I. (not within 25 ft. of place designated by white post or in manner prescribed for receiving and discharging street railway passengers).

<sup>67</sup> Spokane, Wash.

<sup>68</sup> Harrisburg, Pa.; Tacoma, Wash.; Reading, Pa.

<sup>69</sup> Fitchburg, Mass. (not within 10 ft. of white pole designated for a street-car stopping place or 25 ft. of intersection of streets).

<sup>70</sup> Ogden City, Utah (not within 20 ft. of crossing).

<sup>71</sup> Oakland, Cal.; Ashtabula, Ohio.

<sup>72</sup> Fresno, Cal.; Shreveport, La.

<sup>73</sup> Ashtabula, Ohio (applies to standard touring cars or limousines); Spokane, Wash.; Hartford, Conn.; Fort Smith, Ark.; Fitchburg, Mass.; Fresno, Cal.; Long Beach, Cal.

<sup>74</sup> Ashtabula, Ohio (applies to all cars except standard touring cars and limousines); Duluth, Minn.; Davenport, Iowa; New Orleans, La.; Portland, Ore.; Atlantic City, N. J.; Dallas, Tex.; Grand Rapids, Mich.; Providence, R. I. (except children under seven years of age); Taunton, Mass.; Tacoma, Wash.; Schenectady, N. Y.; Little Rock, Ark.; El Paso, Tex.; Melrose, Mass.

<sup>75</sup> Duluth, Minn.; Davenport, Ia.; Reading, Pa.; Harrisburg, Pa.; Hartford, Conn.; Los Angeles, Cal.; Joplin, Mo. (no person ahead of front seat); Austin, Tex. (unless seat is designed to accommodate more than one passenger); Portland, Ore.; Dallas, Tex.; San Antonio, Tex. (with child in arms); Pueblo, Col.; and Fitchburg, Mass. (same as San Antonio); Ogden City, Utah; Providence, R. I. (no passenger with child in arms); Shreveport, La.



N. Y. The words "jitney bus"<sup>76</sup> or "motor bus"<sup>77</sup> must be attached or painted on the car in some cities. Dallas, Tex., requires that a safety certificate be hung in the car. New Orleans, La., requires that the name of the corporation owning or operating the car be displayed in the car.

Some ordinances make stipulations as to where cars shall stand and as to the length of time they shall stand.<sup>78</sup> Special provisions are made in some cities as to cars running on streets on which street railways are in operation.<sup>79</sup> Salem, Mass., requires that two means of exit must be provided for cars with a carrying capacity of more than eight persons. Some ordinances specifically state that no advertising shall be allowed.<sup>80</sup> San Antonio, Tex., requires that no umbrella shall be raised by any person occupying the front seat.

#### PENALTIES

The penalties for violation of the ordinances are usually expressed in terms of fine or imprisonment or both, the maximum period of imprisonment ranging

from thirty to ninety days.<sup>81</sup> The fines are limited as follows: to not more than \$25,<sup>82</sup> \$50,<sup>83</sup> \$100,<sup>84</sup> \$200,<sup>85</sup> \$300<sup>86</sup> and \$500.<sup>87</sup> It is usually provided that licenses may be revoked upon conviction or violation thereof or of the ordinance on traffic regulations. Dallas, Tex., provides that when so revoked a license may not be reissued within six months. Galveston, Tex., and Ashtabula, Ohio, automatically revoke licenses on the second and third convictions respectively.

### Traffic Notes from Hampton, Va.

**Following the Consolidation of Five Companies the Combined Properties Were Rehabilitated—Schedule, Publicity and Fare Systems**

On Jan. 12, 1912, Allen & Peck, Inc., took over the following five companies: Newport News & Old Point Railway & Electric Company, Citizens Railway, Light & Power Company, Newport News Gas Company, Hampton Roads Traction Company, Hampton, Phoebus & Fort Monroe Gas Corporation. On Jan. 1, 1914, these utilities were merged as the Newport News & Hampton Railway, Gas & Electric Company. In addition to the activities named in the title of the company, it conducts ice manufacture with retail distribution. Since the present operating company took charge of these properties, with J. N. Shannahan as general manager, it has spent about \$600,000 for rehabilitation.

Briefly stated the main improvements comprised the following:

Re-equipment of the power house, except for the boilers and one vertical turbine (the latter now used only for peak loads), without serious interruption of the traction and lighting service, although no other source of energy supply was available.

Reconstruction of the pole lines for 11,000-volt transmission and 3450-volt lighting.

Modernization of the lighting system by the installation of luminous arcs, nitrogen-filled lamps and tungsten lamps.

Construction of a gas holder at Newport News and installation of a high-pressure main from the Newport News plant to Hampton, the Hampton low-pressure plant being discontinued.

<sup>76</sup> Atlantic City, N. J. (words must be on rear part of car, not less than 8 in. in length and 24 in. wide).

<sup>77</sup> Dallas, Tex. (words to be painted on rear of car in letters not less than 6 in. high).

<sup>78</sup> Utica, N. Y.; Providence, R. I.; Little Rock, Ark.

<sup>79</sup> In Oklahoma City, Okla., cars are not allowed to run longitudinally on streets on which street railways are in operation, except within fire limits of city. They may operate for more than two blocks in one direction where necessary in crossing fire limits. Tulsa, Okla., requires that cars shall not run longitudinally on streets having street railways.

<sup>80</sup> Augusta, Ga.; Grand Rapids, Mich.; Providence, R. I.; Shreveport, La.

<sup>81</sup> Los Angeles, Cal., however, provides a maximum imprisonment of six months.

<sup>82</sup> New Orleans, La. (not less than \$10 or more than \$25); Ocean City, N. J. (or thirty days' imprisonment in default of fine); Fort Smith, Ark. (not less than \$5 or more than \$15); Little Rock, Ark. (not less than \$5).

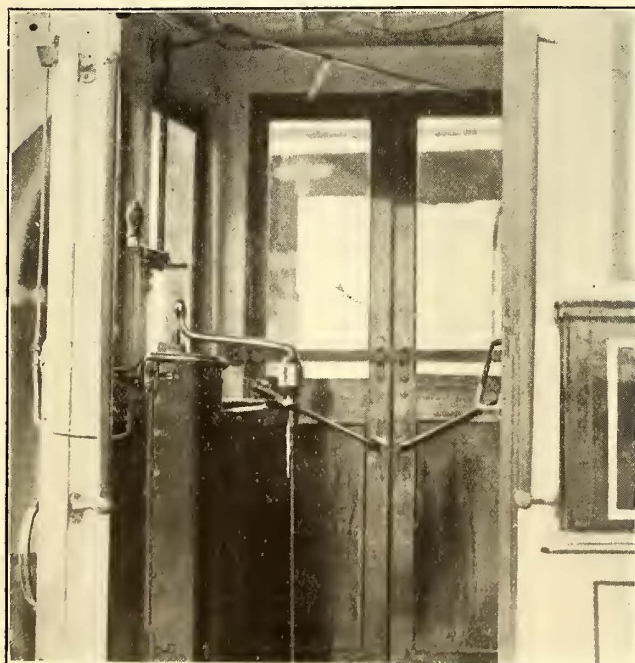
<sup>83</sup> Huntington, W. Va. (not less than \$10 or more than \$50); Atlantic City, N. J. (or not to exceed ten days in jail); Ashtabula, Ohio; Providence, R. I.; Fitchburg, Mass. (\$20); Louisville, Ky. (not less than \$10).

<sup>84</sup> Hartford, Conn. (fine only); Lansing, Mich. (or imprisonment until fine is paid, not in excess of thirty days); Utica, N. Y.; Davenport, Iowa (or thirty days in jail); Duluth, Minn. (or sixty days in jail); Spokane, Wash.; Oklahoma City, Okla.; Seattle, Wash.; Syracuse, N. Y.; Tulsa, Okla.; Galveston, Tex.; Grand Rapids, Mich.; Shreveport, La. (not less than \$5); Long Beach, Cal.; Portland, Ore.; Salem, Mass.; Oakland, Cal.; Pasadena, Cal.; Tacoma, Wash.; Memphis, Tenn. (not less than \$50—a state law).

<sup>85</sup> Schenectady, N. Y. (not more than \$150); Austin, Tex.; San Antonio, Tex.; Fort Worth, Tex.; El Paso, Tex.

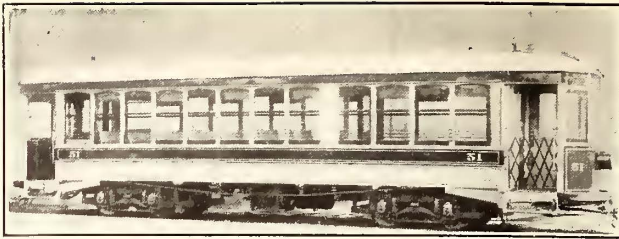
<sup>86</sup> Denver, Col. (not less than \$100 or imprisonment of ninety days or both); Joplin, Mo.; Fresno, Cal.; Pueblo, Col.

<sup>87</sup> Los Angeles, Cal.; Dallas, Tex. (not less than \$5).



HAMPTON TRAFFIC NOTES—CAR REBUILT FOR POSSIBLE ONE-MAN OPERATION





HAMPTON TRAFFIC NOTES—STANDARD DOUBLE-TRUCK CAR WITH SMOKING COMPARTMENT

Replacement of worn special work.

Rehabilitation of all rolling stock, part being rebuilt from the sills up. In repainting the cars, their color was changed from dark yellow to Sherwin-Williams light body color traction green, partly because this color was considered an improvement and partly to make the public realize the betterments which the company was effecting in the service as a whole.

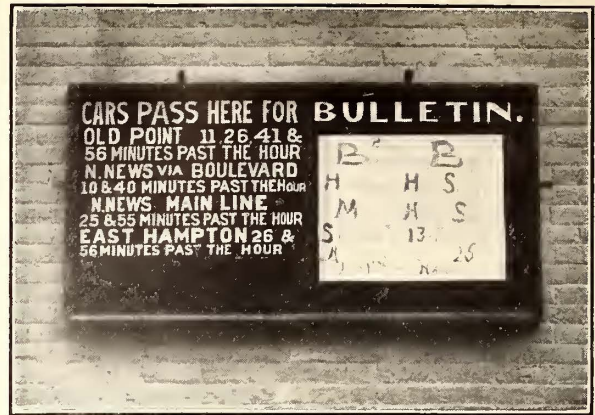
Purchase of four Brill arch-roof semi-convertible cars fitted with smoking compartment and carrying four 203-H tap-field motors with K-49-A controllers. Further purchase of eight single-truck second-hand cars each equipped with two GE-1000 motors.

Lately the management has looked into the possibility of one-man cars for certain feeder lines. One of its eight single-truck cars has already been rebuilt for longer platforms (from 3½ ft. to 4½ ft.). A locking arrangement also has been provided for the rear folding doors on the right-hand side of each vestibule. The convenient control handle for these doors and the simple leverage for the same are shown in the accompanying illustration of the rebuilt vestibule.

The following paragraphs will give some details of the railway service which is now being conducted by this company.

#### SERVICE AND PUBLICITY FOR IT

On a system of this character where shorter headways than fifteen to thirty minutes are uneconomical, the maximum traffic can be obtained only by keeping resident and visitor alike fully acquainted with the schedules. This end is achieved in several ways. One way is to print the schedule of all lines on a card which is then distributed for display in all hotels, important stores and waiting rooms. A second way is to paint on a bulletin board a schedule of cars passing a certain prominent corner, such as the sign reproduced which is installed at the northeast corner of King and Queen



HAMPTON TRAFFIC NOTES—BULLETIN BOARD ON A STREET CORNER IN HAMPTON

Streets, Hampton. A third and still simpler way is to erect a signboard at outlying stops to show at what minutes past the hour the cars for given directions are to be expected. The company also issues a pocket booklet with detailed time-tables of all lines, including ferry connections to Norfolk. The cost of this booklet is defrayed by advertising revenue from local merchants and banks.

The popularity of Old Point Comfort and vicinity as a pleasure resort the year round is a matter of national knowledge. For its transient patrons the company issues a finely-illustrated folder with map, the descriptions in the folder being placed in the order in which a rider starting from Old Point would see the places described. To aid the passenger still further, the same number which distinguishes each place in the text is repeated on the map. The summer schedule calls for such short headways that this folder is printed without a time-table.

The 10-mile run between Old Point Comfort, Phoebus, Hampton and Newport News is made in 45 minutes. In the towns the speed may be as low as 6 m.p.h. because of ordinances, while it is as high as 30 m.p.h. on the intermediate right-of-way. Cars are despatched by telephone. U. S. block signals are standard.

#### FARES

The distance between Old Point Comfort and Newport News is 10 miles. This run is divided into three zones at 5 cents each. Under a franchise provision, workmen's tickets good between the hours of 5 and 7, both morning and evening, are sold in books at half price. Half fare is also granted to children going to and from school.

Aside from these half-rate fares the company is also obligated to sell six tickets for 25 cents for use in Newport News only. In summer a voluntary reduction is made in the form of a 20-cent round trip between Newport News and Buckroe Beach, valid between mid-day and midnight. The going ticket is sold on the car by the conductor, and includes a stub which is exchanged within the Beach limits for a return coupon. The ordinary fare for this trip is 30 cents. Owing to the varieties of fares and the use of zones, the Ohmer register is employed.

Aside from individual excursion tickets, the company handles entire groups for pleasure trips in chartered cars or for tickets sold at 20 cents per person and valid all day. In such cases, the organization which conducts the excursion receives 10 per cent of the fares collected. Sometimes these trips take the form of night trolley rides, with music, to Buckroe Beach.

NEWPORT NEWS & HAMPTON RAILWAY, GAS & ELECTRIC CO.	
WINTER SCHEDULE—EFFECTIVE SEPT. 15, 1914	
Between	Newport News, Hampton, Phoebus and Old Point Via MAIN LINE Every 30 Minutes
	Leave Shipyard and Old Point Same Time 8 and 35 minutes past the Hour
	Leave Shipyard and Old Point 11:05 P. M. Leave Old Point 11:05 and via Boulevard 11:35 P. M.
Between	N. News, Boulevard, Hampton, Phoebus and Old Point Via BOULEVARD Every 30 Mins.
	Leave 28th St. 10, 25, 40 and 55 minutes past the Hour. Leave Old Point 30 and 50 mins. past the Hour
	Leave 28th St. 10, 25, 40 and 55 mins. past the Hour. Leave Old Point 30 and 50 mins. past the Hour
Between	NORTH END and C. & O. DEPOT, WASHINGTON AVE. LINE Every 15 Minutes
	Leave 28th St. 10, 25, 40 and 55 mins. past the Hour. Leave C. & O. Depot 12, 27, 42 and 57 mins. past the Hour
	Leave 28th St. 10, 25, 40 and 55 mins. past the Hour. Leave C. & O. Depot 12, 27, 42 and 57 mins. past the Hour
Between	SHIPYARD and CITY LIMITS, Via Main Line Every 30 Minutes
	Leave Shipyard 20 and 50 mins. past the Hour. Leave Chestnut Ave. and 28th St. 4 and 34 mins. past the Hour
Between	28th St. and WASHINGTON AVE. 31st and CHESTNUT AVE. Via 23rd St. Every 30 Minutes
	Leave 28th and Washington Ave. 3 and 33 minutes past the Hour. Leave 31st and Chestnut Ave. 18 and 48 minutes past the Hour
Between	31st, WASHINGTON AVE. and JAMESTOWN HOTEL Via Ivy Ave. Every 30 Minutes
	Leave 31st St. 5 and 35 minutes past the Hour. Leave Jamestown Hotel, Ivy Ave. 20 and 50 minutes past the Hour
Between	NEWPORT NEWS & NORFOLK Every Hour & 15 Mins. Via Double End FERRY
	Leave Shipyard 5:30 A. M., 6:45, 8:00, 9:15, 10:30, 11:45, 1:00, 2:15, 3:30, 4:45, 6:00, 7:15, 8:30, 28th St. 10:48, operating out 27th and in 28th St. except 10:48 P. M. trip which leaves 28th St. and Washington Ave. via 23rd Street
Between	NORFOLK & HAMPTON Via Bridge Every 15 Mins. 6:50, 8:05, 9:20, 10:35, 11:50, 1:05 P. M., 2:20, 3:35, 4:50, 6:05, 7:20, 8:35, 10:40
Between	KING and QUEEN STREETS and WOOD'S CORNER, East Hampton Every 30 Minutes—Leave King and Queen Sts. 26 and 56 minutes past the Hour. Leave Wood's Corner 12 and 42 mins. past the Hour. 5:50 A. M. until 11:30 P. M. Last Car Leaves Wood's Corner 11:30 P. M.
Between	BUCKROE BEACH & SOLDIERS' HOME Through Phoebus Every 30 Minutes—Leave Buckroe Beach 5 and 55 minutes past the Hour
	5:50 A. M. to 10:30 P. M. Leave Soldiers' Home 12 and 47 mins. past the Hour. Leave Baker's Corner for Buckroe 8:18 and 55 minutes past the Hour
	Leave Old Point 10:48 P. M. 11:45 and 12:45 P. M. 11:45 and 12:45 P. M. 11:45 and 12:45 P. M. 11:45 and 12:45 P. M. 11:45 and 12:45 P. M.

HAMPTON TRAFFIC NOTES—CAR SCHEDULE CARRIED IN STORES AND HOTELS



ANNUAL CONVENTION  
SAN FRANCISCO  
OCTOBER 4 to 8, 1915

# American Association News

ANNUAL CONVENTION  
SAN FRANCISCO  
OCTOBER 4 TO 8, 1915

The Nominating Committee of the Engineering Association Reports Names of Candidates for Office—Convention Committees of the Manufacturers' Association—"White Special" Folder Issued—Accountants' Association Educational Courses

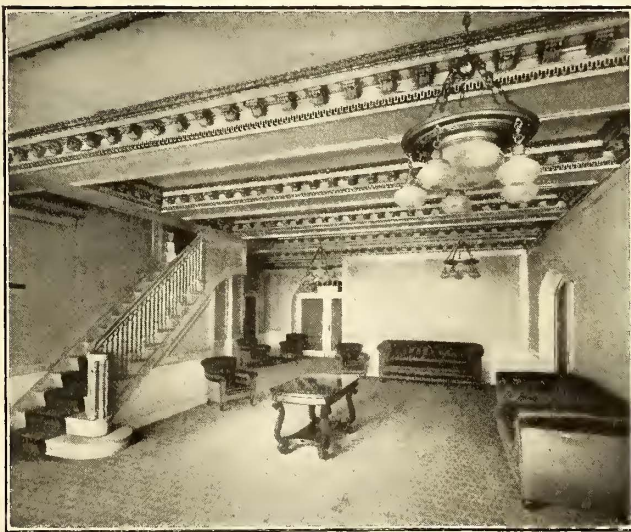
## ENGINEERING ASSOCIATION NOMINATIONS

The committee on nominations has reported the following list of names of its candidates for offices and membership in the executive committee: President, John Lindall, Boston Elevated Railway; first vice-president, F. R. Phillips, Pittsburgh Railways; second vice-president, G. W. Palmer, Jr., Bay State Street Railway; third vice-president, W. G. Gove, Brooklyn Rapid Transit System, and secretary-treasurer, E. B. Burritt, New York, N. Y.

Executive committee (in addition to the above): E. R. Hill, Pennsylvania Railroad; C. S. Kimball, Washington Railway & Electric Company; C. L. Cadle, New York State Railways, and C. F. Bedwell, Public Service Railway.

## MANUFACTURERS' ASSOCIATION COMMITTEE APPOINTMENTS

Vice-President F. A. Elmquist of the Manufacturers' Association, in charge of finance, has announced the appointment of C. P. Billings, Westinghouse Traction Brake Company, Pittsburgh, Pa., as chairman of the finance committee for the San Francisco convention.



LOBBY WHERE SECRETARY'S OFFICE AND REGISTRATION DESKS WILL BE LOCATED, IN HALL OF THE NATIVE SONS OF THE GOLDEN WEST

The appointment of the following committees has also just been announced:

Local Transportation Committee—A. G. Jones, General Electric Company, chairman; G. H. Barker, Standard Motor Truck Company; W. P. Bell, Standard Underground Cable Company; S. M. Gilman, John A. Roebling's Sons Company; G. R. Murphy, Electric Storage Battery Company, and F. W. Webster, Allis-Chalmers Manufacturing Company.

Entertainment—(Under the direction of Thomas Finigan, vice-president, vice-president Pierson, Roeding & Company, San Francisco, Cal.); A. V. Thompson, General Electric Company, San Francisco, Cal., chairman; W. E. Amann, Galena-Signal Oil Company; C. F. Bulotti, Ec-

cles & Smith Company; Richard R. Carr, The Lorain Steel Company; H. S. Clark, Westinghouse Traction Brake Company; H. B. Green, Pennsylvania Steel Company; R. A. Holabird, Ohio Brass Company; F. L. Jones, General Railway Signal Company; H. R. Noack, Pierson, Roeding & Company; J. H. Steiger, American Brake Shoe & Foundry Company, and J. B. Struble, Union Switch & Signal Company.

Press and Publicity Bureau—N. A. Bowers, *ELECTRIC RAILWAY JOURNAL*, chairman; A. H. Halloran, *Journal of Electricity, Power & Gas*.

Hotel and Registration—C. E. Heise, Westinghouse Electric & Manufacturing Company, chairman; R. F. Behan, Westinghouse Electric & Manufacturing Company; H. A. Beuter, Baldwin Locomotive Works; E. F. Bodler, Tool Steel Gear & Pinion Company; E. C. Myers, General Electric Company; F. A. Richards, The J. G. Brill Company; S. P. Russell, H. W. Johns-Manville Company, and E. Sullivan, Pantasote Company.

Information Bureau—W. P. L'Hommedieu, Westinghouse Electric & Manufacturing Company, chairman; Stuart Hazelwood, Midvale Steel Company; G. Koch, St. Louis Car Company; S. H. Lanyon, Federal Signal Company; F. H. Leggett, Western Electric Company; W. P. Millner, Dearborn Chemical Company; C. H. Penoyer, National Conduit & Cable Company, and O. W. Wollcott, Sherwin-Williams Company.

## THE "WHITE SPECIAL"

Complete information concerning the transportation arrangements made by the Chicago transportation committee for the "White Special" train from Chicago to San Francisco is given in a folder, appropriately inclosed in attractive white covers, distributed this week from the office of H. G. McConaughy, director of transportation. This train is in charge of L. E. Gould, *ELECTRIC RAILWAY JOURNAL*, Old Colony Building, Chicago, Ill., who will furnish additional information, and reserve space and tickets.

The train will leave the Grand Central Depot, Harrison Street and Fifth Avenue, Chicago, via the Chicago Great Western Railroad, at 6.30 p. m., Friday, Oct. 1. At Omaha passengers from St. Louis, Kansas City, St. Paul and Minneapolis will join the train, which will leave at 8.30 a. m. on Saturday. Cheyenne, Wyo., will be reached at 8.30 p. m. on the same day. The train will arrive at San Francisco at 10.25 o'clock on Monday morning. The train will be a counterpart of the "Overland Limited." Tourists on the "White Special" can return on the "Blue Special" or "Red Special," or individually.

## ACCOUNTANTS' ASSOCIATION EDUCATIONAL COURSES

As an outgrowth of the course administered last season by Prof. John R. Wildman under the auspices of the educational committee of the Accountants' Association, three courses have been planned for the coming year. These are as follows: Elementary course, course in general theory and practice of accounts, and course in advanced accounting. The third course will be taken by the students who followed the course begun in 1914.



The subjects to be taken up in the elementary course are: Qualities essential to efficient office work; business English; mathematics of business; office practice—care of correspondence, filing, forms, functions, method of preparing and handling invoices, checks, vouchers, notes, etc.; principles of double-entry bookkeeping, with illustrations from the street railway field; practice in double-entry bookkeeping, with material from the street railway field; major and minor reports of the accounting department—why and how made up, and the use to which they are put; brief history of Interstate Commerce Commission, its relation (as well as the relations of various State commissions) to the street railway companies, the scheme of the classification, explanation of accounts, etc.

The topics to be followed in the course on general theory and practice of accounts are as follows: The purpose and scope of accounting; the relation of accounting to allied subjects, such as economics, law, finance and organization; the methods of keeping books and the media for recording financial transactions; accounts—their philosophy, construction and classification; discussion of balance sheet accounts; discussion of revenue and expense accounts; preparation, interpretation and use of balance sheets, income statements, etc.; graphs, charts and statistics as aids to operation and management.

In advanced accounting the following subjects will be covered: Organization and development; operation; merger; consolidation; holding companies; receivership; reorganization; dissolution.

In a pamphlet just issued by the committee, a number of testimonials expressing satisfaction with the first-year course are printed.

## COMMUNICATION

### Girder and High T-Rail Renewals

UNITED RAILROADS OF SAN FRANCISCO  
SAN FRANCISCO, CAL., Aug. 11, 1915.

To the Editors:

I have read the article in the *ELECTRIC RAILWAY JOURNAL* of July 31 regarding rail renewals, and I want to make the following comments:

**Flange Bearing.**—In proper rail sections it is not necessary to renew as soon as the wheel flange rides or touches the floor of the groove or tram. We have rail in service where the groove has been cut through. It had to be removed from the street two years ago, although still good for a year or more. This condition applies only in asphalt and concrete paved streets, otherwise the head of the rail would bend over and break off.

**Corrosion.**—The statement made that corrosion advances more rapidly where the track drainage is good, as on steep grades, is rather novel. This, if true, would seem to indicate that poor drainage is an advantage and, therefore, draining track is a useless expenditure. Personally, I believe that the drier the track can be kept the longer the rail will last, so far as corrosion is concerned. Wherever we have had cases of corrosion of the web and base of the rail, the track was located in poorly-drained flat-grade streets. Electrolytic action takes place more readily, also, where the drainage is poor, and where the rail, therefore, is constantly in damp, moist ground.

**Corrugation.**—Our experience does not lead us to believe that titanium prevents or delays corrugation, but it might lengthen the life of the rail because the metal is practically free from impurities. This has not yet been demonstrated on our property as we have only used titanium for four years. A comparison of titanium-

treated rail and untreated is shown in the following table:

#### REPORT ON CORRUGATED RAILS IN STANDARD TRACK CONSTRUCTION

Lorain steel 106-422 rail on ties spaced 2-ft. centers with 9 in. of rock ballast and asphalt or basalt block paving. All rails open-hearth steel with or without titanium. All corrugations where noted are just starting or have developed sufficiently to be quite noticeable, but are not yet bad.

Track Laid in	Kind of Paving	Kind of Rail	Condition
1909	Asphalt	Open hearth	No corrugation
1910	Macadam	Open hearth	No corrugation
1910	Asphalt	Open hearth	Corrugated
1910	Asphalt	Open hearth	Corrugated
1910	Asphalt	Open hearth	Corrugated
1910	Asphalt	Open hearth	Corrugated
1910	Asphalt	Open hearth	Corrugated
1910	Asphalt	Open hearth	Corrugated
1911			
1912			
1911	Asphalt	Soft titanium	Corrugated
1912			
1911	Block	Soft titanium	Corrugated
1911	Asphalt	Soft titanium	No corrugation
1912			
1911	Asphalt	Soft titanium	No corrugation
1911	Asphalt	Soft titanium	Corrugated
1911	Macadam	Soft titanium	Corrugated
1912			
1912	Asphalt and block	Hard titanium	No corrugation
1913			
1913	Asphalt	Hard titanium	Corrugated
1912	Asphalt	Hard titanium	Corrugated
1913	Asphalt	Hard titanium	Corrugated
1912			
1912	Asphalt and block	Hard titanium	No corrugation
1913	Asphalt	Hard titanium	No corrugation
1913	Asphalt	Hard titanium	Corrugated
1913	Asphalt	Hard titanium	Corrugated
1913	Asphalt	Hard titanium	Corrugated
1913	Asphalt	Hard titanium	Corrugated
1913	Asphalt	Hard titanium	No corrugation
1913	Asphalt	Hard titanium	Corrugated
1914	Asphalt	Hard titanium	Corrugated
1912			

**Welded and Riveted Joints.**—I do not agree that welded and riveted joints have had a tendency to reduce joint difficulties. I think this statement is too optimistic. For a certain time after installation it would appear that such was the case. After a few years, however, when the steel adjacent to the joint begins to break on account of the great heat applied when the joints were installed, the trouble and expense of keeping these in good condition is far more than that of the standard plate joint. Riveted joints cannot be made perfectly tight on account of the shrinkage of the rivets when cold. Furthermore, after they loosen they cannot be tightened without cutting them off and riveting.

B. P. LEGARE,  
Engineer Maintenance of Way and Construction.

### Train Resistance of Electric Cars

On page 239 of the issue of the *ELECTRIC RAILWAY JOURNAL* for Aug. 7 a pair of resistance curves, Fig. 3, was inadvertently included with two energy consumption curves plotted from Third Avenue (New York) Railway tests. They were also referred to editorially as from Third Avenue Railway tests in the issue for Aug. 14. These curves were intended to represent heavy railroad conditions and had no relation to the Third Avenue Railway tests.

A bit of freight business of which the Louisville & Interurban Railway is sure, is represented by water from two locally famous springs near LaGrange, Ky., which is bottled by two concerns in Louisville. Shipments have been made daily from each of the springs in galvanized drums and taken from the interurban depot by the wagons of the bottling company. The Merchants' Ice & Refrigerating Company, which recently acquired the bottling rights of one of the springs, is planning to haul the water in carload lots, storing it until it is bottled. The water is used for carbonating, as well as for other purposes, and the volume of this business is increasing. In carload lots the water might be delivered to the merchants' plant.



# 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.)*

## Los Angeles Commutator Slotter

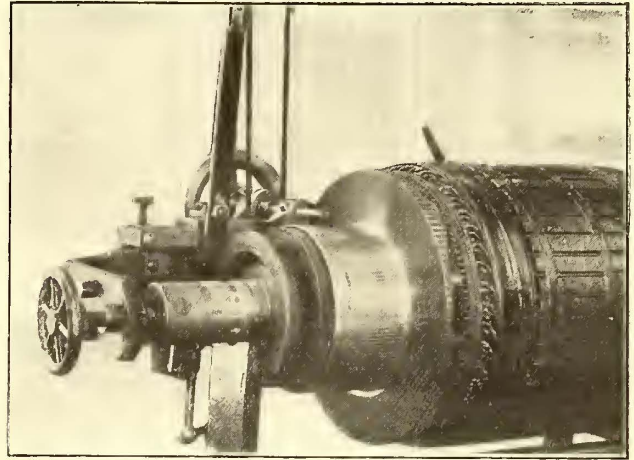
BY E. L. STEPHENS, MASTER MECHANIC LOS ANGELES  
(CAL.) RAILWAY

The advantage of slotting commutators has been so fully recognized that the practice has almost become universal, as nearly every company has in some way or other endeavored to develop some means whereby this slotting can be done in the most satisfactory and economical manner. Our idea was to develop something simple and efficient for a small outlay and we have finally developed a slotter which combines accessibility and ease of operation for a wide range of motors.

Fig. 1 shows an end view of the machine with the saw swung clear of the centers. In this position it receives the armature which is conveyed by chain block from a truck to the centers. The wrought-iron yoke which carries the centers for the armature shaft and machine proper is now swung into position, bringing the saw in line with the center of the commutator. The centers are then tightened on the end of the armature shaft, making the whole rigid.

Fig. 2 is a three-quarter view of the slotter with the armature in place and the machine in operation.

Fig. 3 is a general view of the machine, of the stand and of the air hose, which is used to keep the commutator clean and free from mica dust. The working parts, in this instance, were constructed mostly of wrought iron with brass bushings for the saw spindle. This is driven by a  $\frac{1}{4}$ -in. round belt on a grooved pulley at about 1500 r.p.m. We use a  $\frac{3}{4}$ -in. diameter circular metal saw, held in place by a nut as shown at the

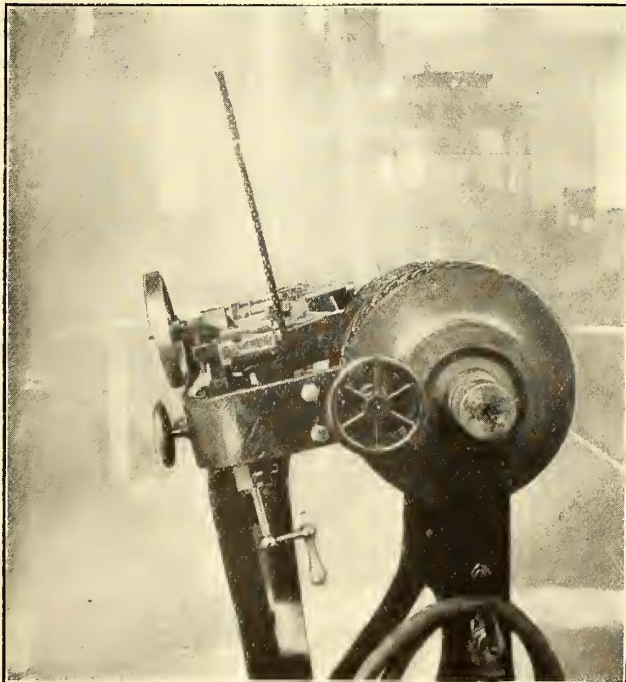


COMMUTATOR SLOTTOR—FIG. 2—SLOTTOR AT WORK

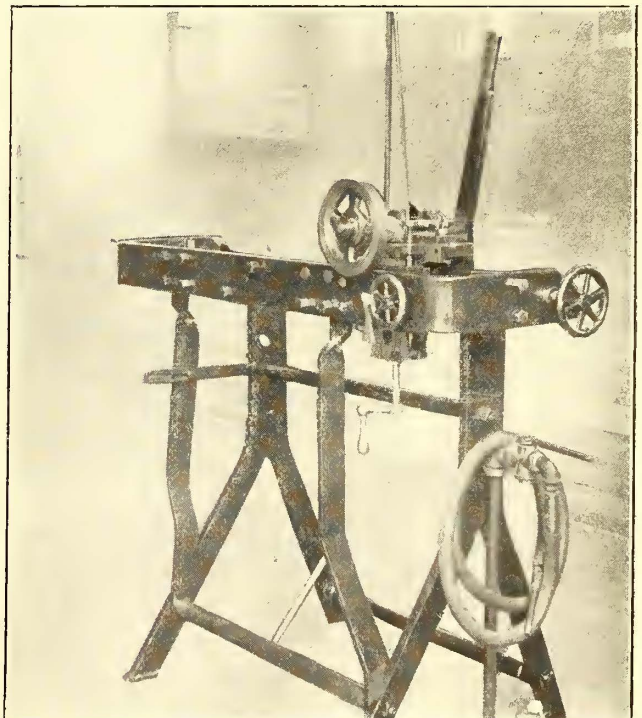
end of the shaft. Hence the saw when worn may be easily removed and replaced by a new one.

This machine is easily adjusted to a commutator of any diameter, by using a hand screw, as shown below the centering frame, which raises or lowers the saw shaft to the proper position and depth of cut, as checked by a thumb screw.

The hand wheel at the side is for adjusting the saw when segments of the commutator are not in line with its shaft center. After this adjustment has been made the workman slots the commutator by pushing the lever



COMMUTATOR SLOTTOR—FIG. 1—VIEW BEFORE FRAME IS SWUNG INTO PLACE



COMMUTATOR SLOTTOR—FIG. 3—THREE-QUARTER VIEW OF MACHINE WITHOUT ARMATURE



toward the armature, moving the sliding carriage which supports the saw spindle. The saw runs clockwise, facing the front of the machine (as in Fig. 3) and is driven from a countershaft overhead. With this device a Westinghouse 38-B commutator of 135 segments can be cut  $3/32$  in. deep, in a minimum time of ten minutes and a maximum of twenty-five minutes, according to the hardness of the mica.

The standard or armature support is constructed of two  $3/4$ -in. wrought-iron forgings held together by  $1/2$ -in. rods running through  $3/4$ -in. gas pipes, which makes it strong and rigid, yet light. This machine has been in use for several years, and has given perfect satisfaction, not only in reduction of time saved but in permitting better work at reduced cost.

## An Unusual Feed-In Clamp

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

For the important matter of connecting the main feeder cable with the trolley wire at the span-wire support several methods, involving different devices and giving different degrees of satisfaction, have been used.

In one type the feed-in conductor is independent of the span wire and is connected to the brass trolley ear by a small iron set screw or else is attached to a separate ear by set screws.

Experience has shown that the cost of the labor and material of this method of providing the feed-in connection by a separate conductor is the highest of all. The current-carrying capacity of the copper supplementary feed-in cable fastened with set screws is uncertain originally and is not permanent, and the feed-in cable is difficult to move because the iron set screws rust in place and break off when attempts are made to loosen or tighten them.

In a second type the contact surface for transferring the current from the feed-in cable to the trolley wire is furnished by using the feed-in cable as the span wire and relying on the pressure of this feed-in span wire, bared, against an uninsulated metal feed-in-yoke, straight-line suspension body or round-top suspension body.

This type of feed-in costs less to install than the first and its parts last practically forever. The area of contact for current-carrying purposes is not great, however. Again, the contact pressure between the bare copper feed-in cable and the metal body varies with the span-wire tension and is uncertain and the conducting surfaces are liable rapidly to become tarnished and corroded by their exposure to the weather so that their conductivity is reduced.

In a third type the feed-in cable, used as the span wire, is held by a clamping or clinching arrangement and soldered in place. This soldering-in process makes a solid piece of the stranded cable, and in the alternate up-and-down motions of the span wire imparted by the passing trolley wheels the copper strands are liable to break off one after the other until the whole conductor fails. This soldering-in also proves expensive if the track centers are changed and the trolley wire has to be moved.

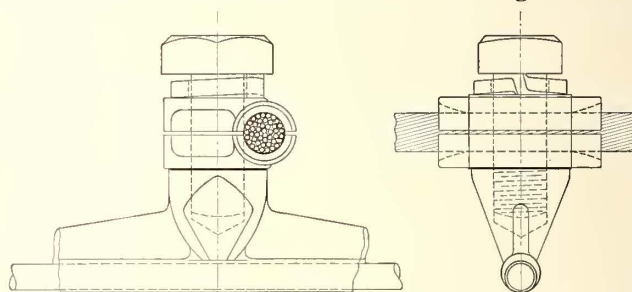
The cap screw in this type of feed-in yoke, located as it is under the feed-in cable and span-wire combined, is very inaccessible for rapid manipulation with a wrench in re-earring work. The current-carrying capacity of this type of soldered-in yoke is, of course, the best possible, but the failure of the feed-in cable at the sharp edges of the yoke, the inaccessibility of

the cap screw and the usual spoiling of the device when removed are points against its popularity.

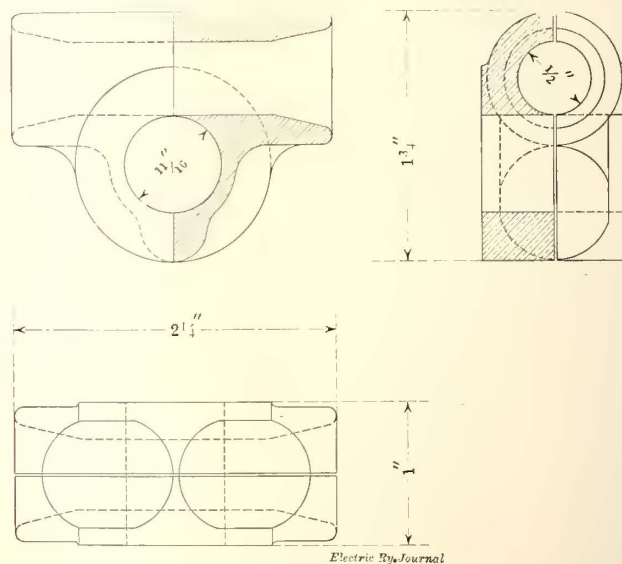
In San Francisco years ago a feed-in device was designed after unfortunate experiences with those then on the market. The working drawings and sketches make plain its construction and method of use. It consists of two special grooved brass washers that inclose the feed-in cable, one above and one below, the whole affair being bolted rigidly to the common trolley ear with the usual  $3/4$ -in. square-head tap bolt and spring lock washer. It has proved to have all the good features of all the other devices and some additional ones, with none of the defects of the others.

It is light in weight, cheap in price, quickly installed, inconspicuous, foolproof and everlasting. It has ample current-carrying and contact-pressure capacity. It requires no soldering, clinch tips or set screws and, as it has no sharp edges, it safeguards the stranded soft-copper feed-in cable from breakage.

It is readily and rapidly taken off for moving or for re-earring and can be used over and over again indefi-



SIDE AND END VIEWS OF FEED-IN CLAMP



CONSTRUCTION DETAILS OF FEED-IN CLAMP

nately. It has proved entirely satisfactory in more than ten years of continuous use and is standard for this company. It is so installed that an approaching wild trolley pole will drive the feed-in cable against the steel cap screw and not against the lips of the brass washer. These brass washer feed-in devices cost 15 cents each, exclusive of the short 2-in. sherardized tap bolt and sherardized spring washer, and weigh but 7 ounces. This light weight is an important point in minimizing the hammer blow of the passing trolley wheel.

Of course, by drilling one or more holes through the top washer the inclosed cable can be soldered into this feed-in device, if this is considered desirable.



## Vacuum Cleaning Cars

BY E. J. HAINES, ASSISTANT TO SUPERINTENDENT OF EQUIPMENT, BAY STATE STREET RAILWAY, BOSTON, MASS.

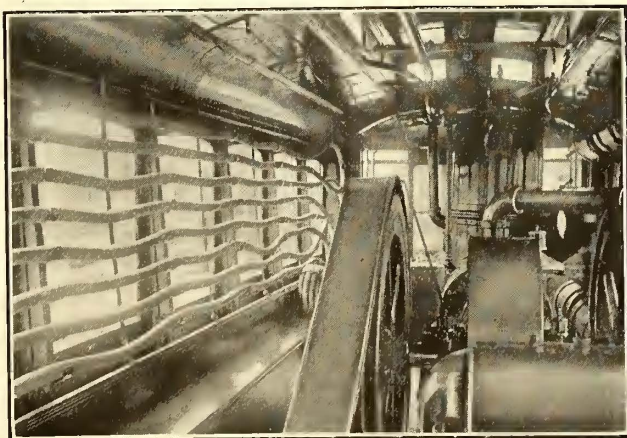
On a system where there are more than two or three carhouses the number of cars at each station might not warrant the installation of a vacuum cleaning plant at each one of these stations. In order to overcome this difficulty on the Bay State Street Railway, where there are thirty-seven operating carhouses scattered over a large territory, the vacuum cleaning plants are installed on cars, four of which are in service, one for each general division. This arrangement admits of the use of apparatus of larger capacity and greater efficiency for the same investment than would be possible with a plant at each station.

The vacuum cleaning cars were formerly single-truck box cars used in passenger service, having 20-ft. car bodies and longitudinal seats. All seats and seat backs were removed, cables were placed in troughs and the insides of the cars were sheathed up to the windows. The 4-in. axles of the Peckham single trucks under the cars were replaced with others  $4\frac{3}{4}$  in. in diameter, and new journal boxes and heavier springs were installed.

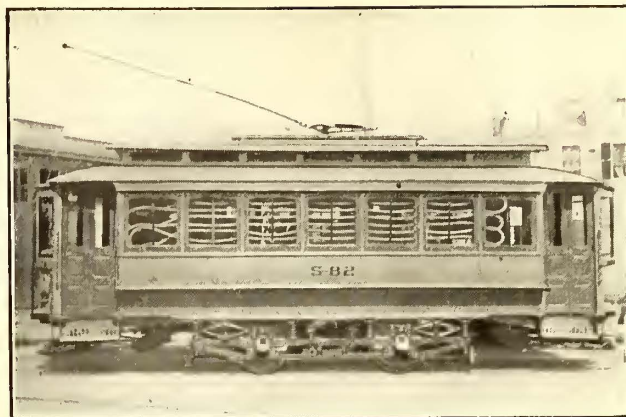
The vacuum cleaning apparatus was then installed, great care being taken to properly distribute the weight. In addition to the vacuum cleaner a 50-cu. ft. air compressor was installed in each car for the compressed-air supply in carhouses not having compressors.

Two different types of vacuum cleaners are used. The first consists of a four-sweeper, horizontal motor-driven, vacuum pump, with a cylinder of 14 in. diameter and 10 in. stroke, operating at approximately 150 r.p.m. The motor is of 20-hp. capacity, 550-volt, type CQ, compound wound, and drives the pump by means of a beveled steel chain, covered with a continuous strip of rawhide. There are two separators, each 24 in. in diameter by 48 in. long, one wet and one dry, which deposit the dirt at points for convenient handling in the most efficient manner. The tools used are four cushion renovators, four special cushion-edge renovators, four long bristle brushes for cleaning flat woodwork and ceilings of cars, four special renovators for cleaning grooves in molding, etc., four special renovators for cleaning heaters and four extension handles. There are 200 ft. of 1-in. or  $1\frac{1}{2}$ -in. special wire reinforced vacuum hose in four 50-ft. lengths. This hose is supported on hangers bracketed on the body posts when not in use.

Boxes with hinged covers are installed under the windows for the storing of tools and a large closet is built at one end of each car, the air compressor and switchboard being located at the other end.



VIEW OF HORIZONTAL TYPE VACUUM CLEANER AND HOSE



EXTERIOR OF VACUUM CLEANING CAR

The other vacuum cleaner is of the turbine type, four-sweeper, direct-connected to a vertical shunt-wound motor of 10 hp. capacity. There is a primary separating tank of 30 in. diameter and a secondary separator of 36 in. diameter with 14-in. bags for separating the fine dust. These dirt bags are so arranged that they can be taken out and emptied after each day's run. Two hundred feet of hose and renovators similar to those in the other equipment are used.

Each one of these vacuum cleaners has some advantages and some disadvantages, so that the selection of either would depend a great deal on the service demanded. The turbine cleaner has the advantage of being lighter and the current consumed is in proportion to the work done, while with the horizontal type the greatest efficiency is obtained with all sweepers in operation. Both 1-in. and  $1\frac{1}{2}$ -in. hose has been used. The smaller is easier to handle but it clogs up more easily, and as there is a great deal of rubbish, such as peanut shells, etc., to be cleaned up at times, it is a distinct advantage to have the larger hose.

One man is assigned to stay with each car in charge of the apparatus. He is assisted at the various carhouses by one or more car cleaners. Two men can in a day thoroughly clean fourteen box cars with longitudinal seats and plush cushions, and more of the semi-convertible cars with cane seats.

## Hydraulic Wheel and Armature Presses

BY "VULCAN," A.M.I.C.E., A.M.I.E.E., ENGLAND

To give very heavy pressure the ram of a hydraulic wheel press must of necessity move very slowly. With the ordinary type of machine having only one belt-driven, constant-speed pump plunger the traveling speed of the ram is practically the same whether the latter is exerting a light or a heavy pressure.

In forcing axles into or out of car wheels the hydraulic ram often has a considerable amount of idle travel before reaching the object to be forced; in fact, on many jobs this idle travel almost equals, and on certain work considerably exceeds, the load travel, i.e., the distance moved under appreciable pressure. The time wasted on the idle movement is proportionately very high, and various arrangements have therefore been devised with the object of increasing the ram speed at this period.

With this object in view some makers provide the hydraulic press with two pump plungers of different diameters, power-driven from the same crankshaft, the larger one or both together being for use on the idle movement of the ram and the smaller one for providing the greater ram pressures required when the work is reached.



Others have used a single pump plunger driven from a two-speed countershaft, and in this case the high speed is employed for small ram pressures, and the low speed when the loading is great.

Such methods have been more or less successful, but the following device, which has been adopted by the writer on presses having only one pump plunger, meets all requirements in the simplest possible manner, and obviates the mechanical disadvantages of the double type.

It consists of a tank fitted on the wall of the building as high as possible above the press cylinder, and connected to the latter through a 1-in. pipe and a  $\frac{5}{8}$ -in. hydraulic valve on the press. The tank is connected to the local water mains through a ball float valve.

Thus, supposing the tank is 20 ft. above the press, this arrangement, with valve open, is capable of imposing on a 10-in. ram a total pressure of about 680 lb., which is more than sufficient to move the ram forward up to the object to be forced.

By coupling the press to the tank on the idle forward travel, a ram speed many times greater than that produced by the operation of the pump may, therefore, be obtained. When the normal forcing pressure is required the tank supply valve is, of course, closed.

This addition to an ordinary hydraulic press will be found to increase the output capacity very considerably and costs very little to install.

## Electric Welding with Dynamotor Sets

BY DANIEL DURIE, MASTER MECHANIC WEST PENN RAILWAYS

In order to save the great waste of current (7 to 1) when using resistance to obtain power direct from the trolley line for electric welding on motor repairs and on track work, this company has had constructed some dynamotor sets. These consist of 15-kw. machines with double commutators and armatures having double windings, one side wound for 650 volts and the other side for 80 volts, running at 2200 r.p.m. The 650-volt commutator is in series with the series winding on the field and the shunt field receives its current from the 80-volt commutator, so the wire is comparatively rugged. This makes the machine self-starting by simply hooking a fish-pole connection over the trolley line. At the same time it has sufficient shunt field strength to prevent its running away. This makes a very compact, light-weight, efficient and economical machine.

One point especially important in connection with welding with a machine of this class is having sufficient inductance in the welding circuit. Welding with the arc electrode was very difficult and with metal electrodes was practically impossible until after the welding current was stabilized by inserting an inductance coil. An inductance coil was finally made out of the core of an obsolete type of 4-kw. transformer wound with No. 4 Deltabeston wire. This inductance coil was used dry without a case. After its introduction the welding arc became very stable, and more suitable than when welding from 650 volts. Moreover, practically no resistance was required, as the strength of the welding current could be regulated by the length of the arc.

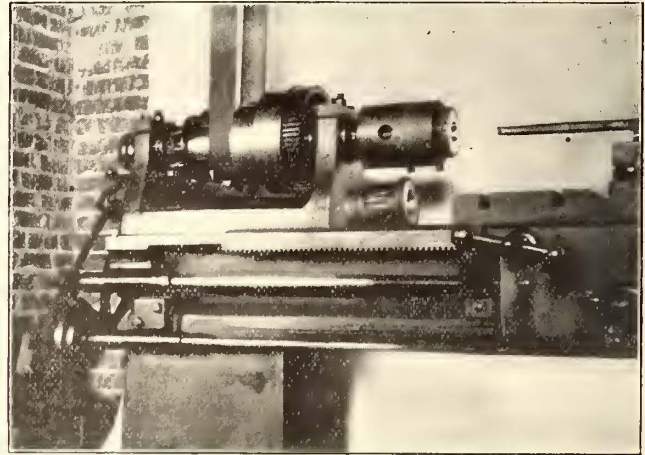
The provision of ample inductance in the welding circuit is absolutely vital to the success of the low-voltage welding apparatus. It also enables the machine to do far better work than when using 650 volts.

Our welding machines are hung underneath ordinary push carts with the axles arched up sufficiently to make room. The bodies of the push carts are used as lockers for helmets, cables, electrode holders and supplies. It is easy for one man to handle the apparatus around the shop or on the track.

## Armature Bearing Jig

BY W. E. NEES, SUPERINTENDENT SELMA STREET & SUBURBAN RAILWAY

The advantage of using a jig for boring motor armature bearings has been generally evidenced by the large number of devices of this character that have been developed, and a simple device of this type is used by the Selma Street & Suburban Railway in its shops, the details being shown in the accompanying illustration. This jig is made large enough to take the largest diameters of bearing, and bushings are inserted for the bearings of smaller size. By adjusting four set screws, of which two are shown in the illustration, it is possible to arrange the jig so that the bearing is bored off-center, and



JIG FOR BORING ARMATURE BEARINGS

the life of the bearing is thus increased about 50 per cent. It has been found that through the use of the jig, an apprentice boy can learn within a short time to bore out bearings as quickly as an experienced machinist.

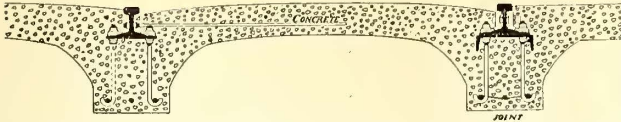
As shown in the illustration, the jig consists of two parts, one of which is screwed on to the spindle of the lathe. This is bored out to a taper, and in the recess is inserted a bushing, the latter being bored out to fit any particular size of armature bearing. By screwing in the set screws that are located on one side of the jig, the bushing is moved off the center line and the bearing held in it is thus bored eccentric to any desired degree.

## Standard Paved Track Construction of the Southern Public Utilities

In a recent issue of the *Southern Public Utilities Company's Magazine*, E. R. Horton, Jr., of the engineering department, described the new form of construction which is being installed in Anderson, S. C., during the present summer. A cross-section of this is shown in the accompanying illustration. The rail support is a concrete beam reinforced with corrugated steel bars in accordance with modern concrete practice. The rail is mounted on the beam on wide bearing plates distributing the weight over 8 in. of width. Long hook bolts, placed at 2-ft. intervals, are used to anchor the rail, the hooks being turned under the reinforcing bars in the concrete beam. To insure permanent contact of the rail with its supports, wooden washers are placed under the base plates and strong lock washers are used on the upper ends of the anchor bolts. This design provides for the forcing of the rail down by the weight of the cars if there is much shrinkage.

At the joints extra support is given by the base plates which run unbroken past them, and the plates are heavily reinforced underneath by means of steel channel.





CROSS-SECTION NEW STANDARD TRACK CONSTRUCTION  
SOUTHERN PUBLIC UTILITIES COMPANY

The hook bolts anchor all parts of the joints together. In addition the splice bars are bolted up with Mayari chrome-steel bolts. To avoid pounding of the joints the heads are carefully ground and the rail ends are butted close together.

A monolithic track foundation and pavement are provided in this construction, the concrete paving being favored because it is believed that if properly constructed it is entirely satisfactory, while at the same time it is cheap. Mr. Horton states that in a few places concrete pavements have not been satisfactory on account of the use of inferior mixtures and poor workmanship and of ignorance of the proper method of making expansion joints. The method for making such joints which has been found satisfactory by the Southern Public Utilities Company is as follows: A smooth piece of weather boarding, greased, is placed in the track and the concrete is carefully edged on both sides, the edge being slightly rounded and compacted thoroughly so as to be very hard when the concrete sets. The surface of the street is laid off into large blocks similar in appearance to large bricks, the surface being scored by means of a large scoring board which lays off four rows of block at once. The scoring board is made of heavy timber sawed out to the proper crown and having on its face V-shaped oak strips suitably placed.

There is no groove next to the rail in this construction as the residents of the towns served by the company prefer this crown construction to the groove construction. There is no jolt when vehicles cross the track and there is nothing to catch the wheels of vehicles.

### New Track and Conduit Construction at Worcester, Mass.

The Worcester Consolidated Street Railway is engaged in reconstructing double track on Main Street between Lincoln Square and Chandler Street and is placing the feed wires underground. The grouted granite-block paving, laid in 1901 at a cost of \$3.50 per square yard, is the oldest of its type on any business street in the country. The track laid in 1901 consisted of Pennsylvania Steel Company's Sec. 222, 95-lb. girder rails, 8 25/32 in. high, laid on 7-ft. ties. The small amount of wear shown by the pavement upon the removal of the grouted blocks from between the rails and from a strip 2 ft. wide outside each track is indicated by the accompanying halftones.

The new track consists of Pennsylvania Steel Company's Sec. 273, 9-in. 125-lb. girder rail in 50-ft. lengths. The rails are of Mayari steel and the track bolts are of the same material. The rails are laid on 6-in. treated chestnut ties, 8 ft. long, with a minimum face of 7 in., the ties being spaced 2 ft. apart on centers. Rail braces are provided on alternate ties and the joints are of the suspended type, with twelve-hole plates. The track bolts, 1 in. in diameter, have 1/16-in. raised threads and Harvey grips, the guaranteed tensile strength of the material being 100,000 lb. per square inch. Each joint is provided with the American Steel & Wire Company's compressed-terminal copper bonds, one 3 in. and the other 10 in. long, giving full rail-section conductivity. A 500,000-circ.-mil cable is bonded around all special work, and cross-bonding is done every 500 ft.



WORCESTER CONSOLIDATED STREET RAILWAY—RELAYING  
BLOCKS BETWEEN RAIL AND OLD PAVEMENT

In laying the new track no ballast was required, an excellent gravel foundation being available. The ties were laid upon a bed of gravel, leveled to within 3 in. of their tops. Concrete of one part cement, three parts sand and six parts crushed stone was poured around the ties to a total depth of 5 in., thus surrounding the base of the rail. On top of the concrete a 1-in. cushion of sand was placed, the paving blocks being bedded upon this by the city. The blocks were laid about 1/4 in. apart and grouted with a mixture of one part cement and two parts sand to a point near the top of the blocks and above this a 1.25 : 1.5 mixture was used. A dressing of pea stone was then broomed upon the granite.

Between Lincoln Square and School Street a strip of felt 6 in. wide and 1/2 in. thick has been placed vertically between a row of blocks laid parallel to the outer rail of each track and the heads of the other paving blocks laid on the street, the axes of the latter being at right angles to the rail. These strips are designed to reduce the noise of the cars by the insertion of a break between the track and the solid structure formed by the paving blocks and the grouting. Pending a test as to the water-tightness of this construction, which was introduced largely as an experiment, it has been decided to omit it in the remainder of the job. The opinion is held in some quarters that with the felt strip in service it may be difficult to prevent water from getting between the block and the rail and ultimately reaching the ties. The space required by the rail braces prevents the application of a continuous strip of felt between the rail and the first row of blocks.



WORCESTER CONSOLIDATED STREET RAILWAY—RELAID  
PAVEMENT WITH EXPERIMENTAL EXPANSION JOINT



The feeder conduit consists of thirty or thirty-six 3½-in. Orangeburg fiber ducts laid in a trench 5 ft. deep and 30 in. wide at the bottom. This will contain both positive and negative feeders, and rental space has also been provided. Special manholes were designed for this work by Howard R. Whitney, engineer maintenance of way Worcester Consolidated Street Railway. These are of an offset type, with entrances 30 in. in diameter located at one side of the track. The working chamber, brick-lined at the sides, with an 8-in. concrete base and concrete, brick and steel roof, is 8 ft. long and 5 ft. wide, the height being 7 ft. 6 in. At one side is a step 3 ft. high and 2 ft. 9 in. wide, below the entrance, which was required by the city to facilitate the location of future underground structures. The negative feeders are carried from duct to duct along the roof, the other cables being racked on the wall in the usual way. A sump at one end of the floor provides for drainage into the surrounding gravel soil. The roof is composed of old rails laid parallel to the track, the rails being spaced just far enough apart to allow a course of bricks to be threaded into place between the webs. The bricks are used in place of wooden forms and a 3-in. layer of concrete is poured upon the bricks, forming the roof slab. Thirteen bull rings attached to walls and floor provide means for the handling of cable from the street into ducts by snatch-blocks and pulleys.

## Electrostatic Potential and Synchronism Indicators

The General Electric Company has developed several devices employing the electrostatic glower for use on high-tension lines. This glower consists of a spherical lamp bulb with the usual base but without a filament, in fact with no terminal inside the vacuum space. One terminal consists of a brass cap on a glass tube pushed up inside the stem to the point near the center of the bulb. It is connected by a copper wire to another cap mounted on the opposite end of the tube. The base forms the second terminal. When the two terminals are subjected to a sufficient difference of potential a glow is produced in the bulb.

In using the glower for indicating potential on a transmission line, it is mounted on a porcelain base in an inverted position in a metallic condenser hood as shown in two of the accompanying illustrations. The inside terminal is connected direct to the hood while the screw-base terminal is connected in series with an air gap formed by two plates mounted on the under side of the porcelain base. An adjusting screw, seen in the illustration, permits variation in the length of the air

gap. The other side of the air gap goes to a hook by means of which the device can be hung from a line wire. This hook is suitably insulated from the condenser hood. A loop is provided in the suspension hook to permit the indicator to be hung over the line by means of the ordinary switch hook used for operating disconnecting lever switches.

Mounted inside the hood is a switch for cutting the glower in and out of circuit, this switch being connected between the hood and the line hook. When the switch is opened the glower is connected between the line and the hood through the spark gap and will light up if there is potential on the line at least equal to the tension between the line and ground on a three-phase system carrying 15,000 volts. When the switch is closed there is a low resistance path between line and hood, and the glower is cut out of circuit.

The short-circuiting switch can be opened and closed by pulls on the cord by means of this construction: The switch consists of two blades, the upper of which rides on the lower, the latter being raised by a spring not shown. On the upper edge of the lower blade is a notch with which the end of the upper blade engages when the lower blade is pulled down a certain distance. To open the switch the string is pulled downward, bringing the lower blade downward also and the upper blade follows by gravity, its end sliding along the upper surface of the lower blade. After the end of the upper blade has passed the notch on the lower, the pull on the string is stopped and the lower blade starts upward under the action of the spring until the two blades are locked by the engagement of the notch and the end of the upper blade. To close the switch the lower blade is pulled down some distance, say 3 in., and released suddenly, causing the end of the upper blade to jump over the notch, both blades rising under the action of the spring.

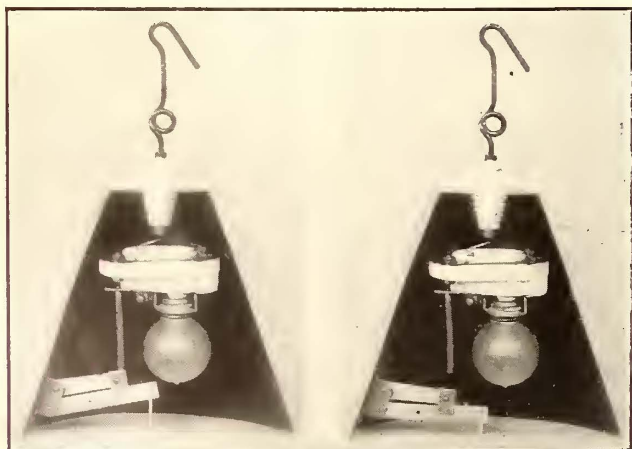
A portable form of the indicator is also made in which the switch is omitted and the hood is attached to a long wood rod. In both forms there is provision for protecting the user by means of suitable grounding devices.

Another use for the electrostatic glower is in synchronizing, especially on circuits where transformers are not used for indicating or measuring purposes. The electrostatic synchronizer operates from the line charging current. The glowers are arranged in a case, as shown in one of the illustrations, and are connected to the line through condensers consisting of suspension insulators. The terminals of one glower are connected through the insulators to the leads of the same phase of running and incoming lines. The others are each connected across dissimilar phases of the remaining leads. When the lines are not in synchronism the glowers indicate the relative frequency of the lines in the usual manner. When they are in synchronism the rotating effect disappears, the glower connected to the corresponding lines being darkened and the other two showing about one-half brilliancy. The minimum voltage for operation is 13,200, and the maximum depends only upon the use of the proper number of insulators.

The synchronism indicator can also be used as a ground detector by connecting one terminal of each glower to the ground and the other terminal to the line.



GLOW POTENTIAL INDICATOR FOR USE AS A SYNCHROSCOPE



CROSS-SECTIONS OF VACUUM-LAMP-TYPE ELECTROSTATIC POTENTIAL INDICATOR, SUSPENSION DESIGN



# News of Electric Railways

## WASHINGTON BUS COMPANY SUSPENDS

### Herdic Line, in Hands of Receiver, Returns Coaches to Manufacturer

The Metropolitan Coach Company, Washington, D. C., has suspended operations, and the route along Sixteenth Street through which it has been running is now being served by two different jitney lines under permits from the Commissioners of the District of Columbia. The coach company has surrendered to the International Motor Company, New York, the electric coaches it has been using in this service and they have been shipped back to New York in connection with a claim for an unpaid balance on the vehicles.

The suspension of service followed negotiations with the Public Utilities Commission of the District of Columbia, during which the Metropolitan Coach Company was refused permission to issue \$150,000 of bonds. Permission was granted to issue \$118,000 of bonds, however, but was not availed of, by reason of a number of circumstances, chief among which was, according to statements made at the office of the Public Utilities Commission, that the coach company refused to furnish information, except such as could be obtained from annual reports, as to the use to which the money desired from the bonds was to be put. In this connection an officer of the commission stated to a representative of the ELECTRIC RAILWAY JOURNAL:

"The commission was never able to obtain enough data from the company until toward the end of the service to afford any authority for the issue of bonds. The commission might have authorized bonds and complaints might have been made by the public afterward who purchased them that there were not enough assets behind the bonds. The company could not show property enough. The company also applied for an increase of fare from six tickets for a quarter to a straight 5-cent fare and the commission stated that while such an increase might be justified if better service were furnished, the service before the suspension would not warrant an increase in fare.

"About a year ago the commission received numerous complaints as to the condition of the equipment of the coach company and the service afforded. The commission notified the company again and again to repair the coaches. The company urged the condition of coaches and the necessity for providing new coaches as a reason for the bond issue, and desired to erect a \$30,000 garage and pay off outstanding indebtedness.

"The commission desired to know what had been done with previous funds raised by the company, but no satisfactory information was obtained on this point. The commission also required as a condition for the issue of bonds that the old stock outstanding of the company should be withdrawn, but nothing was done about that. There was an agreement as to the exchange of transfers between the Washington Railway & Electric Company and the Capital Traction Company, which was automatically done away with by the suspension of the company. It could not be expected that either of the street railways would honor tickets or transfers of the coach company when it had suspended service."

The coach company went into the hands of a receiver shortly before its suspension. The Public Utilities Commission of the District of Columbia is of the opinion that the present traffic along the route served by the coach company will be suitably taken care of for the present by the two jitney lines which have been authorized to conduct business.

The Metropolitan Coach Company owned no land and such expenditures as it made for garage and plant facilities were made for leased land. The company owned six coaches, the cost price of which was \$3,749 each, making a total of \$22,494. According to statements made by the commission there is a balance still due thereon of \$2,894. The commission estimated the value of the property of the company just before the suspension at \$11,000. In one of its orders in connection with the case, the commission said:

"Since the company, during a large part of the 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 the year 1913 approximate more closely 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 the purpose of comparison. The net operating revenue for that year was \$1,080.12. Assuming that the revenue passengers will number the same as in 1913, the annual revenue will be increased by \$4,172.14 over that year by an increase in fare to 5 cents, and assuming that the operating expense will remain the same as in 1913 the annual net operating revenue will be \$5,252.26. 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 \$5,252.26 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 \$1,337.26."

## RAPID TRANSIT PROGRESS IN PHILADELPHIA

### Bids Received for the Construction of the Broad Street Subway and the Foundations for the Frankford Elevated

The Public Service Commission of Pennsylvania on Aug. 14 gave A. Merritt Taylor, director of city transit of Philadelphia, a certificate of public convenience, granting the application made for authority for the construction of a portion of the subway from a point in Broad Street, at the north side of the existing subway structure north of City Hall, to a point in Broad Street at the south side of the existing subway structure, including station platforms and entrances, and also granted a certificate for the construction of the elevated from Front and Arch Streets to Rhawn Street, Frankford, by way of Front Street, Kensington Avenue and Frankford Avenue.

On Aug. 16 the bids for the construction of the west City Hall section of the Broad Street subway and the foundation for the Frankford elevated line were opened by Director Taylor, in the City Transit Department's offices. Seventeen proposals were placed before Director Taylor. For the subway section, the larger operation, there were six estimates, four of which were made by New York firms. Of the eleven bids for the "L" foundation work, three were from New York concerns, and the rest from Philadelphia. One of the Philadelphia bids, that of James Connor, however, was thrown out, since he had failed to file a bond with the City Solicitor. His offer was \$194,875. The names of the bidders and the prices quoted by them follow:

Broad Street subway:		Lump Sum	Aggregate of Bids
Bidder	Bid for Item No. 1		
Keystone State Construction Company, Philadelphia .....			
The Foundation Company, New York.....	\$1,700,000	\$1,737,320	
Arthur McMullen Company, New York.....	1,720,815	1,763,870	
Frederick L. Cranford, Inc., and Smith, Hauser & MacIsaac, Inc., New York.....	2,250,000	2,286,060	
New York and New Jersey Construction Company, New York.....	2,350,000	2,404,770	
The Snare & Triest Company, Philadelphia.	2,449,000	2,486,980	
	2,758,000	2,787,240	
Frankford Elevated Line:		Lump Sum	Aggregate of Bids
Bidder	Bid for Item No. 1		
Edward Fay & Son, Philadelphia.....	\$179,400	\$188,278	
Robert Lombardi, Philadelphia.....	149,000	155,150	
Keystone State Construction Company, Phila- delphia .....	179,000	185,970	
Peoples & Rach, Philadelphia.....	227,000	235,240	
American Paving & Construction Company, Philadelphia .....	307,000	315,640	
Oscar Daniels Company, New York.....	217,000	225,815	
Millard & Lupton Company, Philadelphia....	260,000	273,150	
James D. Dorney, Philadelphia.....	142,590	149,235	
New York & New Jersey Construction Com- pany, New York.....	282,200	290,450	
A. L. Guidone & Son, Inc., New York.....	190,000	202,334	



### DETROIT COUNCIL ACCEPTS M. O. PLAN

Accompanying the plan of purchase and a statement of the prospective profits of the Detroit United Railway city lines under the proposed municipal ownership and operation, the Street Railway Commission of Detroit, Mich., sent an explanatory communication to the Common Council on the evening of Aug. 17. The Council accepted the financial statement, the plan of acquiring the lines and the explanatory communication. All were laid on the table until Aug. 23, when the Council will meet as a committee of the whole to discuss them and possibly set a date for a special election at which to submit the proposition to the electors.

In its statement to the Council, the commission bases its estimate of profits on the 1914 earnings of the company. Its accountants, the commission says, have separated the earnings of the so-called one-fare zone from the earnings of the interurban lines included in the Detroit United Railway.

The commission places the earnings of the one-fare zone in 1914 at \$7,889,570. This, added to the earnings from chartered, express and freight cars, and sundry earnings, makes a total of \$8,096,011. From the grand income total the commission subtracts \$6,191,304 for operating expense, maintenance, depreciation and reserve, leaving a net income of \$1,904,707. This amount, of course, does not include interest and taxes.

In a statement to the public, the commission says it has figured that the earnings of the lines will pay for the lines within thirty years and allow \$10,000,000 for betterments. This, naturally, is a speculation, because until the price of the property has been fixed by the circuit court the commission cannot estimate what the interest charges on the debt assumed will be.

### INDUSTRIAL RELATIONS COMMITTEE COMPLETES WORK

The United States Commission on Industrial Relations, which for two years has been investigating industrial unrest and its causes, concluded its session in Chicago, Ill., on Aug. 14 and adjourned.

The life of the commission expires on Aug. 23. On Aug. 17 it was announced that two reports had been prepared—a majority report signed by the three representatives of capital and by Prof. John R. Commons and Mrs. J. Borden Harriman, and a minority report signed by Chairman Frank P. Walsh and the three representatives of labor. In a statement Harris Weinstock, an employed member of the commission, said the members found themselves to be unalterably divided on social questions and that the presentation of two reports was the only solution of the deadlock. One of the points on which the commission split was a recommendation in the report drafted by Chief of Staff Basil M. Manley, and fostered by Chairman Walsh, that Congress enact laws confiscating, upon inheritance, all fortunes in excess of \$1,000,000. Another ground of difference was that after the whole commission had agreed to recommend the establishment of a permanent bureau of industrial relations, the Walsh wing of the commission wanted to put the bureau under the Federal Department of Labor. The majority took the stand that this would destroy the very purpose of the bureau because capital would have no confidence in arbiters controlled by labor.

### MANDAMUS PROCEEDINGS HOLD UP RAPID TRANSIT CONTRACTS

The Board of Estimate and Apportionment of the city of New York has had before it recently a number of rapid transit contracts awarded by the Public Service Commission for the First District. Under the provisions of the rapid transit act the following procedure is necessary before a rapid transit contract can legally be entered into: Public hearing must be held after due advertisement upon the draft form of contracts, it must then be advertised for bids, and then receive approval as to form by the corporation counsel and receive the consent of the Board of Estimate, which, at the same time, must prescribe a limit of bonds available for such contracts.

All the rapid transit construction contracts prepared by the commission since September, 1910, have been unit price contracts. All the unit price contracts of the commission since the change from lump sum to unit prices have con-

tained a provision, known as Article XII, providing that if any work was not susceptible of classification that it should be done and paid for at cost plus 10 per cent. In view of the great number of unit prices and the fact that the great bulk of the work is comprised in the units of excavation, steel and concrete, Article XII is practically restricted to a very small amount of incidental work.

With two years' experience under the unit price contracts it was found that the practical workings of Article XII could be greatly improved if an alternative method was allowed, whereby the chief engineer, with the approval of the commission, could fix unit or lump sum prices for incidental work as it arose in lieu of the percentage plan. One of the advantages resulted from eliminating the considerable expense of supervision and cost accounting under the percentage provision. Accordingly, early in 1913 the commission submitted to the corporation counsel such an alternative provision. This was approved by the corporation counsel, and has been in every construction contract since that time.

The contracts incorporating this alternative provision amount in value to more than \$73,000,000, and during the past two years have been consented to by the Board of Estimate without question. On the work to date under those contracts the orders under Article XII, including orders under both the percentage and unit price provisions, amount in gross to about eight-tenths of 1 per cent of the work done to date. Many of those orders, however, are in substitution for work which would otherwise have to be done so that the net increased cost due to orders under Article XII would be probably less than half of eight-tenths of 1 per cent. When several large contracts came before the Board of Estimate after being advertised and awarded by the commission that board suddenly insisted on the elimination of Article XII. This raised the questions, first of the legality of the action of the Board of Estimate in giving a consent upon condition, which, the corporation counsel holds, is equivalent to a refusal; and, secondly, whether the commission itself could change a form of contract after its being advertised and bids being received upon it. These questions are now brought before the courts in mandamus proceedings, instituted by the Holbrook, Cabot & Rollins Corporation, one of the contractors concerned, and action will have to be withheld pending the determination of the legal questions.

### PROVIDENCE ARBITRATION HEARINGS

Hearings in the Rhode Island Company's wages arbitration case at Providence were resumed last week, with little prospect of their termination before Labor Day. The time has been chiefly occupied by the evidence of motormen and conductors as to the difficulties of their work. At a recent session Mayor Gainer, chairman of the board, ruled that some weight would be given to comparative wage tables. Efforts were made by the men to show that the work of platform men in Providence is more difficult than in Boston, but without much success. The company has not yet begun its rebuttal. Owing to the indisposition of counsel no sessions were held on Aug. 17 and 18, the hearings being continued until Aug. 19.

### HOLYOKE STRIKE ENDED

After a complete suspension of service lasting eight and one-half days, the operation of cars on the Holyoke (Mass.) Street Railway was resumed at noon on Sunday, Aug. 15, by the striking employees of the company. The issues between the men and the company, relating chiefly to wages and methods of their payment as affected by figuring platform time or time by the day, are to be arbitrated by a board of three members. One member of this board will be chosen by the company, one by the union and the third by Governor David I. Walsh of Massachusetts. Each party to the agreement is to name his arbitrator by noon on Aug. 21. A conference relative to the third arbitrator was scheduled at Boston early in the week between Governor Walsh and Mayor Woods of Holyoke. The interruption of traffic affected more than 65,000 persons in Holyoke and Amherst, and seriously cut into the traffic on the Springfield-Holyoke route of the Springfield Street Railway. The local service of the Boston & Maine Railroad between Springfield, Holyoke and Northampton was heavily patronized during



the strike and a large jitney bus traffic developed in Holyoke. The latter fell off to insignificant proportions soon after the resumption of street railway traffic. The arbitration agreement was ratified by the members of the union at a meeting in Silverman's Hall on Sunday morning. Cars were placed in operation immediately after the meeting, but normal service was not restored until the evening.

**New Electric Line Opened in Utah.**—The Ogden, Logan & Idaho Railway, recently completed between Ogden and Huntsville, Utah, has been formally opened to traffic.

**Louisiana Line Converted to Electricity.**—The line of the St. Tammany & New Orleans Railway & Ferry Company, Mandeville, La., is now being operated by electricity between Mandeville, Abita and Covington. The road has been operated with motor cars. The cost of conversion for electric operation is said to have been \$80,000.

**Proposal for Operating Harbor Lines at Los Angeles.**—The Harbor Commission of Los Angeles, Cal., has under consideration a proposition made by the Pacific Electric Railway and recommended by Clarence H. Matson, secretary and traffic manager of the commission, for the operation of the city's harbor belt line tracks by the Pacific Electric Railway. Mr. Matson points out that the proposed plan will offer the city practically all the advantages of the terminal agreement that failed to be consummated.

**Thirty-three Mile Michigan Line Planned.**—The Michigan Traction Company, Jackson, Mich., announces that an appropriation has been made for the construction and equipment of a 33-mile connecting link between existing divisions of its property now having terminals at Owosso and Saginaw. Construction surveys have about been completed, but the final route has not been chosen. This new line will make possible high-speed service between Bay City, Saginaw, Lansing, Jackson, Detroit, and Kalamazoo.

**Back Franchise Fees an Issue in Los Angeles.**—The Los Angeles Public Utilities Board, in a recent communication to the City Council, declares that the Los Angeles Railway owes the city between \$18,000 and \$20,000 for back franchise fees. The board's claim is based on the contention that franchise privileges originally granted to the company by the county no longer hold, since certain territorial annexations have brought into the city limits and under city jurisdiction certain of the railway's lines.

**Mayor Resurrects Chicago Subway Plan.**—Mayor Thompson of Chicago, Ill., has in the process of preparation his annual message to the City Council. He has announced that he will resurrect the plans for a subway system for Chicago and make a strenuous effort to get actual work started at an early date. The city's traction fund now totals approximately \$16,000,000, an amount which the Mayor deems sufficient to begin construction at once. He will advocate the initial or downtown subway plan for immediate relief of congestion in the loop, after which a comprehensive system may be undertaken.

**New Haven Men Ask More Particulars.**—Further particulars were asked on Aug. 16 by the directors, officers and counsel of the New York, New Haven & Hartford Railroad who were indicted some time ago by the Federal Grand Jury for alleged conspiracy to violate the Sherman law. On Aug. 2, in reply to orders of the Federal Court, Assistant United States Attorneys Swacker and Batts filed a bill of particulars containing sixty-three printed pages and 189 paragraphs. Counsel for the defendants, however, have asked Federal Judge Hunt to direct the Government to furnish further and more sufficient specifications. Decision has been reserved.

**I. C. C. on Directors' Responsibility.**—The Interstate Commerce Commission on Aug. 17 handed down a report on the financial transactions and the operation of the Rock Island Railroad under the Reid-Moore syndicate and the history of the management which finally placed the road in bankruptcy. An aggregate of losses amounting to more than \$20,000,000 is charged to have been caused by the syndicate. In its conclusions the commission has the following to say in regard to the responsibility of directors: "This record emphasized the need of railway directors who actually direct. There are too many directors who acquiesce in what is being done without knowledge and without investigation. A director of a railroad is a quasi-

public official, who occupies a position of trust. A director who submits blindly to the exploitation of his company is a party to its undoing, and he should be held responsible to the same extent as if he had been a principal instead of an accessory before the fact. The greater his prominence, the greater his responsibility and the greater his dereliction. Obviously a man of large affairs could not attend to all the details in intricate transactions, but it is inconceivable that a director of ordinary business prudence and sagacity would sanction large expenditures without an inquiry as to the purposes of such disbursements. So long as this situation exists, however, it suggests the need of a law to charge such directors with individual responsibility for the dissipation of corporate funds."

## PROGRAM OF ASSOCIATION MEETING

### International Engineering Congress

The International Engineering Congress will be held in San Francisco, Cal., from Sept. 20 to 25. All sessions are to be held in the Auditorium Building, Civic Center, Hayes and Larkin Streets, at Market Street. At the general and sectional sessions a very large number of papers will be presented by eminent specialists. There will be an opening general session on Monday morning, Sept. 20, at which addresses will be presented by the Mayor of San Francisco, Gen. G. W. Goethals, honorary president of the Congress, and by distinguished delegates. The John Fritz medal will be presented to Dr. James Douglas. A general closing session will be held on Saturday morning. The balance of the week will be occupied with sectional meetings. Among the many papers of interest to electric railway men the following may be mentioned:

"Status of the Railways of North and South America," by F. Lavis, New York, N. Y.

"Italian Railways," by Prof. Luigi Luiggi, Rome, Italy.

"The Status of Railways and Tramways in the Netherlands East-Indies," by E. P. Wellenstein, The Hague, Holland.

"Economic Considerations Controlling and Governing the Building of New Lines," by John F. Stevens, New York, N. Y.

"City Planning," by Nelson P. Lewis, New York, N. Y.

"London Traffic in 1913," by Sir Albert Stanley, London, England.

"Transit Problem in American Cities," by W. F. Reeves, New York, N. Y.

"Machine Shop Equipment, Methods and Processes," by E. R. Norris, East Pittsburgh, Pa.

"Machine Shop Equipment, Methods and Processes," by H. F. L. Orcutt, Rowington, England.

"High Temperature Flames in Metal Working," by H. R. Swartley, Jr., Jersey City, N. J.

"The Internal Combustion Engine," by Prof. C. E. Lucke, New York, N. Y.

"The 1915 Steam Turbine," by E. A. Forsberg, Stockholm, Sweden.

"The Diesel Engine in America," by Max Rotter, St. Louis, Mo.

"Streets," by George W. Tillson, New York, N. Y.

"Economics of Electric Power Station Design," by H. F. Parshall, London, England.

"Track and Roadbed," by George H. Pegram, New York, N. Y.

"Electric Welding," by C. B. Auel, East Pittsburgh, Pa.

"Effects of Electrolysis upon Engineering Structures," by Prof. A. F. Ganz, Hoboken, N. J.

"The Mechanical Problem of the Electric Locomotive," by G. M. Eaton, East Pittsburgh, Pa.

"Utilities," by President A. C. Humphreys, Hoboken, N. J.

"Public Utilities," by Edward Willis, Chiswick, England.

"Electric Motive Power in the Operation of Railroads," by William Hood, San Francisco, Cal.

"Electric Motive Power in the Operation of Railroads," by E. H. McHenry, New Haven, Conn.

"Signals and Interlocking," by Charles Hansel, New York, N. Y.

"Safety Engineering," by F. R. Hutton, New York, N. Y.

"Motor Vehicles," by Ethelbert Favary, New York, N. Y.

"The Boiler of 1915," by Arthur D. Pratt, New York, N. Y.



# Financial and Corporate

## KANSAS CITY PLAN FILED

### Judge Hook's Arrangement Accepted by City and Reorganization Managers—Railway and Lighting Properties to Be Segregated

Another important step toward the reorganization of the Metropolitan Street Railway, Kansas City, Mo., was made on Aug. 16, when Judge Hook's plan was accepted by the managers who will supervise the refinancing of the street railway and electric light systems of the city, and a certified copy of the plan was filed with the clerk of the Federal court. The agreement, which embodies as its main features the almost complete exchange of old securities and the separation of the railway and the lighting properties, was described briefly as to its principal provisions in the *ELECTRIC RAILWAY JOURNAL* of Aug. 7. City Counselor Evans, who has approved the plan on behalf of the city, says:

"The way is now clear for the refinancing of the company and for putting it on a strong and permanent financial basis by which it can meet all of its obligations under the franchise extension and give Kansas City a better street car service than ever."

The three banking houses, Kuhn, Loeb & Company, Lee, Higginson & Company and Blair & Company, which have had much to do in the past with the securities of the old companies, have by their acceptance of the plan become reorganization managers for carrying out its provisions. H. L. Stuart, of N. W. Halsey & Company, Chicago, Ill., is designated as the personal representative of Judge Hook

become a party to the plan on or before Oct. 1. The pending franchise required the Kansas City Railways to acquire within six months, or such extended time as the city might give, the portion of the street railway system in Missouri. This time was extended to July 7, 1915, and again to Nov. 7, 1915, upon the express condition that the reorganization follow Judge Hook's plan now published.

Judge Hook's plan provides that the lighting and street railway properties be separated in ownership and control so that they may be financed and operated by companies wholly independent of each other. It is now generally admitted that there should be no holding company owning the stocks of both, nor should the stocks or properties of both be mortgaged or pledged to secure the same obligations. With minor exceptions, the present holding company, the Kansas City Railway & Light Company, now holds or controls, subject to pledges, the stocks of the lighting company and the street railways, and has outstanding \$15,678,000 of its own funded obligations. In Judge Hook's opinion, the separation presents little difficulty if a just proportion of that indebtedness be unconditionally set off against the lighting company to the relief to that extent of the street railways. Previous plans suggested that an amount in excess of \$5,000,000 be so set off, but the amount now fixed as the conservative proportion is \$4,977,300. This would leave \$23,722,700 of the old funded debt to be cared for by the new Kansas City Railways. The new company and the lighting company should each take care of its own part of the debt by its own obligations, and the equity then left for the stockholders of the Kansas City Railway & Light Company should be distributed among them as they may determine, without supervision or approval by Judge Hook, provided no common corporate control of the electric and street railway properties is maintained or created.

TABLE — SHOWING NEW SECURITIES AND BASIS OF EXCHANGE

Existing Securities			New Company Three-Year 5½ Per Cent Notes		New Company First and Refund- ing 5 Per Cent Bonds†		New Company Second Mortgage Bonds††			Light First Mortgage 5 Per Cent Bonds†		Light Second Mortgage 6 Per Cent Bonds†	
			Per Cent	Amount	Per Cent	Amount	Per Cent	Series	Amount	Per Cent	Amount	Per Cent	Amount
Class	Amount												
Metropolitan Street Railway consols	\$7,242,000	100	\$7,242,000	....	.....	....	..	.....	..	.....	..	.....	.....
Corrigan Consolidated Street Railway	55,000	100	55,000	....	.....	....	..	.....	..	.....	..	.....	.....
East Side Electric Street Rail- way	250,000	100	250,000	....	.....	....	..	.....	..	.....	..	.....	.....
Kansas City Banks	375,000	100	375,000	....	.....	....	..	.....	..	.....	..	.....	.....
Kansas City & Westport Belt Railway	500,000	..	.....	100	\$500,000	....	..	.....	..	.....	..	.....	.....
Kansas City Railway & Light Company 5's	10,200,000	..	.....	70	7,140,000	....	..	.....	30	\$3,060,000	..	.....	.....
Kansas City Railway & Light Company 6's	5,478,000	..	.....	..	.....	65	A	\$3,560,700	..	.....	35	\$1,917,300	.....
Central Electric Railway	2,000,000	..	.....	50	1,000,000	50	B	1,000,000	..	.....	..	.....	.....
Kansas City Elevated Rail'y 6's	600,000	..	.....	110	*660,000	..	..	.....	..	.....	..	.....	.....
Kansas City Elevated Rail'y 4's	2,000,000	..	.....	42.51	*850,200	36.515	A	*730,300	..	.....	..	.....	.....
Total	\$28,700,000	..	\$7,922,000	.....	\$10,150,200	.....	..	\$5,291,000	..	\$3,060,000	..	\$1,917,300	.....

NOTE—Interest will be adjusted as of July 1, 1915, and holders of the bonds will, in addition to the new securities, receive in cash the interest accrued and unpaid on the existing bonds to said date, as well as additional interest as stated in the plan.

\*Approximate.

†Additional bonds of same lien not presently issued to bear interest not exceeding 6 per cent, as determined by directors.

††Series A, 6 per cent; Series B, 5 per cent. Sinking fund, \$105,820 per annum.

‡Sinking fund, \$38,346 per annum.

to co-operate with the foregoing. These managers are to take such steps as may be required to vest the necessary titles in the proper parties, and by foreclosure at Kansas City, exchange, purchase or otherwise acquire for the new street railway company, the Kansas City Railways, and the Kansas City Electric Light Company or its successor all the street railway and electric light properties, so as to clear the same of all existing mortgages, pledges and liens, except as to the Kansas City Elevated Railway and Kansas City & Westport Belt Railway mortgages, for which special provisions are made. Details in conformity with the plan may be adopted by the managers.

When such acquisitions and the releases in addition justify, the managers may declare the plan operative and cause new securities to be issued, in the meantime issuing interim certificates if necessary. Protective committees representing Metropolitan Street Railway consolidated 5's, Kansas City Railway & Light Company collateral note 6's and refunding 5's and Central Electric Railway 5's have already approved the agreement and in addition as of Aug. 19 the terms of participation therein. Any person interested may

It is stated that the stockholders of the Kansas City Railway & Light Company who own the equity in the lighting and street railway properties should not be assessed further than as provided in this plan for, since the receivers were appointed and up to May 31, 1915, the stockholders have received no dividends. In addition to interest paid on the bonds, \$4,486,755 has been expended on the properties—\$1,664,142 upon the lighting company and \$2,822,613 by the receivers upon the street railways. Furthermore, the defaulted franchise obligations of the old street railways, claimed by the city to be about \$7,000,000 and to be superior to the rights of existing bondholders, are cared for in the new franchise in a modified and extended form and assumed by the new company, and that much of the burden will fall on the stockholders without corresponding increase of income. Moreover, the franchise provides that \$6,300,000 of the surplus earnings of the new company shall be used for "extensions and additions to the property" without increase of capital value on which returns are available for dividends to stockholders. It is proposed, however, that the stockholders shall take or cause to be taken at par suffi-



cient of first and refunding bonds to pay the reorganization expenses chargeable to the street railways and not paid from current funds, the liabilities, claims and charges judicially determined to be prior and paramount to the bonds to be refunded, and to supply the new company with \$1,000,000 in cash for new capital expenditures. Pending reorganization all necessary steps will be taken to provide for advancements of capital value required by the franchise by the issuance of receivers' certificates.

The holders of the bonds of the old companies who become parties to the reorganization are to receive interest at the rates last paid, respectively, to July 1, 1915, the date of the bonds of the new company, except that the holders of the Kansas City Railway & Light Company 5's shall receive an additional 1 per cent per annum from May 15, 1913, to the date above mentioned, and the holders of Metropolitan Street Railway consols shall receive additional interest at the rate of 1 per cent per annum for the period from May 1, 1913, to Nov. 1, 1913.

The bonds of the new company are to run for the life of the franchise. The manner in which it is intended that the new securities shall be distributed is shown in the table on page 330.

Judge Hook states that a reorganization of the Metropolitan Street Railway system and the acceptance of the new thirty-year franchise, which has been conditionally tendered, are imperative if even the bondholders are to save their investments intact. The funded debt amounts to \$28,700,000 (part electric lighting debt), of which more than \$25,000,000 is past due. There is also a large amount of other liabilities, part of which is claimed to be superior to the bonds. In commenting on the plan Judge Hook says:

"This plan is not framed to make a profit or to give an advantage to any security holder. It is not intended to make the old bonds worth par in the present market except as the assurance of safety and intrinsic worth of the bonds of the new company for which the old ones can be exchanged at par may so result. So far as practicable and just the old status has been carried forward and the relative rights of each class of creditors, preferred, secured and unsecured, have been preserved. The franchise tendered by the city offers a way out of much difficulty and loss. It is not likely another will be granted, certainly not without extreme sacrifice. This plan is recommended to every person having an interest in the property."

#### OHIO TAX VALUES \$160,887,220

The value of the street, interurban and suburban railways of Ohio, according to the figures of the State Tax Commission, is \$160,887,220. This is a net increase of \$8,450,700 over the valuation fixed for taxation purposes in 1914. Approximately one-fifth of the total increase was assigned to the Cleveland Railway, thus placing its valuation far above the figures on which the company has several times refused to pay taxes in the past. The increase on this property over 1914 is \$1,717,320, making the total for the year \$24,470,050. The Cincinnati Traction Company with a valuation of \$19,232,270, an increase of \$471,870 over 1914, is second to the Cleveland Railway.

The valuations of other large properties follow:

	Value	Increase
Ashtabula Rapid Transit Company.....	241,330	6,950
Cleveland, Alliance & Mahoning Valley Railroad .....	707,540	347,750
Cleveland, Painesville & Eastern Railroad... 1,825,260		66,850
Cleveland, Painesville & Ashtabula Railroad.. 489,390		11,890
Cleveland & Eastern Traction Company..... 718,090		
Cleveland, Southwestern & Columbus Railway 4,574,770		150,930
Cleveland & Erie Railway.....	22,970	250
Cleveland, Youngstown & Eastern Railway... 415,750		440
Lake Shore Electric Railway.....	\$4,965,240	\$221,390
Lorain Street Railway .....	852,900	26,800
Mahoning Valley Railway .....	3,453,700	137,500
Mansfield Railway, Light & Power Company. 833,630		13,990
Mt. Vernon Railway .....	20,000	*7,920
Northern Ohio Traction & Light Company... 14,410,540		379,690
Pennsylvania & Ohio Railway.....	499,220	*102,370
Plymouth & Shelby Traction Company..... 100,000		
Sandusky, Norwalk & Mansfield Electric Railway .....	263,530	*36,470
Sandusky, Fremont & Southern Railway..... 270,820		
Stark Electric Railroad.....	1,337,680	85,060
Youngstown Park & Falls Railway.....	764,070	124,190
Youngstown & Sharon Street Railway..... 4,832,210		260,640
Youngstown & Southern Railway.....	646,080	*44,040
Youngstown & Ohio River Railroad and Salem Street Railway.....	1,059,320	97,090

\*Decrease.

#### ANNUAL REPORT

##### Illinois Traction System

The comparative statement of income, profit and loss of the Illinois Traction System, Peoria, Ill., for the calendar years 1913 and 1914 follows:

	1914	1913
Earnings:		
Interurban lines .....	\$3,626,636	\$3,604,265
City lines .....	3,021,859	3,072,236
Gas .....	877,982	816,911
Electric .....	3,002,378	2,636,714
Heat .....	314,640	274,672
Water .....	14,386	13,539
Miscellaneous .....	254,973	102,761
Total gross earnings.....	\$11,112,854	\$10,521,098
Total operating expenses, including taxes .....	6,587,462	6,198,873
Net from operation.....	\$4,525,392	\$4,322,225
Interest on bonds, etc.....	3,290,787	2,883,239
Available for depreciation, etc.....	\$1,234,605	\$1,438,986
Less depreciation .....	309,580	
	\$925,025	
Less bond discount for 1914.....	47,956	
Surplus, 1914 .....	\$877,069	

In 1914 the arrangement which had been under consideration for several months, covering the consolidation of the Western Railways & Light Company with the Illinois Traction Company, was consummated on a basis acceptable to the directors of each company. The operating properties of the Western Railways & Light Company included the Atchison Railway, Light & Power Company, the Cairo Electric & Traction Company, the Cairo & St. Louis Railway, the Chicago, Ottawa & Peoria Railway, the Galesburg Railway, Lighting & Power Company, the Northern Illinois Light & Traction Company, the Quincy Railway and the Wichita Railroad & Light Company. The above financial statement for 1914 includes the reports of the newly acquired companies, so that the results of the two years are not strictly comparable.

The interurban and street railway receipts for the year, however, were affected by the general business depression, which caused the closing of many manufacturing in whole or in part, and also by the increased use of the automobile, both in town and country. The general result was a slight decrease in the earnings of these properties. Satisfactory increases in the electric and gas departments were obtained by judicious advertising and strenuous campaigns for the introduction of improved appliances. There was a gratifying decrease in the operating costs at generating stations, but this was partly offset by the increase in taxes and the increases in the wages of trainmen. Taxes for the year were \$61,484, or approximately 16.6 per cent above the amount expended during the preceding year. New wage schedules decided by arbitration increased this item of expense \$31,617.

Between Springfield and Carlinville and between Staunton and Edwardsville the installation of electric automatic block signals was completed, and now all the interurban trackage contemplated when the installation was decided upon is protected by this type of signal. During the year the demand on the freight equipment was such as to justify the purchase of additional cars, and an order was placed for fifty standard hopper-bottom coal cars of 50-ton capacity.

**Alton & Jacksonville Railway, Alton, Ill.**—In an appeal from the decision of the Illinois Public Utilities Commission the Alton & Jacksonville Railway, the successor to the Alton, Jacksonville & Peoria Railway, has filed a suit in the Sangamon County Circuit Court in an effort to reorganize with a capital stock of \$750,000 and a bond issue of \$500,000. When the company decided to extend its lines from Jacksonville to Peoria, application was made to the commission for permission to reorganize with the above-stated capitalization, but its ruling cut the capital stock down to \$192,000 and the bonds to \$450,000. Although this order has not been accepted, the old company has been taken out of receiver's hands and the new company is operating the electric railway from Alton to Jacksonville.

**Argenta (Ark.) Railway.**—The Argenta Railway was sold on July 28 to the Intercity Terminal Railway Company for a nominal consideration. The latter company was incorporated a few weeks ago and held a franchise for the opera-



tion of street cars or motor cars from Markham and Main Streets, Little Rock, to the center of the free bridge. The Argenta Railway held a franchise for the operation of cars from Argenta to the center of the free bridge, in addition to the street railway system in Argenta. With the consolidation of the two companies and the installation of bridge car service, transfers will be issued to passengers from the Argenta lines to the bridge cars or vice versa. It is said that arrangements will also be made for the transfer of passengers from the bridge cars to the Little Rock street cars. It is reported that three large motor buses with seating capacity for twenty passengers are now being constructed on the order of the Intercity Terminal Railway and will be placed in service on the bridge. The officers of the Intercity Terminal Railway are: C. C. Kavanaugh, president; E. W. Jackson, vice-president, and F. J. Schmutz, secretary and treasurer.

**Boise (Idaho) Railroad.**—As stated in a preliminary announcement in the *ELECTRIC RAILWAY JOURNAL* of Aug. 7, the lines of the Boise Railroad and the Idaho Traction Company have been separated. The Boise Railroad has refused to honor the transfers given by the Idaho Traction Company and it is understood the matter is to be taken before the Public Utilities Commission for a hearing. The Boise Railroad has reorganized, with W. E. Pierce, president; H. E. Dalton, general manager; R. G. Jennings, vice-president; J. M. Haines, secretary, and L. H. Cox, treasurer.

**Fort Madison (Iowa) Street Railway.**—The election that was to have been held on July 17 for the approval of the Mississippi Valley Electric Company franchise in Fort Madison has been postponed until Sept. 9. This company recently took over the property of the Fort Madison Street Railway on the condition that the new franchise for the latter company, recently passed by the City Council, be approved by the voters.

**Grand Valley Railway, Brantford, Ont.**—The negotiations between the Lake Erie & Northern Railway and the city of Brantford, with reference to a portion of the Grand Valley Railway section of the lines operated as the Brantford Municipal Railway, have been concluded. As a result, the Lake Erie & Northern Railway has acquired for \$30,000 the portion of the Grand Valley Railway from Paris to Galt, a distance of about 13 miles. The Brantford Municipal Railway will in the future consist of the old Brantford Street Railway and the Brantford-Paris section of the old Grand Valley Railway, the latter being about 8 miles long. The feature of rearrangement is the electrification of the entire Lake Erie & Northern Railway line from Fort Dover to Galt, as described elsewhere. Until this electrification is completed, the purchased section of the Grand Valley Railway will be operated by the Brantford Municipal Railway Commission.

**Idaho Traction Company, Boise, Idaho.**—The United States Circuit Court of Appeals at San Francisco has handed down an opinion affirming the findings of Judge Dietrich of the Idaho Federal District Court, who cancelled \$718,000 of bonds held by the Idaho Traction Company on the property of the Idaho-Oregon Light & Power Company. The fight for the cancellation of the bonds was made by what was known as the Priest committee against the so-called New York committee.

**International Traction Company, Buffalo, N. Y.**—The directors of the International Traction Company have formulated a plan for the retirement of the present \$5,000,000 of 4 per cent cumulative preferred stock, together with the accumulated and unpaid dividends thereon, by the issuance on a share for share basis of new 7 per cent cumulative first preferred stock, which will have priority in all respects over the existing 4 per cent issue. Under this plan, which has already been approved by the greater part of the preferred and common stockholders, the elimination of 42 per cent of accumulated and unpaid dividends will increase the company's credit and the value of its outstanding securities. The accumulation of dividends on the 4 per cent stock came about through the restrictive provisions of the original collateral trust indenture, which prevented the International Railway, the operating company, from issuing any securities to provide for improvements and extensions required by its rapid growth. The readjustment of the indebtedness in 1912 obviated this sit-

uation, and since then the company has paid the regular 4 per cent dividend on the preferred stock. Now a dividend will be declared and paid on this stock from the date of the last dividend payment to the date from which the dividend on the new 7 per cent first preferred stock will accrue. A two-thirds vote of both preferred and stock is necessary for the adoption of the plan.

**Kansas City Viaduct & Terminal Railway, Kansas City, Mo.**—The protective committee for the first mortgage 4½ per cent bonds of the Kansas City Viaduct & Terminal Railway has called a meeting of the holders of its certificates of deposit for Sept. 9 to vote on a proposition to extend for a period of two years the life of the protective agreement, which expires by limitation on Jan. 1, 1916. Within this period the committee hopes to procure a purchaser for the property. Since the receivers of the Metropolitan Street Railway in 1911 failed to secure a reduced toll charge for the viaduct structure, there has been no street car service upon the viaduct. Negotiations for the disposal of the structure have been carried on unremittingly with various prospective purchasers, but with no results thus far. It is stated that until the Metropolitan Street Railway property is reorganized, no plan can be intelligently worked out for the rehabilitation or sale of the viaduct property.

**Montreal (Que.) Tramways.**—The stockholders of record on Sept. 10 have been offered the right to subscribe until Oct. 25 for \$1,000,000 of common stock of the Montreal Tramways in the proportion of one new share for every three shares held. The subscriptions are payable 10 per cent on Oct. 25, with the balance in assessments on two months' notice.

**Newport & Fall River Street Railway, Boston, Mass.**—The stockholders of the Newport & Fall River Street Railway at their recent annual meeting approved a proposition to issue \$100,000 of additional capital stock and \$123,000 of bonds, both in accordance with leases to the Bay State Street Railway.

**Oakland, Antioch & Eastern Railway, Oakland, Cal.**—The California Railroad Commission has authorized the Oakland, Antioch & Eastern Railway to issue two notes, one for \$90,400 to the Union Trust Company, San Francisco, and the other for \$10,000 to A. W. Maltby, in place of a note for \$100,400 previously authorized for issuance to the Union Trust Company.

**Pacific Gas & Electric Company, San Francisco, Cal.**—The gross operating revenue of the Pacific Gas & Electric Company for the calendar year 1914 was \$16,912,688, as compared to \$15,869,006 in 1913. The maintenance, operating expenses, taxes and reserve for uncollectible accounts and casualties in 1914 amounted to \$8,913,922, and for 1913 to \$9,331,206, leaving net earnings from operations of \$7,998,766 in 1914 and \$6,537,799 in 1913. After adding the other income and deducting fixed charges, the balance for 1914 was \$3,645,666, as compared to \$2,723,044 in 1913. Of the year's gross, including miscellaneous income, only 3 per cent came from street railway operation, that of the Sacramento Street Railway. This company's gross revenue for 1914 was \$556,908, a decrease of 2.79 per cent, as compared to the result for 1913. This decrease was caused by temporary local conditions and also, to some extent, by the competition of jitney buses. The total number of passengers carried during the fiscal year amounted to 12,256,142, and the car mileage to 2,481,968. During the year the stockholders of the holding company increased 133 per cent. Since June 3, 1914, the company has sold \$10,177,300 par value of first preferred 6 per cent stock, \$6,039,600 or 59 per cent of which was purchased by stockholders and \$4,137,700 or 41 per cent by employees, patrons and others. The total amount realized was \$8,396,272, of which \$7,840,229 has already been paid in.

**San Francisco-Oakland Terminal Railways, Oakland, Cal.**—The United Properties Company, which is the holding company for the San Francisco-Oakland Terminal Railways, was on Aug. 11 sued for approximately \$2,500,000 in a San Francisco Court by the Anglo-California Trust Company, trustee. The suit was brought on behalf of N. W. Halsey & Company, who loaned that sum to the Oakland Railways in August, 1912. The loan bore interest of 6 per cent and was payable June 12, 1913. No part of the principal has ever been paid, according to the complaint. It



is said that at the time the loan was made the outstanding stock of the Oakland Railways was 270,000 shares, of which the United Properties Company owned 169,990. The company's proportionate stockholders' liability for the loan, therefore, is stated to be \$2,488,796. Simultaneously with the filing of this suit, a similar suit was filed against several hundred owners of stock in the San Francisco-Oakland Terminal Railways, which the complaint says is the actual holding company of the Oakland Railways. These stockholders are declared to be liable according to the number of shares owned. The same judgment is asked in this suit.

**Virginia & Ohio Securities Corporation, New York, N. Y.**—The controlling stock interest in the Steubenville, Wellsburg & Weirton Railway and the Wellsburg Electric Light, Heat & Power Company, formerly held by the Tri-State Railway & Electric Company, was recently acquired by the Virginia & Ohio Securities Corporation. The railway and the lighting companies, however, have not yet been merged.

### DIVIDENDS DECLARED

American Railways, Philadelphia, Pa., quarterly, 50 cents, common.

Central Arkansas Railway & Light Corporation, Hot Springs, Ark., quarterly, 1½ per cent, preferred.

Connecticut Valley Street Railway, Greenfield, Mass., quarterly, three-fourths of 1 per cent, common.

Northern Texas Electric Company, Fort Worth, Tex., 3 per cent, preferred; quarterly, 1 per cent, common.

Terre Haute Traction & Light Company, Terre Haute, Ind., 3 per cent, preferred.

### ELECTRIC RAILWAY MONTHLY EARNINGS

#### BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jun., '15	\$10,420	\$7,960	\$2,460	\$1,123	\$1,337
1 " " '14	11,458	8,870	2,588	1,085	1,503
12 " " '15	118,966	98,844	20,122	13,463	6,659
12 " " '14	121,731	102,208	19,523	12,868	6,655

#### CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO

1m., Jun., '15	\$39,213	\$21,790	\$17,423	\$10,953	\$6,470
1 " " '14	41,178	20,501	20,677	11,075	9,602
6 " " '15	179,739	106,410	73,329	65,724	7,605
6 " " '14	187,069	101,811	85,258	65,933	19,325

#### EL PASO (TEX.) ELECTRIC COMPANY

1m., Jun., '15	\$72,931	\$40,496	\$32,435	\$4,194	\$28,241
1 " " '14	80,052	49,850	30,202	4,202	26,000
12 " " '15	997,414	540,820	456,594	50,328	406,266
12 " " '14	963,471	532,768	430,703	47,961	382,742

#### HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

1m., May, '15	\$21,897	\$12,601	\$9,296	\$4,644	\$4,652
1 " " '14	24,176	15,669	8,508	4,438	4,070
12 " " '15	265,217	170,818	94,399	55,677	38,722
12 " " '14	290,023	177,504	112,519	55,695	56,824

#### LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO

1m., Jun., '15	\$119,785	\$78,189	\$41,596	\$36,350	\$5,246
1 " " '14	127,203	76,702	50,501	35,470	5,031
6 " " '15	625,124	434,619	190,505	216,277	†25,772
6 " " '14	658,106	431,645	226,461	211,721	14,740

#### NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO

1m., Jun., '15	\$331,977	\$200,879	\$131,098	\$52,504	\$78,594
1 " " '14	317,780	199,525	118,255	51,020	67,235
6 " " '15	1,756,651	1,101,646	655,005	308,465	346,540
6 " " '14	1,721,700	1,059,635	662,065	301,835	360,230

#### PENSACOLA (FLA.) ELECTRIC COMPANY

1m., May, '15	\$20,789	\$11,690	\$9,099	\$6,083	\$3,016
1 " " '14	22,746	14,393	8,353	6,065	2,288
12 " " '15	251,397	156,464	94,933	73,766	21,167
12 " " '14	285,349	178,830	106,519	71,780	34,739

#### PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.

1m., May, '15	\$618,364	\$382,464	\$235,900	\$181,306	\$54,594
1 " " '14	706,471	431,041	275,430	175,324	100,106
12 " " '15	7,983,915	4,956,970	3,126,945	2,147,088	979,857
12 " " '14	8,717,662	5,048,226	3,669,436	2,091,915	1,577,521

#### SAVANNAH (GA.) ELECTRIC COMPANY

1m., May, '15	\$64,413	\$41,188	\$23,225	\$21,453	\$1,772
1 " " '14	71,500	46,310	25,190	21,249	3,941
12 " " '15	822,339	533,831	288,508	257,019	31,489
12 " " '14	844,556	560,819	283,737	253,712	30,025

\*Includes taxes. †Deficit.

## Traffic and Transportation

### JITNEY JOTTINGS

#### Eighteen Paragraphs Which Deal Briefly with the Moribund Jitney

The jitney in Camden, N. J., has proved to be a financial failure. Competition has ruined the business, according to Charles Austermal, president of the Camden Jitney Company, which has suspended operation. The Camden Jitney Company was incorporated at \$50,000 and was one of the first in business there. It started with three large touring cars. Business proved to be so profitable that, after a month's operation, the company was incorporated and ran twelve cars. Other companies which operate jitneys in Camden are the West Jersey Jitney Company and the Winton Line. Including the independent operators, it is said there are about 300 cars doing business in Camden.

Numerous arrests of jitney drivers at Galveston, Tex., have followed the failure of the drivers to provide the bond of \$10,000 as protection for passengers and the public against accident. Steps are being taken by the jitney operators to carry one of the cases now pending on the corporation court docket here through the higher courts for an opinion from the State Supreme Court. The Galveston ordinance affects the automobiles now running on the Galveston-Houston line, and the contention of the jitney men will be that neither Houston nor Galveston has jurisdiction over the business as the men in the business are operating strictly an inter-city line.

The City Council of El Paso, Tex., has revised its jitney ordinance by providing for larger indemnity bonds by jitney drivers. Under the old requirement companies owning and operating as many as ten cars were required to give bond for only \$500 per car. Under the new requirement, a bond of \$1,000 per car is required regardless of the number of cars a company operates.

A grievance committee has been named by the jitney men of Dallas, Tex., to express their objections to the new ordinance which was agreed upon by the president of the jitney union and the City Commissioners. The head of the chauffeurs' union is opposed to the ordinance and says it has never received the sanction of the membership. The new ordinance is being strictly enforced.

Another test of the rights of cities to regulate jitneys will be made in the case of the jitney men of Austin, Tex., where a recent city ordinance has been enforced. An effort will be made to get the case before the Supreme Court of Texas and avoid the Court of Criminal Appeals, which has already upheld the cities' right in the case of I. W. Sullivan concerning the Fort Worth ordinance.

A petition asking for a referendum election on the new jitney ordinance of Houston, Tex., was presented to the City Council on Aug. 7, following the refusal of the city to reduce the license fee from \$72 to \$36. All of the principal requests of the jitney men were granted by the city except as to license fee. The ordinance does not require a bond and in many respects is regarded as very liberal to the jitney interests. The new regulations were to have gone into effect on Aug. 10, but the referendum election will suspend them indefinitely. Mayor Campbell is in favor of having the voters express themselves on the subject.

R. E. Platt, manager of Idora Park at Youngstown, Ohio, and five of his employees on Aug. 7 filed suits for damages aggregating \$60,000 on the charge of false arrest against ten jitney bus owners and their attorneys. When the Youngstown Park & Falls Street Railway began charging an entrance fee of 10 cents to people taken to the park by the jitney buses, the owners retaliated by having the park employees arrested on the charge of violating the Sunday closing law. They were dismissed recently.

The new ordinance in Des Moines, Iowa, regulating the operation of jitney buses did not go into effect on Aug. 9 because of an appeal to the Supreme Court from the decision of District Judge Utterback, who held that the jitney ordinance recently passed by the Council was valid in every particular. It provided that jitney operators must designate their routes and give bond for the protection of passengers and pedestrians.



The City Council of Charlotte, N. C., has passed a jitney regulatory ordinance. The feature of the ordinance is the provision requiring the filing of a bond for \$1,500 for the first bus operated and of a bond for \$1,000 for each bus after the first one. Routes must be designated and a record filed of the hours during which it is intended to render service. The routes are subject to approval by the officials of the city.

On July 30 Mayor Grace of Charleston, S. C., ratified the ordinance passed by City Council recently for the regulation of the jitney bus traffic in Charleston. Thirty days after the affixture of the Mayor's signature are allowed jitney operators in which to file the bond assessed according to the provisions of the ordinance.

On Aug. 3 the City Commissioners of Passaic, N. J., passed an ordinance on first reading to regulate the jitneys. The ordinance provides that the license for a bus carrying twenty or more passengers shall be \$25 a year. Smaller buses will be charged \$15, and \$5.50 will be asked from those using automobiles as jitneys.

The Muskogee (Okla.) Electric Traction Company has announced that it will operate one-man cars in that city on account of jitney competition.

The Dominion Power & Transmission Company, which owns the street railway at Hamilton, Ont., has reported to City Treasurer Leckie that the jitneys have been responsible for a decrease in its receipts of \$24,218 for three months. The number of jitneys on the main streets is now about 200. The city is taxing cars at the rate of \$5 a seat.

Police Judge Meyers at Cedar Rapids, Iowa, holds the bond feature of the jitney ordinance recently adopted in City Council to be unconstitutional. The measure provided for a bond of \$3,000 to guarantee indemnity to passengers injured through the carelessness of a jitney bus operator. The court held this amount to be prohibitive.

The City Council of Albuquerque, N. M., by a vote of five to two has served notice on the Albuquerque Traction Company that the franchise of the company will be forfeited if within thirty days it does not show to the satisfaction of the Council that arrangements have been made for adequate service before October. This is the reply of the city to the receiver of the company, who threatened to continue the present curtailment of service for six months unless the Council passed a jitney regulation prepared along lines suggested by him.

The Mayor of Quincy, Ill., has returned to the Council without his approval the ordinance to regulate the jitney passed there. He considers the ordinance unduly burdensome. He expressed the hope that the Council will see its way clear "to prepare a new ordinance which will be fair and reasonable, and generally acceptable."

In Kansas City the opportunity to go into the jitney business, hailed as a godsend to the laboring man and mechanic to get into business for himself, turned into a catastrophe when companies were organized to give scheduled service, largely eliminating the "little fellow." The companies in turn quickly got into trouble through inability to handle labor questions with facility, and through inexperience in the management of the new form of industry. Leavenworth, Kan., offers another phase of the distressing situation. Here the jitney owners were called upon to provide the same protection to the public, the same contribution, proportionately to the incomes, to the public, as other institutions, and had to quit business. In Muskogee, however, the alleged profits of the business have appealed strongly to the City Commissioners, who advocate establishing a municipal system to eliminate the private owner. One of the most illuminating incidents of the recent news is the estimate at Muskogee that the city could set aside \$30,000 a year from the proceeds of a municipal jitney system for street maintenance.

The city of Ottumwa, Iowa, has been sued by the estate of Charles Chessner for \$20,000, the deceased having been killed in an accident involving a jitney bus and a street car. The attorney for the estate asserts that the street railway is not liable, but that the city is, one point being that the jitney skidded on an iron grating in a gutter and was thrown into the street car, and another that the city has adopted no regulatory measures intended to govern the operation of jitneys.

## ALBANY SERVICE ORDER

### Summary of the Provisions of the Latest Order of the Commission Regarding Cars

The Public Service Commission for the Second District of New York made an order on Aug. 13 for the improvement of the rolling stock of the United Traction Company, Albany, in the case which has been before the commission since May 1, 1912. The latest order provides as follows:

The immediate purchase of fifteen new modern cars, completely equipped, seating capacity at least thirty-four, to be put in service in Albany before Dec. 1.

The purchase of ten more like cars to be placed in service in Albany during 1916.

Removal of present cars from "A" Belt Line to be rebuilt and re-equipped for service on the Albany-Troy lines.

Fifteen double-truck, double-end cars now on Albany-Troy line to be rebuilt for tripper service on the belt and other lines.

Eleven double-truck, double-end cars to be rebuilt for the Troy-Albany lines.

Eight single-truck, double-end prepayment cars with 21 ft. 3 in. bodies to be improved as to entrances and exits.

Sixteen single-truck cars with 21 ft. 3 in. bodies to be similarly rebuilt.

One single-truck car to be similarly improved.

Ten single-truck, 18-ft. cars to be rebuilt into five double-truck, center-entrance cars for use on various lines in Albany.

General overhauling and repairing of twenty-eight single-truck cars which have already been rebuilt for prepayment operation.

These alterations, repairs and additions will cost the company between \$100,000 and \$200,000, will increase the number of cars available by about fifty and the seating capacity of the system by between 400 and 500.

The order is made as the result of the decision of the Appellate Division, which compelled the United Traction Company to fulfill all but one of the provisions of the commission's order of last December. Upon that one, involving the purchase of new cars, the commission was ordered to give the company a rehearing, the company alleging that financial difficulties incident to the war in Europe made it impossible to purchase the new equipment ordered. Of this impossibility the present order of the commission says with regard to the evidence submitted at the rehearings held on May 25, June 1 and June 23:

"While it did not appear on the hearings to the entire satisfaction of the commission that the respondent was unable to comply with the provisions of Paragraph 7 of the order of Dec. 11, 1914, because of the European war, yet it did appear that the earnings of the respondent in Albany had decreased very materially during the first half of the year 1915 and that there would probably be no material improvement in the earnings of the company during the continuance of the present business depression. No evidence was submitted to the commission to show that the purchase of new cars and improvements in the present operating equipment of the respondent were unnecessary, and the commission is still satisfied that the respondent should improve its service in these respects forthwith. The respondent also indicated that it was willing to purchase and place in service in the city of Albany during the present year at least fifteen new cars in order partially to comply with the provisions of Paragraph 7 of the order of Dec. 11, 1914."

Paragraph 7 of this order called for the immediate purchase of twelve new modern cars seating forty, to take the place of the 18-ft. cars then in use and the subsequent purchase of thirty more new cars. While the present order does not provide for the purchase of quite so many new cars it provides in addition a practical rehabilitation of all of the rolling stock of the company, bringing it all up to the most modern standards of prepayment cars.

The order is based to some extent on a recommendation of Charles F. Hewitt, the company's manager, and C. O. Birney, the car expert of Stone & Webster, Boston, who made a report to the commission, checked by the commission's own experts in which the recommendations of the order of Aug. 13 were embodied, with the reasons there-



for and the expense of carrying out the improvements.

The present Belt line cars are ordered rebuilt for the Troy service in accordance with the recommendations of Messrs. Hewitt and Birney by installing bulkheads, remodeling doors so that the rear doors will slide one on the other for entrance and exit, dividing rails and fare boxes to be removed and wood slat seats placed about the rear platform for ten passengers, making a total seating capacity of sixty-two, and the wheels, axles, gears and motors of the present Troy cars be substituted for those now on the Belt line cars.

The fifteen cars now in Albany-Troy service will be rebuilt for Albany service by lengthening the platforms and providing folding doors and folding steps on each side, removing the bulkheads and installing the fare boxes, wheels, axles, gears and motors taken from the present Belt line cars. All defects will be remedied and the cars painted and varnished.

Eleven cars now in service to Troy will also be brought up to date by lowering and lengthening the platforms, installing folding doors and steps, the rearrangement of bulkheads and the removal of the smoking compartment and the placing of all cross-seats on one side as in the present Belt line cars. These cars also will be thoroughly painted and varnished.

Eight of the present single-truck, prepayment cars in use on the Quail Street division are to be remodeled by rearranging doors and steps in a safer manner with the steps folding automatically with the doors, the sagging ends trussed up and the cars touched up and varnished. These cars are those numbered between 554 and 573. Sixteen cars numbered between 501 and 535 will be rebuilt by having the bulkheads removed, folding doors and steps on each side of each platform with doors opening outward, all defects remedied, cars painted and varnished and arranged for prepayment service. Car 570 will be equipped with folding steps.

The rebuilding of ten of the old 18-ft. cars into five double-truck, center-entrance cars will give Albany and vicinity the first cars of this type used here. Each of these new cars will have a seating capacity of fifty-four, or 270 seats in all as against the 240 seats now available in the ten 18-ft. cars. The work of rebuilding these and all the other cars, including shortening of the trucks, etc., will be done in the company's own shops.

Mr. Birney and Mr. Hewitt in their report recommend that the fifteen new cars to be purchased be used in the Belt line service and prescribe their construction, but only the purchase of the cars is ordered by the commission. According to the report these cars would be the most modern single-truck cars, 32 ft. long over the buffers and seating thirty-two passengers, doors, steps and platforms to be of the automatic folding prepayment type and the seats arranged six reversible and two cross-seats on each side with birch-wood slats and frames. They would weigh 21,000 lb. each and would cost about \$52,000. Ten of these cars would furnish 640 seats for the 635 passengers on the line at the noon hour. The total weight of these cars would thus be 210,000 lb. against a total weight of 460,000 lb. for the present ten Belt line cars. Affording sufficient seats, the report says that thus in lighter weight \$12,500 in power can be saved annually. It recommends the use of twelve cars on the belt line with three extras each way during the rush hour. The details of this report are not approved by the commission. For instance, it insists that the new cars contain two more seats than those recommended by Messrs. Hewitt and Birney. The company has until Aug. 25 to notify the commission whether it will comply with the terms of this last order or further appeal to the courts.

**Milwaukee Skip-Stop Order Sept. 1.**—The Railroad Commission of Wisconsin expects to issue its order calling for experimental skip stops on the Wells-Farwell, the Greenfield Avenue and the Walnut Street lines of The Milwaukee Electric Railway & Light Company so as to be effective on Sept. 1.

**Electric Meets Steam Competition.**—The Alton, Granite City & St. Louis Traction Company, Alton, Ill., has announced that it will sell ten-ride tickets between Alton and St. Louis for \$4, good for sixty days, with transfer privileges in Alton. This is the cheapest rate ever made be-

tween the two cities, and was arranged to meet steam railroad competition.

**Hearing on Trenton Fares in September.**—Following a hearing on Aug. 17 before the Board of Public Utility Commissioners of New Jersey at Trenton, that body announced that it would delay for three months the plan of the Trenton & Mercer County Traction Corporation to abandon its six-for-a-quarter strip tickets in favor of a flat 5-cent fare. The commission has announced that a hearing on the matter will be held on Sept. 21.

**Progress in Physical Connection Case.**—The result of the hearing of the Public Service Commission of Oregon on the petition for physical connection of the Oregon Electric Railway and the Southern Pacific Company lines at Albany will not be made public for at least six weeks. After the testimony is filed the plaintiffs will have twenty days to file a brief. The Southern Pacific Company, contesting the petition, will then have fifteen days to file its answer, and the shippers five days.

**Operating Agreement Between Ohio Roads.**—An arrangement has been completed between the Northern Ohio Traction & Light Company and the Cleveland, Alliance & Mahoning Valley Railway by which limited trains will be run between Cleveland and Alliance. They will operate over the Northern Ohio Company's tracks to Ravenna and from there to Alliance over the Cleveland, Alliance & Mahoning Valley Railway. Warren, Niles and Youngstown may be reached over lines connecting with the latter road at Newton Falls and Leavittsburg.

**Sign Changes in Cleveland.**—In accordance with an ordinance passed recently the Cleveland (Ohio) Railway has arranged the signs on the front and sides of all cars so that the destination is shown. Signs are changed to comply with the direction in which the car is going. The street signs at the top of the cars, of course, are retained. Some further changes will be made in signs relating to the payment of fares, but before this can be done satisfactorily some standard policy for the payment of fares will have to be adopted by the street railway commissioner's office.

**"Your King and Country Need You; We Can Spare You."** These words were written on all the pay checks of the British Columbia Electric Railway, Vancouver, B. C., that were handed out to employees recently. A. T. Goward, local manager at Victoria, said: "There is no other meaning to the statement than that which the words convey. If any of the men feel called upon to go to serve their king and country, the company will not hinder them in doing so. We are following along the lines of the Canadian Pacific Railway and other big Canadian companies who have written similar intimations on pay checks."

**Rules for Dogs on the Northern Ohio System.**—A new rule regarding the carrying of dogs other than lap dogs on cars of the Northern Ohio Traction & Light Company, Akron, Ohio, is now in effect and duly covered by a supplement to the authorized tariff. Under this rule dogs other than lap dogs may be taken on cars only when a permit has been obtained from the company. A charge of 25 cents will be made for any distance. Permits will not be issued to take dogs on the limited cars. During the hunting season the necessity of obtaining a permit will be waived, but the charge will be as above stated. In all cases dogs must be properly secured by strap or collar and chain.

**Transfer Controversy in Boise.**—Further development in the situation brought about by the refusal of the Boise (Idaho) Railroad to exchange transfers with the Idaho Traction Company is the order by the Public Utilities Commission of Idaho directing Attorney General Peterson to file a complaint against the companies, in order that the matter may be formally brought before the commission for discussion. The lines of the Boise Railroad, for two years a part of the Idaho Traction Company's system, were recently taken over for separate operation by the Boise Railroad, and that company has refused to exchange transfers with the Idaho Traction Company. The commission's present idea is to compel the interchange of transfers, and the railroad companies will have to show cause why such an order should not be issued.



## Personal Mention

Mr. Frank H. Miller, superintendent of the Louisville (Ky.) Railway, has been elected to the Louisville Rotary Club, as the railway power plant member.

Mr. John Holley Clark, formerly counsel of the Flushing Association, has been appointed secretary to Col. William F. Hayward of the Public Service Commission for the First District of New York.

Mr. Willis J. Ripley, who has been assistant secretary, assistant treasurer and auditor of the American Public Utilities Company, Grand Rapids, Mich., has been elected treasurer of the company.

Mr. Guy E. Tripp, chairman of the board of directors of the Westinghouse Electric & Manufacturing Company, has been elected a director of the Chase National Bank, New York, N. Y., succeeding Henry M. Conkey, deceased.

Mr. Bradley B. Hogue, formerly associate editor of the *Times-Herald* of Dallas, Tex., has been made assistant to Mr. Edward T. Moore, secretary and manager of the Dallas Consolidated Electric Street Railway and has been placed in charge of the publicity department of the company.

Mr. A. L. Farquharson, manager of public utilities, Fort William, Ont., has taken over the management of the municipal electric railway there, succeeding Mr. M. O. Robinson, formerly manager of both the Fort William and the Port Arthur Municipal Electric Railways, who continues to manage the Port Arthur Electric Railway.

Sir Albert H. Stanley, managing director of the London tramway, omnibus and tubes companies, is defraying the cost of providing tea at treats for the wives and children of the London United Tramways employees now serving in the army. The treats takes place at some rural spot near each depot, and the incidental expenses and the cost of prizes are defrayed by the employees and the various clubs and institutes.

Sir Adam Beck, chairman of the Hydro-Electric Power Commission of Ontario, received an electric automobile at the opening of the London & Port Stanley Railway in London, Ont., on July 22, in conformity with the motion made by Mayor Church of Toronto last February at the convention of the Hydro-Electric Union. The presentation was made by Mr. Philip Pocock, London, chairman of the London & Port Stanley Railway.

Mr. Thomas B. Smith, Philadelphia, has been appointed to the Pennsylvania Public Service Commission by Governor Brumbaugh, taking the place of Congressman Keiss, who did not accept the appointment offered by the Governor. Mr. Smith was born in Philadelphia in 1869 and was postmaster there during the administration of President Taft. He served in the Philadelphia Common Council and was elected to the Legislature for two terms.

Mr. Harro Harrsen, who had charge of the Dr. Pearson interests in Mexico until he was driven out by the revolutionists, and in April last went to Barcelona to take charge of the Pearson syndicate's interests in Spain, has, according to advices from there, been elected vice-president of the Ebro Irrigation & Power Company, managing director of the Barcelona Tramways, managing director of the Barcelona Electric Company and director of the Sarria Railway.

### OBITUARY

Albert Siegel Mohr, Lincoln, Ill., special agent for the Illinois Traction System, Peoria, Ill., is dead, following a stroke of paralysis.

Edward H. Hoyt died at his home in Haverhill, Mass., on Aug. 6, aged sixty-six years. Mr. Hoyt began his railway career with the Haverhill & Groveland Street Railway, Haverhill, Mass., afterward becoming electrical engineer for the Merrimack Valley Street Railway. Following the consolidation of these lines, he became electrical engineer for the Haverhill & Georgetown Street Railway. Later he became president of this road and was also prominent in the People's Telephone Company of Haverhill. He served in the Massachusetts House of Representatives in 1898 and 1899.

## Construction News

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

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

### RECENT INCORPORATIONS

\***Rapid Transit Company of Illinois, Murphysboro, Ill.**—Incorporated in Illinois to construct an electric railway from East St. Louis to Mount Carmel, via St. Clair, Monroe, Randolph, Jackson, Williamson, Saline, Hamilton, White, Edwards and Wabash counties, with special branch lines to Chester and Murphysboro. Capital stock, \$100,000. Incorporators: Joseph Vonnahme, Daniel P. Roberts, Conrad B. Vonnahme and M. Harned, East St. Louis, and Louis T. Hooltman, Collinsville.

\***Fort Wayne, Decatur & Southern Railroad, Decatur, Ind.**—Incorporated in Indiana to build and operate an interurban railway. Capital stock, \$10,000. Incorporators: M. Gerke, C. Oetting and C. Dirksen.

\***Tennessee Electric Railroad, Nashville, Tenn.**—Incorporated in Tennessee to consolidate the interests of the Cumberland Valley Railroad, Tennessee & Kentucky Railroad and the Nashville, Springfield & Northern Railroad. Capital stock, \$50,000. Incorporators: Lee Baker, William Myers, S. W. Thompson, E. G. Stribling, Robert C. Leonard and H. L. Shoulders.

### FRANCHISES

**South San Francisco, Cal.**—The South San Francisco Railroad & Power Company has asked the Council for a franchise to construct, maintain and operate a single-track or double-track, standard-gage railway in South San Francisco. Bids will be received by William J. Smith, city clerk, until Aug. 30 for this franchise. A certified check of 10 per cent, payable to the treasurer of the city of South San Francisco, must accompany each bid.

**Aurora, Ill.**—The Aurora, Mendota & Western Traction Company has received a twenty-year franchise from the Council which gives the company the right to use the highways between the southern city limits of Aurora near the Spring Lake cemetery and the limits of the village of Montgomery.—[June 26, '15.]

**Waukegan, Ill.**—The Chicago & Milwaukee Electric Railroad has asked the Council for a franchise to operate cars in Waukegan.

**North Andover, Mass.**—The Bay State Street Railway has asked the Council for a franchise to lay double tracks on Sutton Street, North Andover.

**Webster Groves, Mo.**—The United Railways Company of St. Louis has received a new twenty-eight-year franchise from the Council of Webster Groves, which carries with it the improvement of Lockwood Avenue from Summit Avenue to Rock Hill Road, about 1 mile, at a cost of approximately \$80,000. New rails will be laid.

**Corpus Christi, Tex.**—By a referendum election held in Corpus Christi on Aug. 10, the Corpus Christi Traction Company was awarded a franchise to build and operate an electric interurban line to connect with the county line. The principal terminal of the proposed road will be Ward Island, 8 miles south of Corpus Christi, where it is proposed to build an amusement park and pleasure resort. J. H. Caswell, San Diego, is interested. [July 31, '15.]

\***Bremerton, Wash.**—W. D. Peters, Bremerton, has asked the Council of Bremerton and Charleston for franchises to construct an electric railway in both towns.

**Vancouver, Wash.**—The ordinance repealing the franchise of the Washington-Oregon Corporation on Fifth Street through the garrison at Vancouver Barracks, and on East Seventh Street has been put over until the latter part of August by the Council at the request of H. K. Lugg, manager of the corporation, who explains that the company was in the hands of a receiver, and that it expects to reorganize and consequently may have money with which to build the line.



## TRACK AND ROADWAY

**Pacific Electric Railway, Los Angeles, Cal.**—Surveys are being made of the last link of this company's line between Los Angeles and Corona. The road has been completed and in operation as far as Yorba Linda and Stern for some time.

**Municipal Railways, San Francisco, Cal.**—The Board of Public Works has passed a resolution awarding the contract for furnishing and delivering track special work, under contract No. 7, Section "E" Municipal Railway System, bond issue of 1913, to the United States Steel Products Company, at its bid on file.

**West Sacramento Electric Company, Sacramento, Cal.**—This company, which was incorporated in February, 1915, will be dissolved on Sept. 5. The company, with the consent of the California Railroad Commission, recently sold its properties to the Pacific Gas & Electric Company for the sum of \$30,000. [Feb. 20, '15.]

**East St. Louis & Suburban Railway, East St. Louis, Ill.**—This company reports that it expects to install track circuit signals on two miles of single track between French Village and O'Fallon division. Apparatus has been purchased from the United States Electric Signal Company.

**Chicago, Ottawa & Peoria Railway, Joliet, Ill.**—This company reports that it expects to build two plate girder bridges, one to consist of four 43-ft. spans and one to consist of two 35-ft. spans.

**Murphysboro Electric Railway, Light, Heat & Power Company, Murphysboro, Ill.**—Work has been begun by this company on the reconstruction of its line in Murphysboro.

**Peoria & Chillicothe Electric Railway, Peoria, Ill.**—A mortgage of \$1,500,000 was authorized at a recent meeting of the stockholders and directors of this company. [Aug. 6, '15.]

**Union Traction Company of Indiana, Anderson, Ind.**—This company is placing the massive 50-ft. steel girders used in building the tracks over the Milton Avenue subway in Anderson.

**Kansas City, Kaw Valley & Western Electric Railway, Bonner Springs, Kan.**—It is stated that work will be begun at once on the construction of this company's extension from Bonner Springs to Lawrence.

**\*Salina, Kan.**—It is reported that a company is being organized to build an interurban railway from Salina to Fairbury, Neb., via Concordia and Belleville. The Arkansas Valley Interurban Railway will connect with the proposed line at Salina.

**Salina (Kan.) Northern Railroad.**—The Salina Northern Railroad will be operated as a standard gage steam railroad; but for the passenger service General Electric gasoline-electric motor cars will be used. The contracts for the equipment, and for materials for construction have been made. The railroad will be 90 miles in length, extending from Salina through Salina, Lincoln, Mitchell and Osborne counties, all in Kansas, to Osborne and Downs. Three miles of track have been laid out of Salina, the grading is practically completed between Salina and Lincoln, 35 miles, and several bridges are under construction. The Salina Northern Railroad is being built by the Keystone Construction Company, Salina, Kan., of which E. A. Tennis is president. Officers announce that they hope to have the line in operation by Jan. 1, 1916.

**\*Cumberland Traction Company, Edmonton, Ky.**—This company has been formed by G. H. Greenup, Elizabethtown, with a capital stock of \$50,000, to build and operate a line between Edmonton and Elizabethtown. Plans as to the terminus of the road have not matured, although it is stated that the line may connect with the Hodgenville and Elizabethtown branch of the Illinois Central Railroad or with the Louisville & Nashville Railroad in Hart County. The first step proposed is the construction of the line between Edmonton and Hiseville, 16 miles. Right-of-way has been secured.

**St. Tammany & New Orleans Railway & Ferry Company, Mandeville, La.**—Operation by electricity has been begun on this company's line to connect Mandeville, Abita and Covington. The line was converted from motor-car operation to electric operation at a cost of \$80,000. [April 17, '15.]

**Lewiston, Augusta & Waterville Street Railway, Lewiston, Me.**—Frederick B. Teeling, Litchfield, has suggested to A. H. Ford, third vice-president and manager of this com-

pany, the advisability of constructing an electric railway from Topsham to Monmouth. Under the plan outlined by Mr. Teeling, the road would start at Topsham or Brunswick, go to Bowdoinham, thence to Richmond corner, passing through Litchfield, crossing the Lewiston, Augusta & Waterville Street Railway at Tacoma and going to Litchfield Mills and on into Monmouth. The road would be 33 miles in length.

**Portland (Me.) Railroad.**—This company has been granted trackage rights on York Street in order to connect its tracks on the new Portland bridge with its regular street lines.

**Boston (Mass.) Elevated Railway.**—A contract has been entered into between the Port Directors of South Boston and the Boston Elevated Railway to lay double tracks and install overhead equipment and necessary connections for a line from Summer Street along the viaduct to the new Commonwealth Pier, thence down the ramp, crossing D Street and coming back up Northern Avenue to a point directly opposite the entrance of the Fish Pier. The extension will cost approximately \$50,000.

**Detroit (Mich.) United Railway.**—This company is reconstructing its tracks in Birmingham on the Pontiac division.

**Twin City Rapid Transit Company, Minneapolis, Minn.**—This company reports that it plans to build a double-track extension from the Snelling-Minnehaha line to the new Twin City motor speedway, 1¼ miles, with storage tracks for 100 cars. The company has just completed a steel-plate girder bridge to carry the county road over the tracks of the Lake Minnetonka line at Brookside Station.

**Metropolitan Street Railway, Kansas City, Mo.**—John M. Egan, 1500 Grand Avenue, Kansas City, has been delegated by the receivers of this company to solicit sealed proposals on or before Aug. 25, 1915, to construct and complete ready for operation on or before Dec. 31, 1915, double track on portions of Broadway, Twenty-fourth Street, Thirty-first Street and Main Street and single track on Prospect Avenue and Twelfth Street, Kansas City, in all about 38,935 ft. Plans and specifications will be furnished upon application. Bids to be received for this work are officially advertised elsewhere in this issue.

**\*Three Forks, Mont.**—Construction has been begun on a new line between Three Forks and Radersburgh. It is reported that Julius Rosholt, Fairmount, N. D., is financing the new railway.

**Alamance, Durham & Orange Railway & Electric Company, Burlington, N. C.**—Plans are being considered by this company to build an extension of its line from Burlington to Elon College and Gibsonville and then to Altamahaw and Ossipee. Junius Harden, Burlington, is interested. [June 26, '15.]

**Cincinnati (Ohio) Traction Company.**—The Council of Cincinnati recently authorized a bond issue of \$3,000 to extend and improve Reading Road in order to allow the construction of this company's extension to Bond Hill. It is proposed to build the line on Reading Road, as the courts have ruled that it cannot be built on Paddock Road because consents of the property owners cannot be secured.

**Cleveland (Ohio) Railway.**—County Commissioners Andrews and Metzger declared in favor of the issue of \$2,200,000 in bonds on Aug. 14 for the construction of subway approaches to the new bridge across the Cuyahoga River from both the east side and west side for the use of the Cleveland Railway and interurban traffic. The commissioners have authority to issue bonds for this purpose, according to Assistant Prosecuting Attorney Green. J. J. Stanley, president of the Cleveland Railway, has expressed a willingness to pay rental for the use of the subways and Street Railway Commissioner Witt has been quoted as saying that the saving in time and expense on the part of the railway will almost equal the amount that will be paid in rental.

**Oklahoma (Okla.) Railway.**—A report from this company states that it will rebuild at once 1 mile of roadbed, using 100-lb. steel ties and concrete and brick paving.

**Hamilton, Ont.**—The Hamilton Hydro-Radial Union was informed on Aug. 10 that the engineers of the Hydro-Electric Power Commission of Ontario at work to the south of Hamilton are surveying for an electric line not only from Hamilton to Port Dover and other points on Lake Erie, but



for a line which will enter into competition with those of the Dominion Power & Transmission Company, as well as the steam road of the Toronto, Hamilton & Buffalo Railway. The plans call for a Hydro-Radial railway to St. Catherines and all intermediate points, including a branch line to Dunnville, Cayuga, etc.

**Portland Railway, Light & Power Company, Portland, Ore.**—The Portland Railway, Light & Power Company is relaying its double tracks on East Glisan Street, between East Sixtieth and East Seventy-fifth Streets.

**Southern Pacific Company, Portland, Ore.**—D. W. Campbell, assistant general manager of the Southern Pacific Railway, stated recently: "We are ready to start work on our electrification to Corvallis as soon as the City Council of that city grants us a franchise." The Southern Pacific's proposition to the Council asks permission to lay a second track on Sixth Street, paralleling the existing track of the old Oregon & California Railroad; a second track on Ninth Street, paralleling the existing track on the old Corvallis & Eastern Railroad; a track on Van Buren or some other parallel street, satisfactory to the people of Corvallis, and another track on Washington Street, making a complete loop. The Southern Pacific Company has set aside money to pay for an electric extension from Whiteson, the present terminus, to Corvallis, 43 miles. This will give the company an electric line from Portland to Corvallis, 97 miles, with an alternate route between McMinnville and Portland of 50 miles. The proposition of granting the franchise will come before the Corvallis Council at an early date.

**Philadelphia & West Chester Traction Company, Upper Darby, Pa.**—The Philadelphia *Ledger* said recently: A determined effort on the part of the Philadelphia & West Chester Traction Company to force an entrance into Chester is believed to be behind a purchase of a tract of 5 1/3 acres of land in Sharon Hill immediately opposite the Collingdale terminus of the Philadelphia & Garrettford Railway, one of the subsidiaries of the Philadelphia & West Chester company. While entrance to Chester is believed to be the object of the company, the obvious route, which would be through Darby and Ridley townships, would strike almost through the property of the Baldwin Locomotive Works, and one of the most densely populated districts of the county would be traversed.

**\*Washington, Pa.**—Business men of Washington are interested in a proposition to construct a street railway to connect Washington with the mining communities of Ellsworth, Cokeburg, Bentleyville and adjoining districts. The proposition as outlined calls for a line about 11 miles in length that would join the Pittsburgh Railways system in Washington with the terminus of the Bentleyville-Charleroi Street Railway at Cokeburg.

**Montreal & Southern Counties Railway, Montreal, Que., Can.**—This company reports that it expects to install an interlocking plant and signals for a single-track diamond at Abbotsford, Quebec.

**Tennessee Electric Railroad, Nashville, Tenn.**—This company has recently been organized to consolidate the interests of the Cumberland Valley Railroad, Tennessee & Kentucky Railroad and the Nashville, Springfield & Northern Railroad. The rights-of-way of these three projects, two of which have already been surveyed and secured, aggregate 275 miles of road, which at present has no railroad facilities whatever. Nashville, it is stated, will be the pivotal point. The first step proposed is to be the construction of the Cumberland Valley road, which is to extend from Nashville via Smithville to Sparta. The Southern Finance & Construction Company is named as having arranged the financing of the project.

**Dallas (Tex.) Southwestern Traction Company.**—J. O. Andrewartha, consulting engineer of the Dallas & Southwestern Traction Company, has advised the Board of Commissioners that the interurban railway of that company will be built from Dallas to Austin and that a system of interurban lines will be constructed with Austin as the radiating center. He says that all financial arrangements for the construction of several hundred miles of interurban lines have been made and that the work will be carried on as rapidly as the material can be handled. Besides building a trunk line south from Dallas to Austin, branch lines will extend to San

Angelo, Brownwood, Lockhart, San Antonio and probably to other towns. The Dallas & Northwestern Traction Company, which is owned by the same interests, is preparing to construct an interurban railway from Dallas to Denton. The cars will be operated by gasoline motors. [July 10, '15.]

**Northern Texas Traction Company, Fort Worth, Tex.**—This company advises that construction has been begun on the extension of its Summit Avenue line about 1 mile south.

**San Antonio (Tex.) Traction Company.**—Work has been resumed by this company on the construction of double tracks on Goliad Street, San Antonio, after a delay of almost a year. The work of concreting the tracks on South Presa Street has been completed.

**Petersburg & Appomattox Railway, Petersburg, Va.**—A contract for the construction of this company's line from Petersburg to City Point has been awarded to the Vaughan Construction Company, Roanoke, for about \$200,000. [Aug. 14, '15.]

**Radford-Willis Southern Railway, Radford, Va.**—Grading has been begun at Little River between Snowville and the mouth of Indian Creek for this company's 28-mile line from Radford to Willis. Williams Brothers Construction Company, contractor. J. L. Vaughan, president. [July 10, '15.]

## SHOPS AND BUILDINGS

**Pacific Electric Railway, Los Angeles, Cal.**—Plans are being considered by this company to construct a new passenger station at Pomona. No definite location has as yet been selected.

**Municipal Railways of San Francisco, San Francisco, Cal.**—The contract for the construction of the second story of the carhouse of the Municipal Railways of San Francisco at Geary Street and Presidio Avenue has been awarded to James L. McLaughlin by the Board of Works for \$26,747.

**Wilmington & Philadelphia Traction Company, Wilmington, Del.**—William D. Haddock & Company have been awarded the contract to build an addition to this company's carhouse at Delaware Avenue and duPont Street, Wilmington, and work will be begun at once. The American Bridge Company received the contract for the steel structural work.

**New York, N. Y.**—Following are unofficial totals of bids opened by the Public Service Commission on Aug. 3 for station finish on Route No. 50, the Queensboro Subway extension, and on Sections Nos. 1 and 3 of routes Nos. 36 and 37, the Corona elevated railroad in Queens: Snare & Triest Company, New York, \$611,563; Marble Arch Company, New York, \$750,000. Bids opened on Aug. 4 for station finish on Section No. 2 of Routes Nos. 36 and 37, the Astoria elevated railroad in Queens: Charles Meads, New York, \$272,000; Snare & Triest Company, New York, \$274,296; Simon Russeck, Inc., New York, \$285,270.

**Toronto (Ont.) Civic Lines.**—Works Commissioner R. C. Harris told the Board of Control in a report on Aug. 11 that it would cost \$285,000 for the city to establish car shops with a maximum capacity of fifty car bodies a year. The commissioner repeated his former report that car shops are not necessary at present and that after the franchise expires the city would not be warranted in establishing a manufacturing plant, inasmuch as the requirements of a street railway system can be provided more economically by the car builders.

**Marshall (Tex.) Traction Company.**—This company reports that it has just completed an addition to its carhouse to accommodate three new cars received in June and July.

## POWER HOUSES AND SUBSTATIONS

**Montreal & Southern Counties Railway, Montreal, Quebec, Canada.**—This company reports that it has awarded a contract to the Nicholson Construction Company of Montreal for the construction of a substation at Granby, Que. A contract has also been awarded to the Canadian Westinghouse Company for one 400-kw. motor generator set and to the Northern Electric Company for a switchboard.

**Salt Lake & Utah Railway, Salt Lake City, Utah.**—This company has contracted with the Westinghouse Electric & Manufacturing Company for a substation at Springville. The station will be equipped with three 250-kw. rotary converters but will be designed to accommodate additional machines as needed.



# Manufactures and Supplies

## ROLLING STOCK

St. Albans & Swanton Transit Company, St. Albans, Vt., has purchased one set of double trucks and two new four-motor equipments, complete.

Anaconda (Mont.) Street Railway reports the addition of six new 50-ft. cars to care for increased business on local lines. The new cars will be similar to the large motor cars now in use.

Albuquerque (N. M.) Traction Company has ordered from the St. Louis Car Company seven steel underframe double-end, one-man cars to be mounted on St. Louis 9-ft. wheel-base trucks equipped with Westinghouse WEE motors. The cars complete will weigh 11,500 lb.

United Traction Company, Albany, N. Y., has been directed by the Public Service Commission of New York, Second District, to purchase immediately fifteen new modern cars, completely equipped, with a seating capacity for at least thirty-four passengers, to be put in service before Dec. 1, and ten more similar cars to be placed in service during 1916. The company is also required to rebuild its present car equipment as noted in detail elsewhere in this issue.

New York & Long Island Traction Company, Long Island City, N. Y., has specified the following details of equipment for the six double-truck end-entrance car bodies recently ordered from the Southern Car Company:

Length over all...42 ft. 5 in.	Registers .....	Dayton
Length of body...31 ft. 8 in.	Gears and pinions....	West.
Bolster centers.....19 ft.	Gongs .....	Brill Dedenda
Width over posts...8 ft. 6 in.	Hand brakes.....	Lord
Height, rail to sills..35½ in.	Hand straps.....	Rico
Body .....	Heaters .....	Consol.
Interior trim.....cherry	Headlights ...	"Golden Glow"
Roof .....	Journal boxes.....	Symington
Air brakes.....West. Type H	Motors.....	West. 307-V
Bumpers,	Paint .....	Chicago
Hedley anti-climbers	Resistances .....	E.M.B.
Cables .....	Seats.....	Hale & Kilburn
Control .....	Springs .....	Southern
Curtain fixtures, Cur. Sup. Co.	Trolley .....	Nuttall
Curtain material...Pantasote	Trucks.....	Brill 27-M.C.B.-2
Destination signs.....Hunter	Ventilators .....	Ry. Utility

## TRADE NOTES

Tubular Woven Fabric Company, Pawtucket, R. I., has been awarded the highest prize, a gold medal, for Duraduct, the well-known flexible non-metallic car conduit, by the award jury of the Panama-Pacific Exposition, San Francisco.

Metals Coating Company of America, Chicago, Ill., has opened an office at 100 Summer Street, Boston, Mass., in charge of Herbert Jaques, Jr., who is prepared to furnish information and demonstrate the Schoop metal coating process.

Walter A. Zelnicker Supply Company, St. Louis, Mo., has purchased the good-will and stock of the Bintliff Supply Company, successor to Bintliff & Herb, who did a general railroad, mill and factory supply business and specialized in railroad track tools, such as Jim Crow rail benders, track drills, etc.

Elcon Company, New York, N. Y., has received an order from the Connecticut Company for forty-six sets of unbreakable E. M. B. resistances for the new cars recently ordered by this company. The cars will weigh 17 tons and will be equipped with two GE 40-hp. motors and K-6 control. These resistances are also specified on the six cars recently ordered by the New York & Long Island Traction Company.

Harrisburg Water Laboratories, Harrisburg, Pa., have been organized for the purpose of making chemical examinations of water. The organization consists of L. McCreath of the firm of Andrew S. McCreath & Son, analytical and consulting chemists, Harrisburg, Pa., Dr. G. R. Moffitt, city chemist, and Farley Gannett, consulting engineer, formerly engineer of the Water Supply Commission of Pennsylvania.

W. S. Barstow & Company, Inc., New York, N. Y., have reorganized their department of construction engineering, with Arthur M. Torrey, formerly with Hildreth & Company, New York, in charge. Prior to 1908, this firm was very active in railway, public utility and industrial construction. In that year it branched out into the ownership and management of public utilities, of which it now controls about forty in the Eastern and Middle Eastern States. During the past seven years less attention was given the construction engineering department than formerly, though the company never retired from this field. The reorganization of the department betokens greater activity along this line. In connection with the construction engineering department, the company has instituted an industrial bureau for the purpose of assisting in developing industries in the communities where it controls utility properties. In these places working arrangements have been made with the local chambers of commerce and a co-operative plan of locating industries is being worked out.

Esterline Company, Indianapolis, Ind., manufacturer of "Golden Glow" safety illumination headlights, reports shipment of headlight equipment to the following railways during the month of July: Altoona & Logan Valley Electric Railway; Fort Smith Light & Traction Company; Wichita Railroad & Light Company; Southern Traction Company, Waco, Tex.; Kentucky Traction & Terminal Company; Denver (Col) Tramway; Sioux City Service Company; St. Louis Car Company for new cars of the Southwestern Gas & Electric Company; Southern Car Company for new cars of the Corpus Christi Railway & Light company; Tidewater Power Company; Gulfport & Mississippi Coast Traction Company; Hutchinson Interurban Railway; Wason Manufacturing Company for new cars of the Tucson Rapid Transit Company; Shreveport (La.) Railways; Windsor, Essex & Lake Shore Railway; Detroit United Railway; Terre Haute, Indianapolis & Eastern Railway; McGuire-Cummings Manufacturing Company for new cars of the Iowa Railway & Light Company; Omaha & Council Bluffs Street Railway; East St. Louis & Suburban Railway; New York, Westchester & Boston Railway; Metropolitan Street Railway; El Paso (Tex.) Electric Railway; New York & Queens County Railway; St. Louis Car Company for the Wisconsin-Minnesota Light & Power Company's new cars; Rockford & Interurban Railway; Packard Motor Car Company for new trucks of the Honolulu Rapid Transit Company; Mason City & Clear Lake Railroad; Lebanon-Thorn-town Traction Company; Hattiesburg Traction Company; Cincinnati Car Company for new cars of the Binghamton (N. Y.) Railway.

## ADVERTISING LITERATURE

Tool Steel Gear & Pinion Company, Cincinnati, Ohio, has issued a folder which contains service comparisons between tool steel gears and pinions and special quenched gearing, which show a greater length of life in favor of the former type.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 47,406, which describes the company's Type F, Form K-20 oil switch, for use on voltages up to 2500. These switches are built in three capacities: non-automatic and automatic, for use on two, three and four-wire systems, and for current up to 300 amp. They are especially adapted for conditions where inflammable materials or explosive gases are present.

S K F Ball Bearing Company, New York, N. Y., has just made a notable contribution to the light car and power economy situation, by issuing a booklet entitled, "Economies of the Light Car in Electric Railway Service." At a time when electric railways are finding it necessary to use every possible source of economy, this book should be very welcome indeed. Facts and figures are presented to show why the big heavy car really is not as economical and efficient in the end as the small car, equipped with such modern devices as ball bearings. The problem is viewed broadly from the maintenance of car details to the promotion of travel by giving higher speed and shorter headways. A number of illustrations show what progress has been accomplished in light car construction to date, while others show energy tests and excellent drawings of the S K F bearings.



**W. H. Huff, Beverly, N. J.**, successor to the Stokes Wood Preserver Company, has issued a catalog describing its preservative paint, "Locustine," for treating ties and poles. This compound increases the life of wood, toughens the wood and makes it less liable to mechanical abrasion, notably in the case of rail cutting on railroad cross ties. It also increases the holding power of spikes and log bolts. The catalog shows illustrations, accompanied by testimonial letters, showing two black oak ties which have been under track on the Pennsylvania Railroad continuously for nineteen years and which are still in a fine state of preservation. Another illustration shows ties in process of treatment for use on the Philadelphia (Pa.) Rapid Transit Company.

**Stow Manufacturing Company, Binghamton, N. Y.**, has issued Bulletin 400 describing and illustrating a few of its portable tools, both belt and electric driven. Special effort has been made to design these tools with a maximum proportion of power to size. Several of the designs are constructed to save floor and bench room, being of the suspended types, thus putting them out of the way in a safe place when not in use and always in easy reach of the operator. The tools described in the catalog include two spindle drills, electric breast drills, S1-U universal drills, drills for heavy work, friction sensitive drill, tool post grinder, electric bench grinder, electric hand buffer with flexible shaft motor combination, motor-driven screwdrivers, flexible shaft center grinders, radial flexible boring machines, suspended drills, portable energy grinders and suspended-type direct-connected buffer or grinder.

**Q. & C. Company, New York, N. Y.**, has issued a large, complete and handsomely bound catalog describing and illustrating its railway materials, including Bonzano rail joints (used on the Pennsylvania Railroad), rolled steel step joints, cast metal rail joints, insulated rail joints, special reversible tie plates, Vaughan automatic rail anchor, guard rail clamps, adjustable rail braces, guard rail braces, portable rail saws, Samson rail benders, rail inspecting device, derails, Fewings wrecking frogs or replacers, skid shoes, Gilman-Brown emergency knuckles, Ajax vestibule diaphragms, snow flangers and Edman refrigerator car doors. All the illustrations and diagrams, especially those showing the rail devices, are large and clear, and in the case of the rail joints show how the lower part of the splice-plate projects between the ties below the base of the rail, thus forming a splice approximating the strength of the rail.

**F. D. Spotswood, Lexington, Ky.**, safety promoter, has issued a catalog which describes and illustrates completely his illustrated safety-first campaign accident blotters, warning newspaper cuts, two color car signs and safety-first buttons. The catalog recommends especially the use of warning blotters in schools where their pictorial appeal to the children, when one design at a time is distributed, with explanation from teachers, is especially profitable, not only because of the widespread and permanent effect upon the growing generation, but also because it is the best and easiest way to interest and educate the general public through parents and friends of the children. The catalog illustrates a large number of designs which are being used by the Bay State Street Railway, St. Joseph Railway, Light, Heat & Power Company; Waterloo, Cedar Falls & Northern Railway; Milford & Uxbridge Street Railway; San Diego Electric Railway; Sheboygan Railway & Electric Company; Roanoke Railway and Electric Company; Great Falls Street Railway; York Railways; Tri-State Railway & Electric Company; Des Moines City Railway; Union Traction Company of Indiana; Knoxville Railway & Light Company; Georgia Railway, Light & Power Company; Reading Transit Company; Chattanooga Railway & Light Company, and Michigan United Railway.

**Bureau of Safety, Inc., Chicago, Ill.**, has just organized and has sent out its first circular. In it is outlined the purpose of the bureau, namely, to conserve human life and to prevent needless physical and mental suffering by reducing the number of avoidable accidents. It also proposes to prevent needless loss of property by reducing the number of preventable accidents and fires. The plan of the special service offered by this bureau contemplates the formation of a practical scheme of safety work, and the assignment of properly qualified representatives for carrying out all the necessary details. The work of this repre-

sentative would include lectures, the systematizing of methods for reporting accidents and the resultant grading of departments in safety work, methods for keeping minutes of safety meetings and the disposal of recommendations made by workmen, and plans for future inspection of accidents and fire hazards. The bureau will also issue a monthly publication devoted to accident prevention, welfare and sanitation, which will be supplied to companies availing themselves of the services of the bureau. It is also prepared to counsel and furnish information with reference to general accident prevention or with reference to any special accident prevention problems. The bureau will make regular inspections of the physical and mechanical conditions of plants and submit recommendations and suggestions for improvement.

## NEW PUBLICATIONS

**Standard Handbook for Electrical Engineers, Fourth Edition.** Prepared by a staff of specialists under the editorial direction of Frank S. Fowle. McGraw-Hill Book Company, Inc., New York, N. Y. 1984 pages. Leather, \$5 net.

The fourth edition of the well-known "Standard Handbook for Electrical Engineers" is practically a new work although it is based upon previous editions. The book is divided into twenty-five sections, each prepared by one or more specialists of international reputation. The sections from the old edition have been rewritten, simplified and rearranged in accordance with a more comprehensive editorial scheme, while entirely new sections on the following subjects have been added: Industrial motor application, electric vehicles, electric ship propulsion, mechanical engineering and general engineering and central station economics.

From the standpoint of the electric railway engineer the most important sections are those treating of electric railways, power plants, power transmission, properties of materials, and industrial motor applications. He will also find other sections, particularly that on units, conversion factors and tables of great reference value.

The section on electric railways was written by A. H. Armstrong, General Electric Company; N. W. Storer, Westinghouse Electric & Manufacturing Company; Azel Ames, Kerite Insulated Wire & Cable Company, and A. F. Ganz, Stevens Institute of Technology. One hundred and fifty pages are devoted to this subject, which is subdivided under three main heads; electric traction, railway signaling and electrolysis. The text on electric traction is a revision by Messrs. Armstrong and Storer of the former's section in earlier editions of the Handbook. It takes up the characteristics of railway operation, types of motors, braking, trucks and car bodies, self-propelled cars, electric locomotives, power distribution, distributing systems, etc. Mr. Ames gives an interesting general treatment of the intricate subject of signal systems, while Professor Ganz covers the much-discussed subject of electrolysis. In the last-named subject the bibliography is of particular importance.

The section of power plants is by R. J. S. Pigott, formerly mechanical construction engineer Interborough Rapid Transit Company, New York; A. T. Safford, consulting engineer, and G. I. Rhodes of White, Weld & Company. More than 200 pages are devoted to the subject and the elements of steam, gas, oil and hydraulic power plants are thoroughly covered. A special division is allotted to electrical equipment, and power-plant economics is also adequately treated. In view of the attention given to power plants in the Standard Handbook this subject was omitted from the electric railway handbook, recently issued by the same publishers.

It would, of course, be futile even to attempt to list the topics covered in the several sections, but the above illustrations will serve to indicate the general plan. In all sections particular attention is paid to definitions and bibliographical references and to useful typographical display. The total issue of the Standard Handbook to date is 35,000 copies, indicating the place which it occupies in the industries. Its many friends will appreciate the efforts of the editor and his collaborators, during two and a half years of continuous effort, in giving to the engineering profession what eight years of experience in publishing the Standard Handbook have shown to be the most useful data.