

Electric Railway Journal

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The Conference on Tuesday

The Place: 29 West Thirty-ninth Street, New York
The Time: 9.30 a. m. sharp.

THERE should be a good attendance at the conference of the American Electric Railway Association next Tuesday. The subjects relate entirely to the two topics uppermost now in the minds of electric railway managers—how to provide the labor for the operation of the cars and how to increase the receipts so as to pay for the expenses of operation and leave a fair amount for the return on invested capital. The first question involves the practicability of the war bonus as a means of wage adjustment in the electric railway industry as well as the possible substitution of women for male employees. There will be papers on both of these subjects. With higher fares, there are two points to be considered: how are they to be obtained and are they to be in the form of an increased uniform fare or some sort of a zone system? The advocates of both plans will be heard. Owing to the length of the program the secretary announces that the conference will begin promptly at 9.30 a. m.

Help the Nation by "Selling" the Liberty Loan to Employees

NO more patriotic duty can be performed by those who cannot join the armed forces of the nation than to furnish to the Government funds for the present crusade. Electric railway corporations and officials realize this, of course, and they will do their duty with the second Liberty Loan as they did with the first. But besides buying bonds for themselves there is another most commendable act—that is, inducing others to buy. In this direction electric railway managements can do much good by explaining to employees the fundamentals of bond buying, by showing the facility of purchase and even co-operating through a partial-payment plan, and also by impressing upon employees the need of investment from current savings. It is highly desirable that employees should not finance their bond purchases from accumulated savings-bank deposits, for not only would they thus lose the betterment of their financial status which current savings would mean, but their demands upon the banks might cause a forced liquidation of securities and thus seriously depress values. These points should be explained to employees in simple language. Slips in pay envelopes, bulletins in car houses, talks before benefit-association and other meetings or some other method suited to local conditions can readily be used for conveying the message. For the next few

weeks the whole country will be one vast field for the use of expert salesmanship in putting the Liberty Loan across to the people, and electric railways as employers will, we are sure, be prompt to do their share.

Better Late Than Never, But Better Never Late

THE words quoted elsewhere in this issue from the decision of the Washington Public Service Commission in abolishing 4-cent tickets in Seattle show a real appreciation of its duty in helping utilities to meet new conditions. The commission frankly acknowledges that heavy burdens bear upon the electric railway service in Seattle to-day, that this service has commendable features and that its efficiency should be maintained. Hence financial relief is now granted—a most praiseworthy move. But—and we say this not to criticize the Washington commissioners but rather to point out a fundamental defect in most commission laws—has not the relief been deferred longer than it should have been? The table appearing in this issue shows that only six times in the last seventeen years has the real rate of return for the Seattle railway property been 6 per cent, and that after 1909 it dropped until in 1915 and 1916 it was minus 1.29 per cent and 0.83 per cent respectively. Is not this striking evidence of the accuracy of President Brush's recent assertion, *i.e.*, that under present rate procedure an electric railway must first become actually unsuccessful before aid can be secured. This, of course, should be changed, for good railway credit depends upon the maintenance of successful operation rather than upon a recovery from actually experienced misfortune.

Publicity Justified Because the People Want It

ELECTRIC railway companies, like all other public utility companies, exist, in the last analysis, on public sufferance—that is to say, the public has both the right and the power to decide under what restrictions public service shall be rendered. Most of our public services began their life's history under private ownership, and that status will persist unless the public becomes convinced by positive evidence of the need of a change. But the fact nevertheless is that the system is on trial. Is it working well? The public wants to know the details. Is it working badly? The public wants to know the details. These simple facts are sufficient to justify a policy of publicity, and Mr. Lee's article on "Advertising in Publicity Work" takes up the cudgel in behalf of the public service company anxious

to inform the public of its work and aims. He defends it against the attack of the politician who charges that the use of advertising space for this purpose is a subsidizing of the press. He also considers some of the practical details concerning publicity ways and means.

Saving a Road from the Junk Pile

NO greater mistake has been made by the public in transportation matters than the assumption that once an electric railway is built and placed in operation continuous service will be maintained thereafter, regardless of the inadequacy of the revenue derived from the traffic. Hence, when the citizens of the Fall River, Mass., district awoke one morning, a fortnight or so ago, to find that preparations had been completed to remove the Providence & Fall River Street Railway in the most literal sense from the map of Massachusetts, something close to consternation reigned among those dependent upon its service. With the dismantling of the road immediately in prospect—and with the high prices now prevailing for scrap metal there is large junk value in any electric railway property—the citizens of Swansea, Somerset and Seekonk, as well as the Chamber of Commerce of Fall River and other groups of business men and manufacturers, realized that the existing service would be wiped out unless the road was rescued from the results of its recent sale at auction, following the default of its bond interest.

In the face of this situation the people came to the rescue of the property, and a vigorous campaign led to a stay of sentence upon the road pending its purchase by the local public at a figure representing about one-quarter of its former capitalization and floating debt. At this writing, final arrangements are being completed for the transfer of the property to these local purchasers, and it is expected that operation will be resumed inside of a fortnight.

Two aspects of the case are of special interest: the unwillingness of the public to see the property junked, and the possibility that future costs of service will be met from operation. The original investment was wiped out at the foreclosure sale, despite the existence of a 6-cent fare unit on the line. In its through-passenger business the road suffered from the competition of the Providence-Fall River electrified line of the New Haven system, and while a considerable freight and express traffic was handled, most of the revenue went to connecting or adjacent street railways. As regards the future, it is unlikely that fares will be increased above the 6-cent basis for the present, but plans are afoot to secure legislation this winter which will authorize a municipal guarantee of a 6 per cent return upon the purchase price of the road, \$90,000, after the payment of operating costs; also, it is hoped, the reduction of certain taxation burdens. Whatever may be the future situation as regards fares, the action of the public in rushing in at the last moment to save the property from being dismantled is eloquent evidence of the necessity to a community of electric railway service.

Effect of Small Car Body Capacity on Schedules

THE operating advantages of the one man car are so marked that it is very important for railway managers not to overemphasize in their own minds one of the advantages of this car, namely, the increased schedule speed brought about by a reduction in car capacity. We referred to this matter in the leading editorial in our issue of Sept. 22—the “More Service for Less Cost” issue—but it is worthy of further exposition. There is, perhaps, a tendency to lay undue stress on this advantage because it was only two or three years ago that the extremely large car, as exemplified in the double-deck designs of 1913, was spectacularly demonstrated as unsatisfactory because of its frequent stops and low speed.

With a car that carries small passenger loads, it is obvious that relatively few passenger stops will be made and that schedule speed will be relatively high because, in city service, schedules are absolutely dominated by the number of stops per mile. The relation, however, between car-body size and schedule speed is by no means proportional, and a car about half the size of the present standard would not, other factors being equal, be twice as fast. Instead, it would be something like 10 per cent faster, the actual figure depending upon a number of variables of which by far the most important is that of passenger stops. This is on the assumption that the same rates of acceleration and braking are used with the small cars as with the large ones. Obviously higher rates will produce higher schedule speed but, as Kipling says, that is another story.

Probably the most reliable data ever published on the subject of passenger stops and car capacity were obtained in the Newark tests of the year 1913, and the curves derived from these in connection with fairly representative city lines and heavy traffic indicate that a reduction in car capacity from, say, fifty seats to thirty seats would reduce the passenger stops (as differentiated from stops, or their equivalent in slow-downs, made on account of vehicular interference) from, say, ten per mile to about seven and five-tenths per mile. This decrease of two and five-tenth stops per mile for a twenty-passenger decrease in the load on the car, is probably a typical example of the results to be expected from such a change, and at the same time it is close to a maximum, because as congestion increases the relative values of the two figures draw together and as it decreases the concrete values of the figures grow less. Now, no matter what other operating conditions exist in connection with a change in car capacity, there is only one thing that can happen because of such a reduced number of stops per mile. This is a saving in time proportional to the number of eliminated stops. Regardless of the original speed attained with a large car body, the speed of a small car on the same run will be greater only because the latter can devote to normal movement certain periods of time during which the large car is stationary or is accelerating or braking at relatively low average rates subsequent to or prior to passenger stops.

Relation of Schedule

Speed and Stops Per Mile

IN the case just mentioned there will be about two and five-tenths stops eliminated per mile, and the time that the small car can save because of its reduced capacity may be measured exactly if the time lost at each stop is known. On this point it is generally assumed that the elimination of one passenger stop saves about fifteen seconds. This commonly used figure may be explained by the assumption of a 15 m.p.h. average running speed, the average rather than the maximum being taken because the average speed is the speed from which braking begins and to which acceleration extends in connection with the average stop. Then, for stops with acceleration and braking rates of 1.5 m.p.h.p.s. (this figure is a minimum for modern car operation and appreciably lower rates need not be expected upon a properly operated road) the car will travel about 110 ft. during a ten-second braking period and 110 ft. during a ten-second accelerating period at an average speed of 7.5 m.p.h. Thus the two periods will occupy twenty seconds, and if a five-second stop is included the total time elapsing from the commencement of braking to the end of acceleration after the stop will be twenty-five seconds. If the stop had not been made, the 220 ft. of track within which the above cycle of operation was completed would have been covered at the average running speed of 15 m.p.h., and this would have required ten seconds in time. Therefore, the net loss due to the stop would be the difference between the two figures, or fifteen seconds.

On the basis that a thirty-passenger car may make two and one-half fewer stops per mile than a fifty-passenger car, the total time saving for the small car, at fifteen seconds per stop, is thirty-seven and five-tenths seconds per mile. The saving can be appreciably no more than this because a low accelerating rate has been assumed, and the increased speed of the small car may be properly determined in no other way than by the incorporation of this saving in time into the schedule. With an original schedule calling for 8 m.p.h. (under which a mile is covered in 450 seconds), this saving of thirty-seven and five-tenths seconds of time means an increase of about 9 per cent in speed, or if the original speed were 10 m.p.h. (and a mile covered in 360 seconds) the increase would come to about 11 per cent.

Comment may, perhaps, be introduced here with regard to the effect of a greatly increased length of stop on the above results. If, for example, stationary time at each stop should be assumed at the high figure of ten seconds instead of five seconds, the time lost at a stop becomes twenty seconds, and the saving due to two and one-half eliminated stops per mile becomes fifty seconds instead of thirty-seven and five-tenths seconds. If, as before, the original schedule called for 8 m.p.h., the new speed would then become 9 m.p.h., an increase of $12\frac{1}{2}$ per cent. This, however, represents an extreme, and in general it may be said safely that the speed increase due to the reduced number of stops

made possible by decreasing the capacity of a standard car to that commonly used in one-man car design is not far from 10 per cent in any case. In brief, among the many advantages that may properly be expected from small one-man cars, that of increased speed is limited in extent. Any improvement in schedules exceeding 10 per cent arises from such a factor as improved propulsion equipment and may not be credited to the reduced number of stops arising from the reduced size of the body. This fact must have due weight in connection with any proposals to reduce one-man car capacities still further, or to make them appreciably less than the sizes that are now generally used, since there is the definite penalty of an increased number of units to be purchased for every decrease in car capacity.

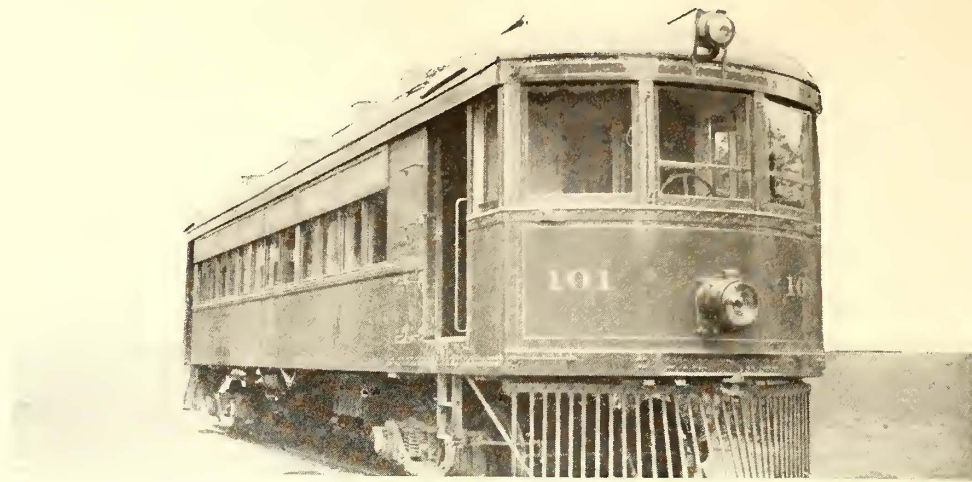
The Practical Man Needs

Mental Stimulus These Days

“YOU ought to give us more equipment and maintenance articles of a nature to provoke thought,” said the head of the mechanical repair department of an important railway recently; “that’s the kind that is most interesting and helpful to me.” Our good friend struck here the keynote of the equipment section as well as all other departments of this paper. That some articles do not stimulate his thought may be due partly to the failure of the writers to put sufficient thought into the articles, and partly to the fact that what stimulates one man would not necessarily appeal to another. If each reader gets one or more mental “jolts” each week he has at least something to be thankful for.

The comment from this engineer which we have just quoted indicates a natural desire on the part of the men in the field for mental stimulus which it is the duty and privilege of their technical paper to supply. We hope and believe that this desire is widespread, although it is not as general as it should be. There is no place in these days for the old-fashioned rule-of-thumb methods applied in a humdrum manner in the shop or the power house, on the track or the line. The interesting task, the stimulating job, is the one which taxes one’s resources of ingenuity, resourcefulness and initiative, and it also is usually the one done most economically. The high costs of labor and materials put an extra premium on these qualities to-day, and these qualities are the result of vigorous, spontaneous thinking.

When one considers that a single practicable idea may save thousands of dollars in real money he certainly ought to be stimulated if he has any mental capacity at all. Whether the thinker gets his share of the saving which he produces or not (although he deserves to get it) he has done the industry a good service. And one does not have to be the designer of a new type of car or power house to come into this game. It’s open to everybody and there’s plenty of room. This is one of the convincing reasons for the support of a technical paper in each field of industry—to transmit the news of these improvements so that all will benefit.



RE-ENGINEERING AN INTERURBAN LINE—NEW 1200-VOLT, 59,000-LB. CAR

Re-engineering an Interurban Line

Change Made from Single-Phase to 1200-Volt D.C., from 90,000-Lb. to 59,100-Lb. Cars, from Generating Station with Extremely Low Load Factor to Purchased Power, Etc., in Attempt to Reduce Operating Expenses to a Basis Commensurate with Traffic—New Substations First to Be Built According to National Electrical Safety Code

WHEN a road intended originally to be a 150-mile line connecting two important traffic points turns out to be a 22-mile line extending from one of these points out to a small town, it is not surprising that the engineering for the bigger project should be a complete misfit for the smaller one. Such in a word were the circumstances which surrounded the building of the Fort Wayne-Decatur (Ind.) electric line in 1906, and the passing of the road into the hands of a receiver in 1912. It was the original expectation that the railroad would be promptly extended from Decatur to Springfield, Ohio, and the short piece of line from Fort Wayne to Decatur was engineered and constructed in accordance with what was considered the most economical plan for the larger project. This first 22-mile section of the line was placed in operation on Feb. 2, 1907, by the Fort Wayne & Springfield Railway, but the extension to Springfield never materialized. However, the equipment was purchased to fulfill the original idea of the promoters, from which it was deemed necessary to adopt as high a trolley pressure as was possible at that time—6600 volts—making use of the 25-cycle a.c. single-phase system and the very heavy cars which go with it.

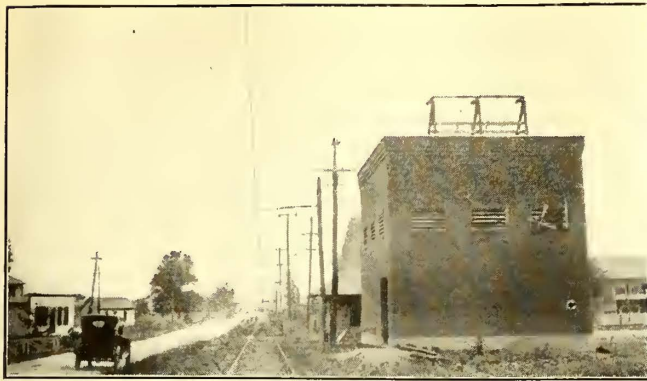
A power house for supplying energy to this line was constructed at Decatur, and equipped with a 680-hp. heavy-duty cross-compound Buckeye engine direct connected to a 450-kw. Westinghouse generator. The power house was built for two such units, but only one was installed. The guarantee on this equipment was a rate of 14 lb. of steam per kilowatt-hour with a 26-in. vacuum, but owing to the extremely low load factor which prevailed at the station with only one car operating on a three-hour schedule this rate was never reached. The cars were making only 11,000 miles a month with an energy production of 30,000 kw.-hr. a month. This made the cost of power run up to 12.66

cents per car-mile, not including any overhead expense or line losses, the figure given being the average cost during the first six months of 1915.

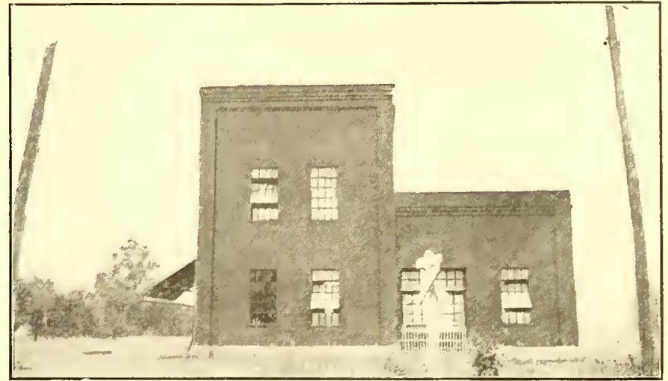
Operation went on under these conditions with comparatively light traffic until Sept. 12, 1912, when the property passed into the hands of French Quinn of Decatur, receiver, who operated the road until Dec. 2, 1915. At this time it was sold at public sale by the court and purchased by the holders of the receivers' certificates in the name of Charles H. Worden of Fort Wayne, trustee. Thereafter, until July 1, 1916, the road was operated as an individual enterprise by S. W. Greenland, general manager Fort Wayne & Northern Indiana Traction Company. Through various operating economies the expenses of the road were somewhat reduced during this period. For instance, by a more efficient use of labor at the power house the cost of energy per car-mile was reduced to 10 cents for the first six months of 1916 as compared with 12.66 cents for the same period the year before. It was impossible, however, to gain what might be considered economical operation, owing to all the handicaps placed upon the property by the misfit equipment.

On July 1, 1916, the property was bought by the Fort Wayne & Decatur Traction Company, incorporated in Indiana, of which James H. Haberly of Fort Wayne is president. An arrangement was then made with the Fort Wayne & Northern Indiana Traction Company to operate the road, and it was thereby continued in the hands of Mr. Greenland.

With a financial rehabilitation of the property accomplished, it was decided that the physical property should be re-engineered and equipped with modern cars and a power distributing system of proper design for the length of road and nature of the traffic. In order to maintain the investment in the distribution system as low as possible, it was determined that by making



RE-ENGINEERING AN INTERURBAN LINE—STEP-UP SUBSTATION BUILT ACCORDING TO STANDARD CODE



RE-ENGINEERING AN INTERURBAN LINE—ROTARY CONVERTER SUBSTATION BUILT ACCORDING TO STANDARD CODE

use of a 1200-volt d.c. trolley pressure, a single substation located midway on the line between Fort Wayne and Decatur would prove satisfactory. The complete rehabilitation of the property, therefore, included the scrapping of the old cars and power house and the building of new substations.

CHANGES NECESSARY FOR THE NEW SYSTEM OF OPERATION

The changes necessary in the old plant to adapt it to the 1200-volt system were not as extensive as might at first be imagined. The old catenary overhead was entirely suited to the new scheme, for the No. 0000 trolley contact wire and the 1/2-in. steel messenger cable, also used as a feeder cable, provided ample current-carrying capacity for the 1200-volt system with the d.c. supply station located near the middle point of the line. With the 6600-volt single-phase system but one rail had been bonded. The second rail was bonded for the d.c. system, but otherwise no change here was necessary. The old a.c. lightning arresters located about 1 1/2 miles apart were adjusted for 1200-volt use and redistributed along the line so as to have a 1-mile spacing. The grounds were also renewed by driving 12-ft. of 1-in. or 1 1/2-in. galvanized iron pipe into the ground at the foot of the pole.

The work necessary to supply energy to the rotary substation comprised a 1 1/2-mile extension of one of the heavy 4000-volt, three-phase, four-wire feeders in Fort Wayne to serve a step-up substation located just outside the city, 4 1/2 miles from the power house. At this point the voltage is stepped up to 33,000, and the power is transmitted over a new three-wire, three-phase line, mounted on the poles which support the trolley brackets and extending 9 miles to the rotary converter substation. This makes the total distance of this substation from the power house in Fort Wayne approximately 13.5 miles. No. 2 copper wire was used for the high-

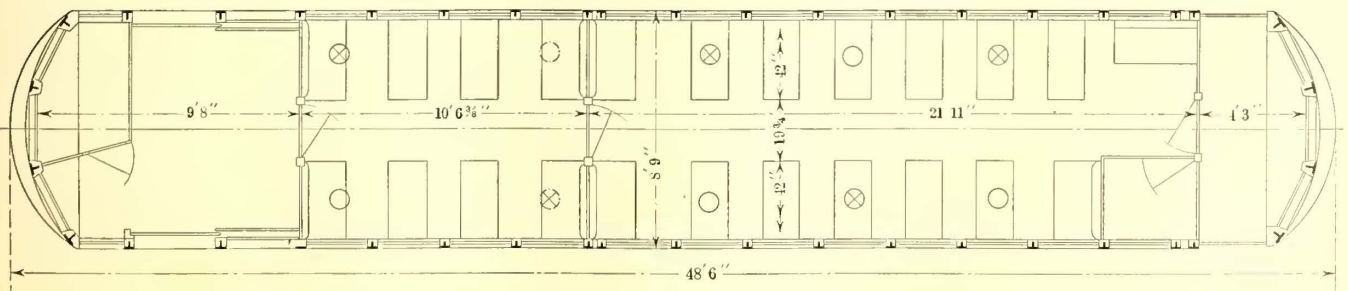
tension line and the poles on which it was placed are of chestnut and 45-ft. long.

During the construction work when the substations had been completed at 1 o'clock p. m. on a Saturday, the old power house caught fire and burned at 2 p. m. This left the road without any power supply, since there was still a mile of the high-tension line to the substation to be built, and the railway was therefore left without power supply. It was necessary to dispense with service until the following Thursday.

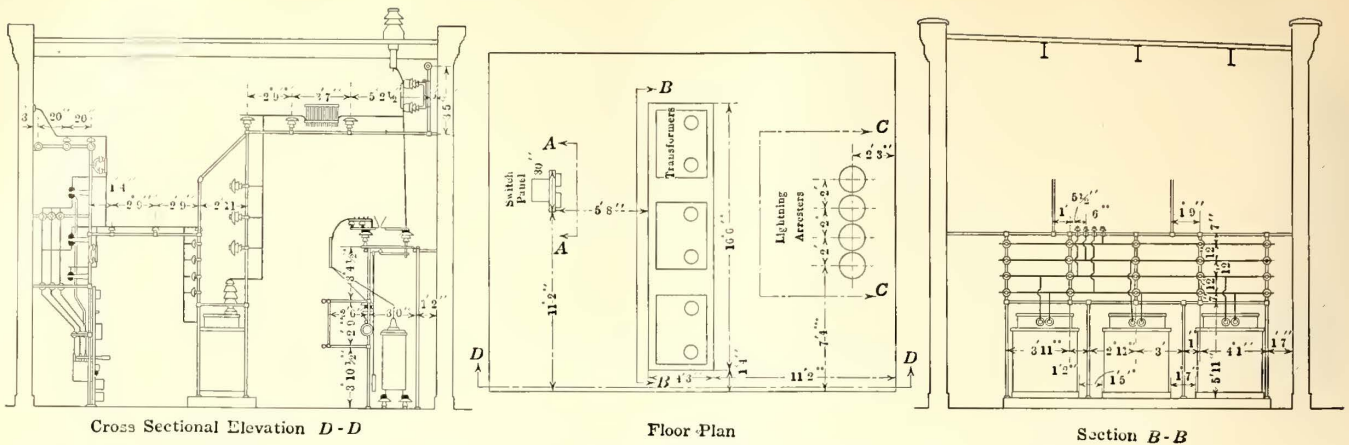
STANDARD CODE SUBSTATIONS

The interesting feature about the step-up and rotary converter substations is the fact that they are the first to be built absolutely in accordance with the new Bureau of Standards safety code. The interest in this connection is very largely one of clearances, and these are shown quite completely in the several accompanying drawings. The step-up substation has a very simple layout whereby the 4000-volt circuit enters at one side of the building, passes through the hand-operated oil switch and the disconnecting switches on either side of it, thence through the transformers and electrolytic lightning arresters, and out at the opposite side of the building at the 33,000-volt potential. The liberal clearances and generally neat layout of wiring are at once noticeable when one enters the station. The advantages of following the rules of the code in the design of the station can readily be appreciated when one sees the completed work, and the additional building cost necessitated by the more liberal clearances is insignificant in stations of this size, according to E. S. Myers, electrical engineer Fort Wayne & Northern Indiana Traction Company.

The equipment in the step-up substation comprises three 150-kva. transformers, complete with electrolytic lightning arresters, and the switchboard panel for the incoming 4000-volt feeder. The building itself is con-



RE-ENGINEERING AN INTERURBAN LINE—PLAN OF NEW 59,000-LB. CAR



RE-ENGINEERING AN INTERURBAN LINE—CROSS-SECTION (DD) THROUGH STEP-UP STATION. FLOOR PLAN STEP-UP SUBSTATION. LOW-TENSION BUS ARRANGEMENT STEP-UP STATION

structed with red brick walls and concrete floors and roof. Three ventilator openings in each of the four side walls are provided, but otherwise there are no windows. The cost of this station was as follows:

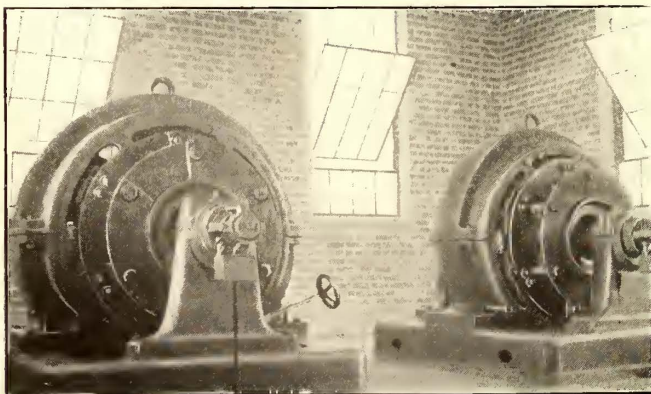
Material	\$1,544.17
Labor	1,230.48
Electrical equipment	4,470.28
Labor and installing	215.55
Total cost	\$7,460.48

The rotary converter substation is also a red brick building with concrete floors and roof, which includes space for use as a waiting room and a smaller room adjoining the operating room. The portion of the building over the two rooms is two stories in height and the space above the rooms serves as a gallery on which the oil switches and electrolytic lightning arresters are installed. Large wire-glass steel-frame windows furnish good daytime lighting for the operating room. A 6000-lb. simple crane, with chain hoist, is carried on offsets in the side walls, and serves for handling the equipment in the main operating room. Equipment installed in the gallery must be handled by other means, since the crane track is only slightly above the floor level of the gallery.

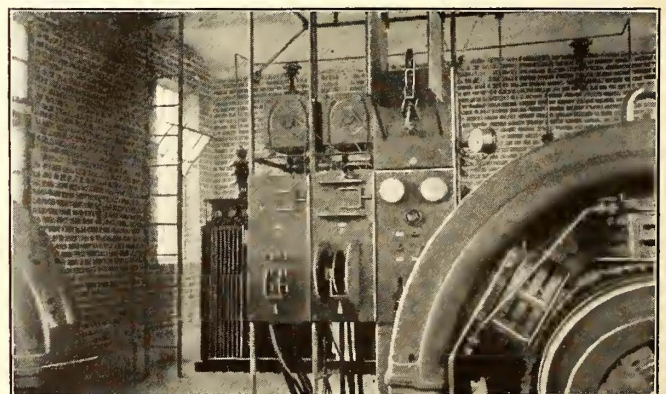
The path of current through the substation is very simple and direct. It comes in off the high-tension line at the roof line at the back end of the gallery and passes down through the aluminum lightning arresters, up through the choke coils, down to the oil switches, and down to the three 150-kva., 33,000/390-volt transformers on the main floor, and thence into the 4-ft. x 4-ft.

tunnel underneath the floor. From here the low-tension cables extend over to the switchboard, and thence on through the tunnel to the two 200-kw., 600-volt, 1200-r.p.m., three-phase, 60-cycle interpole rotary converters operating in series to produce the 1200-volt line pressure. The switchboard has but a single feeder panel and one circuit breaker from which connection is made to the outside trolley at a distance of 5000 ft. either way from the substation. The trolley is fed at this distance from the substation to provide resistance in the circuit between the trolley connection and the rotary as a means of cutting down voltage disturbances. It is a practice with the Fort Wayne & Northern Indiana Traction Company to make these connections 2500 ft. from the substations on 600-volt trolley supply and double the distance on 1200-volt supply. In addition to the single feeder panel in the switchboard, there are provided also two starting panels. The meters are installed on the feeder panel with a bracket-type station voltmeter mounted on the frame. The oil switch is manually operated from levers extending through this panel.

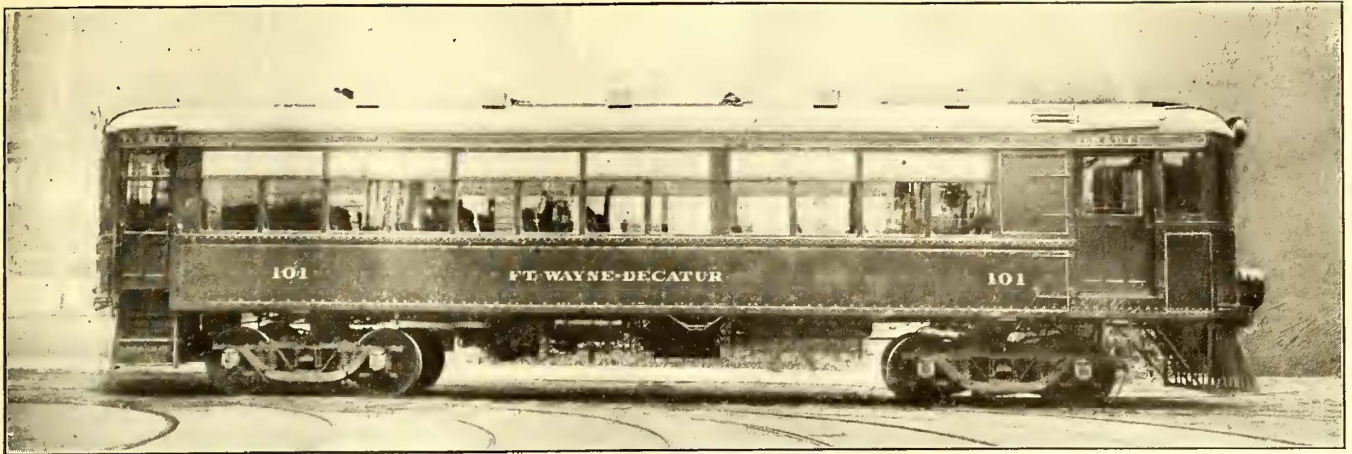
The transformers at the step-up substation are star-connected, while those at the rotary substation are connected in closed delta with the neutral grounded at the substation only. Through this arrangement if a heavy ground occurs on one leg of the high-tension line the neutral ground may be opened up and the grounded leg made use of temporarily as the system ground, and operation thus continued. By this means it is possible to avoid tying up the line. As another means of maintaining the service without interruption, the relays in



RE-ENGINEERING AN INTERURBAN LINE—TWO 1200-R.P.M., 600-VOLT ROTARY CONVERTERS OPERATING IN SERIES



RE-ENGINEERING AN INTERURBAN LINE—SWITCHBOARD AND TRANSFORMERS IN ROTARY SUBSTATION



RE-ENGINEERING AN INTERURBAN LINE—THE NEW CARS WEIGH 30,000 LB. LESS THAN THE OLD

the step-up substation are set with a time lag of eight seconds, so that any temporary disturbance will not operate the oil switch. This station is operated without an attendant, and it is therefore very desirable to keep the transformers on the line, unless there is an extremely heavy and continuous disturbance.

The rotary converter substation complete cost \$16,178.99. This total was made up of the following items:

Material	\$3,814.47
Labor	1,606.69
Electrical equipment	10,214.19
Labor of installing	543.64
Total cost	\$16,178.99

NEW 1200-VOLT ROLLING STOCK

With the change from alternating current to direct current the old cars weighing approximately 90,000 lb. each were dismantled and three new passenger cars weighing 59,100 lb. each were purchased in order to give a one-and-one-half-hour service, instead of the three-hour service formerly provided. These cars are of all-steel construction except for the wood interior finish, and are equipped with Baldwin 73-18-K trucks, Westinghouse 307-CV 600-1200-volt motors and HL control. The car bodies are 48 ft. long over all with a weight distribution as follows:

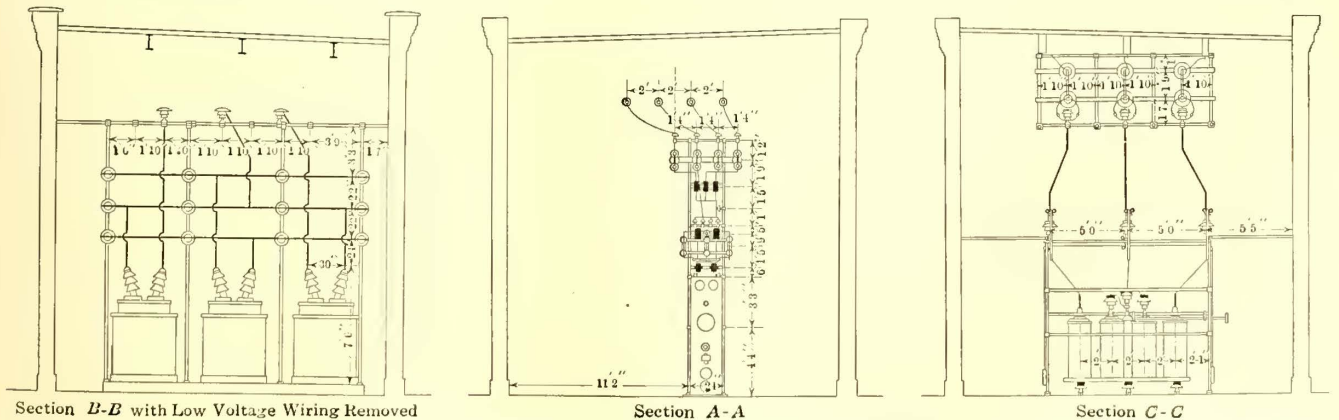
	Pounds.
Body, electrical equipment and air brake.....	32,600
Trucks	15,900
Motors	10,600
Total	59,100

An express car also purchased is constructed of wood, but is supplied with the same equipment and

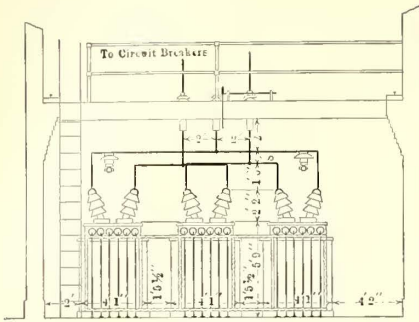
given a gear ratio for a speed of 35 m.p.h., while the passenger cars are geared for 45 m.p.h. All cars are equipped with a changeover switch for operating on the 600-volt trolley supply in Fort Wayne. This switch is located in the cab just above the motorman's head, where it is within easy reach. Throwing the switch over in the cab automatically makes all the necessary changes in connections underneath the car by means of a piece of apparatus separate from the HL control and specially designed for the purpose.

The D-2-N Westinghouse Traction Brake Company air compressor utilized has two separate windings and a commutator at each end of the armature for use on both the 600 and 1200-volt trolley pressures. The change-over from 600 to 1200 volts on the air compressor is also included in the operations controlled by the master change-over switch installed in the motorman's cab. Peacock no-staff hand brakes are installed in the center of the cab at the front end of the car.

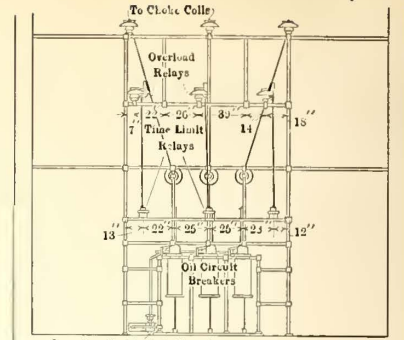
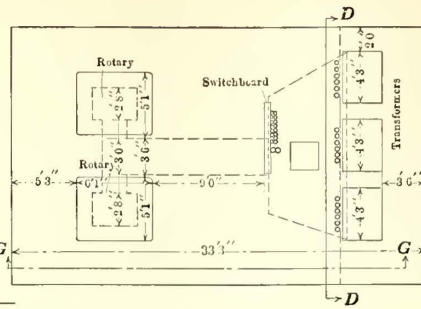
The cars are built for single-end operation, and all switches are located just above the windows on the front end of the car where they are within easy reach of the motorman and very accessible for repair. The sand box, air governor, etc., are also located within the cab. The car-body interior is divided into a main passenger compartment, a smoking compartment and a baggage compartment, in addition to the motorman's cab. The smoking compartment provides a seating capacity for sixteen passengers and the main compartment for thirty passengers, or a total of forty-six. The seats are of unusually generous dimensions, and are likewise liberally spaced. They are 41½ in. wide over



RE-ENGINEERING AN INTERURBAN LINE—HIGH-TENSION BUS ARRANGEMENT STEP-UP STATION. SWITCH PANEL AND INCOMING LINE STEP-UP STATION. LIGHTNING ARRESTERS AND CHOKE COILS



Section D D



RE-ENGINEERING AN INTERURBAN LINE—TRANSFORMER CONNECTIONS, ROTARY SUBSTATION. FLOOR PLAN, ROTARY ROOM AND SWITCH GALLERY, ROTARY SUBSTATION. OIL CIRCUIT BREAKERS AND RELAYS, ROTARY SUBSTATION

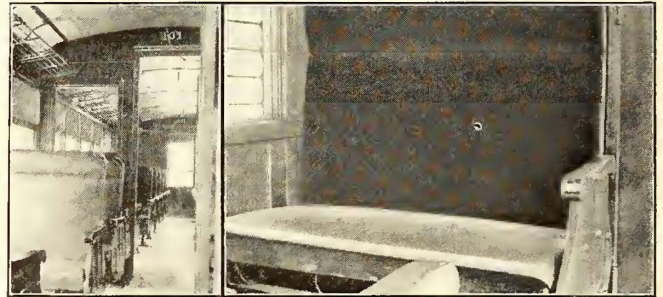
the arm rests, with backs 28 in. high and spaced for 31½-in. centers. They are all stationary seats and are covered with plain green plush in the main compartment and with fabrikoid in the smoking compartment. The omission of an inside side panel in the cars also adds width to the seat space. The seats were supplied by the St. Louis Car Company, which also built the cars. The two plush-covered seats in the main compartment next to the center bulkhead are protected against wear from the feet of the passengers occupying the first forward-facing seats by means of an iron strap which extends across the front edge of the cushion.

The car bodies are 8 ft. 6 in. wide. The arched roof is supported on T-posts, which extend over the top of the car to form the one-piece carlines. The three steel bulkheads act to stiffen the car body as well as to separate the several compartments. The floor is constructed with a maple flooring laid with the lower layer lengthwise and the upper layer crosswise of the car. This is covered with ¼-in. battleship linoleum in the aisle with a molding strip on each side to protect the edges. This double flooring is made use of as an insulation against the cold in the winter time. Further insulation from the cold is also provided by the use of ¾-in. flaxlinum insulation placed between the outside and inside steel plate sheeting. The cars are heated with the Peter Smith hot water system.

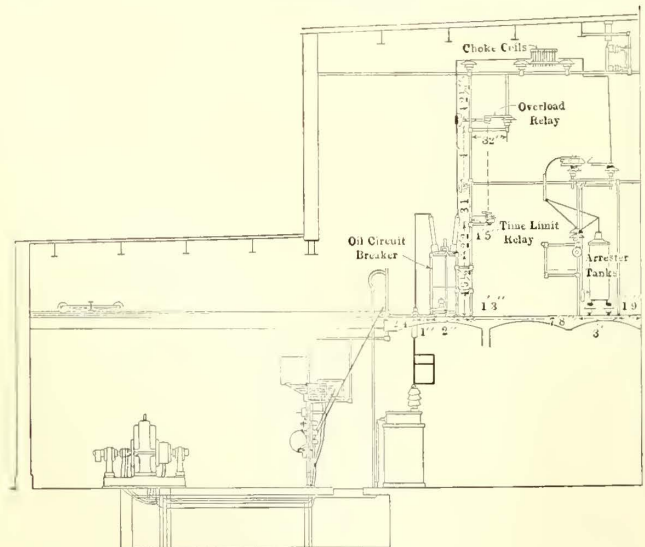
The car interior is finished in birch stained a light cherry, and the Agasote headlining is painted a cream color. One of the features which adds materially to

the beauty of the car and to the pleasure of riding in it is the use of the Forsyth beadless brass sash, which gives the impression that the car has no sash at all. These are fitted with O. M. Edwards locks and Forsyth weather strips. Pantasote curtains on Curtain Supply Company ring fixtures and Rex all-metal rollers were used. The Imperial prism glass in the upper Gothic sash also adds materially to the exterior beauty of the car. Five-bar window guards built in sections covering two windows are hinged at the bottom so that they can be readily dropped for cleaning the window glass.

The artificial night-lighting within the car is provided by two rows of 23-watt Mogul base lamps set in



RE-ENGINEERING AN INTERURBAN LINE—LOOKING TOWARD REAR END OF NEW CAR. IRON STRAP TO PROTECT PLUSH CUSHIONS



RE-ENGINEERING AN INTERURBAN LINE — CROSS-SECTION THROUGH ROTARY SUBSTATION

the headlining over each seat. These are connected ten in series on the 1200-volt system and five in series on the 600-volt system. The change-over on the lighting system is also included as one of the operations controlled by the main change-over switch.

The rear vestibule of these cars is equipped with the O. M. Edwards trapdoors. Ventilation within the car is provided by ten Railway Utility intake and exhaust ventilators. A 1200-volt General Electric Company luminous arc headlight is installed just above the bumper on the front end of the car, and an ordinary incandescent headlight for use on the 600-volt trolley supply inside of Fort Wayne city limits is installed on the roof.

These cars were designed by Arthur W. Redderson, superintendent of motive power Fort Wayne & Northern Indiana Traction Company, and their use has resulted in a current consumption 50 per cent less than that formerly required by the heavier type equipment. All electrical equipment utilized in the rehabilitation of the property was furnished by the Westinghouse Electric & Manufacturing Company.

Advertising in Publicity Work

Publicity Is Justified Because the People Want It—Newspaper Advertising One of the Best Ways of Reaching the Public—The Best Time to Use This Medium and the Proper Kind of Copy Are Discussed in This Article

By IVY LEE

PUBLICITY for public utilities is justified, if for no other reason, because the public itself wants it and has a right to it. The utilities are being paid for doing a certain job for the public, and they are answerable to that public.

Is the public service working well? The public wants to know the details.

Is it working badly? The public wants to know why, and it wants that story told frankly, sincerely and fully.

The public may not agree with the company's views, but it is entitled to have them.

Electric railway men are coming more and more to appreciate that the business is theirs only in a relative sense; that the public service is really the public's and subject to the control of public opinion. It is, therefore, an important matter to the electric railway man what public opinion about the utility is.

The public has both the right and the power to change entirely the system under which utilities operate, and therefore they exist absolutely on sufferance. A man may have no opinion whatever about the business of art pottery, for instance, because he doesn't come in contact with it. It doesn't affect his daily routine. But the daily life of everybody is touched by the public utility, and everybody has an opinion about the conduct of the public utility. What the people know about you molds that opinion, and they won't know your side of it unless you tell them.

The greatest need of the moment is for the electric railways to take their story directly to the people over the heads of commissions, municipal authorities and legislatures. If trolley fares are to be raised, the people must pay the bill, and they will want and they are entitled to know why.

Public utilities, like governments, are subject in the last analysis to the will of the people. As Mr. Dooley put it: "Supreme Court decisions follow the election returns." Courts, legislatures and commissions are all subject to the popular will.

There are many ways to get the electric railway story to the public, among them by the use of advertising space in the daily press.

But electric railways and many other corporations are to-day reluctant to do that advertising which otherwise they might do for fear they will be criticised by public officials for "subsidizing the press."

Yet, in the old days when the public utility man was silent, the politician denounced him for his "secretiveness." One suspects that what really irks the politician is not the policy of honest publicity, adopted by the public service corporations, but the fact that they are making their publicity effective.

No amount of advertising will permanently sustain a mistaken argument, bolster false policies or protect

from the consequences of misdeeds. "You cannot fool all the people all of the time."

Any interest, public or private, which earnestly, sincerely and candidly takes its case to the people should, at any rate, have strong public support for that fact. Every man is entitled to a full hearing in the court of public opinion.

Newspapers and advertising men—in fact, all interested in the progress of democratic institutions, whose ultimate safety must depend upon a fully informed public opinion—should omit no opportunity to make clear to public officers, commissions, even Congress, what the people want to know.

The ultimate fountain of power in a democracy is and must be the people. Corporations should take their cases to the people. If the case is sound the fact that it is presented to the people will secure its approval. If the case is weak the active presentation of it will but give critics of it an opportunity thoroughly to bombard it. The people gain in either event.

Having decided upon a general policy of publicity the electric railway man is next faced with the practical questions of methods and mediums. Just as the artist has on his palette all sorts of colors with which to produce his picture—Chinese white, purple lake, yellow ochre, burnt umber, etc., and just as he must decide whether to paint in water colors, or oils, or use pencil, pastel or charcoal, so the publicity man has his selection of methods. There are numerous means by which to address the public, among them being leaflets, posters, car cards, interviews, signed statements, speeches and advertisements. The most important of all these are the ones dealing directly with the daily newspaper, and in this discussion we shall consider the uses of advertising alone. The principles underlying sound publicity apply to all these media, of course, but the technique varies.

WHEN THE ADVERTISEMENT IS BEST

The advertisement is indispensable when one wishes to reach the whole public with his argument but hasn't the time required to prepare pamphlets or posters.

The great points of value about the advertisement as a publicity method are that you are master not only of the text but you write your own headlines and you put in your own italics.

It makes a lot of difference what the headlines say, for many read the headlines and no more. The attitude of mind of all readers is bound to be much affected by first impressions, and headlines give first impressions.

Suppose the facts are that your railway company has been unable to pay dividends and for that reason you cannot get investors to put money into the business, hence the public service is threatened. Now over a

news article setting forth these facts the following headline might appear:

SEEK TO RAISE FARES
TO PAY MORE DIVIDENDS

Is the general impression left on the mind of the man who merely glances at this headline one of complete fairness to the company? But suppose the headlines over your advertisement are:

FARES MUST BE INCREASED
TO KEEP UP THE SERVICE

The man glancing at that will have a fairer notion of the real situation. But it is not a headline that newspaper men would be likely to write. It is the expression of a conclusion. In effect, therefore, it is an opinion, and newspapers generally avoid putting opinions in headlines except as to matters in which they have a direct interest.

As a piece of news, what you have to say might be accorded by the editor half a column or half an inch. As an advertisement your idea gets exactly the space you think it needs.

WHAT SHOULD WE ADVERTISE?

What should we advertise? In general, things which it is important to have printed at once but which are not likely to be regarded by newspaper men as news and hence would not appear in the paper unless paid for as advertisements.

If the mere fact of extensive advertisement for a thing gives it (as judged by the newspaper man) a news value, the paper will print a news article about it in addition to your advertisement. As an example of this we may cite George W. Perkins's recent advertisement on behalf of Governor Whitman's food bill before the Legislature at Albany. Mr. Perkins stated his views in advertisements printed throughout the State. But the fact that he did this so extensively and so effectively made the fight of news interest, and the newspapers printed news articles and editorials about it, thus multiplying the sum total of publicity Mr. Perkins obtained for his argument.

Many electric railway men have found it to be of great advantage to keep some details of daily operation constantly before the public. They explain a new routing, tell why traffic was halted for thirty minutes on such and such a street, or tell of a new improvement to be put in. These are not matters of sufficient importance for the newspaper to print as news in competition with news of the war, of the selective draft, etc. But unless told at once it will do little good. The small advertisement serves every purpose. And this keeps the public acquainted with the company's desires and plans in the public interest. That is highly important to do, and it is important to keep doing it. It puts the human note into the business too. It is no longer utterly and coldly impersonal. That is why it is important that responsible heads sign all public notices. One should always make his advertising direct and assume responsibility for it.

Very often advertising those things in which one's own business interest is not direct, but only the interest that any good citizen has, is most valuable in the beneficial reaction of public sentiment. For instance, in Elmira, when the Women's College was seeking more funds last spring the Elmira Water, Light & Railroad

Company boosted the work on its cars and won public approval.

In the present 6-cent fare campaign the New York State Railways used advertising space in Rochester, Syracuse and Utica to give the public the real figures on their business covering a period of five years, with the effect that newspapers and leading citizens freely admitted that the company had proved its case.

WHEN AND HOW TO ADVERTISE

Advertise when there is something to say that ought to be said at once and said to the whole public. First impressions are deepest, and it is often most important to have the first say.

The company should not be left to make a tardy explanation after the public has secured a misconception of the facts through ill-informed newspaper reports or interviews with those who are seeking to prejudice the public mind. It is highly important to forestall your enemy, to "beat him to it," for the corporation baiter looks rather foolish making statements that have already been discounted.

The advertisement should be marked by its simplicity and dignity rather than by its ornateness or freakishness. Not that emphasis is to be avoided. Far from it. No speaker can be effective with a dull monotonous droning. As one emphasizes words or phrases by voice or gesture, so in printing a moderate amount of emphasis here and there lends interest. But it should not be overdone. Don't emphasize too many things or you lose contrast.

Do not use too many faces or styles of type. To use too big type in small advertisements is as faulty as to use too small type in big advertisements. It is generally well in public utility advertising to avoid flamboyance, over-display and generally the suggestion of great expenditures. The message does not need it. You are not advertising bargains; you are printing opinions. You do not shout at people. You reason with them.

People will not study advertisements. They glance them through. So they must not be too long nor have too many topics, and they cannot be too direct and simple.

An advertisement three columns wide, and half to three-quarters of a column deep is generally big enough to stand out well on a newspaper page, if not, indeed, to dominate it. It is important that the advertisement be simple and direct and as brief as possible with clarity. Seldom should such an advertisement have more than 400 or 500 words—300 words is better, and 200 still better.

Avoid having too many thoughts in it. Rarely go beyond three principal ideas, and one is better.

Like all really good publicity, the advertisement must be based in an honest case, and breathe the spirit of sincerity and truth. If it be merely "clever" it will fail—the cleverness will probably arouse suspicion.

There is no hocus pocus or mystery about good publicity or good advertising. It is neither subtle or mysterious nor "clever." It is honest, direct and simple.

Yet, strangely enough, that is the most difficult effect in the art to produce. The best actors in the world seem not to be acting at all, they are "so natural." That is the sign of the highest art in acting just as it is in advertising as applied to the publicity conducted by public utilities.

New P. R. R. Locomotive Has Powerful Electrical Equipment

Current Taken from Trolley at 11,000 Volts, Single Phase, and Converted by Transformer and Phase Converter Into Three-Phase Current Which Is Supplied at 850 Volts to Four Induction Motors

TESTS of the Pennsylvania Railroad's new electric locomotive are in progress on the main line electrification in the vicinity of Philadelphia, and from the trial runs already made it is certain that, while the rated capacity is 4800 hp., the locomotive is capable of developing as much as 7000 hp. at starting. In a previous article on this locomotive, published in the *ELECTRIC RAILWAY JOURNAL* for June 9, 1917, page 1048, the details of the mechanical construction were given. In the following article emphasis is laid on the electrical equipment, details of which were not available when the previous article was published. The Pennsylvania Railroad constructed the mechanical parts at its Juniata shops, and the Westinghouse Electric & Manufacturing Company designed and supplied the electrical equipment.

MECHANICAL FEATURES

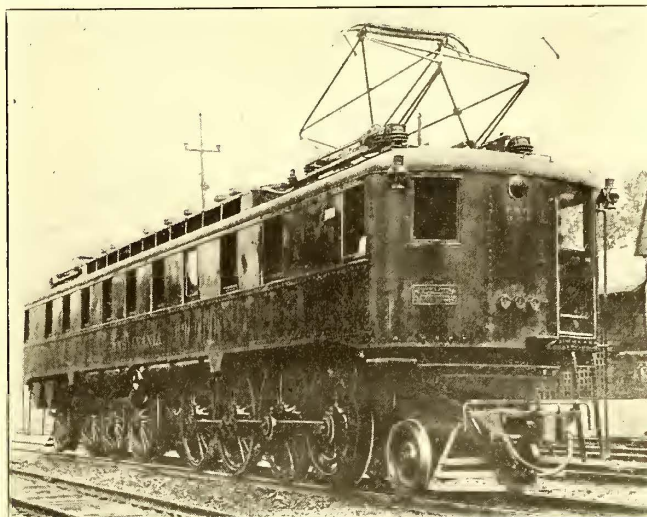
In the general design and layout of the locomotive some of the points which were given primary consideration are as follows: (1) Even distribution of weight about both the longitudinal and transverse center lines of the cab. (2) Grouping of apparatus in a compact manner so that the locomotive would have a minimum length. (3) The location of the heavier pieces near the center of gravity of the cab so as to reduce the dumbbell effect, both in nosing and in rolling. (4) The provision of space for convenient removal of any piece of apparatus without requiring other equipment to be moved. (5) The provision of an unobstructed passageway down both sides of the locomotive, thus permitting access to both sides of all apparatus.

Each truck has three pairs of rod-connected 72-in. driving wheels grouped in a 13-ft. 4-in. rigid wheelbase. Outside the rigid wheelbase is a jackshaft, carrying on each end a gear center which is rod-connected to the adjacent driving wheel. Each gear center carries a pair of independent, flexible gear rims with $1\frac{3}{4}$ diametrical pitch and 10 deg. helical teeth. The jackshaft is driven by two motors, each of which has a pinion mounted on each end of the armature shaft. Ahead of the jackshaft in the truck is a two-wheeled swing bolster leading truck. This leading truck bolster is arranged with a combination of swing links and cam rollers to accommodate the large swing required by the combination of rigid wheelbase, together with the advance of the leading truck ahead of the rigid wheelbase.

The cab, which is 72 ft. 6 in. long, is considerably longer than any previously constructed locomotive cab. The main foundation structure consists of two girders 26 in. deep, spaced 5 ft. apart, and forming with a cover plate a box girder extending throughout the length of the cab. The electrical machinery is mounted

directly on top of this box girder, which also carries the cab sides and roof through transverse bolsters and cross-bearers. The cab structure is relieved of all strains due to end shock, except those resulting from its own inertia, the train shocks being transmitted through the draft gear and the main truck framing. At the mid-length of the cab is a built-in well for the accommodation of the liquid rheostat.

The cab is mounted on two pivoted trucks which are articulated together in a unique manner. The bumper girder on the inner end of each truck is a portion of a circular ring, rectangular in cross-section and hav-

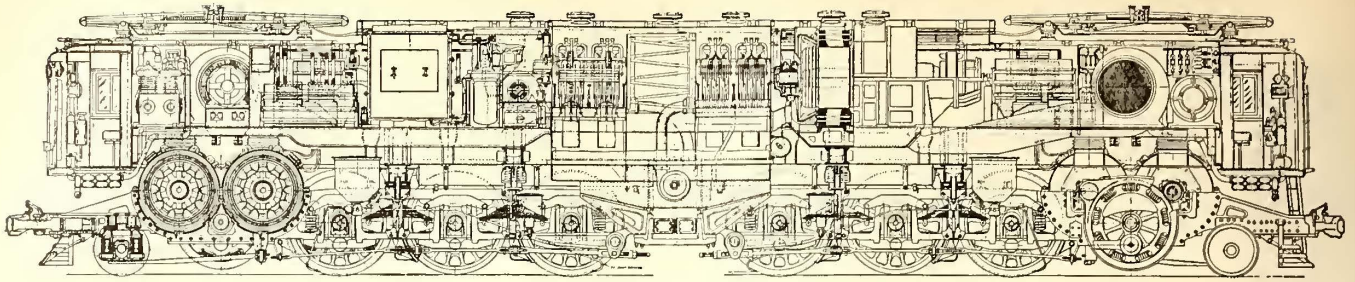


PENNSYLVANIA LOCOMOTIVE—FIG. 1—GENERAL VIEW OF GIANT ELECTRIC ENGINE

ing the truck center plate as its axis. The bumper girders of the two trucks are in contact with each other, and are surrounded by a massive link which extends down and forms a rigid part of the cab structure.

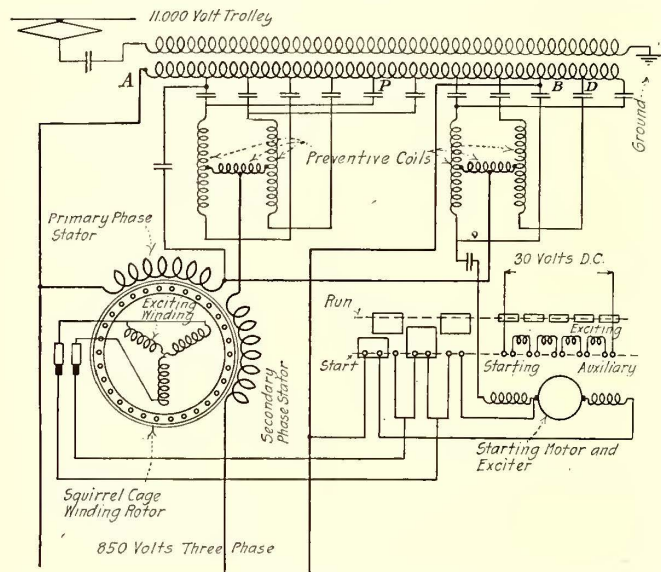
TRANSFORMER AND PHASE CONVERTER

The method of control can best be realized by following the course of the power from the trolley wire to the motors and noting what part each piece of apparatus performs and its method of functioning. As shown in the general wiring diagram, Fig. 3, single-phase current at potential of 11,000 volts is collected by the pantograph and flows through an oil circuit breaker to the primary of the transformer and then to the framework of the locomotive which forms the ground connection. The secondary of this transformer supplies power to the phase converter, which may be considered as a combined motor and generator. Its function is to transform part of the power so that it will have a phase displacement of 90 deg. from the transformer voltage. The converter is essentially an induction motor with a



PENNSYLVANIA LOCOMOTIVE—FIG. 2—SIDE ELEVATION SHOWING LOCATION OF APPARATUS. THE OVER-ALL LENGTH IS 76 FT. 6 IN.

two-phase primary winding on the stator. One winding is connected across a portion of the turns of the transformer secondary, and a second winding is so placed on the converter stator that when the squirrel-cage rotor of the converter revolves it will generate in this winding an electromotive force 90 deg. in phase position from that in the primary winding. This principle is shown in Fig. 4, which indicates the relative positions



PENNSYLVANIA LOCOMOTIVE—FIG. 3—GENERAL WIRING DIAGRAM SHOWING SIMPLIFIED CONNECTIONS OF TRANSFORMER AND PHASE CONVERTER

of the windings in a two-pole converter. There are four poles in the actual converter.

The transformer primary and secondary and the winding on the converter stator are shown in the general diagram, with other details yet to be explained. It will be noted that provision is made for connecting the converter windings at various points in the secondary of the transformer, which is done to provide for balancing the phases under different loads. Connections are also made through preventive coils to limit the current to a safe value when two switches are closed at the same time in transferring a connection from one point to another.

As just explained, the function of the phase converter is to transform part of the power to a second phase in quadrature with the first. As three-phase current is desired, however, another step is necessary in transforming the power now in two-phase form to the three-phase form. This is done by means of the well-known T-connection, or Scott connection, which is shown in Fig. 5. When two windings in which power is being generated with voltages at right angles are

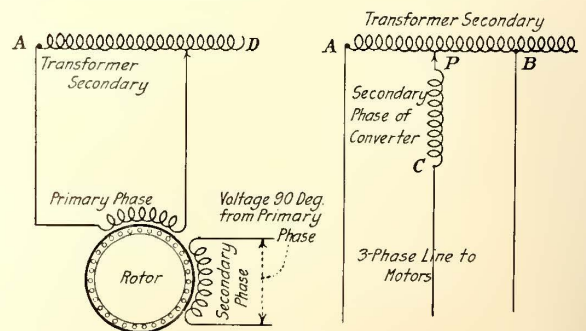
connected as shown in this diagram, three-phase power can be taken from the terminals A, B and C, assuming that the voltages are properly proportioned. In order to get balanced three-phase current under various conditions of load, however, it is necessary to shift the point of connection, P. On the Pennsylvania locomotive provision for doing so is made by the taps already referred to. The general diagram, Fig. 3, shows how the T-connection is made in this case.

As the phase converter is not self-starting a single-phase series starting motor is provided, which is shown diagrammatically in the figure, together with an outline sketch of the controller for the small machine in starting and running positions. When the converter is running the starting motor is used as a direct-current generator for the purpose of exciting the phase converter. Direct-current excitation for the exciter itself is provided by a small motor-generator set, not shown, the motor of which is a three-phase induction-type machine.

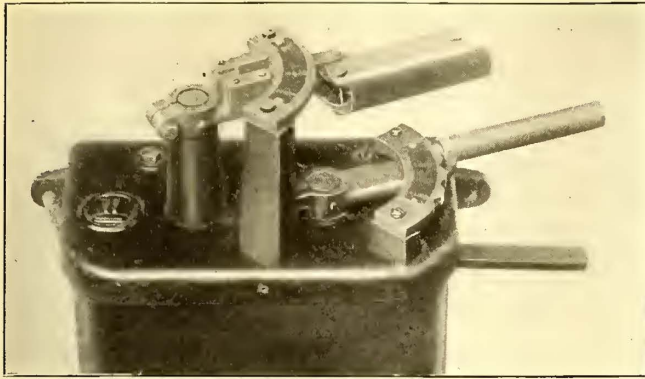
In the general diagram it will be noted that there is an exciting winding on the converter rotor which, as just explained, is supplied with direct current from the exciter when the converter is running. This is for the purpose of improving the power factor, which is, of course, much higher when the excitation is thus supplied than when it comes through the primary winding. When the rotor of the converter is at synchronous speed the direct-current excitation revolves mechanically at exactly the same speed as the revolving field, hence the possibility of this arrangement. Exciting current is taken into the rotor through a pair of collector rings represented in the diagram by conventional symbols.

CONTROL

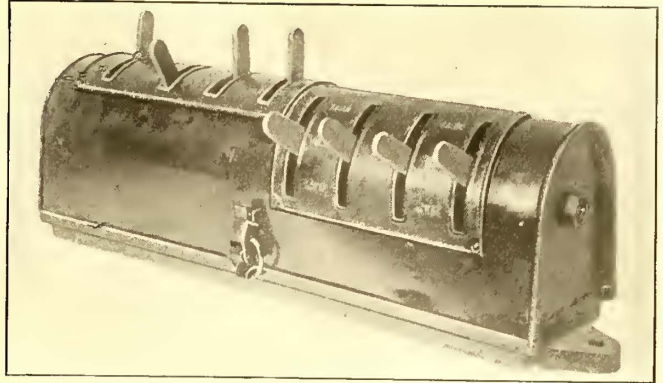
The three-phase power, obtained as outlined above, is supplied to each of the four motors through a set of five electro-pneumatically operated unit switches, which



PENNSYLVANIA LOCOMOTIVE—FIGS. 4 AND 5—DIAGRAMS SHOWING HOW PART OF THE POWER IS DISPLACED 90 DEG., ALSO THE TRANSFORMER CONNECTIONS BY WHICH THE THREE-PHASE POWER IS OBTAINED



PENNSYLVANIA LOCOMOTIVE — FIG. 6 — MASTER CONTROLLER SHOWING THE THREE OPERATING LEVERS



PENNSYLVANIA LOCOMOTIVE—FIG. 8—AUXILIARY MASTER CONTROLLER FOR OPERATING LIQUID RHEOSTATS

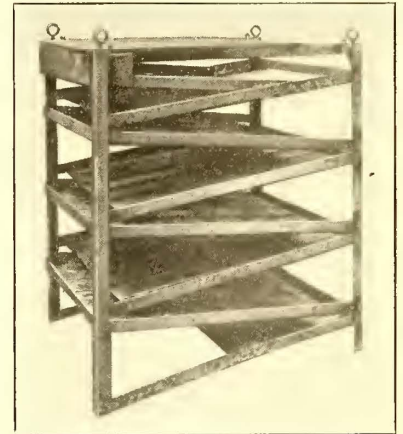
are also used as reversing switches. One of the switches is used commonly for both forward and reverse operation, and the other four switches are used in pairs to interchange the connections of two of the phases to obtain forward or reverse rotation of the motors. The motors are arranged for the two normal running speeds of approximately 10 and 20 m.p.h. On the low speed, each pair of motors is connected in "cascade," the secondary of one motor being connected to the primary of the other, the secondary of which is connected to an adjustable liquid rheostat used for accelerating or speed regulating purposes. On the high speed the motor primaries are connected to the three-phase supply in parallel, each secondary being connected to a regulating liquid rheostat. The control is arranged so that the change from one speed to another is made without losing more than half of the accelerating or regenerating torque, this result being accomplished by effecting a progressive transition of the pairs of motors.

The operation of the locomotive is primarily controlled by a master controller shown in Fig. 6, there being one of these controllers located in each of the motorman's compartments. Three handles are provided corresponding to "reverse," "speed" and "acceleration" control. The "reverse" handle is used for changing the direction of rotation of the motors by closing the proper set of motor primary switches. The "speed" handle is employed to change over the speed

combinations of the main motors from "cascade" to "parallel" operation, and the "accelerating" handle is utilized to control the primary switches and the differential air engine which varies the level of the liquid in the rheostats.

The "speed" handle has three positions, one each for the 10 and 20 m.p.h. combinations, and one midway between these two. The latter is used as a transition position to enable one pair of motors to be changed over to a new combination without entirely losing accelerating or regenerating torque.

The "acceleration" handle has three positions, marked "raise," "hold" and "lower." These words refer to the level of the liquid in the rheostat by which the speed of the locomotive during either the "cascade" or the

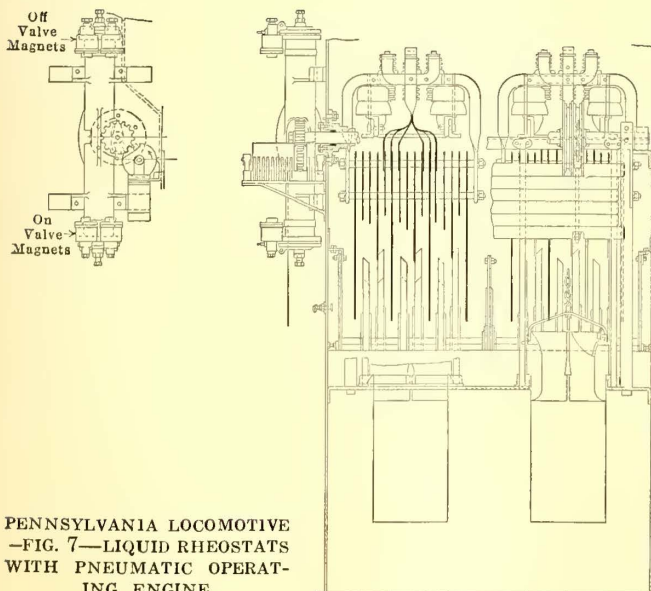


PENNSYLVANIA LOCOMOTIVE—FIG. 9 —COOLING POWER TRAYS WHERE AIR IS BLOWN AGAINST THE ELECTROLYTE

"parallel" motor connections is varied. A movement of the handle to the "raise" position and then back to the "hold" position will give a positive increment to the height of the liquid level, and a movement of the handle to the "lower" and then back to the "hold" position will lower the level of the liquid rheostats.

Overload protection is obtained by a current limiting relay, the advantage of this means of protection being that the circuit is not opened. The relay will first arrest the rise of the liquid level in the rheostats, and then lower this level if the accelerating current goes beyond a certain fixed maximum value.

The four liquid rheostats required to govern the driving motors are located in two separate tanks, the casings of which are built as a part of the locomotive frame. Each tank contains two sets of electrodes. Centrifugal pumps circulate the liquid continuously through each of the tanks. The level of the liquid in each tank may be varied independently by means of tubular overflow valves, which are controlled by differential air engines of the Westinghouse PK type, Fig. 8. The maximum pressure across the electrodes of



PENNSYLVANIA LOCOMOTIVE —FIG. 7—LIQUID RHEOSTATS WITH PNEUMATIC OPERATING ENGINE

these rheostats varies from 850 volts to 1000 volts. This is said to be the highest voltage that has ever been applied to a rheostat of this type, the achievement having been made possible by the use of staggered insulating barriers located in the bottom of the tanks. The barriers increase the resistance between adjacent electrodes by causing the current passing through the electrolyte to follow elongated paths. The liquid rheostats are located in the center of the locomotive, one pair on each side of the cooling-tower compartment.

To cool the electrolyte in the rheostats a small percentage of the liquid is by-passed to the top of the cooling towers, one of which is shown in Fig. 9. While the liquid is flowing over the surface of the cooling trays air is blown over the trays in a direction opposite to that of the flow of the liquid. In this way the body of the electrolyte in the main supply tank is sufficiently cooled by the expenditure of a relatively small amount of pumping energy and by the sacrifice of a small quantity of electrolyte lost by evaporation.

The circulating pumps draw the liquid from the main tank and force it into the electrode compartments through flow equalizers which prevent splashing and insure the equalization of flow over the entire width of the tank. When the liquid level has reached its maximum height, which occurs when the overflow valves occupy their uppermost positions, a set of switches is automatically closed to short-circuit the secondary motor winding and this action cuts out the liquid rheostats.

The liquid rheostats may be operated independently of each other by means of levers located in an auxiliary master controller, Fig. 8. This control is used to equalize the load on the pairs of motors and to reduce independently the current supplied to one pair of motors when the wheels slip. The auxiliary to the master controller also has levers which will raise and lower the pantograph, start and cut out the phase converter, and operate the phase-converter voltage and phase-balancing switches.

Regeneration does not require any extra control equipment. This is due to the inherent characteristics of the induction motor. The manipulation of the master controller is exactly the same for "regeneration" as it is for "running."

Bion J. Arnold Examining B. R. T. Property

The Public Service Commission for the First District of New York on Oct. 1 adjourned until Nov. 12 the hearings on the applications of the Staten Island electric railways and the surface lines of the Brooklyn Rapid Transit Company for financial relief. At the adjourned date, therefore, the several higher-fare cases now pending before the commission, including those of the Third Avenue Railway and the New York Railways, will be taken up.

The application for a postponement of the Brooklyn Rapid Transit Company case was made by A. H. Williams, counsel, on the plea that the figures desired by the commission could not be prepared for the hearing on Oct. 1. It was stated that Bion J. Arnold is making an examination of the property, and that his report will not be ready before the November date.

Bonus System Started in St. Louis

Careful, Skillful and Efficient Operation Means More Money to Transportation Employees—Demerit Plan Used

ON Sept. 1 the United Railways of St. Louis placed in operation a new bonus system covering every member of the transportation department. This system, modeled particularly after one in Milwaukee, that has been very successful during the last one and one-half years, is designed to give the men extra pay and make them more careful, more efficient, more courteous and more watchful as to the welfare of passengers. The following digest of the plan is taken from talks by Superintendent Cameron to employees, as reported in the *United Railways Bulletin*.

FACTORS IN ESTABLISHING THE BONUS

There are four factors which determine the bonus to be paid to employees—namely, injuries and damages; maintenance of mechanical equipment; earnings per car-mile, and wages per car-mile. For the purpose of calculation the following table of standards has been established, subject to necessary change to meet new conditions:

	City Lines	County Lines
Injuries and damages, percentage of gross receipts	5.75	1.90
Maintenance of mechanical equipment per car-mile (cents).....	0.06	0.045
Earnings per car-mile (cents).....	29.00	15.85
Wages per car-mile (cents).....	6.44	4.37

In calculating the bonus to be paid, an entire year is considered, *i.e.*, the current month and the preceding eleven months. For instance, in figuring the bonus for September, the cost for each month beginning with October, 1916, will be used. This is because one month should not be considered as a proper guide, and this rule will hold good in figuring all the factors of the bonus.

How the factors are employed is illustrated by the following notes: If the employees operate cars in such a manner that the expenses of the claims department fall below the standard established for the payment of damages, the difference between the standard and what it paid is transferred to the bonus account. Similarly, if through the exercise of proper care the maintenance of the mechanical equipment costs less than the standard established, the difference between the standard and the actual cost is transferred to the bonus account. If by careful operation—courtesy, running cars on even space, hauling one's own passengers, carefully watching for passengers and requiring each passenger either to deposit his fare in the box or show other evidence of transportation, and not running cars ahead of time—the earnings per car-mile exceed the standard established, the difference between the standard and the actual receipts is transferred to the bonus account. The same applies to the other factor, wages per car-mile.

The company agreed to back the bonus system to the extent of \$97,000 to be given to the transportation department for bonus money. The company will not recover any part of this sum. When it is expended, there will have been established the bonus account, and then the transportation department will receive 40 per cent of the money saved by careful, skillful and efficient operation. The company will also receive 40 per cent, and the remaining 20 per cent will be set aside for the sal-

aries of the clerical force which takes care of the bonus system.

In dividing the employees' 40 per cent, the motormen and the conductors share alike in the last three factors that go to make up the bonus. In dividing the money saved in the damages account, however, motormen receive 60 per cent and conductors 40 per cent of the share that goes to employees. The reason for this is that a motorman is more liable to be demerited for accidents, and it is desired to have the two operators receive approximately the same amount of bonus.

INDIVIDUAL SHARES BASED ON DEMERIT SYSTEM

On the first of each month each employee of the transportation department is credited with 1000 grade points. If, during the month, he violates any rule prescribed in the grade book, he is demerited accordingly. The only difference between the rule book and the grade book is that in the latter a penalty is attached to the violation of any rule. At the end of the month, each man's demerits are added and subtracted from his original credit of 1000 points, and the result thus obtained is his standing.

The value of a grade point is determined by ascertaining the amount of saving in each one of the factors in the bonus account and then establishing the total number of grade points on the entire system after demerits are deducted. Each grade point is then calculated to be worth so much money, and the man who has not been demerited during the month gets more bonus than the man who has been demerited 100 points, and so on. If a man is demerited 250 points, he does not participate in the bonus distribution that month. At the beginning of the next month, however, he is credited with 1000 points as before. If a man receives 250 demerits a month for three months in succession, he is liable to dismissal.

In the first instance the division superintendent assigns the demerits for each violation of rule. The man who is demerited is notified immediately that he has been so charged. If he is not satisfied with the ruling, he has the privilege of appealing to what is known as the bonus committee. This consists of the division superintendent as chairman and secretary, the present director of the Employees' Mutual Benefit Association and a third member. If the director is a motorman, the employees at each car station elect a conductor as the third member. If the director is a conductor, they elect a motorman. This member must have been in service for two years in good standing.

The bonus committee may add to or take from the demerits assigned by the division superintendent. If the employee is still dissatisfied with the ruling, he may appeal to the superintendent of transportation and from him to the chief executive officer of the company. No bonus committee has authority to change the grade book in any manner whatever. Suggestions as to changes, however, will be cheerfully received and considered. The members of the bonus committees, except the division superintendent, receive \$1 for each meeting they attend (which will be weekly) when there are cases on appeal. If there are no cases on appeal, they receive 50 cents. All committees are subject to a call to attend a general meeting in the company's office once a month, to talk over bonus matters.

The employees who will benefit from the operation of the bonus system are as follows:

Class A.—Motormen and conductors.

Class B.—Clerks at the different carhouses, foremen, supervisors, division superintendents, the superintendent of employment and clerks, the superintendent of schedules and clerks, the superintendent of transportation and the assistant superintendent of transportation and their clerks, and telephone operators.

Miscellaneous.—Car hostlers, curve cleaners, flagmen and switchmen.

In figuring the monthly bonus, men who work from one to seven days are credited as working one-quarter of a month; eight to fifteen days, half a month; sixteen to twenty-three days, three-quarters of a month; and twenty-four days or more, a full month. For the purpose of figuring the bonus, an extra man is considered to have worked a day if he reports on time. In the case of Class B employees, \$150 a month is considered the maximum salary of any employee of the transportation department, and the officers are subject to penalization and must earn any bonus paid to them.

It is assumed, says Superintendent Cameron, that at first the bonus will amount to from \$1.50 to \$2 a month for a man who has more than 750 grade points. When the system was started in Milwaukee, the first month's bonus was about 56 cents for each man who had more than 750 grade points. Now each man who has more than this number to his credit at the end of the month receives from \$6 to \$8 in addition to his regular wages.

Manchester Tramways in War Time

How This English Company Has in Various Ways Done Its Bit Toward Winning the War

BY J. M. MCELROY

General Manager Manchester (England) Corporation Tramways

AS soon as war broke out there was a great rush among employees of the Manchester Corporation Tramways to join the forces voluntarily, and every encouragement was given to their patriotism. This naturally caused temporary inconvenience, but this was quickly overcome by the engagement and the training of other men. We did not rest content, however, with the encouragement of our own men to enlist. By means of posters paid for by us and exhibited in the cars, we aided the national campaign in recruiting prior to the adoption of compulsory enlistment.

Members of the staff to the extent of 2738 have joined the colors, and the great majority of these are, or have been, at the front. The dependents of these men receive generous allowances from the corporation while they are away (the total paid to date being £165,000). No employee is to be any the worse off for having joined the army or navy, and his position is guaranteed when he returns to civil life.

Up to the present 159 of our employees have been killed in action or have subsequently died of wounds. Thirty-six have been officially reported missing, and eighteen have returned more or less incapacitated and unable to carry out their former duties. Other and suitable employment has been found for fourteen of these, and the others remain to be dealt with.

When it was found that the war was likely to last, and difficulty was experienced in filling the places of our men, women were requested to offer themselves.

They responded very well. They act as conductors and car cleaners at the same rate of pay as the men, and on the whole they perform their duties satisfactorily. Unfortunately, however, our experience has been that a larger percentage than we like give up the work for various reasons. We hope to reduce this percentage, and are doing everything possible to make the conditions attractive and of the best. For instance, one necessity was soon apparent—a provision for the women conductors to rest as opportunity occurred. This was accomplished by the installation of a small circular seat attached to the side of the stairway of each car. This seat tips up automatically when not in use.

We have not as yet had recourse to the employment of women drivers of tramcars. Owing to the congested condition of the Manchester streets and the abnormally heavy traffic prevailing, one hesitates to bring about this innovation unless forced by circumstances to do so.

Owing to the depleted staff, we have been compelled to discontinue the building of new cars, the laying of new track and the renewal of the existing permanent way except where absolutely necessary. No new rails have been purchased for a considerable time, and track renewals are therefore indefinitely postponed.

DELIVERY SYSTEM AND WAR CHARITIES

We have in Manchester a parcels collection and delivery system in connection with our tramways which has proved of inestimable value in this war time. The deliveries cover an area of from 8 to 10 square miles, in which we carry a large number of parcels from and to the various munition shops. With the aid of our regular and constant car service, we are enabled to deal with these parcels expeditiously, thereby saving valuable time in the transit of machinery, repairs, materials, etc. Hence indirectly the country benefits by our system. If we could not perform these services, the firms concerned would have to use their own employees at considerable loss of time. More than 120 firms are regularly handing to us for immediate delivery parcels marked "Urgent War Work."

We have been instrumental to the end of July in raising £26,723 for the many good causes in connection with the war. These efforts have not been restricted to British funds. Funds of the French, Belgium and other of our allies, the Red Cross, etc., have benefited. The method is to enlist the sympathy of the public by posters gotten up by us and displayed in the car windows, giving the necessary particulars of the object in view. Boxes are fixed on each platform for receiving the amounts the passengers are disposed to give—the system is a purely voluntary one. Our passengers have, in addition, been appealed to for suitable reading matter for the troops at the front. The latest effort (restricted to one day) resulted in the collection of more than 10,000 books.

Finally, a national shell factory has been established at one of our depots. Thus we are doing our bit towards the production of means whereby this great war must be won.

Owing to the congestion of the railroads in France, large quantities of Red Cross supplies are being transported by motor truck from seaports to Paris.

Commission Appreciates Its Duty

Additional Matter from Decision Abolishing Four-Cent Tickets on Seattle Division of Puget Sound Company

THE ELECTRIC RAILWAY JOURNAL of Sept. 22, page 552, contained a news account of the recent ruling of the Washington Public Service Commission, whereby the further sale of 4-cent tickets in Seattle by the Puget Sound Traction, Light & Power Company has been eliminated. Yet the full decision of the commission, just available, contains two sections which it seems worth while to add to the previous record. These show the rate of return on the railway property during recent years and the commission's appreciation of the present railway problems.

The commission appended to its decision a table showing the yearly rate of return from Jan. 19, 1900, to Dec. 31, 1916, for the Seattle Division without power facilities. Part of this table is reproduced herewith.

YEARLY RATES OF RETURN, IN THOUSANDS, EARNED BY THE RAILWAY SYSTEM, WITHOUT POWER FACILITIES, ON THE SEATTLE DIVISION OF THE PUGET SOUND TRACTION, LIGHT & POWER COMPANY

Calendar Year	Average Structural Cost During Period	Gross Revenues	Operating Expenses	Depreciation Not Included in Operating Expenses	Taxes	Real Net Earnings	Real Rate of Return
1900	\$2,079	\$704	\$522		\$16	\$159	7.65
1901	3,865	916	580	120	41	173	4.49
1902	4,965	1,307	957	126	72	151	3.05
1903	5,587	1,500	1,033	177	76	212	3.81
1904	5,950	1,669	1,196	80	85	307	5.16
1905	6,253	1,892	1,246	148	93	403	6.45
1906	6,721	2,319	1,547	140	112	519	7.72
1907	7,726	2,941	2,129	79	224	507	6.57
1908	9,084	3,185	2,329	145	184	526	5.79
1909	10,406	4,060	3,043	65	212	739	7.10
1910	11,525	3,651	2,772	150	219	508	4.41
1911	12,220	3,518	2,603	306	209	399	3.27
1912	13,036	3,486	2,555	413	243	273	2.09
1913	13,757	3,665	2,499	468	303	395	2.87
1914	14,084	3,656	2,436	506	307	406	2.88
1915	14,403	3,011	2,336	562	298	†185	†1.29
1916	14,699	3,152	2,461	516	296	†121	†0.83

(Discount not included.)

†Deficit.

In preparing the table, it was assumed that the railway system would purchase its power from the light, power and steam-heat system at the rate of 1 cent per kilowatt-hour for 500-volt d.c. power and 0.75 cent for 2300-volt a.c. power.

In deciding to allow the rate increase, the commission expressed itself in part as follows:

"This commission would be remiss in its duty if it failed to recognize the economic changes which have taken place and are still taking place, and the unbalancing of activities. We are passing from a peace to a war footing. Under these conditions few, if any, of the old relationships can continue to exist. If we have any power to aid in the readjustment of matters that new conditions may be met, we should be fair enough to exercise it.

"Every article which the company must purchase to maintain its properties is abnormally high. It is in evidence in this case that the wages of employees have greatly increased, and that further advances and new conditions are being demanded. They call for increased expenditures. All just demands of the workers of the respondent must be met. We know from personal contact with the conductors and the motormen that they are manly, courteous and efficient. From the files in

this office we know that few complaints have been entered by patrons, either against the company or its employees, as to the operation of trains, and few accidents have occurred in Seattle, the fault of which is traceable to the company or any of its workers. These are commendable facts, and such efficiency should be maintained if the statute law of the State is to be complied with."

COMMUNICATIONS

"More Service at Less Cost" Issue

STONE & WEBSTER
TEXAS DISTRICT OFFICES

HOUSTON, TEX., Oct. 1, 1917.

To the Editors:

I have just finished reading—from cover to cover—the Sept. 22 issue of the ELECTRIC RAILWAY JOURNAL, "The Story of the One-Man, Light-Weight, Safety Car," and I want to take this prompt method of congratulating you upon the splendid manner in which the subject is presented. I regard the entire issue as an achievement and a tribute to the science of your organization.

The story should be studied with care by every man interested in the electric railway business, as the development of the safety car marks the beginning of a new era in electric railway service.

The safety car idea, in the full sense, was born in Texas in the mind of Mr. Birney, and developed and its practical operation successfully demonstrated on a large scale in Fort Worth, and we gladly give to the electric railway industry as a whole the experience we have had with it.

At the electric railway convention (now postponed on account of the war) the keynote of the meetings of the Transportation & Traffic Association, of which I am president, was to have been "safety cars" and "street railway service." By the time the convention is held I hope other progressive street railway ideas will have been born, developed and successfully demonstrated.

LUKE C. BRADLEY.

Guarantees Anti-Friction Bearings

RAILWAY ROLLER BEARING COMPANY

SYRACUSE, N. Y., Oct. 2, 1917.

To the Editors:

We notice on page 444 of your Sept. 15 number a communication on "Sleeve or Ball Bearings for Motors" signed "Engineer." In the last paragraph of this letter the author makes the statement, "it seems to me that if the makers of anti-friction bearings cannot afford to make a guarantee of duration longer than one year, it is because the risk is too great."

This firm has guaranteed its anti-friction bearings of all types for a period of three years and in some cases even a longer period. Such guarantee is stipulated in the back of our catalog, and if we have not advertised to that effect it is due to an oversight, which we will take steps to correct.

P. A. STACY, Manager.

Economy of Automatic Substations

SCHENECTADY, N. Y., Oct. 2, 1917.

To the Editors:

Since the publication of my article in the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 15, discussing the reduction of railway operating costs by the use of automatic substations, it has been suggested that a more detailed explanation of the points brought out by the chart on page 435 might be of interest to your readers.

This chart consists of train sheets showing the effect of schedule upon the time of substation operation when equipped with automatic control.

As explained in the article, these charts apply to an assumed length of road of 50 miles with five substations, one showing 120-minute headways, the other sixty-minute headways. Each is divided into three schedules of different layovers. The time each station carries more than one-half the car load is indicated by the shaded portions, and this time is equivalent, in the case of automatic operation, to the time when the station is running. The remainder of the time the station is shut down. Table I gives in detail the time of operation of the several stations.

TABLE I—EFFECT OF SCHEDULE UPON TIME OF AUTOMATIC SUBSTATION OPERATION, GIVEN IN MINUTES OF SUBSTATION OPERATION PER HOUR

Substation	Headway	120 Minutes	Total Substation Minutes Per Hour				
			A	B	C	D	E
Schedule I—No layovers	120	20	27	13	27	20	107
Schedule II—30 and 90-minute layovers	120	20	25	28	32	15	120
Schedule III—60-minute layovers	120	20	18	25	17	20	100
Headway 60 Minutes							
Schedule I—No layovers	60	40	35	26	35	40	175
Schedule II—15 and 45-minute layovers	60	25	35	40	50	45	195
Schedule III—30-minute layovers	60	30	50	60	50	30	220

The point that for 120-minute headways more power could be saved with sixty-minute layover, and that for sixty-minute headways more power could be saved with no layovers, simply serves to illustrate the fact that for each particular system a certain schedule will be found most economical for automatic operation. For a longer or shorter road with a different number of substations, a different schedule might show the greatest economies.

TABLE II—ASSUMED DATA AND CALCULATED ECONOMIES ON TYPICAL 50-MILE INTERURBAN ROAD

Headway between cars	Minutes	120	60
Length of road	Miles	50	50
Schedule speed	M.p.h.	25	25
Weight of cars	Tons	30	30
Number of stops per mile		0.5	0.5
Capacity of substation converters	Kilowatt	300	300
Length of operating day	Hours	18	18
Total car-miles per day		900	1,800
Energy consumption per car-mile	Kilowatt-hours	1.7	1.7
Total energy per day at cars	Kilowatt-hours	1,530	3,060
Total energy per day high-tension side substation	Kilowatt-hours	1,860	3,720
Total substation hours possible (5 substations)			
Kilowatt-hours		90	90
Total substation hours actual running	Hours	30	52
Total time substations are not running	Hours	60	38
Running light losses per substation	Kilowatt	15	15
Energy saved per day, automatic operation	Kilowatt-hours	900	570
Energy saved per year, automatic operation	Kilowatt-hours	328,500	208,000
Total energy per day, manual operation	Kilowatt-hours	2,760	4,290
Value of energy saved per year at 1/2 cent per kilowatt-hour		\$1,642	\$1,040
Energy saved, automatic operation	Per cent	32.5	13.3

Table II is based on the car schedules in the chart and shows the energy savings possible for the assumed conditions. As might be expected the more infrequent car service shows the greater energy saving, but it is on

the railway having just such a service that the power bill is the largest proportion of the total operating expenses. The same is true with regard to the item of substation attendance. For these obvious reasons the interurban running few cars per day has been the first to make extended use of the automatic substation.

W. D. BEARCE.

Regulation of Incandescent Headlights

HOLDEN & WHITE, INC.

CHICAGO, ILL., Sept. 29, 1917.

To the Editors:

We have read with interest the article by J. R. McFarlin, in your issue of Sept. 15, concerning the regulation of incandescent headlights. Some of the statements which Mr. McFarlin makes in this article lead us to answer, calling attention to certain phases of the regulation of incandescent headlights and power lights.

We recognize the correctness of his references to the inherent regulation of Mazda lamps with tungsten filaments, but we feel that the regulation of the headlight by burning it in direct series or in multiple series with the car lights is limited to low-intensity headlights, such as are used in city and suburban service. Moreover, the maximum intensity headlight lamp which can be used satisfactorily is the 94-watt lamp, and the projection offered by this headlight is too limited for high-speed interurban service.

With the demand for increased projection, the use of low-voltage, high-intensity, gas-filled bulbs became necessary. The most acceptable lamp at first was the 32-volt, 150-watt, 4.7-amp. locomotive headlight lamp, and a number of attempts were made to use this lamp in series with several circuits of interior lamps, together with an additional resistance in order to pass the necessary full current to the headlight. This installation was never satisfactory because it was too involved and too expensive. The use of 250-watt, 110-volt lamps was not satisfactory for the same reason, namely, the cost of additional resistance and the limits of regulation.

Mr. McFarlin states that no voltage regulators have come to general use. With this we naturally take exception, because of the extent to which we have installed Watson voltage regulators, completely equipping one railway and making installations on a number of others.

This regulator, as a matter of fact, is the only device which has ever been successful in railway service in adequately regulating the interior lights and headlights so that over an extensive voltage variation there is no perceptible effect on the lights. Mr. McFarlin will admit that the drop in voltage with a Mazda lamp regulation is very perceptible, and his table shows that when the voltage across the headlight is only 50 per cent of normal line voltage, the percentage of headlight candlepower is only 45 per cent when burned in series with resistance, and is 48 per cent when burned in series with Mazda lamps.

With the Watson regulator, when the line voltage is only 52 per cent of normal, the headlight illumination is 100 per cent normal. This, however, is at the limit of the regulator.

But take a case where the line voltage is 70 per cent or normal. Then, according to Mr. McFarlin's chart, the headlight would show 57 per cent normal candle-

power if burned in series with resistance, and 69 per cent, if burned in series with car lights. Under the same trolley voltage condition, the headlight burned with the Watson regulator would be normal and not at all decreased in intensity. At the same time the interior car lights also would be normal in intensity and there would be no reduction of illumination.

Our scheme of regulation permits the use of either a standard 4-amp. arc or an incandescent headlight, using a 37.5-volt, 4-amp. lamp in a Golden Glow, or a Crouse-Hinds reflector headlight, or an 80-volt, 4-amp. lamp in U. S., General Electric, Golden Glow or Crouse-Hinds headlight. The Watson regulator was described in the ELECTRIC RAILWAY JOURNAL for Dec. 16, 1916.

W. MCK. WHITE, Vice-President.

AMERICAN ASSOCIATION NEWS

Conference on Tuesday, October 9,
begins at
9.30 a. m. *sharp*

Chicago Section Meeting

About 120 members and guests attended the regular meeting of the Chicago Elevated Railroads' company section on Sept. 18. J. H. Mallon read excerpts from President Wilson's proclamation of April 15 covering the necessity of conservation of material and labor. General Manager E. C. Noe and G. T. Seely, assistant general manager, delivered short addresses on the need of conservation in all departments during the present national crisis. This thought was reiterated by representatives of the transportation, road, shop, electrical and store departments, who explained briefly the necessity for conservation in their respective fields and pointed out the ways it could be accomplished.

James K. Miller of the legal department then spoke on "What We Are Fighting For." The names of 168 company employees who have enlisted were then read, including ten who are already commissioned. Several vocal and instrumental selections constituted the entertainment for the evening.

Bulletins on Freight Car Loading and the Second Liberty Loan

The eighth of a series of bulletins being sent out by the American Association Committee on National Defense was issued on Sept. 27. It contained the letter of Sept. 14 issued to shippers and receivers of freight by the Commission on Car Service of the Special Committee on National Defense of the American Railway Association. The letter urges the use of the maximum capacity of freight cars in moving commercial freight while the requirements of the government in the present emergency are putting an unusual burden on the freight-handling facilities of the railroads. It points out that it is most unpatriotic of any shipper not to use the full carrying capacity of cars since the failure to do so may prevent other shippers from getting any cars at all during the period of car shortage. Two lists of suggestions are furnished which can be of direct use to both shippers and receivers in an effort to conserve

the railway facilities. Member companies are requested to co-operate in this important movement.

Bulletin No. 9, which was issued on Monday of this week, calls attention to the request of Secretary of the Treasury McAdoo that the association render its assistance in the campaign to give publicity to the forthcoming Liberty Loan. The use of dash signs and space on the interior of cars and doubtless many other means may be found helpful. It is suggested that all electric railway managers get in touch with their local Liberty Loan committees to secure needed information regarding the bonds in order to present their advantages to employees. The details of several partial payment plans on file at the association headquarters will also be furnished on request. The committee hopes to see increased effort along these lines so that the good showing made by the industry in connection with the first loan may be excelled.

Data on One-Man Cars

Supplementary Information Is Given to the Table Published in the Issue of Sept. 22

SUPPLEMENTARY to the table covering structural and operating features of the single-operator car which appeared in the special issue of the ELECTRIC RAILWAY JOURNAL for Sept. 22, pages 541, 542 and 543, the following tables are added in an effort to furnish all the available information on this subject. They include reports which were received too late to be incorporated in the special issue and in the cases of the Tucson Rapid Transit Company and the East St. Louis & Suburban Railway, corrected data which have come to hand. These data, as a whole, are the result of a direct canvass of all the railways reported to have one-man cars in operation or under construction. It may be that there are a few other companies having such information, but the information which has been secured covers a very large percentage of the field.

The present compilation is divided for convenience

EQUIPMENT DATA ON ONE-MAN CARS

Company	Type of Motor	Gear Ratio	Door and Step Control Used, and Hand or Air-Operated	Are Air Brakes Used?	Do Controller and Brake Have Automatic Features?
ARIZONA					
Tucson Rapid Transit Co.	G.E. Auto Type 1063 E.I.-W.I.	1:10	Hand	No	Yes
COLORADO					
Grand River Valley Ry			Step	Yes	Yes
ILLINOIS					
C. Ill. P. S. Co. at Anna	G.E. 800	14:68	None	No	No
C. Ill. P. S. Co. at Taylorville	(1) G.E. 78A (2) G.E. 800B	(1) 14:69 (2) 14:67	None	No	No
Central Illinois Trae. Co	G.E. 800	17:64	Hand	No	No
E. St. Louis & Suburban Ry	G.E. 67	15:69	Hand	Yes	No
KANSAS					
Hutchinson Interurban Ry		14:67 15:68 16:81	Hand	No	No
OKLAHOMA					
Enid City Ry.	G.E. 51	14:67	Hand	No	No
WEST VIRGINIA					
Ohio Valley Electric Ry.	West. 101B2	18:64	Hand	Yes	No
CANADA					
Moncton Tramways, Elec. & Gas Co., Ltd.	C.G.E. 1000	17:67	None	No	No

into general and special data but includes the same items as presented in the previous table. The significance of the data was touched upon briefly in the introduction to the table on page 540 in the issue of two weeks ago.

Figures relating to the interstate bridge between Portland, Ore., and Vancouver, Wash., show that more than one-third of the tolls of the bridge have been paid by the Portland Railway, Light & Power Company. That company paid from Feb. 15, the date of the opening of the bridge, to July 31 the sum of \$25,695 for tolls, as against \$40,512 paid by the general traveling public. Vehicle traffic is steadily increasing, however. For March the vehicle and foot passenger tolls amounted to \$4,472, in April to \$6,218, in May to more than \$7,000, in June to \$9,308, and in July to \$11,426.

TABLE SHOWING GENERAL DATA ON ONE-MAN CARS

Company	Population (1917) of Cities Served	Number of Cars of All Types Owned	Number of One-Man Cars Operated	Length Overall of Present One-Man Cars	Width of Same Over Sheathing	Weight of Same Without Load, Pounds	Single or Double End	Seating Capacity	Are Fare Boxes Used?	Sched. Speed in M.p.h. with One-Man Cars	Normal Headway in Minutes, Using One-Man Cars
ARIZONA											
Tucson Rapid Transit Co.	20,000	9	3	28'6"	7'6"	9,800	Double	28	Yes	7½	12
COLORADO											
Grand River Valley Ry. at Grand Junction	8,500	7	2	30'			Single	40	Yes		20
ILLINOIS											
Central Illinois Public Service Co. at Anna	3,500	3	3	30'	7'8"	22,000	Double		No	9	2 f
Central Illinois Public Service Co. at Taylorville	10,000	3	3	33'	7'8"	22,000	Double		No	10	2 i
Central Illinois Traction Co. at Paris	9,000	7	3	28'-30'	6'2"	18,000	Double		No	9	2 j
East St. Louis & Suburban Ry. at Belleville	25,600	151	5	37'	8'1½"	33,933	Double	32	Yes	7.2	2 j
KANSAS											
Hutchinson Interurban Ry.	23,000	23	9	18'6"-20'			Double	32	Yes	(1) 8-(8) 9	10, 15, 2) and 3)
OKLAHOMA											
Enid City Ry.	15,000	17	5	30'		24,000	Double	42	Yes		
Pittsburg County Ry. at McAlester	(Cars ordered. To be delivered latter part of 1917.)										
WEST VIRGINIA											
Ohio Valley Electric Ry. at Ashland, Ky.	20,000	53	1	39'	8'4½"	33,000	Double	40	No	7	
CANADA											
Moncton Tramways, Electricity & Gas Co., Ltd., at Moncton, N. B.	12,000	5	3	25'	7'1"	16,000	Double	26	Yes	7½	

¹Use two men during rush hours.

²This car is operated in shuttle service on 10-min. running time between termini with a 5-min. layover at each end of line.

EQUIPMENT and MAINTENANCE

HAVE YOU A GOOD WAY
OF DOING A JOB?

—*Pass It Along*

These Articles Have Been Selected to Provoke Thought and Stimulate Discussion. All of the Technical Departments Are Represented

Laying Concrete Track Base Without Storing Materials on Streets

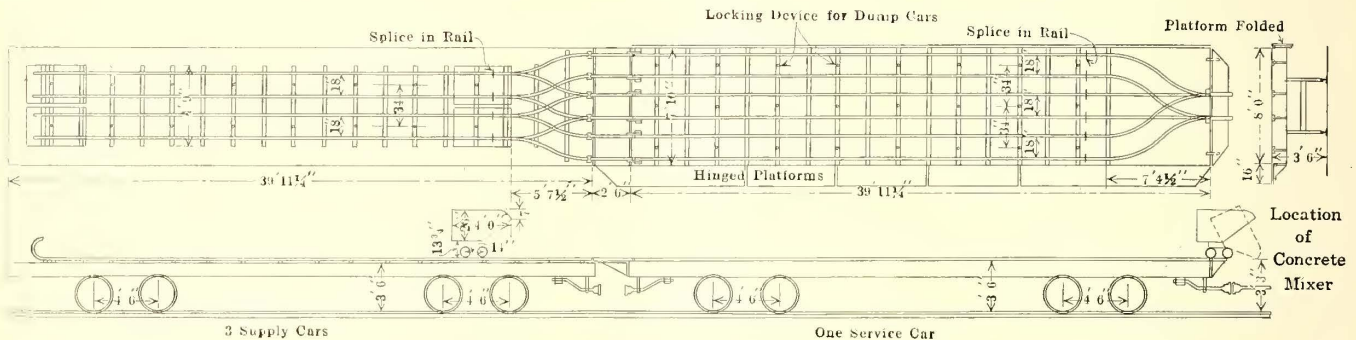
Specially-Equipped Service Cars and Small Ore
Dump Cars Used to Supply Concrete Mixer with
Necessary Materials as Needed

BY EDWARD A. WEST
Chief Engineer, Denver (Col.) Tramway

A scheme for constructing the concrete base for street railway track which eliminates the necessity of storing stone, sand, cement, etc., on the city streets during the work has been devised and placed in successful operation by the Denver Tramway. A number of small ore dump cars are filled at a central material yard with

small ore cars at a time and are used to haul material from the centrally located material storage yard to the concrete mixer. The ore cars are securely locked to the rails by means of a lever at the rear of each car. The cars are thus held rigidly in place so that they may be safely transported through the city streets.

Special bunkers with spouts deliver the material directly into the ore cars, the proper amounts of sand and rock being allowed to run into each car to make up one charge for the concrete mixer. Then with all sixteen ore cars properly filled with these materials, the supply car is pulled up to the cement house close by, where a small hand-operated crane is used to lift a bag of cement and deposit it on top of the sand in each car. When



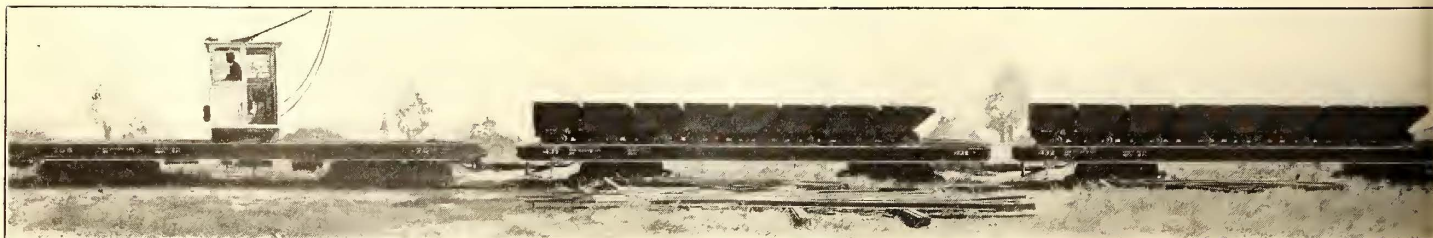
TRACK SYSTEM FOR THE DUMP CARS ON THE SUPPLY AND SERVICE CARS

a charge each for the concrete mixer at the job. These small cars are transported between the storage yard and the job on ordinary service flat cars on which narrow-gage track is laid.

The equipment includes one flat car which is called the service car of the outfit and on which three of the narrow-gage tracks are laid, as shown in the accompanying drawing. This remains with the concrete mixer which is a self-propelled machine. Other service cars, called the supply cars, are each equipped with two narrow-gage tracks which branch into three tracks at one end to connect with the three tracks on the service car. These have sufficient capacity to carry sixteen of the

loaded the car is taken to the job and the sixteen small dump cars are pushed onto the concrete mixer service car, while the empties on the latter are pushed back onto the supply car to be returned to the yard for another load.

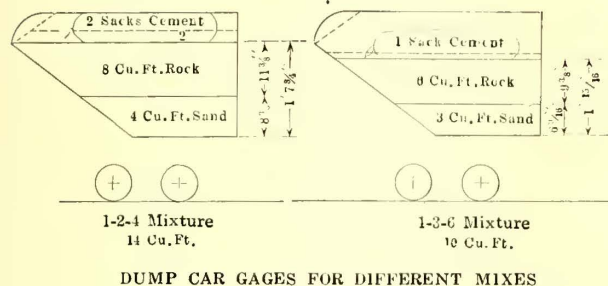
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DENVER TRAMWAY CONCRETING TRAIN. ONE FLAT CAR REMAINS WITH THE MIXER WHILE

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The center-cab car, shown on the left-hand end of the train in the picture, is a new one constructed in our shops for hauling the supply cars between the material bunkers and the service car. The concrete mixer is a self-propelled Municipal Engineering Company Austin No. 13 type and is equipped with a water pump located on the front end to keep the storage tank on the top of the machine filled. A large reserve water tank for



supplying the mixer is hung underneath the service car, but only the bottom edge of it shows in the illustration.

By means of this concreting outfit no material whatever is stored in the streets and no cement is found piled along the sidewalks, and no shelter is necessary to protect it from rain. In transporting the cement the bag is laid on top of the sand and rock in the dump car rather than mixed with it at the material yard, since the sand might be damp and cause a partial setting en route. The empty sacks are sent back to the material yard with the empty dump cars.

Through time studies, it was determined that three of the supply cars would be able to keep the mixer in continuous operation on any job within a radius of 4 miles of the central material yard. This calls for a thirty-minute headway of the supply cars. By the use of eleven men with this outfit it is possible to pour 225 cu. yd. of concrete in eight hours at any point within the 4-mile radius.

Our latest idea in connection with this train is to use it this fall for transferring sugar beets from the standard-gage track on our interurban line to the narrow-gage in the city. If this works out it will give the concreting train a better load factor since it will be used for a much longer period.

Rotting of wood, as is generally known, is caused by vegetable growths which feed upon its substance and so alter its characteristics that we say that the wood has become rotted. Ordinarily these vegetable growths are fungi, but there can be little doubt that the roots of grass and trees also attack wood in a similar manner.

Splice Sleeve vs. Splice Ear

All Factors Considered, the Sleeve Costs 3.06 Times as Much as the Ear

BY S. L. FOSTER

Chief Electrician United Railroads of San Francisco

To the engineer of distribution the joint in the trolley wire is as consumingly interesting as the joint in the rail is to the engineer of maintenance of way, because the joint has usually been the weakest link in the overhead construction chain.

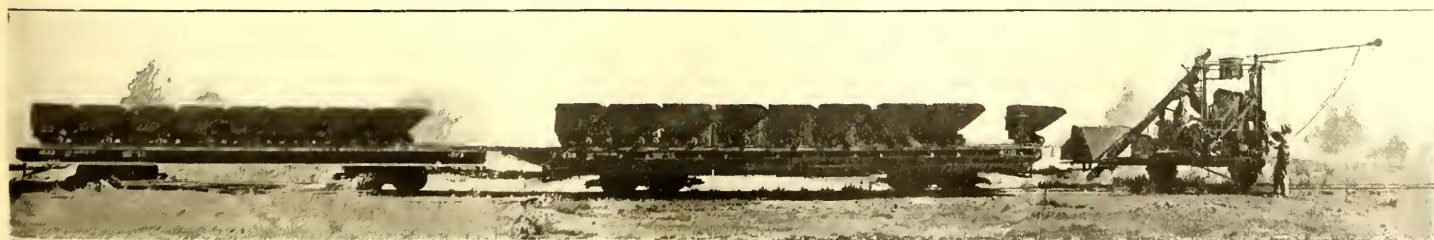
There were two leading types of overhead construction in the earliest days of that industry, namely, the Sprague and the Thomson-Houston. The former used a No. 2 B. & S. silicon bronze trolley wire and splice sleeves with which to connect adjacent lengths of wire. The latter used No. 0 hard-drawn copper and splice ears. The Sprague splice sleeve relied altogether on solder for the tensile strength of the device, whereas the other company's device had, besides the adhesion of the solder, the added strength afforded by bending back the ends of the trolley wire after they were brought up through the holes in the splice ear.

The Sprague soldered sleeve proved a failure, as the adhesion or cohesion of the solder suffered some sort of progressive deterioration due to the action of the soldering flux or possibly to molecular change similar to the well-known tin disease and aluminum disease. The ends of the trolley wires pulled out of these sleeves most unexpectedly, letting them fall to the ground. The sleeve was then improved by bringing the ends of the wire up through holes in the tube and bending them back on the sleeve, thus producing the 1917 type of splice sleeve. This bending back alone without any soldering has been found to withstand a pull of about 70 per cent of the full tensile strength of the No. 00 wire provided that the bent-back section of the wire is held bent back.

QUESTIONABLE ADVANTAGES OF THE SLEEVE

There are to-day advocates for both the sleeve and the ear. The first claim for the sleeve was that it saved waste in construction, as joints could be thus made anywhere in the span, whereas if the connection between lengths of trolley wire was made with a splice ear it had to be made at the span wire, and a short piece of trolley was always cut off. It was also claimed that there was danger of the splice ear turning over on its side and knocking the passing trolley wheel off the wire if the splice ear was located out in the span. That saving of trolley wire ends, however, has not proved to be much of an item.

On the other hand the splice sleeve was thought to make the overhead "softer," reducing the hammer blow from the trolley wheel and increasing the life of the



THE OTHER THREE BRING UP THE LOADED DUMP CARS AND TAKE AWAY THE EMPTIES

EQUIPMENT and MAINTENANCE

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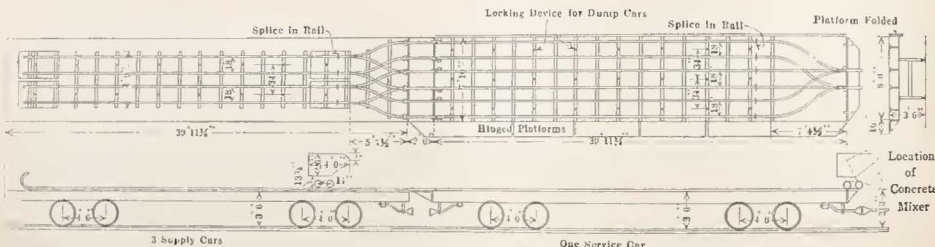
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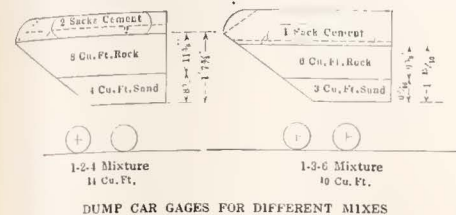
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joint. That may have been true of the earlier types furnished, but does not hold good to-day.

SPLICE EAR REQUIRES NO SOLDER

The splice in the trolley has been studied in the effort to eliminate the necessity for soldering, and after trying in a Riehlé testing machine all the devices on the market and many invented by the company's engineers—fourteen different designs in all—it was found that a light, properly designed splice ear holding the wire by a set screw answered the purpose best of all. The tensile strength was ample, the resistance less than that of an equal length of wire. The devices in which toothed designs were used to grip and hold the wire were found either not to hold worn and full-sized wire equally reliably or to be very deficient in tensile strength and to yield more or less under strain and admit slack into the span. The sleeves using set screws had the disadvantage that either the set screws were left projecting, and were thus liable to offer an obstruction to the passing wheels when the sleeve turned over or sidewise, or when the set screws were screwed up till the heads broke off the sleeve was no good for repeated use in case it was necessary to cut it down before being worn out.

The sleeve designed for use with solder could be employed without solder. Ample tensile strength could be secured by bending the ends of the wires over after bringing them out of the central holes in the sleeve and holding them in that position. The upturned ends of the wire could be riveted over ferrules or washers. A $\frac{3}{8}$ -in. hexagon steel nut could be screwed onto a full-sized No. 00 trolley wire and, cutting its own thread in the copper, or the bent-down trolley end could be held firmly against the sleeve by a light brass cap screwed to the tube, or the bent-down end could be given a chisel edge and reinserted in the tube, etc. All these sleeve ideas worked well in the case of full-sized wire, but not well at all on worn wire. None of them acted well when the sleeve turned over and none of them could be as quickly installed as the set-screwed splice ear. They were all very deficient in conductivity.

RELATIVE COSTS

The splice ear now used costs about 1.44 times as much as a splice sleeve and lasts twice as long according to some foremen, and three times as long according to others. At twice the life the ear costs but 72 per cent as much as the sleeve per unit of time.

To put in a sleeve calls for special tools and expert manipulation to get the two ends of the trolley inserted in the tube and brought out at the central holes. Then emery cloth, soldering flux and hot solder must be provided, calling for a forge and charcoal fire or gasoline furnace, and the solder must be carefully sweated through the tubular splicing device. Then the sleeve must be allowed to cool off slowly. It is less conveniently done in wet weather. The ropes often are injured by the hot solder pots and spilled acid.

To install a splice ear calls for no special tools nor expert work. The wires are readily put through the short vertical holes in the ear, and they are held by the set screws on either full-sized or worn wire. Weather has little effect on the speed in this case, and the work can be abandoned before completion and finished later or on some other day, whereas the installation of the

soldered sleeve must be completed in one continuous operation while the sleeve and the solder are hot.

On actual surprise tests on a pleasant day it took a tower wagon crew twenty minutes and cost 71 cents for labor and material to put in a splice sleeve and two and a half minutes and 8 cents for labor to install a splice ear, or eight times as long and nine times as costly for the former as for the latter. The eight times longer required for the sleeve installation means more interruption to the car schedules and possible loss of revenue. If the sleeve costs nine times as much to install and lasts only half as long it is only one-eighteenth as desirable as the splice ear if the two devices cost the same. The sleeve costs 3.06 times as much as the ear for the purpose, considering cost to install, net cost and life of the device.

OTHER ADVANTAGES OF SPLICE EAR

When a splice ear is dangerously worn but the trolley wires are not, the wires can be removed from the old splice ear and inserted in a new one. This cannot be done economically in the case of the soldered sleeve. The sleeve has to be cut out, and as the trolley wire has thereby been shortened 17 in., two splice sleeves and a short piece of trolley wire must be used to close up this long gap.

In installing the splice sleeve it is subject to considerable strain in "picking up" or prying up the ends of the trolley wires to bring them out of the central openings in the tube. As there is only a small factor of safety in the splice sleeve originally, it often gets bent slightly in this operation and is rather summarily straightened out at the end of the job with a hammer. The result of this treatment and the bath of hot solder is that the brass of the sleeve loses its original tensile strength, and unforeseen breakages of perfectly new splice sleeves used on Phono-Electric wire have occurred at these central openings where the cross-section of the sleeves is least.

In installing the set-screw splice ear it is subject to no strain nor to any bath of hot solder. The factor of safety of the ear is originally much higher than that of the sleeve. We never have a new splice ear break either in service or under test.

When the splice sleeve was the standard the numerous line crews always kept a fire going in their forges for rapidly heating the solder. This feature meant quite a large quantity of charcoal per day for the system, not to mention the solder oxidized by the heat and thrown out as dross, the time of the men attending the fire, the wear and tear on the forges and the fire hazard to the wagons and cars. Since the adoption of the splice ear as standard no more fires are maintained on tower wagons or cars, with the resulting savings in fuel, time, solder and forge repairs.

When a splice sleeve is installed the hard-drawn copper wire and the brass sleeve are more or less softened by their exposure to the bath of hot solder. That exposure tends to shorten their life. With the set-screw unsoldered splice ear neither the wire nor the ear is exposed to any such heat and they both retain their original tensile strength, thus partially explaining the longer life of the splice ear.

The set-screw unsoldered splicer is considered so much more preferable to the soldered sleeve that it is used in San Francisco out in the span to repair wires

burned off by foreign contacts, breaks at defective brazes, etc. No splice sleeves at all are used.

The splice ear has 42 per cent more conductivity when installed, is stronger originally, is simple, fool-proof and reliable, while the sleeve is far more costly to install, calls for expert handling, special tools, a fire and a pot of hot solder, is unreliable and causes longer delays to the revenue traffic than the splice ear, either when being installed or being removed.

METHOD OF TESTING SPLICE EAR

A simple method of deciding on what is the most satisfactory splice ear is to secure a few specimens of each type on the market, and, after providing each end of one of each type with short pieces of trolley wire installed as in overhead practice, test these samples one after the other for elongation, tensile strength, etc., both when splicing full-sized trolley wire and worn wire. For this purpose a Riehle testing machine or similar appliance could be used.

Much of value can be learned by careful observation of the performance of the splicers, as the strain is gradually applied in this test. Specimens of each remaining type not eliminated as unsatisfactory by the tensile strength test should then be installed in series a few feet apart on a working trolley wire on a line of heavy service. After several months' wear the length of trolley containing these test samples should be cut out in one piece and brought to the office for inspection, comparison, dissection, etc. The linemen's judgment should not be accepted as final in the matter, although much can be learned from listening to their views.

The New York, New Haven & Hartford Railroad has ordered five new electric locomotives. These will weigh approximately 180 tons each and will have 50 per cent greater capacity than any electric locomotive now in use on this railroad. In addition to being used on the electrified section between New York and New Haven these locomotives will also be used for service into the Pennsylvania station, New York, over the New York Connecting Railway and the new Hell Gate Bridge. The locomotives will operate safely at a speed of 70 m.p.h.

Special Work Economics

BY M. BERNARD

Assistant Engineer Way and Structures Department, Brooklyn (N. Y.) Rapid Transit System

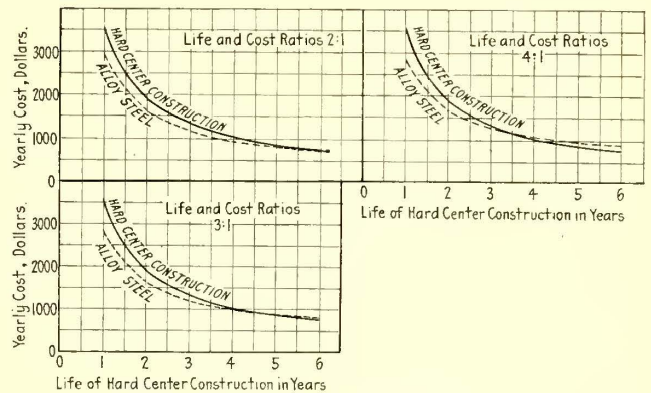
It has frequently been stated that the use of solid alloy steel special work instead of the ordinary hard-center construction is justified wherever the following ratio exists:

$$\frac{\text{Life of solid alloy steel}}{\text{Life of H.C. construction}} = \frac{\text{Cost of solid alloy steel}}{\text{Cost of H.C. construction}}$$

The reason given for this is that the solid alloy steel construction requires less renewal expense.

However, no consideration seems to have been given to the interest charges on the money invested. On account of such charges there is a possibility of the interest on the investment required with the solid alloy steel construction offsetting the expense caused by the more frequent renewals of the cheaper type of construction.

This is shown by the accompanying table, which has been computed on the assumption that the lives of the two types of construction were in direct proportion to their costs. The hard-center construction is arbitrarily assumed to have an initial cost of \$2,000; therefore, when the cost ratio is 2 to 1 the solid alloy steel con-



CURVES MADE UP FROM TABLE SHOWING THE RELATION BETWEEN YEARLY COSTS OF SOLID ALLOY STEEL AND HARD-CENTER CONSTRUCTION WHEN THE INITIAL COSTS OF THE TWO TYPES VARY DIRECTLY IN PROPORTION TO THEIR LIFE

TABLE SHOWING THE RELATION BETWEEN YEARLY COST OF SOLID ALLOY STEEL AND HARD-CENTER CONSTRUCTION WHEN THE INITIAL COSTS OF THE TWO TYPES VARY DIRECTLY IN PROPORTION TO THEIR LIFE

TABLE I—COST OF SOLID ALLOY STEEL: COST OF H. C. CONSTRUCTION=LIFE OF SOLID ALLOY STEEL: LIFE OF H. C. CONSTRUCTION=2:1

	Solid Alloy Steel		Hard Center		Solid Alloy Steel		Hard Center		Solid Alloy Steel		Hard Center	
	Two Years	One Year	Four Years	Two Years	Six Years	Three Years	Eight Years	Four Years	Ten Years	Five Years	Twelve Years	Six Years
Initial cost of special work	\$4,000	\$2,000	\$4,000	\$2,000	\$4,000	\$2,000	\$4,000	\$2,000	\$4,000	\$2,000	\$4,000	\$2,000
Other material and labor	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400
Total cost	5,400	3,400	5,400	3,400	5,400	3,400	5,400	3,400	5,400	3,400	5,400	3,400
Interest at 5 per cent	540	170	1,080	340	1,620	510	2,160	680	2,700	850	3,240	1,020
Grand total	5,940	3,570	6,480	3,740	7,020	3,910	7,560	4,080	8,100	4,250	8,640	4,420
Yearly cost	2,970	3,570	1,620	1,870	1,170	1,303	945	1,020	810	850	720	737

TABLE II—COST OF SOLID ALLOY STEEL: COST OF H. C. CONSTRUCTION=LIFE OF SOLID ALLOY STEEL: LIFE OF H. C. CONSTRUCTION=3:1

	Solid Alloy Steel		Hard Center		Solid Alloy Steel		Hard Center		Solid Alloy Steel		Hard Center	
	Three Years	Two Years	Four Years	Two Years	Six Years	Three Years	Eight Years	Four Years	Ten Years	Five Years	Twelve Years	Six Years
Initial cost of special work	\$6,000	\$2,000	\$6,000	\$2,000	\$6,000	\$2,000	\$6,000	\$2,000	\$6,000	\$2,000	\$6,000	\$2,000
Other material and labor	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400
Total cost	7,400	3,400	7,400	3,400	7,400	3,400	7,400	3,400	7,400	3,400	7,400	3,400
Interest at 5 per cent	1,110	170	2,220	340	3,330	510	4,440	680	5,550	850	6,660	1,020
Grand total	8,510	3,570	9,620	3,740	10,730	3,910	11,840	4,080	12,950	4,250	14,060	4,420
Yearly cost	2,836	3,570	1,603	1,870	1,192	1,303	987	1,020	863	850	781	737

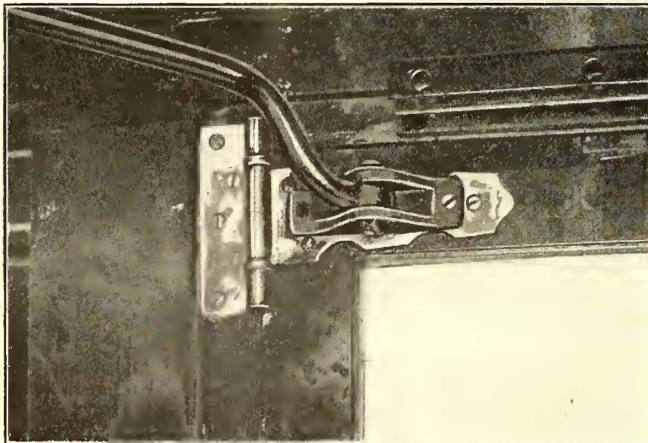
TABLE III—COST OF SOLID ALLOY STEEL: COST OF H. C. CONSTRUCTION=LIFE OF SOLID ALLOY STEEL: LIFE OF H. C. CONSTRUCTION=4:1

	Solid Alloy Steel		Hard Center		Solid Alloy Steel		Hard Center		Solid Alloy Steel		Hard Center	
	Four Years	Two Years	Four Years	Two Years	Six Years	Three Years	Eight Years	Four Years	Ten Years	Five Years	Twelve Years	Six Years
Initial cost of special work	\$8,000	\$2,000	\$8,000	\$2,000	\$8,000	\$2,000	\$8,000	\$2,000	\$8,000	\$2,000	\$8,000	\$2,000
Other material and labor	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400
Total cost	9,400	3,400	9,400	3,400	9,400	3,400	9,400	3,400	9,400	3,400	9,400	3,400
Interest at 5 per cent	1,880	170	3,760	340	5,640	510	7,520	680	9,400	850	11,280	1,020
Grand total	11,280	3,570	13,160	3,740	15,040	3,910	16,920	4,080	18,800	4,250	20,680	4,420
Yearly cost	2,820	3,570	1,645	1,870	1,253	1,303	1,058	1,020	940	850	862	737

struction will cost \$4,000 and will last twice as long. The average life of special work on our system is about six and one-half years and hard-center construction is the standard construction used. From a study of the yearly cost curves plotted from the values given in the table, it will be seen that, with this average life, the hard-center construction is the more economical. The curves also show that the higher the ratio of costs, the shorter the life of the hard-center special work can be without costing more than the solid alloy steel. Another point to be considered is that when using long-lived special work at heavy traffic location, there is the possibility of not obtaining the benefit of improvements in design. Hence the condition may occur where the heavy traffic location has special work which is obsolete in the light of later improvements.

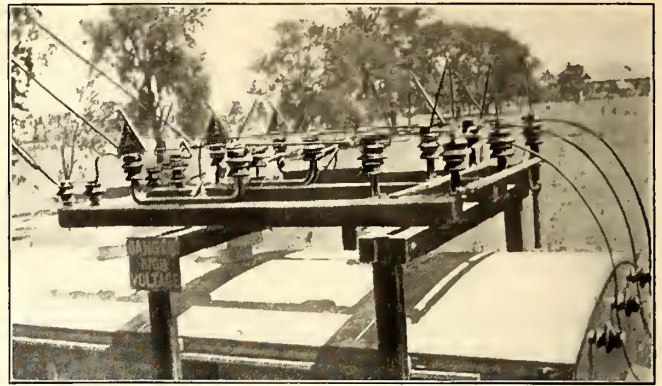
Case-Hardened Pins Used on Worcester Car Door Fixtures

On March 16, 1917, the Worcester (Mass.) Consolidated Street Railway made what is probably the first installation of Boyerized (case-hardened) pins and bushings on the door fixtures of a car. The accompanying cut shows the exterior of a door casting and hinge, with operating rod running toward conductor's stand at the left. The operating rod is $\frac{1}{2}$ -in. extra-heavy wrought-iron pipe with a cold-rolled steel eye



VIEW SHOWING CASE-HARDENED PIN INSTALLED ON WORCESTER CAR

driven into the pipe at the right-hand end. A Boyerized pin with a shank $\frac{3}{8}$ in. in diameter and $1\frac{7}{8}$ in. long and with a head $\frac{1}{4}$ in. thick and $\frac{3}{4}$ in. in diameter receives a driving fit into the door bracket casting, and a Boyerized bushing of $\frac{3}{8}$ -in. inside diameter and $\frac{5}{8}$ -in. outside diameter and $\frac{13}{16}$ in. long surrounds the pin, the pin and bushing forming a running fit. The bushing is carried in the steel eye at the end of the rod. All the wear is on the bushing and pin. Up to the present time the wear has been negligible, compared with a life of less than three months in the case of the ordinary cold-rolled steel pin without a bushing. This combination also is noiseless. A $\frac{1}{8}$ -in. cotter keyhole is provided near the bottom of the pin to prevent turning against a boss on the under side of the bracket casting. Twenty-six cars on this road have now been equipped in the above way, and it is planned to equip a total of eighty-two.



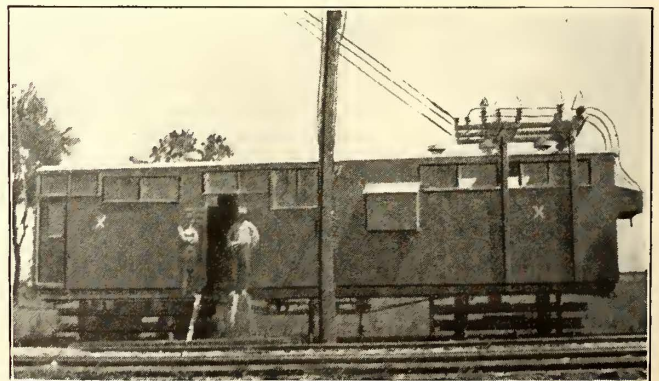
ROOF OF TEMPORARY SUBSTATION SHOWING INCOMING FEEDERS AND HORN-GAP LIGHTNING ARRESTERS

Army Camp Gets Emergency Service Louisville Railway Makes Temporary Substation to Serve Camp Zachary Taylor

A portable substation has been placed by the Louisville Railway near Camp Zachary Taylor, the federal army cantonment near Louisville, which the company is serving. The camp is located 2 miles from the city limits on an interurban line and the only new track construction consisted in converting the 2 miles of single-track work into double-track construction, and the building of about 4000 ft. of new double track, most of it on government property. This new trackage lies about equidistant between one of the power plants of the railway and a permanent substation, and it was found that a portable substation would be more economical than permanent construction, particularly in view of the uncertainty as to how long the camp might be in use.

The company already had a three-phase, 13,200-volt transmission line paralleling the existing interurban line passing the cantonment site, so it was not necessary to construct a transmission line. Frank H. Miller, superintendent of motive power, accordingly determined on the substation, fixed the location and prepared the plans which were carried out by the shop department.

A regulation flat car was built in the shops and then taken to one of the city substations, where a 500-kw. rotary with the necessary auxiliary apparatus was borrowed and loaded on the car. The next stop was the company's shops where the wiring was installed and the apparatus housed by the construction of tempo-



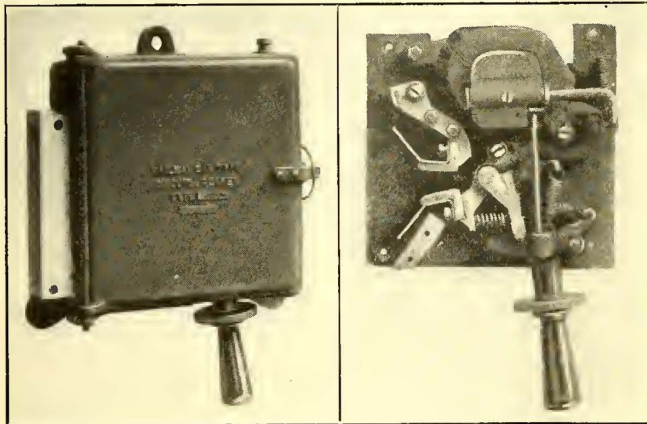
LOUISVILLE RAILWAY'S TEMPORARY SUBSTATION FOR CAMP ZACHARY TAYLOR. BLOCK PIERS WERE USED WHILE CONCRETE FOUNDATIONS WERE BEING BUILT

rary sides and roof, giving the appearance of a box car. It was then moved to a temporary siding built for the purpose at about the center of the new load. Here the trucks were removed, and concrete piers were constructed under the car to prevent excessive vibration. The illustrations show a general view of the substation and a near view of the roof on which the incoming feeders are protected by Burke horn-gap lightning arresters.

Circuit Breakers for Cars Having Small Motor Equipment

To meet the demand for a light-weight circuit breaker for use with one-man cars and other railway equipment employing small motors, the Westinghouse Electric & Manufacturing Company has developed the breaker shown in the illustration. The construction of this breaker is such that the complete working elements can be removed from the inclosing box by removing the calibrating button and the four screws which secure the elements to the box. It is, therefore, not necessary to remove the box from the car. The arc chute is composed of asbestos lumber and molded arcing blocks and it is also easily removed from the outside of the breaker by releasing a sliding catch.

This type of circuit breaker has a continuous rating based on the capacity of the blowout coil used—the smaller the capacity the greater the number of turns in the coil and vice versa. It is, therefore, recommended that in using this breaker, one having as small a continuous rating as possible should be selected, as this



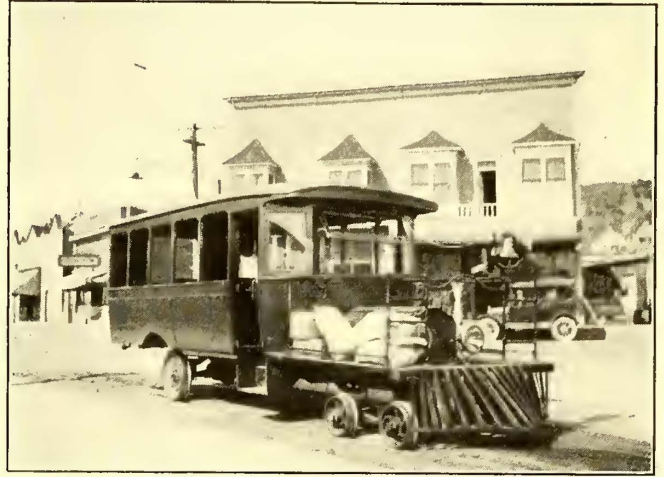
EXTERNAL AND INTERNAL VIEWS OF CIRCUIT BREAKER FOR LIGHT-WEIGHT CARS

breaker will have the maximum blowout effect. Of course, no hand-operated platform breaker can safely be relied upon to open dead grounds. The magnitude of the current which will flow in the event of such a short-circuit is dependent upon the generator capacity, feeder resistance, the speed and setting of the station breakers, etc. However, this circuit breaker is built to operate satisfactorily under average conditions.

An analysis of nearly 6000 accidents occurring to employees of public utility companies located in several states shows that a larger per cent of accidents occurred to linemen than to those in any of the other classes of work.

Combination Express and Passenger Car Made from Auto Truck

Starting with a White automobile truck the Cowlitz, Chehalis & Cascade Railway, operating between Chehalis and Onalaska, Wash., has constructed and is using daily the combination freight and express car shown



AUTOMOBILE TRUCK CONVERTED INTO COMBINATION FREIGHT AND PASSENGER CAR

in the illustration. The car has a passenger body seating twenty-one persons and an express platform. It is equipped with flanged wheels for operation on standard-gage track.

During the month of June, 1917, the car covered 4560 miles and hauled 3620 passengers. On five days of the week the average mileage is 150, but on Saturdays and Sundays the car makes 210 miles. The operating expenses during June were 7.5 cents per mile, this figure covering gasoline, oil, repairs, maintenance, overhead percentage, etc., but it does not include depreciation or interest on investment.

First Ten of 200 Safety Cars With Ball Bearings Go to Tacoma

In the review of equipment for light-weight safety cars, published in the "More Service at Less Cost" issue of Sept. 22, reference should have been made to the important part which the ball bearings of the Gurney Ball Bearing Company, Jamestown, N. Y., is playing in this development, as evidenced by their application to 200 of these cars. Of this number, 141 are going on Stone & Webster properties. Rapid progress is being made in the equipping of the cars, ten of which have recently gone to Tacoma from the American Car Company.

The bearings for the main journals are of the Gurney Radio-Thrust type. The peculiar feature of these bearings is their ability to carry both radial and thrust loads. This enables them to carry easily the heavy thrust loads due to rounding sharp curves. In the GE-258 motors for these cars, bearings of the plain radial type were used. These were also furnished by the Gurney Ball Bearing Company.

The application of ball bearings to both motors and journals of such a large number of new cars marks a decided advance in the application of anti-friction bearings in railway service.

London Letter

Edinburgh to Increase Fares—London Underground Fares Up 25 Per Cent—Report on Traffic Congestion in Manchester

(From Our Regular Correspondent)

The Edinburgh & District Tramways, the Edinburgh Corporation lessee, has decided to raise its fares. The 1½d. and 2½d. fares will now be 2d. and 3d. respectively. Further increases and alterations will follow at an early date. The company says it has been compelled to take this step in view of the refusal of the corporation to reduce the rent. It points out that the dividends paid over a period of twenty-three and a half years average 7.63 per cent. The total sum paid in dividends represents £165,875, whereas the corporation received for rent and owners' rates, taxes and insurance to June 30 last £1,818,281. Other causes of the present advance are the enormous increase in the cost of materials, increased wages, and the depletion of the car service. The company states that it may be compelled to withdraw some of its concessions, which include reduced fares to soldiers, school children, etc., and season tickets to the public and to members of the corporation and public officials. Since the outbreak of war the company has paid £16,000 in war allowances to dependents of former employees. The recent increase in wages represents £12,000 a year. This is in addition to other increases since 1914. Costs of materials are likely to increase still further. Just one item—cable—has shown an increase of 73 per cent since 1914. It is estimated that the increase in expenditure for the year ended June 30, 1918, will be £75,000, as compared with 1913.

Announcing an increase in Underground railway fares, the London Electric Railway states that when in January the steam railroads increased all their fares by 50 per cent the railways in the central London area still retained their original fares. This caused many anomalies, but it was felt that an all-round increase of 50 per cent would be unreasonable, having regard to the largely business character of the traffic. The question of adjustment in the fares has, however, now been considered on a basis which would cause the least hardship, and certain local and through fares have been revised. The revisions will affect the District, Metropolitan, London Electric, Central London, and City & South London Railways, and the Great Northern & City and East London lines. No revision, however, will take place where the present 50 per cent increase is already effective. It is stated that generally the increase will be an average under 25 per cent of the present fares. The London General Omnibus Company has already increased the fares on a number of its bus routes. This has given rise to many complaints, and it is hoped that, after a trial, certain modifications will be introduced.

An inquiry, begun nearly six years ago, into the best means of relieving traffic congestion in the streets of Manchester has been brought to a close by the presentation of the report of the traffic congestion special committee. Separate investigations and reports had previously been made by the tramways, the watch and the improvement committees. The tramways committee sent a deputation to study American and Continental methods of dealing with urban street traffic, and the watch committee, following the same method of study, also dispatched representatives to Continental cities. In course of time these committees presented reports, and the traffic congestion special committee was then appointed to consider the independent findings and make final recommendations to the City Council. The tramway committee in its report pointed to the rapid growth of the population served by the Manchester and Salford tramway systems, and the special committee insisted upon the need for new trunk routes and additional tramway terminals, and indorsed the watch committee's suggestion that Parliamentary powers should be obtained to enable the police more effectively to regulate street traffic. As regards the site of the old infirmary in Piccadilly, the special committee suggested that it was the duty of the royal infirmary old site special committee to prepare a complete scheme for dealing with this site.

The committee which is considering the interconnection

of the Lancashire & Cheshire electricity supply systems has issued a further report which states that the committee has come to the conclusion that the interconnection of the several supply undertakings is but the first step to be taken in the reorganization of the existing interests with a view to securing an adequate, cheap and reliable supply of electrical energy for industrial and all other purposes. The opinion is expressed, however, that the practice of making profits for the purpose of handing over substantial grants in aid of local rates is detrimental to the interests of an adequate and economical supply of electricity, particularly for industrial purposes. On the other hand, the committee would lay stress on the necessity of making adequate provision for depreciation and obsolescence.

Not the least interesting among the innovations which the scarcity of petrol has produced is the arrival of the coal-gas-driven passenger-carrying charabanc. A trip in one of these new vehicles is now a regular feature of holiday life at Eastbourne. Not only do visitors take pleasure rides in the novel cars while they are at the seaside, but they also make the initial journey from London to the South Coast in them, thus avoiding the discomforts of overcrowded railway trains. In South London a charabanc with a large gas bag on its roof arriving full of passengers and taking up a new and similar load is a familiar sight. The claim is made that while the 124 miles round trip between Eastbourne and London performed on petrol at its present price would be £2 14s., the cost on coal gas is under £1. There are now nine of these vehicles in use, and between them they carry 400 people a day and travel some 2500 miles a week.

In presenting the accounts for the year ended March 31 last at a recent meeting of the tramways committee of the Newcastle Corporation, the chairman said it was satisfactory to note, in view of the heavy expenditure which will be required in the future, that there was now practically £106,000 in the reserve and renewal fund. The cost of renewals for some years to come would be considerably heavier than in pre-war times, and it would be advisable to appropriate the whole of the year's surplus to that purpose. He added that it was difficult to forecast what would be the result of tramway working in the future. The working costs on tramway systems all over the country had advanced considerably and the problem of fares would for years be a matter requiring special consideration. Many towns had already increased their ordinary fares to meet the abnormal increase in working expenses. Every endeavor would be made to carry on the Newcastle undertaking without having recourse to increasing the fares, and it was to be hoped that the traffic returns would be such as to avoid the undesirability of having to make any alteration to the existing fares and stages.

The Lancashire and Cheshire tramway workers are seeking to obtain an advance of 7s. 6d. a week, in addition to 2s. 6d. received a short time ago, as the result of an award made by the committee on production. The Amalgamated Association of Tramway Workers has informed the Federation of Tramway Authorities that it is its intention to take up the matter of bonuses separately with each tramway instead of through the Federation. The Federation has replied that it will consent only to joint action. As a result the tramway workers concerned have given twenty-one days' notice to each of the nineteen authorities to grant their application or refer it to arbitration.

Since the beginning of the current financial year the receipts of the Leeds city tramways have shown an increase of more than £1,000 a week, as compared with a year ago. In the last financial year the income, for the first time in the history of the undertaking, exceeded £500,000. It is highly probable that this record will be passed before March 31. The main causes of the greater use of the tramways may be looked for in the restriction of train services, the higher cost of that means of traveling and the development of munition works. Many people have spent holidays at home, getting a change of scene by visiting country places served by the trams. New early morning services have been introduced to enable thousands of munition workers to catch the special trains which run to factories in the district. Apart from this, however, the ordinary traffic returns are steadily rising.

A. C. S.

News of Electric Railways

Traffic and Transportation

Financial and Corporate

Personal Mention

Construction News

Dallas Franchises Accepted

Messrs. Strickland and Hobson, After Long Negotiations, Take Over Dallas Railway and Lighting Properties Under New Grants

The service-at-cost franchises for electric railway and lighting privileges in the city of Dallas, Tex., were accepted by J. F. Strickland and C. W. Hobson on Sept. 27. The acceptance came after extended negotiations. At one time it appeared that the franchises would likely be rejected, but the City Commission made certain concessions in the form of extensions of time within which certain contract features of the franchises calling for extensions and new interurban lines are to be complied with. Mr. Hobson pleaded that the war situation and the fact that the mills were at work on war orders made it impossible to get steel with which to construct certain of the new lines. He was willing that the provision for an expenditure of \$1,000,000 within eighteen months in betterments to the city system should stand, and that the provision for two additional interurban lines into Dallas, each to be at least 30 miles in length, should be included in the grant, but he requested more time in which to build these lines. The commission was impressed with the soundness of these claims.

NEW COMPANIES INCORPORATED

Charters for the two new companies that have taken over the lighting and traction properties have already been filed in the office of the Secretary of State at Austin, and the formal transfer of the properties was made at midnight on Sept. 29. The traction company, to be headed by Mr. Hobson, is chartered as the Dallas Railway Company. It is capitalized at \$100,000. The incorporators are Charles W. Hobson, James C. Duke and Herbert M. Hughes. The principal stockholder is Harry M. Durning, New York. It is explained that Mr. Durning is merely an intermediary between the Hobson and Strickland interests and the securities company that is financing the reorganization of the Dallas properties. The lighting company is incorporated as the Dallas Power & Light Company. It is capitalized at \$150,000. The incorporators are J. F. Strickland, W. B. Head and C. E. Calder. Harry M. Durning, New York, is also named as principal stockholder of this corporation. Officers of the Dallas Railway Company have been announced as follows: C. W. Hobson, president; H. M. Hughes, vice-president; Henry Lange, Jr., secretary-treasurer. The members of the board of directors are: J. C. Duke, H. A. Olmsted, W. A. Green, W. R. Ellis, John H. McDonald, Judge M. L. Morris, J. K. Hexter, H. M. Hughes, H. E. Hobson, and C. W. Hobson.

In filing his acceptance of the franchise, Mr. Hobson did so with the written understanding that he is to carry out immediately one of the three demands of the franchise—to spend \$1,000,000 in altering, reconstructing, rearranging and improving the street railway properties and in making additions and betterments. The other two provisions—the building of two interurban lines, the first within six months after operations under the new franchise are begun and the second within six months from the time the gross earnings from the traction properties east of the Trinity River, or within the city of Dallas proper, or the gross earnings per mile of those properties, reach certain sums stipulated in the franchise—Mr. Hobson deemed impossible to accept because of the war, or “other causes which could not be reasonably anticipated” when the franchises were framed. He declined to accept unless the city agreed that the delay was covered by the clause in the franchises reading “unless prevented by war, strikes, riots, acts of God, casualty or other causes which could not reasonably have been anticipated.”

ORDINANCE REPASSED

Prior to the acceptance of the grants the City Commission repassed the ordinance confirming and re-enacting the ordinance granting a franchise to the Northern Texas Traction Company, passed on Jan. 8, 1917, which is the execution of a lease of its property in Oak Cliff by the Northern Texas Traction Company (a Stone & Webster property) to the Dallas Railway Company, and the execution of an interurban operating contract with the Dallas Railway Company under the direction of the city. The re-enactment of this ordinance was required by Stone & Webster. A second ordinance giving the city the right to grant leases over all lines in Dallas was also passed as an emergency.

A statement was also filed showing that charter proceedings have been had that form the Dallas Railway Company out of the Dallas Consolidated Electric Street Railway, Metropolitan Street Railway, Rapid Transit Company and the Dallas Interurban Terminal Association.

OFFICIAL STATEMENT BY MESSRS. HOBSON AND STRICKLAND

Relative to acceptance of the lighting and traction franchises, Messrs. Hobson and Strickland gave out the following statement:

“The filing of the acceptance of the railway and lighting franchises, we trust, is the final act in the solution of street railway and lighting problems of the city of Dallas. We realized, at the time the Mayor, in April, 1916, suggested that we organize local companies to take over these properties and operate them under the ‘service-at-cost plan’ of franchises, that the undertaking was a very large one, but we consented to try to bring about an equitable solution to all concerned, and from that day to this we have been busy to that end.

“A few days after the election last April at which the franchises were ratified by the people of Dallas, thereby making it possible for us to take over the properties, the United States entered the war against Germany. This declaration of war greatly upset the entire financial status of the nation, thus making it exceedingly difficult to raise the large sums of money called for in the franchises. The obstacles and delays have been numerous, but one by one we have surmounted them, and our acceptance of the franchises means that we are prepared to carry out every commitment in them.”

NEW CONDITIONS AFFECTING INTERURBAN CONSTRUCTION

The new agreement with reference to the building of the interurbans is as follows:

“To build an interurban not less than 30 miles in length, from some outside point into Dallas, work to be begun within six months from the time of operation under the ordinance passed, the interurban to be put in service within eighteen months from that date, unless prevented by war, strikes, riots, acts of God or casualty or other cause which could not have been reasonably anticipated, the city to receive \$200,000 as liquidated damages if this agreement is not carried out.

“To begin an interurban not less than 30 miles in length from some outside point into Dallas, work to begin within six months from the time when the gross earnings of the lines east of the Trinity River exclusive of the interurbans shall bear the same proportion to the then property value as the gross earnings for the calendar year of 1913, the city to receive \$350,000 as liquidated damages for failure to comply with the agreement.”

This agreement also is required:

“To expend the sum of \$1,000,000 in altering, reconstructing, rearranging and improving the properties originally put in operation by the new company, the city to receive \$200,000

as liquidated damages for failure to comply with the agreement."

Concurrently with the final passage of the ordinance granting an electric light and power franchise, J. F. Strickland in writing agrees to expend the sum of \$2,000,000 in altering, reconstructing and rearranging and improving the distributing system, power plants and properties and in making additions and extensions, and the city shall receive \$250,000 damages for failure to comply with the agreement.

The appointment of a supervisor by the Mayor and Commission is made mandatory "on or before" the date upon which Messrs. Strickland and Hobson shall commence to operate under the new franchises. The duties of the supervisor are broad. The City Commission may at any time remove him and if found dishonest the board must remove him from his duties.

PROVISIONS REGARDING FARES

The rates of fares on the electric railways which become effective as soon as the franchises become operative are on a graduated scale and are as follows:

"Sec. 21. The maximum rate of fare for a single continuous ride within the present limits of the city of Dallas, in one direction, over any route of said company, shall be 5 cents cash fare, universal free transfer, and including said maximum rate the following schedule or scale of fares is hereby established:

- "(a) Five-cent cash fare; universal free transfer.
- "(b) Five-cent cash fare, six tickets for 25 cents; universal free transfer.
- "(c) Four-cent cash fare, 1-cent transfer, no rebate.
- "(d) Four-cent cash fare, 1-cent transfer, 1-cent rebate.
- "(e) Three-cent cash fare, 1-cent transfer, no rebate.
- "(f) Three-cent cash fare, 1-cent transfer, 1-cent rebate.
- "(g) Three-cent cash fare, 2 tickets for 5 cents, 1 transfer, no rebate.
- "(h) Three-cent cash fare, 2 tickets for 5 cents, 1-cent transfer, 1-cent rebate.
- "(i) Two-cent cash fare, 1-cent transfer, no rebate.
- "(j) Two-cent cash fare, 1-cent transfer, 1-cent rebate.

"Each of the foregoing rates of fares when in force shall be the rate of fare for a continuous single ride within the present limits of the city of Dallas in one direction, over any route of said company, whether enumerated in Sec. 1 hereof or not; and when any of the foregoing rates of fare is in force with regard to which a ticket rate is provided the company shall sell, on all of its cars, at all times, re-issuable tickets at the rate provided, each of which tickets shall entitle the holder to one such ride.

"The company shall furnish free transportation to the policemen and firemen of the city of Dallas to the extent now permitted by law. Children of twelve years of age or less and students of not more than seventeen years of age shall be carried on the company's lines for one-half of the regular fare collected for transportation of adult persons as now required by law."

The conditions under which local Dallas interests were to take over the properties in that city were summarized in the *ELECTRIC RAILWAY JOURNAL* of Oct. 21, 1916, page 903.

City Purchase Talk in San Francisco Supervisors Take Steps Looking Toward Purchase of United Railroads by the City

Definite steps have been taken looking toward the purchase of the United Railroads, San Francisco, Cal., by the city. Some time ago the Board of Supervisors adopted a resolution favoring the purchase by the city on fair terms. Following that there was much discussion of the subject and citizens representing nearly every occupation called upon the Mayor and expressed the hope that some such purchase might be effected. As a result of this expression of opinion the Mayor informally assembled a number of representative citizens in his office to discuss some method of placing the matter before the public. It was the consensus of opinion at this meeting that circumstances demanded immediate action.

Representatives of these citizens were then asked by the

Mayor to inquire of the members of the committee having charge of the reorganization of the United Railroads whether they thought the owners of the properties were willing to entertain overtures for the sale of the properties. It was reported back to the Mayor that the reorganization committee was of the opinion that it would be appropriate for the company to sell to the city and that the committee would use its influence to bring about that result.

MEETING IN MAYOR'S OFFICE STARTS THINGS

On the receipt of this communication the Mayor invited the members of the reorganization committee to meet a representative committee in his office to see whether the matter could be brought to a point sufficiently definite to justify him in sending a communication to the Board of Supervisors. The Mayor was satisfied after hearing the discussion of the representatives of all elements that it was advisable that the purchase of the properties be made and that the Board of Supervisors proceed with plans and negotiations for the purchase. A communication on the matter sent by the Mayor to the Supervisors was referred by the board to its committee on public relations. Subsequently this committee adopted the following resolution:

"Resolved, that it is for the best interests of the people of the city and county of San Francisco that the city and county acquire all of the properties of the United Railroads if said properties can be purchased upon equitable terms.

"Resolved, further, that the city engineer be and is hereby authorized to confer at once with a representative of the United Railroads for the purpose of arriving at a basis of valuation and that he report at an early date to this board."

At the meeting at which this resolution was passed it was decided to recommend that City Engineer O'Shaughnessy be authorized to enter into negotiations with the United Railroads for the purpose of arriving at a basis of valuation.

MACHINERY SET IN MOTION

In explanation of what is proposed by the resolution, Mayor Rolph in an address said:

"We have in mind the fact that the charter of the city provides for the acquisition of all public utilities by the municipality. We have also had in mind the fact that the Board of Supervisors has unanimously passed a resolution requesting that negotiations be entered into with the United Railroads for the acquisition of its properties by the city.

"This resolution will set the machinery in motion. We want to give the city engineer the necessary authority to confer with representatives of the United Railroads for the purpose of agreeing upon a basis. Discussion of matters in advance of this is premature. We want to proceed step by step until we see what can be developed and when this is done the matter will be laid before the people for their approval or disapproval."

Up to Sept. 29 Mr. Lilienthal had not announced the name of the company's engineer who will confer with Mr. O'Shaughnessy, representing the city. It was expected, however, that he would name a representative of the company within the next few days.

In a letter addressed to H. T. Jones, superintendent of the United Railroads, Mr. Lilienthal said:

"In response to your inquiry whether it is true that pending negotiations by the city for the purchase of the company's property there is to be any change in the operating conditions of the company, I beg to say that no such change is to occur.

"It is impossible for the city to acquire the properties short of nine months, and the period may be prolonged as much as fifteen months. In the meantime the railroads will be managed by the owners as heretofore."

As stated previously in the *ELECTRIC RAILWAY JOURNAL*, the proposal which has been made for the purchase of the property is that the railroad should be appraised now and an offer made by the city to purchase on the installment plan. The city and the United Railroads will agree on a year that would represent a fair measure of the net earnings of the railroad or take a year that will be an average of five years and agree on that as the price to be paid by the city for every year of its franchise, payable yearly.

Results of Toledo Primary

Present Mayor, Author of Community Traction Plan, Defeated—Mr. Schreiber, Former City Solicitor Under Brand Whitlock, Will Run

Charles M. Milroy was defeated as a candidate for a second term as Mayor of Toledo, Ohio, at the primary election on Sept. 11. He received only 2055 votes. Cornell Schreiber stood highest in the list of candidates with 7918 votes. George A. Murphy, former chief of police, who was ousted from office when Carl H. Keller was Mayor, and Robert T. Haworth, Socialist and pacifist, were the other primary nominees.

Now that Mayor Milroy is not to succeed himself the question being asked is: What will become of the Milroy street railway commission and its community plan for taking over the street railway property of the Toledo Railways & Light Company? The Milroy plan has not yet been completed and in all probability will remain pretty much as it is until the change of administration takes place. It is not known what the policies are of any of the three candidates for the mayoralty, but some of them may differ from those of Mayor Milroy. From the fact, however, that Mr. Schreiber, the leading candidate at the primary, is a pupil of former Mayor Brand Whitlock, it may be surmised that he will be in favor of the community-ownership plan.

Mr. Schreiber was city solicitor under Mr. Whitlock. In that office he had valuable experience in street railway matters. If he should be elected, the experience thus gained would serve Mr. Schreiber well in handling the present situation. Mr. Schreiber's vote was 2327 greater than his nearest competitor. If this indicates anything, he may be successful at the polls.

AMENDMENT TO BOND ISSUE LAW DEFEATED

The proposed amendment to the city charter relating to the issuance of bonds for the purchase of public utilities was defeated on Sept. 11 by a vote of 14,126 to 6,923. The proposed amendment gave the city broad powers in regard to issuing bonds which were to be backed by the city's taxing power. It was aimed at doing away with the present Ohio law which permits cities to issue bonds for acquiring public utilities, but provides that the bonds may act only as a lien against the utility acquired. By the defeat of the proposed amendment the law remains unchanged.

The defeat of the amendment does not in any way affect the negotiations now pending between the city and the Toledo Railways & Light Company for the purchase of the street railway lines, because the negotiations contemplate a method different from either the old law or the proposed amendment. The importance of the election is that it disposed of any plan for municipal ownership of the electric or gas properties of the Toledo Railways & Light Company.

B. R. T. Wooden Subway Cars to Go

The elimination of the wooden cars from operation in the Centre Street loop subway in New York may begin early in December. This was the effect of testimony by W. S. Menden, chief engineer of the Brooklyn Rapid Transit system, before the Public Service Commission on Oct. 1, at the hearings now being held to consider the elimination of the wooden cars from the loop and other questions of service.

Mr. Menden testified that certain reconstruction work is still necessary at the Wyckoff Avenue station on the Broadway-Myrtle Avenue elevated line before the heavy steel cars can be operated past that station to Fresh Pond Road. He thought this work would be completed about Dec. 1. The steel cars will be placed in operation at various intervals, and until the full complement of steel cars is in service it will be necessary to operate a certain number of the present wooden cars, gradually eliminating these as the steel cars are received. Changes are necessary to the platforms of the wooden cars for extensions to reach the platforms in the loop subway station. The material for these platform extensions has been ordered and delivery is promised by Nov. 1, at which time the work will begin.

J. P. H. DeWindt, chief of the transit bureau of the

commission, testified that he had made investigations of the situation and felt sure that operation of the steel cars could be had at a relatively early date. Mr. DeWindt also testified that his investigation showed that the company would have on or about Dec. 1 approximately 100 steel cars which could be placed in the Broadway-Myrtle Avenue-Centre Street loop service. He advocated that at the earliest possible moment steel cars, rather than wooden cars, be stored in the loop subway between rush hours.

The commission adjourned the hearing until Dec. 3, when further reports will be made as to the progress toward operation of the steel cars.

Chattanooga Strike Developments

Company Insists on Contract That Shall Legally Bind Both Sides

F. W. Hoover, vice-president of the Chattanooga Railway & Light Company, Chattanooga, Tenn., replied on Sept. 18 to the proposal of arbitration made to the company by John B. Colpoys, federal mediator, looking toward the settlement of the strike in Chattanooga. As stated in the *ELECTRIC RAILWAY JOURNAL* for Sept. 22 Mr. Colpoys suggested recognition of the union, the reinstatement of the men who are now out and arbitration of the question of whether or not the thirty or forty men against whom the company had a special grievance should be reinstated or discharged. Mr. Hoover said:

"I acknowledge your favor of the 12th inst., in which you propose that we 'resume relations with our former employees,' and that 'all matter in dispute be submitted to arbitration.'

"We are entirely willing to enter into 'contractual relations' with such of our employees as have not been guilty of acts of violence during the recent strike.

"There is no matter in dispute between our former employees and ourselves as to hours of work or wages. There are, however, differences between us in the following particulars:

"First—We insist that if 'contractual relations are to be resumed' the contract in question must be one that legally binds both parties. If we are to be responsible to each employee, so also must each employee be responsible to us. This can only be accomplished by having each employee sign his own contract.

"Second—We insist that each employee shall agree to render faithful and efficient service, and if for any reason he becomes dissatisfied and wants to quit, do so in peace and let us alone. In other words, that he will not go on a strike and destroy our property or encourage others to do so.

"We are not willing to arbitrate any of the above matters."

Members of the union of employees of the company voted on Sept. 22 to reject the individual contract proposition submitted to them by Mr. Hoover. The contract was presented to the men for consideration by Mr. Colpoys. On the previous day the Mayor had written to Mr. Hoover and the union suggesting that the questions in dispute be submitted to a board of citizens, two to be selected by company officials, two by the union and the fifth to be selected by these four. To this Mr. Hoover replied in part:

"We will be glad at all times to meet any committee of citizens selected by yourself, and outline to them our position in this controversy. We must, however, respectfully decline to name any committee to represent this company, as we feel there are no matters between the car men and that company that can be arbitrated.

"The facts in connection with this controversy have been pretty thoroughly aired through the local press, but I should be glad to enlighten anyone seeking further information on this subject."

On Sept. 23 there was a parade of strikers in Chattanooga. It was attended by much disorder. During one mêlée a citizen was shot to death and a soldier was severely wounded. Following this outbreak the city commissioners held a long conference with Mr. Hoover, at which it is understood a new proposition made by Mr. Colpoys was considered. The terms of this proposal were not made public pending formal reply from Mr. Hoover.

Commission Approves One-Man Cars

Massachusetts Board Approves Use of One-Man Cars by Bay State Street Railway—Commission Order Refers to Treatment of One-Man Cars in the Electric Railway Journal

In an order of ten pages issued under date of Oct. 3, the Bay State Street Railway, Boston, Mass., is authorized by the Public Service Commission of Massachusetts to install and operate one-man cars on certain routes in Revere, Salem, Beverly, Danvers, North Reading, Haverhill, Quincy, Randolph, Weymouth, Dedham, Hyde Park, Milton and Taunton, with the regulations that when the car is running the operator shall transact no business relative to fare collection or transfer issue, and that when leaving the car the operator shall remove and retain in his possession the reverse handle of the controller. The commission favors the purchase by the company of new cars of the one-man type, giving permission for but one remodeled car to be tried out in this class of service.

REVIEW OF FITNESS OF ONE-MAN CARS

The order includes a comprehensive review of the general fitness of the one-man car for economical operation on non-congested lines, with references to recent treatment of this topic in "Electric Railway Transportation" (Blake and Jackson), by A. Stuart Pratt of the Stone & Webster Management Association at a hearing before the board, and also in the special "More Service at Less Cost" issue of the ELECTRIC RAILWAY JOURNAL (Sept. 22, 1917). The commission is favorably impressed with the automatic safety devices now employed on such cars. The two types of one-man cars proposed by the Bay State company each seat twenty-nine persons. One is a light, strong steel car weighing 15,440 lb., the other being remodeled and of wood, weighing 21,540 lb. In the former type the wheels are 24 in. in diameter, with an 8-ft. wheel base and cross seats. The reconstructed car has longitudinal seats, 33-in. wheels and a 6 ft. 6 in. wheel base.

PUBLIC DESIRE TRIAL OF ONE-MAN CARS

The commission believes that the public served by the company desires a thorough trial of one-man car operation. At the hearings the employees of the company opposed the introduction of the new cars, but in the opinion of the commission "this attitude is contrary to their own best interests." The board says:

"The Bay State company has a number of country lines with very low earnings which are in serious danger of being abandoned unless expense can be decreased, and it also has short-haul lines of the type already mentioned where it ought to be possible to increase both service and patronage by the use of one-man cars, and to meet jitney competition to much better advantage. The company has recognized the principle that a higher rate of wages ought to be paid the man who combines the functions of motorman and conductor, and if these cars will accomplish the results anticipated, they will improve a situation which is as threatening to the employees as it is to the company itself."

The commission points out that while there may be economy in initial investment in the adaptation of existing cars for one-man operation, this is offset by loss in operating efficiency. The reconstructed car will consume materially more power than the new car and it is very likely to attract less traffic. The commission prefers to compare the working of the two types before authorizing any more of the remodeled units.

CARS ALL ON SHORT LINES

The routes specified in the petition are all short with light traffic. They range from about 4.5 to less than 0.5 mile in length. The importance of utilizing the one-man car to develop additional traffic and not merely as a means of economy is strongly emphasized in the finding. The decision says in part:

"The management . . . intends to put one-man cars to the use so strongly emphasized in this journal of the trade (ELECTRIC RAILWAY JOURNAL); but this intention ought to be made unmistakably clear to the public, and

ought to be carried into practice at the earliest possible moment. If the two cars now in the possession of the company can be used on some short city line to increase a thirty-minute to a fifteen-minute headway, or better still, a twenty-minute to a ten-minute headway, they ought to be put into use at once, and to facilitate such action the order entered below, approving certain routes for one-man operation, has been so drawn that it may readily be extended from time to time to include additional routes. If, however, a satisfactory application of the theory of increasing service cannot be obtained with two cars only, the company ought to use its best endeavors to secure a sufficient number of cars for this purpose at an early date and in the meantime inform the public fully as to the plans which it intends to carry into effect."

Seattle Arbitration Completed

Decision Expected by Nov. 1 from Board Which Has Been Hearing Seattle and Tacoma Wage Evidence

Public hearings in the arbitration of the demands of the employees of the Puget Sound Traction, Light & Power Company, Seattle, and the Tacoma Railway & Power Company, Tacoma, closed on Sept. 25 with a final session at Tacoma and one at Seattle. The attorneys for the company and those for the employees were to submit briefs to the arbitration board by Sept. 29. Dr. Henry Suzzallo, chairman of the board, stated at the conclusion of the hearing that three weeks or a month will be required for a thorough study of the evidence. To assure unquestionable facts regarding the prevailing standard and cost of living, Dr. Suzzallo stated he will employ nine expert economists and three experts in home economics, members of the faculty of the University of Washington, to obtain for the board impartial testimony to be considered in arriving at the findings. The final testimony at Tacoma concerned mainly the wage differentials between Seattle and Tacoma.

Seattle Extension Bill Passed

Council Plans to Extend the Municipal Electric Railway

The City Council of Seattle, Wash., on Sept. 24 passed a bill adopting a plan for an extension of the municipal electric railway by connecting up the lines of Division C and Division A. The plan proposes the construction of an elevated railway on Washington Street, Railroad Avenue, Whatcom Avenue and Spokane Street, and extending from First Avenue south to the West Waterway. The estimated cost of the line is placed at \$350,000, to be paid for by the sale of utility bonds, interest and principal payable from the revenues of the electric railway system. In order to connect the lines, it is proposed to utilize track of the Seattle & Rainier Valley line by a common user agreement. This would extend Division A, which has its present terminus at Third Avenue and Pine Street, to the west waterway.

Mayor H. C. Gill said on Sept. 22 that he will veto the bill adopting a plan for the extension, saying that the proposed elevated line would compete with lines of the Puget Sound Traction, Light & Power Company without materially improving the transportation facilities. Mayor Gill has, however, approved the bills providing for the proposed extension of Division A of the municipal railway into Ballard, saying that he believed the extension into Ballard would be the means of increasing the revenues so that the municipal line might be made self-sustaining. This plan, which it was proposed to carry into effect with funds borrowed from the city light depreciation fund, may have to be abandoned, for Walter F. Meier, assistant corporation counsel, in an opinion addressed to the finance committee of the Council, holds that such transfers of funds are illegal in the event that the electric railway fund is insolvent. The charge of insolvency was made by Councilman Will H. Hanna, chairman of the finance committee, in requesting the opinion.

On Sept. 27 Councilman Erickson introduced a bill in Council appropriating \$12,000 from the general fund for

the extension of Division A into Ballard. The appropriation, which will require the vote of seven members of the Council and the approval of the Mayor, will be a charge against the 1919 tax levy, for the reason that no provision was made in the tax levies for this or next year for such an expenditure. This bill takes the place of a bill now pending in the Council appropriating \$12,000 from the light depreciation fund to the street railway fund, a transfer held by Mr. Meier to be illegal, as noted previously.

No Expert for St. Louis at Present

The public utilities committee of the Board of Aldermen of St. Louis, Mo., has abandoned for the present its plan of employing an outside expert to draft a third United Railways' settlement ordinance, and will hold frequent sessions to shape up a new ordinance, based upon the terms of the pending bill known as the second plan, which does not involve a partnership between the company and the city. Alderman Schwartz, chairman of the committee, states that the committee is trying to provide a better plan of obtaining extension of lines than the proposed method. The question of the \$60,000,000 earning value which the pending bills allow the company has not yet been discussed.

The committee of the Chamber of Commerce which has had the proposed United Railways' compromise ordinance under consideration has decided that it will not employ Delos F. Wilcox, consulting public utilities expert of New York, to make a survey of the local street railway situation.

Boston Men Seek Wage Conference

The wage committee of the Boston (Mass.) Elevated Railway car men's union recently addressed a communication to the executive officers of the company requesting a conference relative to a further increase in wages, on the ground that the increased cost of living necessitates steps toward meeting the present situation at least temporarily. The men and the company are now working under an agreement which does not expire until May 1, 1919. The committee stated that it is not the intention of the men to break the existing contract, but that wage increases are greatly desired. At a conference on the afternoon of Oct. 4 neither side evinced any disposition to depart from the terms of the agreement. Whether any further increases can be granted at this time, pending legislation relieving the company's financial status, is understood to be an open question. Well-informed opinion outside the company expresses considerable doubt as to the feasibility of an increase at this time.

Rockford Strike Settled.—The strike has been settled which caused a partial tie-up of city and interurban service on the Rockford & Interurban Railway, Rockford, Ill., during the week ended Sept. 29. The attempt of the Amalgamated Association to organize the property failed. All of the older employees of the company have returned to work. They are satisfied with the wages and working conditions. The local police made it known promptly that it would not tolerate any attempt at disorder.

Increase in Wages on New York State Railways.—The New York State Railways, Syracuse and Utica, has granted its trainmen an increase in wages of 1 cent an hour retroactive to Sept. 1. A provision in the agreement between the company and the men calling for an advance on May 1 next of 1 cent is thus anticipated. The advance gives the men on the city lines 27, 29 and 31 cents an hour, according to the length of service. For interurban work the men will now receive 33 cents and on the Oneida line 36½ cents.

New Offices for Rhode Island Company.—The Rhode Island Company's separation from the New Haven Railroad was further accentuated a few days ago when the executive and administrative offices were removed from the New Haven office building and established at 100 Fountain Street, Providence, R. I. The Palmer block, in which the headquarters of the electric railway are now established, was remodeled and extended for the new tenants, under contract. The company occupies the four top floors of the structure. All of its offices will now be under one roof.

New York Public Utilities and the Loan.—The full support of all the public utility corporations operating in the New York Federal Reserve District will be thrown into the second Liberty Loan campaign through a special committee, headed by George B. Cortelyou, president of the Consolidated Gas Company. Some of the national organizations which will assist in the campaign are the National Electric Light Association, the American Gas Institute, the Natural Gas Association, the National Commercial Gas Association and the American Electric Railway Association.

Syracuse Lines in New Offices.—As the result of an agreement between the newly-organized Rochester & Syracuse Electric Railway the offices and shops of the concern will soon be removed from the Lakeland plant to Newark. Previous to the receivership the offices of the old company were located in the Electric Terminal Building, Syracuse. Subsequent to the appointment of the receivers, some \$11,000 or \$12,000 was expended in fitting up new offices at Lakeland. These new offices will now be occupied exclusively by the Empire State Railroad, which is to comprise the Syracuse, Lake Shore & Northern and Auburn & Northern lines of the former Empire United Railways, Inc.

Providing for Coal Supply at Lexington.—A satisfactory solution of the difficulties of the Kentucky Traction & Terminal Company in obtaining sufficient supplies of coal for its power plant at Lexington, Ky., depends on the action of the fuel administration at Washington. Under consideration at this time is an enforced resumption of mining operations in the Southeastern Kentucky-Tennessee field, which has been closed since the early part of August on account of a strike. Supplies from that territory have failed the Lexington company. Some relief has been obtained from the Chesapeake & Ohio Railroad, which at the expense of consumers in the Lake territory, to which the bulk of its shipments are consigned, has been providing the company at Lexington with sufficient coal to keep operating.

Increase in Wages Sought in Trenton.—The trainmen in the employ of the Trenton & Mercer County Traction Corporation, Trenton, N. J., are seeking an increase in wages to a flat rate of 32 cents an hour. On July 1, 1916, the men signed an agreement for three years under which the rate of pay was fixed at 29 cents an hour. The men are bound by the agreement to live up to its terms, but say that conditions have become so difficult for them that unless the wage scale is revised it is more than likely that many of them will accept employment in other lines of industry where wages are higher than those that the men are now receiving in railway work. The national organizer for the men has informed the men that they must live up to the terms of their agreement with the company unless the company sees fit to grant an increase.

Another Paving Suit in Seattle.—The second suit to be brought by the city of Seattle, Wash., against the Puget Sound Traction, Light & Power Company to compel that company to pave between its tracks on certain lines was started on Sept. 28 in the King County Superior Court. The complaint was prepared by Hugh M. Caldwell, Corporation Counsel, and signed by Mayor Hiram C. Gill. The first suit was brought by the city on March 26, and late in June was dismissed by Judge Kenneth Mackintosh, who ruled that he could not pass on the case until the State Public Service Commission had acted on the petition of the Puget Sound Traction, Light & Power Company to be relieved of its franchise obligations, which include paving between its tracks, payment of two per cent of gross income, etc. The petition of the company for relief from these obligations has been in the hands of the Public Service Commission for nearly two years.

Program of Association Meeting

Central Electric Association

At a meeting of the executive committee of the Central Electric Railway Association held on Sept. 13, it was decided to cancel the November meeting of the association on account of war conditions. It is the intention of the executive committee to carry on its work as heretofore, giving the members the benefit of everything that is available.

Financial and Corporate

Annual Reports

Glasgow Corporation Tramways

The comparative income statement of the Glasgow (Scotland) Corporation Tramways for the years ended May 31, 1916 and 1917, follows:

Traffic receipts	1917 £1,245,507	1916 £1,149,264
Sundry receipts	14,607	8,072
Total revenue	£1,260,114	£1,157,336
Traffic expenses	£395,736	£350,186
General expenses	137,816	144,297
Maintenance and repairs	143,758	133,659
Power expenses	67,231	64,346
Clydebank bridges	879	516
European War	£745,420	£693,004
	92,645	80,438
Total expenditure	£838,065	£773,442
Balance carried to net revenue account	£422,049	£383,894
Interest on investments	78,637	81,203
Total	£500,686	£465,097
Deductions	339,702	421,549
Surplus to common good	£160,984	£43,548

In the financial year ended May 31, 1917, the Glasgow Corporation Tramways broke all records. The surplus to be handed over to the common good, which is the sum remaining after the payment of all charges and reserves, and may be regarded as the net profit, amounted to no less than £160,984, as compared with £43,548 in the previous year.

This result was obtained in spite of the fact that the payments to dependents of the men on active service and supplementary allowances increased from £80,438 to £92,645. The traffic receipts showed the very large expansion of £96,243; but against this there was an increase in expenses of £64,623. A notable item in the accounts was the income tax, which rose from £39,853 to £64,622, an increase of £24,769. The deductions included £114,377 for the sinking fund, £34,049 for depreciation and £39,255 for the permanent way renewals fund.

The following are the traffic statistics for 1916-17: Average track mileage open (single), 196¼; car mileage, 25,786,047; increase, 822,738; traffic receipts per car-mile, 11.592d.; increase, 0.543d.; traffic receipts per passenger, 0.769d.; increase, 0.008d.; passengers, 388,294,876; increase, 25,923,412; passengers per car-mile, 15.059; increase, 0.543.

The Glasgow tramways department has in the last twenty years paid off out of revenue the capital cost of the undertaking. The tramways, with all their buildings and plant, stand in the books of the corporation at nothing, and their earning power remains as a substantial civic asset. Upon the strength of this asset the Glasgow corporation recently raised more than two millions from the Scotch banks and put them into the war loan, undertaking to pay off the debt within eight years.

American Public Utilities Company

The income statement of the subsidiaries of the American Public Utilities Company, Grand Rapids, Mich., for the twelve months ended June 30, 1917, follows:

Gross earnings from operation	\$3,819,820
Operating expenses	2,151,001
Net earnings from operation	\$1,668,819
Miscellaneous income	100,354
Gross income	\$1,769,173
Expenses	80,764
Interest	1,217,471
Net income	\$470,937
Dividend on preferred stock	255,897
Balance	\$215,040

The gross earnings from operation showed an increase of 15 per cent in business during the last fiscal year. The net

earnings increased 11.8 per cent in the same period. The company entered the current year with a larger earning power than ever before enjoyed.

The business of the subsidiary Wisconsin-Minnesota Light & Power Company, which operates the street railway system in Eau Claire and an interurban line out of this city, has more than doubled during the period of its control by the American Public Utilities Company. The earnings for 1917 were \$1,532,347 as compared to \$1,226,650 in 1916, a gain of \$305,697 or about 25 per cent.

The unfavorable conditions in the territory of the subsidiary Jackson Light & Traction Company, Jackson, Miss., noted in the 1916 report, have changed for the better. The city has taken on a new activity, and there has been a substantial growth in gas, electric, power and railway business. The gross earnings in 1917 totaled \$314,280 as compared to \$288,043 in 1916, an increase of \$26,237 or almost 10 per cent.

Showing of New York Lines for Quarter

Total Revenues Increase \$1,110,091, but Net Corporate Income Decreases \$899,837

Electric railway companies operating in the city of New York reported to the Public Service Commission for the First District for the quarter ended March 31 financial results as shown in the following table:

Total operating revenue	\$25,682,603	Inc. \$1,110,991
Total operating expenses	14,869,316	Inc. 1,514,818
Net corporate income	2,186,798	Dec. 899,837

Operating revenues of the Brooklyn Rapid Transit companies for the quarter ended March 31 amounted to \$7,117,038, an increase of \$443,702; net corporate income \$240,779, a decrease of \$10,978. Manhattan surface roads, including the New York Railways, the Third Avenue Railway and other lines, operating revenue \$4,899,838, a decrease of \$395,922; deficit \$404,095, a decrease of \$726,990. Bronx surface roads, including the Yonkers and Westchester lines, operating revenue \$1,206,692, an increase of \$17,775; deficit \$98,836, a decrease of \$97,921. Queens surface roads, operating revenue \$553,871, a decrease of \$13,105; deficit \$227,964, a decrease of \$69,545. Hudson & Manhattan Railroad, operating revenue \$1,121,896, an increase of \$98,828; net corporate income \$221,888, an increase of \$31,256. Interborough Rapid Transit Company, operating revenue \$10,553,367, an increase of \$927,588; net corporate income \$2,477,956, a decrease of \$25,915.

Legal Bonds Certified in Massachusetts

The Massachusetts Public Service Commission has certified to the bank commissioner that saving banks may be permitted to invest in the bonds of the following electric railway companies:

Boston & Revere Street Railway, controlled by the Bay State Street Railway; East Middlesex Street Railway, also controlled by the Bay State Street Railway; Fitchburg & Leominster Street Railway, Holyoke Street Railway, Springfield Street Railway, Union Street Railway, West End Street Railway and Worcester Consolidated Street Railway.

Each of these companies has complied with the statute requiring that they pay without impairment of capital dividends of at least 5 per cent in each of the five preceding years.

The commissioners have also certified that banks may invest in the bonds of the Boston Elevated Railway and the Milford & Uxbridge Street Railway. These companies have omitted dividends in recent years, but previously had paid the required dividends for a period extending over at least five years.

Tax Commissioner Trefry has decided that the rate for the corporate franchise tax this year will be \$19.47, an increase of 33 cents over last year's rate. The rate for this tax is determined by the tax commissioner by computing the average rate at which property is taxed locally throughout the commonwealth.

New Haven Favors Preferred Stock

The annual meeting of the stockholders of the New York, New Haven & Hartford Railroad will be held on Oct. 24. On the same date there will be held a special meeting at which the shareholders will be asked to authorize an issue of \$45,000,000 of preferred stock. The plan to issue preferred stock has been approved by the board of directors and notices have been sent to the stockholders reviewing the affairs of the company at length. It is proposed from the proceeds of the issue of preferred stock to pay off \$45,000,000 of floating debt represented by one-year notes maturing on April 1, 1918.

It is the belief of the board that some plan of financing other than the renewal of the notes must be adopted to eliminate the process of renewing the notes each year and to give the company sufficient time to sell securities now in its treasury, which will enable it to realize more satisfactory returns than any that could now be obtained in the war securities market.

In their letter reviewing the affairs of the company the directors refer to plans being made to ask the authorities for permission to charge 2¾ cents per mile for local tickets and 2½ cents per mile for mileage tickets, which increase if granted will mean about \$3,000,000 of additional new revenue a year. It is explained that there is also a movement to increase fares on the electric railways controlled by the company and that if this increase is granted it will materially improve the value of the electric railways.

It is explained that more than \$12,000,000 of floating debt has been paid off by the New Haven in the last four years and that during that time about \$17,000,000 has been spent on improvements, betterments and equipment.

New Financing in September

According to compilations made by the *Journal of Commerce*, New York, borrowing by industrial and railroad corporations in September totaled \$80,800,000, which compares with \$186,000,000 for the month of August and \$95,600,000 in September, 1916. The falling off in new financing has been due to the general disposition of banking and corporate interests to leave the investment market clear for the government loan. The total for bonds, stocks, and notes of industrial and railroad and public utility corporations issued in the nine months ended Sept. 30, 1917, is \$1,348,707,000, compared with \$1,712,826,000 for the corresponding period last year, or a decrease of \$364,000,000.

Stock to Employees and Patrons

West Penn Railways Announces Plan Under Which Its Employees and Patrons May Share in the Company's Profits

The West Penn Railways, Pittsburgh, Pa., is offering its 6 per cent cumulative preferred stock to employees and patrons. A statement to its employees made by the company through the medium of the *West Penn Bulletin* follows in part:

"The West Penn System is a great property. It serves the greatest industrial district in the world, wherein business possibilities are almost limitless. Demand for its products—light, power and transportation—is steadily expanding and needs much new construction to keep pace with requirements of its customers. This is a situation that promises well for the securities of such properties, and West Penn Railway preferred stock, therefore, appears as the one security for employees of the system for the following reasons:

"1. The stock is safe and is recommended by conservative and experienced business men, long affiliated with successful and profitable enterprises.

"2. West Penn Railways preferred dividends have been paid regularly every quarter since February, 1906.

"3. The stock is listed on the Pittsburgh stock exchange and a ready market is usually obtainable.

"4. The stock is offered at \$82 per share, which nets 7.32 per cent per annum on the money actually invested and at

which price it promises probability of ultimately higher prices.

"5. Employees paying on the installment plan, after final payment, will receive a check representing the difference between interest charged and dividends credited, which, for the forty-month period, will be for more than \$11 per share, thus bringing the actual cost of the stock down to about \$71.

"6. Employees buying the stock are really 'betting upon themselves,' as they are largely responsible for the success of the company. If the stock is a good paying proposition for officers and directors it must be equally good for the employees, whatever their position.

"When a company pays its dividends without intermission during the severest financial and business depression the country has ever known and through other lean periods in eleven and one-half years, the record justifies the confidence that has been placed in the stock. Where can one obtain the same class of security which will net 7.32 per cent, free of Pennsylvania State tax and the normal federal income tax"?

Auburn & Syracuse Electric Railroad, Syracuse, N. Y.—The Auburn & Syracuse Electric Railroad has petitioned the New York Public Service Commission, Second District, for permission to issue, *nunc pro tunc*, \$115,000 in first and refunding mortgage 5 per cent gold bonds, and for authority to issue \$282,000 in first and refunding mortgage 5 per cent gold bonds.

Buffalo Southern Railway, Buffalo, N. Y.—The Buffalo Southern Railway, which has been in the hands of a receiver for four years, will be sold. Bondholders of the property have refused to improve the service and equipment and mortgage foreclosure proceedings will be started by John W. Ryan, attorney for Nathan A. Bundy, receiver. This decision was reached at a hearing before Public Service Commissioner Barhite in Buffalo. The commission recently directed the bondholders to make necessary improvements in service and equipment or dispose of the property. Some of the bondholders have pledged their securities to reorganize the road, but others oppose the plan. The Buffalo Southern Railway operates between the Buffalo city line at Seneca Street and Hamburg, Orchard Park, Ebenezer, Gardenville and other nearby towns. The Fidelity Trust Company, Buffalo, is trustee under a mortgage on the property for \$2,000,000 under which \$600,000 of bonds have been issued. In speaking on the prospects of disposing of the property, J. W. Ryan, attorney for the receiver, said that the Lancaster Light & Power Company, Lancaster, N. Y., has been negotiating for the property with the idea of extending the line to East Aurora, but that the sum offered by this company was less than that tendered by men who wanted to junk the line. The International Railway, Buffalo, N. Y., is also understood to have considered buying the property, but it is said that no agreement on price could be reached.

California Railway & Power Company, San Francisco, Cal.—At the annual meeting of the California Railway & Power Company the retiring directors were re-elected. Lyman T. Hammond of Bonbright & Company, New York, N. Y., was also elected a director, thus increasing the board membership to twelve.

Catskill (N. Y.) Traction Company.—The property of the Catskill Traction Company will be sold at public auction at Catskill on Oct. 23 by Referee Orliff T. Heath. The road is 5.5 miles long and runs from the Point Landing at the Hudson River to Leeds. The affairs of the company were referred to in the *ELECTRIC RAILWAY JOURNAL* of Sept. 22, page 550.

Cleveland (Ohio) Railway.—L. C. Hanna, Jr., member of the firm of M. A. Hanna & Company, has been elected a director of the Cleveland Railway to succeed Benedict Crowell, member of the Council of National Defense, who resigned to give all his time to the needs of the country.

Commonwealth Power, Railway & Light Company, Grand Rapids, Mich.—The Consumers' Power Company, a subsidiary of the Commonwealth Power, Railway & Light Company, has sold an additional block of \$1,500,000 of two year

6 per cent secured gold notes due July 1, 1919, to Harris, Forbes & Company, Hodenpyl, Hardy & Company, E. W. Clarke & Company and Coffin & Burr, who are offering them at 98%, yielding 6% per cent.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—Official notice has been issued of the formation of a protective committee to represent the holders of the first consolidated mortgage bonds of the Fort Wayne & Wabash Valley Traction Company, assumed by the Fort Wayne & Northern Indiana Traction Company. The addition of three members to the committee as originally announced makes the personnel as follows: P. M. Chandler, chairman; E. W. Clark, Cyrus S. Gray, A. A. Jackson, John H. Mason, C. S. W. Packard, R. Lancaster Williams, with J. K. Trimble, secretary. The committee invites the deposit of bonds with the Commercial Trust Company, Philadelphia, Pa., or the Fidelity Title & Trust Company, Pittsburgh, Pa., by Nov. 15.

Jersey Central Traction Company, Keyport, N. J.—The Fidelity Trust Company, Newark, N. J., recently announced that all of the outstanding bonds of the Jersey Central Traction Company, dated Dec. 1, 1904, had been called for payment on Oct. 1.

Mansfield Public Service & Utility Company, Mansfield, Ohio.—The Mansfield *Shield* said recently: "After negotiations covering several months, the passing of the entire system of the Mansfield Public Service & Utility Company into the possession of Henry L. Doherty & Company, New York, N. Y., has been consummated. The adjustment of all differences with the stockholders of the utilities company have been completed, and the entire holdings have been transferred to the New York company."

Maryland Electric Railway, Annapolis, Md.—John P. Baer, of Hambleton & Company, Baltimore, Md., has been elected a director of the Maryland Electric Railway to succeed C. I. Iglehart.

Middle West Utilities Company, Chicago, Ill.—Halsey, Stuart & Company, Chicago, Ill., are offering on a 7 per cent basis an issue of \$1,000,000 of three-year 6 per cent collateral gold notes, series "B," dated Sept. 1, 1917, of the Middle West Utilities Company. The notes are due Sept. 1, 1920, and are secured by deposit of interest-bearing securities in the aggregate principal amount of 120 per cent of all notes outstanding.

Providence & Fall River Street Railway, Swansea Center, Mass.—It is practically settled that the Providence & Fall River Street Railway, recently sold at auction to Karl Andren Company, Boston, Mass., will be taken over by a group of Swansea residents now forming, and that it will be continued in operation. The option which Swansea people had on the railway expired on Sept. 29, but it was renewed for one week and \$81,000 of the \$90,000 necessary to complete the transaction had been subscribed by Oct. 3. Mr. Andren bought the entire property at foreclosure for \$68,000 about three weeks ago.

Orleans-Kenner Electric Railway, New Orleans, La.—There were no bidders when the Orleans-Kenner Electric Railway was offered for sale recently by William Defour, special master in bankruptcy, appointed by the federal court and acting under its authority. The upset price was \$400,000.

Rochester Railway & Light Company, Rochester, N. Y.—The Rochester Railway & Light Company has increased its common stock by \$750,000, which it is authorized to sell to the Mohawk Valley Company to fund the proposed merger with the Canandaigua Gas Light Company, the Dispatch Heat, Light & Power Company, the Eastern Monroe Electric Light & Gas Company and the Ontario Light & Traction Company. The Mohawk Valley Company owns a majority of the capital stock of the Rochester Company and is controlled, in turn, by the New York Central Railroad.

Tampa (Fla.) Electric Company.—The Tampa Electric Company, which controls the entire electric railway and the electric light and power service in Tampa, is offering \$216,800 of new capital stock to its stockholders of record of Sept. 15, 1917, to the extent of one full share for each ten shares held. The stock is offered at par, \$100 a share.

United Gas & Electric Corporation, New York, N. Y.—The United Gas & Electric Corporation has declared a

dividend of 1 per cent on the first preferred stock, payable on Oct. 1 to stock of record of Sept. 22. This is a reduction of three-quarters of 1 per cent. The stock is 7 per cent cumulative. A statement issued by the directors says: "The full dividend was not declared in view of the uncertainty as to the full amount of the federal revenue taxes to be met and the abnormal conditions existing in the security markets. During the past year the increase in gross earnings of the subsidiary companies was more than \$1,300,000, while during the same period the cost of coal, coke, oil and other materials, as well as of labor and local taxes, increased more than \$1,100,000; and an additional amount of over \$180,000 was charged for maintenance, renewals and replacements to the fund set up for this purpose for the preceding twelve months. In other words, the entire increase due to abnormal operating conditions was absorbed by the increase in gross earnings and a small increase shown in net." There is now 9 per cent in back dividends due on the first preferred stock. The item in the issue of Sept. 22, in regard to a 1 per cent common stock dividend, was based on current newspaper financial reports which proved to be incorrect.

Electric Railway Monthly Earnings

CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.		Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., July, '17		\$40,500	\$25,293	\$15,207	\$6,552	\$8,655
1 " " '16		32,858	*19,171	13,687	6,559	7,128
12 " " '17		433,185	*259,179	174,006	78,734	95,272
12 " " '16		383,240	*224,907	158,333	78,568	79,765
CITIES SERVICE COMPANY, NEW YORK, N. Y.						
1m., Aug., '17		\$1,366,659	\$30,809	\$1,335,850	\$226	\$1,335,624
1 " " '16		628,823	24,501	604,322	720	603,602
12 " " '17		17,296,942	320,588	16,976,354	3,265	16,973,089
12 " " '16		7,149,948	219,437	6,930,511	421,003	6,509,508
EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.						
1m., July, '17		\$84,332	*\$45,682	\$38,650	\$10,358	\$30,025
1 " " '16		72,309	*38,992	33,317	8,762	24,554
12 " " '17		907,336	*491,431	415,905	111,611	\$310,991
12 " " '16		797,879	*418,704	379,175	106,119	273,056
EL PASO (TEX.) ELECTRIC COMPANY						
1m., July, '17		\$103,171	*\$66,712	\$36,459	\$4,940	\$31,519
1 " " '16		76,173	*74,148	2,025	4,892	†2,867
12 " " '17		1,243,515	*767,016	476,499	60,494	416,005
12 " " '16		1,045,317	*567,785	477,532	54,167	423,365
HUDSON & MANHATTAN RAILROAD, NEW YORK, N. Y.						
1m., Aug., '17		\$487,659	*\$248,792	\$238,867	\$217,745	\$21,122
1 " " '16		445,555	*206,622	238,933	215,051	23,882
2 " " '17		976,360	*485,177	491,183	435,098	56,084
2 " " '16		894,650	*410,393	484,257	429,349	54,908
JACKSONVILLE (FLA.) TRACTION COMPANY						
1m., July, '17		\$54,322	*\$36,387	\$17,935	\$15,730	\$2,205
1 " " '16		50,981	*35,285	15,696	15,408	288
12 " " '17		659,770	*442,501	217,269	187,078	30,191
12 " " '16		616,065	*420,410	195,655	180,084	15,571
LEHIGH VALLEY TRANSIT COMPANY, ALLENTOWN, PA.						
1m., Aug., '17		\$279,077	*\$177,671	\$101,406	\$50,871	\$62,535
1 " " '16		229,704	*135,043	94,661	51,269	†53,692
12 " " '17		2,760,031	*1,833,032	926,999	624,152	†454,919
12 " " '16		2,403,603	*1,443,429	960,174	628,488	†461,134
PENSACOLA (FLA.) ELECTRIC COMPANY						
1m., July, '17		\$32,947	*\$18,274	\$14,673	\$7,806	\$6,867
1 " " '16		20,964	*12,076	8,888	7,712	1,176
12 " " '17		309,397	*178,785	130,612	93,102	37,510
12 " " '16		276,272	*153,426	122,846	89,311	33,535
PHILADELPHIA (PA.) RAPID TRANSIT COMPANY						
1m., Aug., '17		\$2,436,680	\$1,404,966	\$1,031,714	\$812,440	\$219,274
1 " " '16		2,149,836	1,223,473	926,363	815,011	†111,352
2 " " '17		4,874,074	2,834,441	2,039,633	1,623,771	415,862
2 " " '16		4,364,765	2,444,948	1,919,817	1,630,279	289,538
REPUBLIC RAILWAY & LIGHT COMPANY, YOUNGSTOWN, OHIO						
1m., Aug., '17		\$426,115	*\$274,715	\$151,400	\$85,282	†\$73,167
1 " " '16		335,758	*183,147	152,431	69,033	†85,930
12 " " '17		4,444,721	*2,847,949	1,596,772	939,530	†701,590
12 " " '16		3,748,882	*2,190,485	1,558,397	778,986	†794,180
TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.						
1m., Aug., '17		\$848,477	\$572,426	\$276,051	\$162,411	†\$113,639
1 " " '16		849,966	525,187	324,779	144,734	180,045
8 " " '17		6,882,599	4,548,104	2,334,495	1,189,095	1,145,400
8 " " '16		6,740,241	4,187,967	2,552,274	1,143,167	1,409,107
UNITED LIGHT & RAILWAYS COMPANY, GRAND RAPIDS, MICH.						
12 m., Aug., '17		\$2,016,845	*\$164,112	\$1,852,733	\$655,943	\$1,196,790
12 " " '16		1,850,434	*140,901	1,709,533	565,005	1,144,528

*Includes taxes. †Includes non-operating income.

Traffic and Transportation

Six-Cent Fare in Effect in Connecticut Connecticut Company Agrees to Refund in Event that Its Increase Is Not Sustained

The increase in unit fares from 5 cents to 6 cents on the lines of the Connecticut Company, operating 178 miles of electric railway in the principal cities of Connecticut, went into effect on Oct. 1. Announcement of the proposed increase was made on Sept. 20. Discussion of the matter was begun at once by city officials in the various municipalities and the advisability was considered of their acting in unison against the raise. Bridgeport was one of the first cities to consider the matter. There City Attorney Comley was instructed to make a study of the 6-cent fare matter and prepare to take whatever legal steps he regarded as most feasible. On Sept. 28 he asked Judge Curtis of the Superior Court for an *ex parte* hearing on a temporary injunction. Meanwhile L. S. Storrs, president of the Connecticut Company, appeared before a special committee of the Aldermen of New Haven at which the fare increase was discussed. Mr. Storrs reviewed the needs of the company and said that the directors were opposed to any postponement of the date of putting the increase into effect.

APPLICATION MADE FOR RESTRAINING ORDER

Formal application for an injunction was made to the Superior Court before Judge Curtis of Bridgeport on Sept. 28. The court was inclined to refuse an injunction unless the city would file a bond to protect the company in case the fare increase was found to be reasonable. City Attorney Comley doubted whether the city had the right to put up such a bond. Judge Curtis then announced that an order would be issued against the company unless it agreed to print on all the books of seventeen tickets for \$1 that the excess of 15 cents for such tickets over the straight 5-cent fare would be refunded if the new rate was found to be excessive. The company promptly ordered such a refund note to be published and made it apply to all of its lines in the various cities throughout the State. The ruling of Judge Curtis follows in part:

"On Sept. 28 the parties appeared and were heard and now upon due consideration it appears and it is ordered that a temporary injunction ought to issue with a bond the sum of which is to be hereafter fixed by the court, until a final adjudication that the 6-cent fare is not unreasonable unless the Connecticut Company shall issue and sell on and after Oct. 1 at its local offices seventeen tickets for \$1 in book form with cover to any person demanding the same with the following provision printed, stamped or written thereon, to wit:

"*Bridgeport Division.*—This cover good for refund of 15 cents at any office of this company in the event of a final adjudication that the 6-cent fare upon the division in which this book was sold is unreasonable, and excessive, in which case no injunction shall issue."

STATEMENT BY COMPANY

The company issued a statement quoting from the decision. It concluded its announcement as follows:

"This order applies only to the Bridgeport division, but the company has decided to extend its application to all of its divisions. The order requires the company to sell these tickets at its local offices, but for the greater convenience of the public the tickets can be obtained from the starters and inspectors on the streets and an effort is now being made to have them on sale at local points throughout the territory, which points will be announced as soon as decided upon."

The traffic committee of the City Council of Bridgeport met on Oct. 1 to take up the question of protesting against the 6-cent fare and to consider the preparation of an appeal to the Public Utilities Commission. After a short discussion consideration of the matter was put over to another date not fixed.

Public Support Electric Railways

Threatened Curtailment or Suspension of Service May Be Averted Through Legislative Action in Massachusetts

The public hearings now being held by the street railway investigating commission, composed of members of the Senate and House of Representatives of the Massachusetts Legislature of 1917, have already developed the fact that the public in various communities is not only keenly alive to the seriousness of the electric railway situation, but is anxious to lend its support to any measure that will avert suspension of the service and tend to improve it.

At Fall River during the week ended Sept. 29 many prominent bankers, lawyers, manufacturers and representatives of merchants concurred in the belief that the person who makes the electric railway service possible by furnishing the money for the construction and maintenance of the utility is entitled to a fair return for the use of the money he loans. It was said that the railways must get relief, regardless of claims of mismanagement or anything else.

CLAIM OF MISMANAGEMENT REFUTED

As to claims of mismanagement, Frederick A. Fisher, president of the Lowell Institute of Savings, speaking before the Commission at Lawrence stated:

"Regarding the claim of poor management or mismanagement of electric railways, no one who is fair minded can attribute the present situation to such a cause. The very fact that all or nearly all public utility companies over the State are in a bad way is in itself a refutation of the claim of poor management. One or two corporations might be mismanaged, but it is absurd to think that all of them have been mismanaged.

"As for the 5-cent fare—it was an accident. If there had been a 6-cent piece instead of a nickel piece, the fare would have been 6 cents from the start. It was not necessary to charge more than 5 cents years ago. Perhaps it wasn't necessary to charge that much, but there isn't any doubt that 5 cents will not suffice to pay for a street car ride to-day. I hold that Americans believe in paying for what they get."

RURAL LINES ARE NECESSARY

In some instances at these public hearings the representatives of certain towns and cities have taken the stand that the electric railways operate at a profit within the city limits, and that it is not the concern of such cities that the suburban lines be maintained. This view, however, was shown to be narrow and undemocratic by Cornelius Mahoney, an attorney of North Andover, speaking before the commission at Lawrence. Mr. Mahoney said:

"The rural electric railway is the salvation of any city. Within almost a stone's throw of where I now stand there are tenements housing twenty-four families, terribly crowded, unsanitary, breeding places for tuberculosis. The rural electric railway makes it possible for some people to escape this sort of thing, and it is a shortsighted and narrow and unAmerican policy to think only of the interests of a few people in a limited area like the 7¼ square miles of Lawrence in discussing a situation of this sort."

City Solicitor Tracy of Taunton, speaking before the commission said:

"All interurban and suburban electric railways should be a unit whenever connected. The scrapping of the Snake Line (between Fall River and Providence) or the threatened scrapping of the Taunton and Pawtucket line should not be possible. The electric railway is the conveyance for the poor people, many of whom have established homes along rural non-paying lines. It is a matter of general public welfare that as many people live in the country as possible. Any situation which threatens to make it difficult for people to live in the country must be met with a big public spirit. Any measure that will keep people in the country and tend to get more people into the country deserves the support of every patriotic citizen."

Michael O'Brien, a labor leader in the city of Lawrence, surprised the members of the commission by stating that the working classes, when they understood the situation, were not opposed to increased fares. Mr. O'Brien stated:

"We workers are interested in the prosperity of employers and in corporations because we realize that prosperity can not come to them without coming to us also. No self-respecting workman wants to ride on an electric railway without paying a just return for the service. No workman wants something for nothing, because we workmen realize that the reverse is so often true, that people get nothing for something. The trouble is there are a lot of people who think they do not want an electric railway until the last car has gone."

Hearing on Philadelphia & Western Fares

The Public Service Commission of Pennsylvania held a hearing at Philadelphia on Sept. 28 to consider the protests against the increase in rates put into effect by the Philadelphia & Western Railway on July 5. The principal protestants were represented by counsel. Thomas A. Newhall, president of the company, was called to testify as to the financial condition of the railway. Another hearing will probably be held on Oct. 25.

Late on Sept. 28 the company issued the following statement in defense of its position:

"The railway company bases its application for an increase of fares largely on the tremendous increase in the cost of materials and labor required in its operation. Material prices have increased since 1915 from 40 to 400 per cent. Even if the increases are granted, the resulting increases in earnings will not add more than 10 per cent to the company's earnings."

In a letter sent out to the Norristown patrons of the Philadelphia & Western Railway the company, in justification of the increase in fare to Sixty-ninth Street, Philadelphia, from 25 cents to 30 cents, says that "it cost the company \$4,845.53 more to give the same train service in the month of August, 1917, than it did in the month of August, 1916." The letter says further:

"The amount we collected in August over and above our old rates was just about sufficient to pay the increase in our coal bill alone, to say nothing of the additional cost of labor and other materials. We regret the necessity of making the increase in rates of which complaint has been made. We should have increased the rates six months ago, but waited, hoping that the conditions making the increases necessary would change for the better, instead of which they have steadily become more acute."

Liberty Loan Pay Envelopes

With a view to bringing the Second Liberty Loan to the attention of workmen at the psychological moment, the publicity department of the Liberty Loan committee at New York has ordered 500,000 pay envelopes bearing a printed appeal for subscriptions to the loan. These envelopes will be distributed free to firms employing more than 500 men. For concerns which prefer to use the envelopes they have in stock, printed slips for insertion in pay envelopes have been prepared, and where this would be too great a demand on the clerical force, rubber stamps for printing a facsimile of the appeal on standard envelopes have been ordered.

Envelopes and inserts bear a medallion of the Statue of Liberty in red, while above is inscribed:

"There is a war!
We're in it!
Wars cost money!
We've got to pay for it!
'We' means Labor as well as Capital!"

Across the medallion is a brief statement of the purposes of the loan, its value as an investment and an appeal for the purchase of the bonds on the installment plan.

Khaki Uniforms for Trainmen.—The trainmen of the Lehigh Traction Company and the Wilkes-Barre & Hazleton Railway, Hazleton, Pa., will soon appear in khaki uniforms on account of the present high cost of the cloth used previously in the uniforms.

Vermont Company Seeks Fare Increase.—Application has been made to the Public Service Commission of Vermont by the Rutland Railway, Light & Power Company for permission to increase its fare unit from 5 cents to 6 cents, effective on Oct. 15. F. S. Nicholson, general manager of the company, states that the increase is made necessary by decreased revenue due to the added cost of both material and labor.

Pacific Electric to Operate Bus Service.—The Pacific Electric Railway, Los Angeles, Cal., has been authorized by the Railroad Commission of California to operate auto bus service between San Bernardino, Patton, Highland and intermediate points, San Bernardino County. The company has purchased the Highland Transportation Line and proposes to use three trailer type buses with a capacity of seventeen passengers each.

Fare Case Under Advisement.—An application of the Kansas City-Western Railway for a higher schedule of fares between Kansas City and Leavenworth and intermediate points was heard at Leavenworth on Sept. 18 by the Public Utilities Commission of Kansas. The proposed change will affect persons working in Kansas City who live along the interurban line and use commutation tickets. The matter was taken under advisement by the commission.

Commission Considers Bridgeton Fare Case.—The Board of Public Utility Commission of New Jersey has reserved decision on the application of the Bridgeton & Millville Traction Company to abolish its six-for-a-quarter tickets and those sold at the rate of fifty for \$2. A hearing on the question was held recently at Camden, N. J. The company wanted the new schedule to become effective some time ago, but the board ruled that no alteration could be made until Nov. 6.

Hearing on Higher Fares Postponed.—Without taking definite action on the matter of increased fares as proposed by the Scranton Railway, the members' council of the Scranton Board of Trade has tabled the proposition until Oct. 24. The Public Service Commission of Pennsylvania has set Oct. 15 to hear protests against the proposed 6-cent schedule. Some weeks ago a special committee approved the increase. The report was referred to the board of directors, who passed it on to the members' council for definite action.

Increased Tariff Opposed as Excessive.—A. R. Myers, general manager of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., entered a denial recently at Erie, Pa., that it violated its franchises at Harborscreek, North East Township and North East Borough, by doubling its tariff, and also denied that the freight tariff had been raised. Robert J. Firman, retained as counsel for the district affected, announced that he proposed to conduct an investigation into conditions of the company to prove that the increase is illegal.

Hearing on Salt Lake Fares.—Hearings were held before the Public Utilities Commission of Utah on Sept. 19 and 20 on the petition of the Utah Light & Traction Company for permission to increase the fares between Salt Lake and suburban towns, to abandon the sale of fifty-trip books for \$2 and to charge 1 cent extra for transfers. H. F. Dicke, general manager of the company, said that the mobilization of soldiers at Fort Douglas had increased the revenue of the company, but that the increase in operating expenses this year over those of last year had more than offset the increase in traffic.

Higher Fares for Reading Suburban Lines.—The Reading Transit & Light Company has filed with the Public Service Commission of Pennsylvania a new schedule for an increase of from 5 to 6 cents on the suburban lines of Reading, Norristown and Lebanon to go into effect on Nov. 1. There will be no increase within the city limits of the three towns and no curtailment of service. In speaking of the new schedules an official of the company stated that the increase has been applied only to the suburban lines where the cost of operation is proportionately greater than in the city while the revenue is proportionately less.

Bus Service by Railway.—The Glendale & Montrose Railway has filed an application with the Railroad Commission of California for authority to establish jitney service for passengers and packages between Eagle Rock and Pasadena,

Los Angeles County. The line is to afford quick service between Glendale and Eagle Rock. The company proposes to charge \$3 for a thirty-ride family book and \$3.50 for a forty-six-ride school ticket for the calendar month, and to operate a ten-passenger Ford automobile every half hour from Eagle Rock from 6.30 a.m. to 10 p.m., and hourly from Pasadena from 7 a.m. to 11 p.m.

Unprofitable Service May Be Suspended.—In the case of the Lewisburg & Ronceverte Electric Railway, Lewisburg, W. Va., the Supreme Court of West Virginia on Sept. 18 decided that a public service corporation is under no obligation to continue its service longer than the public interests demand such service. The court held that whenever the returns were insufficient to pay the expenses of the service there ceased to be a public demand for it. Efforts had been made to compel the company to continue in operation between Lewisburg and Ronceverte in the face of the fact that the returns were less than the expenses.

Skip Stop Plan in Baltimore.—A hearing was held recently before the Public Service Commission of Maryland on protests to the skip stop plan which was inaugurated on two of the lines of the United Railways & Electric Company, Baltimore, last spring. While the plan was commended by many of the patrons of these lines, there was considerable opposition from persons at whose corners the cars did not stop. It has now been decided, with the sanction of the Public Service Commission, to try the staggered form of skip stop, which provides for the stopping of cars going in one direction at every corner skipped by cars going in the opposite direction.

Skip-Stop Plan Considered in Washington.—A hearing was recently held before the Public Utilities Commission of the District of Columbia on the proposal to inaugurate the skip-stop system on the Chevy Chase line of the Capital Traction Company between Rock Creek loop and Chevy Chase circle. Opinion favored the "staggered" or alternate system under which cars going in one direction would stop at every other corner and those traveling in the opposite direction would stop at the alternate corners. John H. Hanna, vice-president of the Capital Traction Company, stated that the plan, which is tentative, had been worked out at conferences of the officers of the company and representatives of two citizens' associations. The representatives of the citizens prepared the list of the streets proposed to be eliminated from the present schedule of stops.

Higher Rates in Chambersburg.—The Chambersburg & Shippensburg Railway, Chambersburg, Pa., proposes to increase its fare unit from 5 cents to 7 cents in its different fare zones. The new schedule of tariffs has been filed with the Public Service Commission of Pennsylvania. It affects express and baggage rates as well as passenger fares. The passenger fares proposed are all increases over the fares now in effect, with the exception of the one-way fare of 5 cents within the borough limits of Chambersburg. All other fares are on the basis of 7 cents per zone. In all instances the round-trip fares are double the one-way fares. Transfers will be issued to passengers within the borough limits of Chambersburg when transferring to the Chambersburg, Greencastle & Waynesboro Street Railway good for transportation within the borough limits only. The express, baggage and milk rates are increased about 5 cents per zone for the second, third and fourth zones.

Bus Proposed to Replace Non-Paying Line.—Ansel M. Easton has filed with the Railroad Commission of California an application for authority to abandon the Burlingame Railway, a single track line, 2 miles long, operating one storage battery car. The application states the railway has never paid the expense of operating it and has been a constant source of loss to the owner. Mr. Easton says if permitted to discontinue the railway he will take up the track and pave and repair the streets occupied by it to the satisfaction of the city. In another application filed with the commission Mr. Easton asks for authority to operate a 40-hp., fifteen-passenger Studebaker bus from Broadway Station, Burlingame, to Alvarado Avenue, in the Easton Addition, just outside the southwesterly limits of Burlingame. He proposes charging a 5-cent fare and making about fifteen round trips daily. This bus is to take the place of the railway he wishes to abandon.

Legal Notes

CHARTERS, FRANCHISES, ORDINANCES

FEDERAL COURTS.—*Service on Foreign Corporation Cannot Be Made on Mortgagee.*

The property of a foreign corporation cannot be said to have been transferred, metaphysically speaking, from the state of its incorporation to the State of New York, to be used as the basis of jurisdiction in the latter State in a suit upon the company's mortgage bonds, merely because the trustee under the mortgage was a New York corporation, in which the title to the mortgaged property for the purpose of the trust was vested. (Toledo (Ohio) Railways and Light Company v. Walter L. Hill and Ralph L. Spotts, 37 Supreme Court Rep., 591.)

NEW JERSEY.—*Commission Jurisdiction Over Fares—Effect of Fare Agreements on Leased Lines.*

The Public Utility Commission has jurisdiction under P. L. 1911, p. 380, art. 17h, to forbid street railways to put into effect proposed withdrawal of sale of six tickets for 25 cents, increasing rate to 5 cents. An ordinance as to street car fares, passed by agreement between city and company, is binding also as to lines of companies under long-term leases to party to agreement. (Trenton & Mercer County Traction Corp., v. Inhabitants of City of Trenton et al., 101 Atlantic Rep., 562.)

LIABILITY FOR ACCIDENT

ILLINOIS.—*Accident from Baggage in the Aisle.*

Where a woman carrying a small baby was injured by a sudden jerk of a street car, causing her to stumble and fall over baggage in the aisle, she was not guilty of contributory negligence as a matter of law in not seeing such baggage, since she was boarding the car in the ordinary manner, and could not be expected to anticipate a sudden jerk of the car nor then be expected to control her movements. (Heineke v. Chicago Railways, 116 Northeastern Rep., 761.)

INDIANA.—*Limitations to the Rule of "Last Clear Chance."*

Instruction that, if plaintiff negligently exposed himself to injury, yet if defendant, after discovering the exposed situation, inflicted the injury on him through a failure to exercise ordinary care, plaintiff may recover is bad, in not excluding a recovery if plaintiff, by the exercise of ordinary care after defendant had discovered his peril, might have been able to extricate himself from the dangerous position to which he had negligently exposed himself, as in such case his failure to extricate himself would be negligence proximately causing his injury. (Union Traction Company of Indiana v. Elmore, 116 Northeastern Rep., 837.)

NEW YORK.—*Collision with Bracket Poles in Center of Street.*

Where a street railway changed from horse to electric power pursuant to Laws of 1884, Chap. 252, and the municipality did not designate the location of its poles, it could place them as it chose in the highway, but if it chose a position so dangerous that the choice was unreasonable, the company and the city were chargeable with liability for injuries resulting therefrom, the road being liable because the poles were a nuisance. In an action against the railway and others for injuries when an automobile collided with a pole in the center of the street, the question of whether this location, with the changes in the conditions of travel since the poles were installed, had become a menace to travel was held to be for the jury. (Stern v. International Railway et al., 115 Northeastern Rep., 759.)

WISCONSIN.—*Employment Held To Be Not Under Workmen's Compensation Act.*

Although an employee was required to be within call while off duty, injury sustained while procuring a money order for personal use was not suffered while engaged in "services growing out of and incidental to his employment," entitling him to relief under the workmen's compensation act. (Brienen v. Wisconsin Public Service Co., 163 Northwestern Rep., 182.)

Personal Mention

George W. Hark has resigned as general manager of the Reno (Nev.) Traction Company.

W. I. Saffell has resigned as general manager of the Kankakee & Urbana Traction Company, Urbana, Ill.

Allen Blanchard has resigned as master mechanic of the Boston & Worcester Street Railway at Framingham, Mass.

George E. Pellissier, consulting engineer, Springfield, has been appointed assistant general manager of the Holyoke (Mass.) Street Railway.

John F. Trumbull, chief engineer of the Public Utilities Commission of Connecticut, has been commissioned captain in the engineering corps, United States National Army.

M. S. Sloan, vice-president and general manager of the New Orleans Railway & Light Company, New Orleans, La., has resigned. No successor to Mr. Sloan has been announced.

J. R. Herton, heretofore employed as conductor on the Southern division of the Michigan Railway, has been made trainmaster of the Southern and Northern interurban divisions.

L. E. Custer, who has heretofore acted in the capacity of inspector of Jackson for the Michigan Railway, has been promoted to the position of superintendent of transportation of the Jackson city lines.

William H. Jennings, formerly chief lineman for the Indianapolis, Columbus & Southern Traction Company, Columbus, Ind., has succeeded N. S. Anderson as superintendent of way and structures.

A. G. Snell has resigned as superintendent of transportation of the Rockford (Ill.) City Traction Company. Mr. Snell was formerly with the Indianapolis Traction & Terminal Company for many years.

Dion Martinez of Philadelphia has been appointed assistant engineer in the department of city transit. Mr. Martinez will have charge of all engineering plans in connection with the new subway and elevated lines in Philadelphia.

J. M. Allen, assistant treasurer of the Middlesex & Boston Street Railway, Newtonville, Mass., has resigned, effective Oct. 15. Mr. Allen will assume a position with the Dennison Manufacturing Company at Framingham.

George Buttrick, formerly superintendent of overhead for the Bridgeport division of the Connecticut Company, has resigned to accept the position of superintendent of line construction with the Republic Railway & Light Company, Youngstown, Ohio.

Charles B. Hart, formerly head of new business in the light and power departments of the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., has been appointed electrical engineer to succeed E. S. Meyers. Mr. Hart has been associated with the company for fifteen years.

A. G. Simcox has been named superintendent of the Rockford (Ill.) City Traction Company to succeed A. G. Snell, resigned. Mr. Simcox has been associated with traction interests in that locality for a number of years. Until recently he has been assistant superintendent of transportation of the Rockford City Traction Company.

M. C. McElligott, formerly superintendent of transportation of the railway system of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, has been made superintendent of employment of all departments of the company. Mr. McElligott has been with that company for several years. He was previously inspector and division superintendent.

Rockwell, manager of the railway department of the Electric Railroad & Light Company, Manila, P. I., is in the United States on a vacation, with Mrs. Rockwell at

Mr. Rockwell's headquarters while here at the office of The J. G. White Management Corporation, New York City, which is operating manager of the

Henry L. Doherty, president of the Doherty Operating Company, New York, N. Y., is the subject of a biographical sketch in the October number of the *American Magazine*. The article reviews Mr. Doherty's life from the time he was an obscure newsboy until he became a man of nationwide prominence. Many of his experiences are related and several quotations given to describe his character and personality, which are held largely responsible for his unusual success.

E. Irvine Rudd of Glenbrook, Conn., has been appointed engineer of the Public Utilities Commission of Connecticut during the absence of John F. Trumbull. Mr. Rudd was born in Cairo, Ill., in 1879. He was educated in Mississippi and at the Rensselaer Polytechnic Institute, Troy, N. Y. He has been engaged in railroad, electric railway and contracting work for about sixteen years, for the last four years as assistant engineer with the Central Railroad of New Jersey.

Wilford Phillips, general manager of the Winnipeg (Man.) Electric Railway, has resigned his active duties on account of failing health. He will continue to act in an advisory capacity. Mr. Phillips was formerly connected with the Niagara Gorge Railway. He has been with the Winnipeg Electric Railway for about seventeen years and to him is attributed very largely the growth of the company in all its branches. He had asked about a year ago to be relieved of the management of the railway on account of his health. Last February he received leave of absence and spent four months in California, returning much improved. Mr. Phillips will remain in Winnipeg for a few weeks after his successor, A. W. McLimont, assumes charge. He will then leave for the winter months.

E. S. Myers, formerly electrical engineer of the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., as reported recently in the *ELECTRIC RAILWAY JOURNAL*, has been made general manager of the Vicksburg Light & Traction Company, Vicksburg, Miss. Mr. Myers was graduated from Purdue University in 1905. He was employed for two years in the testing department of the General Electric Company, Schenectady, N. Y., and was then transferred to the commercial engineering department in the factory. Later he entered the sales organization in the Chicago office of the company where he remained two years. His next connection was with the Fort Wayne & Northern Indiana Traction Company as electrical engineer in charge of the light and power department, including the power stations and substations and the lighting and power business in Fort Wayne and fourteen surrounding towns.

R. C. Leeper has been appointed general manager of the Reno (Nev.) Traction Company to succeed George W. Hark, who resigned. Mr. Leeper has been connected with the Reno Traction Company for



R. C. LEEPER

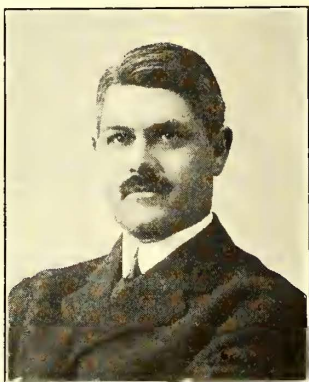
about ten years. He spent the greater part of his early life in the harness and saddlery business. In the year 1897 he was elected constable of the city of Reno and remained in that office for six years, when he was appointed chief of police. In December, 1907, four years later, he resigned to become connected with the transportation department of the Reno Traction Company. He has been employed in the office of the company in various capacities since 1913, assisting in the management of the

property, until his recent appointment to succeed Mr. Hark as general manager. Mr. Leeper's long connection with the company in so many different branches of its work, his intimate knowledge of the city and its needs through his long residence there and his previous service as an official of the city are all experiences that should help him materially in solving the problems with which he will be confronted in his new position of general manager.

Charles F. Hewitt, whose resignation as general manager of the United Traction Company, Albany, N. Y., took effect on Oct. 1, will take a short vacation and then expects to take another operating position, about which an announcement will be made later. Previous to his Albany connection Mr. Hewitt was vice-president and general manager of the Des Moines (Iowa) City Railway.

Joseph F. Porter, as noted recently in this paper, has been elected president of the Kansas City Light & Power Company, Kansas City, Mo. Mr. Porter's career dates from June, 1885, when he entered electrical work with the Des Moines (Iowa) Edison Company, which he served for six months. This was followed by service for the same length of time with the Appleton (Wis.) Edison Company and later by short connections with the Western Edison Light Company, Chicago, and the Abilene Water & Electric Light Company, Abilene, Kan. In 1887 he was employed by the Western Electric Construction Company, St. Louis, and later in the same year, when that company moved to Kansas City, he entered construction work for himself. Two years later he sold his business and entered the railway supply business with J. G. White & Company, New York. In 1893 he went to Alton, Ill., to assume the presidency of the Railway, Gas & Electric Company and other companies building and operating railway and other properties in that district. Under his direction the organization of practically all of the electric railway, lighting and gas properties in Alton and adjoining towns was effected. In 1906 he was elected president of the Tri-City Railway & Light Company, and subsidiaries, Davenport, Iowa, which he has operated until the present time.

Talmadge C. Cherry, who was recently elected vice-president and general manager of the Rochester & Syracuse Railroad, Inc., has been made a vice-president of Allen & Peck, Inc., electric railway managers and engineers. Mr. Cherry has been associated with that firm for a number of years. He was elected vice-president and general manager of the Auburn & Syracuse Electric Railroad, Syracuse, N. Y., in April, 1916. Upon the resignation of Ernest Gonzenbach as general manager of the Empire United Railways, Syracuse, under the co-receivers, C. Loomis Allen and Hendrick S. Holden, Mr. Cherry was made operating manager of the Empire United system. Recently the co-receivership was dissolved, Mr. Allen remaining as receiver of the Rochester, Syracuse & Eastern Railroad, and Mr. Holden taking the receivership of the Syracuse, Lake Shore & Northern Railroad, preceding the sale of the two properties separately. Since then Mr. Cherry has been general manager of the Rochester, Syracuse & Eastern Railroad, the Syracuse, Lake Shore & Northern Railroad passing into the operating management of Ford, Bacon & Davis under its separate reorganization plan. When the Rochester, Syracuse & Eastern recently was reorganized into the Rochester & Syracuse Railroad, Mr. Cherry was made vice-president and general manager. Mr. Cherry entered railway work as timekeeper on construction and track work and as rodman with the engineers of the Syracuse Rapid Transit Railway. Subsequently, in 1900, he became superintendent of construction of line and track for the Lorain (Ohio) Street Railway and was general manager of that road from 1901 to 1903. He has also been connected in managerial capacities with the Saginaw Valley Traction, Light & Gas Company, the Ohio Central Traction Company, the Buffalo & Lake Erie Traction Company, the Utica & Mohawk Valley Railway, the Schenectady (N. Y.) Railway and the Maryland Electric Railways. He has been active in the work of the New York Electric Railway Association, during his connection with roads in that State, and also of the American Electric Railway Transportation & Traffic Association.



T. C. CHERRY

A. W. McLimont has been appointed to succeed Wilford Phillips in charge of the active management of the Winnipeg (Man.) Electric Railway, effective Oct. 1. Mr. McLimont was vice-president and general manager of the Michigan United Railways, Jackson, Mich., from 1910 to 1912. In January, 1914, he was elected vice-president and general manager of the San Francisco - Oakland Terminal Railways, Oakland, Cal. In 1885 he was employed by the New England Telephone & Telegraph Company. He later became connected with the Thomson-Houston Electric Company, Boston, Mass., which he served until 1903. During that period he assisted in building, organizing and operating railway



A. W. MCLIMONT

properties and installing electric light plants in the following cities: Dallas, Houston, St. Joseph, Cedar Rapids, Rockford, Springfield, Marquette, Nashville, Chicago and New Orleans. Subsequently he became general manager and resident engineer of the Dubuque Light & Traction Company, Dubuque, Iowa, and in 1905 resigned to supervise the construction of 70 miles of overhead work in New Orleans. Upon its completion he entered the foreign department of the General Electric Company and designed, built and operated two monocyclus electric light and power plants in Costa Rica, Central America. He next supervised the construction of a long-distance transmission line and hydroelectric plant at Cordova, Argentina, after which he returned to the United States to take charge of the high-tension transmission line construction work for the Hudson River Power Transmission Company. His next work was building and operating electric light plants for the Guanajuato (Mexico) state government. This was followed by work in street railway electrification at Monterey, Mexico, after which he spent about two years in building and operating electric railways at Lima, Peru. Returning again to the United States Mr. McLimont became electrical and operating engineer of the Public Service Commission for the First District of New York. In March, 1909, he resigned to become general manager of the Chicago & Milwaukee Electric Railroad, Chicago, Ill., and the following year he was appointed vice-president and general manager of the Michigan United Railways. Mr. McLimont is a Canadian by birth.

Obituary

Royal Canfield Peabody, president of the Combustion Engineering Corporation, New York, N. Y., died recently.

James Sager, superintendent of track and line of the People's Railway, Dayton, Ohio, died recently from an attack of appendicitis.

Artemus S. Raymond, promoter of the first electric railway between Dedham and Forest Hills, Mass., which later became a part of the Bay State Street Railway system, died on Sept. 30 at East Dedham. Mr. Raymond was born in Pawtucket, R. I., seventy-five years ago. He was a founder and vice-president of the Hyde Park Trust Company.

William J. Wood, a member of the Public Service Commission of Indiana and formerly special examiner for the Interstate Commerce Commission, died at his home in Indianapolis on Oct. 3. Mr. Wood was appointed a member of the Railroad Commission of Indiana upon its creation in 1905. He was made chairman to succeed Union B. Hunt and was reappointed to the commission in 1909. Mr. Wood championed the safety-first movement on the railroads in Indiana and was instrumental in having the law modified to give the Railroad Commission power to require the installation of block signals. He was at one time vice-president of the Louisville & Nashville Railroad in charge of its legal department.

Construction News

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

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

RECENT INCORPORATIONS

***Dallas (Tex.) Railway.**—Incorporated in Texas to own, maintain and operate electric railways in Dallas under the new franchise noted on page 635 of this issue. Capital stock, \$100,000, being 1000 shares of a par value of \$100 each. Incorporators: Charles W. Hobson, James C. Duke and Herbert M. Hughes, all of Dallas.

FRANCHISES

Montgomery, Ala.—To complete a link in the double-track electric railway service that is being planned by the Montgomery Light & Traction Company to and from Camp Sheridan, the City Commission of Montgomery has granted the company a franchise to remove its present switch at the intersection of Madison Avenue and Monroe Street to the corner of Madison Avenue and Ripley Street and to lay and maintain a track on North Ripley Street from Madison Avenue north to the city limits. The granting of this franchise affords a belt line to and from Camp Sheridan. The new track will be laid out on North Ripley Street and will parallel the present track from the intersection of Pollard and Ripley Streets.

Long Beach, Cal.—The Pacific Electric Railway has asked the Railroad Commission of California for permission to abandon its line between Twentieth Place and Miramer Avenue, Long Beach.

Peoria, Ill.—The City Council of Peoria has refused to grant the St. Louis, Springfield & Peoria Railroad, a subsidiary of the Illinois Traction System, new franchise rights on South Washington Street.

Rockford, Ill.—The Rockford City Traction Company has received permission from the City Council to extend its track on East State Street 110 ft. east from Rome Avenue to permit the laying of a Y on a lot purchased for this purpose.

West Brookfield, Mass.—The Worcester & Warren Street Railway has asked the Board of Selectmen for permission to make a physical connection between the tracks of the Worcester & Warren Street Railway and the Ware & Brookfield Street Railway in West Brookfield. This connection will make it possible for through service between Ware and Spencer.

Walkerville, Mich.—At a recent election in Walkerville a by-law was passed giving the Sandwich, Windsor & Amherstburg Street Railway a franchise to construct an extension on Ottawa Street from Walker Road to Lincoln Road.

Buffalo, N. Y.—The International Railway has been granted permission by the City Council to lay a loop track around the Soldiers' and Sailors' Monument in Lafayette Square. This change was advocated by Inspector Barnes of the Public Service Commission in its recent report on local traffic conditions. The loop will be used to relieve the congestion on Washington Street in the retail shopping district. Cars from several east side lines will be routed around the square instead of operating them down Washington Street to a switch. The Council has decided that the tracks will be used as a siding so it will not be necessary to submit the franchise to a vote at the next municipal election. Construction work will be begun at once.

Dayton, Ohio.—The City Railway has asked the Board of County Commissioners for permission to construct an extension of its Kammer Avenue division from Kammer Avenue west to Westwood, thence north to Hoover, thence two blocks to a terminus and a loop, which the railway proposes to construct on private property.

McAlester, Okla.—The Pittsburgh County Railway has made application to the City Commission for permits to construct passing switches on three car lines in that city.

TRACK AND ROADWAY

Los Angeles (Cal.) Railway Corporation.—The public utilities committee of the City Council of Los Angeles has recommended to the City Council the extension of the West Jefferson Street line of the Los Angeles Railway Corporation from its present terminus at Fourth Avenue to Ninth Avenue, and an extension of the South Park Avenue line from Slauson to Manchester Avenue.

Pacific Electric Railway, Los Angeles, Cal.—This company will contribute \$7,000 towards the building of a new bridge across the Santiago Creek, the old structure having been pronounced unsafe.

Jacksonville (Fla.) Traction Company.—This company is considering the construction of an extension to the quartermaster's camp at Black Point.

Miami (Fla.) Traction Company.—This company is extending its track north along Biscayne Drive and within a short time will have its tracks laid to Buena Vista.

Galesburg & Kewanee Electric Railway, Kewanee, Ill.—This company is laying new steel rails on East Third Street, Kewanee, preparatory to paving.

***Pikeville, Ky.**—A company is being organized to construct an electric railway in Pikeville and a line between Pikeville and Williamson, W. Va. It is said that construction will begin about the first of the year. A. Stryck is interested.

Shelbyville & Frankfort Interurban Railroad, Shelbyville, Ky.—This company will construct five short bridges in connection with its proposed railway from Shelbyville to Frankfort. J. W. Gudgell, Shelbyville, secretary. [Aug. 4, '17.]

Detroit (Mich.) United Railway.—In connection with the double-tracking of the Detroit United Railway between Mount Clemens and Detroit, it was originally proposed to connect the Brady and Gosling switches. The Brady switch extends from a point nearly 2 miles south of Mount Clemens for approximately 1 mile. The Gosling switch, which is to be connected with Brady, is a distance of 0.63 mile south. The original plan has now been changed to include double-tracking between the Brady switch and the Clinton River, giving double track practically between Mount Clemens and Roseville. This is a material increase in the track extension plans and is one that should materially improve service on the line. In addition to this work the Linwood and Roseville switches will be connected and the Hooker switch will be extended.

Hannibal Railway & Electric Company, Hannibal, Mo.—It is reported that the Hannibal Railway & Electric Company will construct three extensions to its lines.

Kansas City (Mo.) Railways.—The board of control of the Kansas City Railways, after making an examination of the Ninth Street elevated track and a thorough survey of the reports of the engineers, decided the structure is safe and that the service will be continued. Minor repairs will be made immediately.

Brooklyn (N. Y.) Rapid Transit Company.—Operation has been begun by the Brooklyn Rapid Transit Company on its Metropolitan Avenue line from Middle Village to Jamaica.

New York Municipal Railway, Brooklyn, N. Y.—The Public Service Commission for the First District of New York has awarded a contract to I. J. Stander & Company, Inc., at \$64,149, for the construction of Shaft No. 2 near First Avenue, Manhattan, in connection with the Queensboro Subway.

Public Service Railway, Newark, N. J.—The City Commission of Trenton has adopted an ordinance requesting the Public Service Railway and the Riverside Traction Company to relocate 125 poles along the Newark and Elizabeth branch along Liberty Street. Both companies are now maintaining poles on that thoroughfare and property owners object.

New York State Railways, Rochester, N. Y.—Plans are being made by the New York State Railways to reconstruct before winter tracks in Andrews Street from Front to Water Street; Jefferson Avenue, between Bronson Avenue and Cady Street, and in Main Street East, between Prince and Goodman Streets.

Youngstown & Niles Railway, Youngstown, Ohio.—Announcement has been made by the Mahoning & Shenango Railway & Light Company that work will be suspended on the construction of the Youngstown & Niles Railway, a subsidiary, owing to the financial conditions which have arisen as a consequence of the war. [Sept. 29, '17.]

Henryetta-Dewar-Kusa Traction Company, Henryetta, Okla.—Work will begin at once on this company's proposed line from Henryetta to Dewar and Kusa. A large part of the material has been ordered and much of it delivered, having been taken over from the defunct Henryetta Traction Company. Practically all of the ties to be used in the construction of the road are being made in Henryetta. J. J. Harrison will have charge of the survey work. [Sept. 8, '17.]

West Penn Railways, Pittsburgh, Pa.—It is reported that the West Penn Railways has purchased the Market Street bridge leading from Steubenville, Ohio, into West Virginia from the Steubenville Bridge Company at \$500,000.

Chattanooga Railway & Light Company, Chattanooga, Tenn.—Operation has been begun by the Chattanooga Railway & Light Company on its new extension to Fort Oglethorpe.

Texas Electric Railway, Dallas, Tex.—Announcement has been made by the Texas Electric Railway that it would join with the Commissioners of Dallas County and the city government of Lancaster in paying for the paving on that portion of the Dallas-Waco Highway that lies within the city limits of Lancaster. This highway parallels the tracks of the Texas Electric Railway.

Northern Texas Traction Company, Fort Worth, Tex.—This company has completed its downtown loop, extending from Throckmorton and Seventh Streets on Throckmorton to Eighth, thence to Commerce, and up Commerce to Seventh and out Seventh. The Summit Avenue, Arlington Heights and Camp Bowie street cars use this loop, which was installed by the company to avoid congestion of traffic in the downtown section.

Galveston, Tex.—According to a supplemental contract which has just been entered into between the Larkin & Sangster Company and the Gulf, Colorado & Santa Fé Railroad, the Galveston, Henderson & Houston Railroad, the Galveston, Harrisburg & San Antonio Railroad and the Galveston-Houston Electric Railway, the steam railroads named are to bear 45 per cent of the cost of constructing the destroyed portions of the causeway which spans Galveston Bay, the Galveston-Houston Electric Railway 22 per cent and the county of Galveston the remaining 33 per cent. The total cost of the proposed work will be about \$1,500,000.

Big Bend Transit Electric Railway, Spokane, Wash.—According to a report from Miles, the Big Bend Transit Electric Railway, which proposes to build an electric road from Spokane to Miles, on the Columbia River, is making active progress. The company proposes to construct a line from Spokane along the Spokane River, Long Lake, Little Falls, Old Fort Spokane and down to Miles. The company is engaged in taking over the grants and deeds for overflow lands on the former Spokane Indian reservation above the company power site at Old Fort Spokane. [April 10, '15.]

Tacoma (Wash.) Municipal Railway.—Shortage of timbers and lumber needed for the construction of the trestle over the Milwaukee Railway tracks will delay the opening of tideflats carline of the Tacoma Municipal Railway until the middle of October, or two weeks beyond the date originally set for the completion of the line. Laying of tracks across the hill beyond the trestle is proceeding rapidly. Erection of the poles to carry the trolley wire has been completed. That the Tacoma Railway & Power Company will make a strong bid for the contract to operate the tideflats line upon its completion was evidenced recently by the receipt of a letter addressed to the Council from Louis H. Bean, general manager, stating that the company would submit its terms at an early date. Mayor Fawcett and the commissioners agreed, when the line was first contemplated, to allow the Tacoma Railway & Power Company to enter a bid on the operation of the line, and if it was found that the private company could operate cheaper than the city, the bid would be given favorable consideration.

SHOPS AND BUILDINGS

Valdosta (Ga.) Street Railway.—Work has been begun by the Valdosta Street Railway on the construction of a new carhouse at West and Floyd Streets. The new building will be of ample size to house the rolling stock of the company and make such repairs as are necessary.

Fort Wayne & Decatur Traction Company, Decatur, Ind.—This company is building a new station at Jackson and Second Streets, Decatur.

Kansas City, Mo.—For a second time Mayor Edwards of Kansas City has vetoed the ordinance passed by both houses of the City Council locating the proposed union station for the use of the interurban railways at Tenth and McGee Streets.

New York Municipal Railway, Brooklyn, N. Y.—The Public Service Commission for the First District of New York has awarded a contract to the P. J. Carlin Construction Company, New York, the lowest bidder, for the construction of station finish for Sections 1 and 2 on the Culver line in Brooklyn. The amount of the contract was \$731,124.

Cleveland (Ohio) Railway.—The street railway committee of the City Council has approved the purchase by the Cleveland Railway of twelve acres of land at Lorain Avenue and West 117th Street, on which a new carhouse is to be erected. It is expected that a crosstown line will be built near there and the new carhouse and yards will thus take care of two lines. The cost of the land was \$22,500.

Reading Transit & Light Company, Reading, Pa.—Plans are being considered by this company for the construction of a new station in Boyertown.

POWER HOUSES AND SUBSTATIONS

Augusta & Aiken Railway, Augusta, Ga.—This company will construct a new electric transmission line through Druid Park Avenue to connect its lines at Summerville and Monte Sano.

Bay State Street Railway, Boston, Mass.—This company has received a new turbo-generator which will be installed by it in an addition which has recently been completed to the Quincy power house. It is expected to have the unit in operation about Nov. 1, at which time the Bay State Street Railway expects to furnish about 3000 hp. to the Fore River Ship Building Corporation, to be used in building government war vessels, the Legislature having given the Bay State Street Railway a special permit to furnish this power during the construction of these vessels.

Point Pleasant (N. J.) Traction Company.—This company reports that it expects to place a contract during the next few weeks for one new 100-hp. motor generator set.

International Railway, Buffalo, N. Y.—Plans have been filed by the International Railway for the erection of a new substation at 285 Military Road, to cost about \$7,000.

Interborough Rapid Transit Company, New York, N. Y.—The property at 2633 Jerome Avenue, about 100 ft. x 113 ft., has been acquired by the Interborough Rapid Transit Company, at a price of about \$26,000, for the erection of a new transformer station.

Southern Public Utilities Company, Charlotte, N. C.—The City Commissioners of Reidsville have accepted the \$30,000 offer of the Southern Public Utilities Company for the Reidsville electric light and power plant and ordered an election to be held in October to permit the people to vote on the proposition.

Pittsburgh (Pa.) Railways.—This company plans to construct a new sub-station at Island Avenue and Boquet Street, McKee's Rocks.

Virginia Railway & Power Company, Richmond, Va.—Plans are being made by the Virginia Railway & Power Company to construct a one-story brick and concrete substation, to cost about \$2,500.

Appalachian Power Company, Bluefield, W. Va.—A contract has been awarded by the Appalachian Power Company to C. W. Hancock & Son, Lynchburg, Va., for the construction of a new electric generating station on the New River, to cost about \$900,000. The plant will be steam-driven and will have a capacity of 100,000 kw.

Manufactures and Markets

Discussions of Market and Trade Conditions for the Manufacturer, Salesman and Purchasing Agent
 Rolling Stock Purchases Market Quotations Business Announcements

Railway Trade Conditions in New England

Largest Activity Found in Products Designed to Give More Service at Less Cost—Situation Generally Encouraging

To a large extent, country-wide conditions are reflected in the New England street railway field as this month opens. Directly and indirectly, the influence of the war is paramount. Lines in urban and manufacturing districts are handling a heavy traffic, but net earnings are far from satisfactory, with very few exceptions indeed. So far as materials and supplies are concerned, the opinion is widely held, both in manufacturing and operating circles, that the top has been reached in prices. Government fixing of copper, steel and iron prices, it is thought, will stabilize markets in the long pull, although at present the purchaser finds little opportunity to obtain products at anything like substantial reductions from prevailing high levels. The prediction has been voiced, however, that in the near future some of the jobbers will shade existing prices in order to anticipate the effect of the government price reduction program, and it is felt that this action may lead to more advantageous charges on steel, from the purchaser's viewpoint.

Deliveries show little improvement. Stationary motors of small size, say 25 hp. or below, can be obtained in many cases on fair shipment dates, but railway motors are far behind on deliveries. In the wire and cable field, Government work is absorbing certainly half the output of local plants. The amount of new construction work at present under way on New England traction lines is negligible and the financial situation is unfavorable to the strengthening of distribution circuits except in cases where strict necessity determines such a policy. Labor-saving devices are being sought, especially where the initial cost is moderate.

In the car manufacturing field, two recent developments are of interest. The Wason plant of the Brill company, at Brightwood, Mass., is about to give attention to the manufacture of aeroplanes. It is learned on excellent authority, but not officially confirmed, that the Osgood-Bradley Car Company of Worcester, Mass., has received an order to manufacture a million dollars' worth of gun carriages. In response to an inquiry by this journal, it was learned that the regular business of the company will in any event be continued and that the plant will not be taken over by the government.

Manufacturers and dealers supplying street railway repair shops are at present indirectly affected, at least, by the difficulties such operating companies are experiencing in procuring and retaining skilled labor for maintenance work. The attractions of war service, especially in connection with the naval construction program and with the corresponding intensified building of merchant vessels. Wages at both government and private shipyards are very high, and the large amount of overtime now required is an additional incentive to employment, despite the increased wage scale of the larger street railways. The platform labor supply appears to be fairly adequate, although the draft has taken away many men of suitable qualifications for this work, and in southern New England, at least, a real scarcity of platform labor is turning the thoughts of electric railway managers to the question of using women conductors. So far as can be learned, only one important road in New England, the Boston & Worcester Street Railway, is at present engaged in wages arbitration proceedings. At

this writing, too, relations with organized labor are in general better than for some time.

The coal situation at present leaves much to be desired. Withdrawal of bottoms from the coastal trade is throwing serious and anxious burdens upon power plant owners all over eastern New England. Most companies appear fairly well supplied with coal for immediate requirements, but for many the future holds disquieting uncertainties. The opinion is advanced that if the neutral vessels at present held up by the embargo on exports of dubious destination can be utilized in the coal-carrying trade, the situation will be immensely relieved. Companies in central New England which are purchasers of hydroelectric energy are in a relatively fortunate position with respect to the fuel situation. The demand for such energy is at present tremendous, and the two largest companies of mid-New England, the New England Power Company and the Turners Falls Power & Electric Company, are doing everything possible to add to their generating facilities to meet the increased business which is now being offered to them from railway and industrial sources.

Manufacturers of electric railway specialties appear to be unusually busy, so far as products are concerned which may be keyed under the terms "More Service at Less Cost." A factory producing case-hardened material for miscellaneous service reports that it is four months behind on orders; and a district agency handling fibrous insulating material in place of slate or marble points to an enormous demand for its products, the government being a very heavy purchaser. The ease with which such material can be machined and its lightness in handling are unquestionably a factor in its fitness for street railway service under present conditions. Special trackwork is difficult to obtain on satisfactory deliveries, the shortage of material here representing a real burden to the manufacturer. In the chilled wheel field, production conditions are improving due to the return of labor to the wheel foundries after the usual summer reduction. Deliveries are accordingly better in this branch. Wheel interests in close touch with the electric railways report that credits are fairly good at present.

Some encouragement can be found in the fare situation on New England street railways, and in Massachusetts various plans for securing more adequate revenue are being given a trial. A hopeful sign is the willingness of the public in many cases to concede higher rates in preference to further curtailment or abandonment of service under private ownership. The needs of the companies are being forced upon the public by the war conditions, and a great opportunity is accordingly present and in part being utilized in this section to give the electric railway situation effective publicity.

Active Second-Hand Market

Demand for Electrical Equipment Greater than Ever—Delay in Delivery of New Apparatus Holds Up Release of Used Material

Conditions in the second-hand market are fully as good as six months ago. The failure, or rather the delay, in delivering new goods is strongly affecting the movement of second-hand apparatus. That is to say, quite a lot of machinery of the latter description has already been bought, but cannot be released or displaced until equipment is ordered and installed.

Prices cannot be altogether stable, as they must be adjusted to meet varying conditions and circumstances. The owners of apparatus are fully alive to market needs, and

there is a steady, if not insistent, demand for everything available, and of all sizes, power and capacity. As second-hand dealers usually buy on a cash basis, payments in resale transactions are subject to the same terms, hence collections are satisfactory.

One drawback, complained of generally, is probably inherent to the business. When an inquiry for second-hand apparatus is afloat, in some manner or other after thirty or more persons seem somehow involved in the proceedings. The regular houses are pestered with applications from known and unknown sources. The belief that the number of inquiries represents an equal number of individual orders is at times misleading. As a matter of fact, only one concern is in the market, and others are purely supposititious.

Generators furnish a good example of the situation in most lines of electrical equipment. The demand for them has been stimulated and maintained by the corresponding scarcity in new goods, deliveries just now being made for orders placed at the first of the year.

Supply parts are also far behind in delivery arrangements, and the immediate future is disclosing no daylight in this respect. The government or official buying price on copper is not affecting the sale of finished goods. A recent purchase of ribbon wire—bare copper—was made at 50 cents a pound, and the buyer was quite pleased to have it placed at his disposal at this quotation. The second-hand trade is not figuring on any cut in price for specialties or supplies in which copper is a component part.

Government Curtails Sheet Steel Deliveries

Shortage of Steel Necessitates Certain Manufacturers Resorting to Wooden Cars Excepting on Light-Weight Types

During the spring—or in April to be exact—the federal government, under a statute enacted by the existing Congress, requisitioned all the sheet-steel rolling plants of the country for various purposes, but particularly to roll tin plate to meet the demand for food containers required in enormous quantities by the military service. Manufacturers of all kinds who employ sheet, especially in a large way, were thereupon notified that the supply in the future would be curtailed at least 20 per cent for an indefinite period and that they should govern their operations accordingly. Considering the stocks in hand, the shortage was not immediately felt, but now the curtailment is very much in evidence. Car builders and electrical manufacturers were particularly hard hit by this action.

The leading manufacturers were not long in taking action, and buyers of machinery and all equipment of which sheet steel was an important constituent were notified that their requirements would be proportionately reduced. The output of sheet steel has since been distributed from the mills under governmental regulations and supervision. What remains after official needs are satisfied is distributed on an allotment basis. The mills accepted all orders as usual, but deliveries cannot and will not be guaranteed; hence manufacturers of finished products are in turn obliged to adopt the same tactics toward their respective customers.

In some instances the curtailment of the sheet-steel supply exceeds 20 per cent, ranging from 25 to even 50 per cent in some descriptions of apparatus, as the government decides. This is especially true of transformers. There is neither appeal nor recourse, and no attempt is made to mitigate the rigor of the federal order. Public service customers as well as private ones have accepted the restriction in like spirit. The apportionment has not proved vexatious or embarrassing as yet, but the buying trade is not infrequently "up in the air" when making estimates for large units. The manufacturers are equally perplexed when the question of deliveries is reached. The shipments of sheet steel from the mills vary so greatly or are strung along in such a manner that by the time notification is given that the last lot is ready or on the cars an indifference as to its receipt in connection with some particular order is plainly apparent. In deference to this state of

mind, as expressed by one of the leading apparatus makers, the order may as well be canceled.

Owing to the fact that the government is commandeering practically all the heavy gage sheet steel and the heavier sections of structural material for shipbuilding purposes, certain of the car builders are now forced to quote exclusively on wooden cars when the heavier types are demanded.

Fortunately, builders generally of the light-weight, one-man car in their far-sighted anticipation of an increasing demand for this type of equipment placed large orders for the lighter sections and sheets required for their manufacture. They now, so far as could be learned, have sufficient stocks of these materials on hand and have enough on order to dispel apprehension as to the immediate future.

For the heavier cars, however, stocks in car builder's yards, it developed on inquiry among manufacturers, are practically exhausted and to get the material on orders placed at this time it is stated is almost without exception out of the question.

Of the light-weight, one-man cars, between 600 and 700 are understood now to be under construction. Practically all of these are being built against orders already placed. The materials on hand and ordered, it is reported, are sufficient for the production of a similar number of cars of this type, at least.

Crossing Signal Business Looking Up

Increasing Volume of Traffic with Attendant Accidents Propelling Roads Into Market for Additional Protection

While conditions in the market for various types of automatic crossing signals have been rather quiet for some time, there seems to be a general feeling over the country indicative of favorable business prospects for the coming months. As the amount of traffic is increasing upon the railways, generally, there is also an increased number of crossing accidents. The railroads are naturally very anxious to avoid this destruction of life and property and also to do everything in their power to reduce their liability in damage suits. The automatic crossing signal is recognized as offering a substantial aid in this direction, and there are evidences of plans for purchase of additional crossing protection during the next few months.

NEW YORK METAL MARKET PRICES

	Sept. 26	Oct. 3
Prime Lake, cents per lb.	23 1/2	23 1/2
Electrolytic, cents per lb.	23 1/2	23 1/2
Copper wire base, cents per lb.	36	35
Lead, cents per lb.	8	8
Nickel, cents per lb.	50	50
Spelter, cents per lb.	8 1/2	8 3/4
Tin, Straits, cents per lb.	62	60 1/2
Aluminum, 98 to 99 per cent, cents per lb.	41 1/2	39

OLD METAL PRICES—NEW YORK

	Sept. 26	Oct. 3
Heavy copper, cents per lb.	23 1/2	23 1/2
Light copper, cents per lb.	20 1/2	20 1/2
Red brass, cents per lb.	19	19
Yellow brass, cents per lb.	16 1/4	16 1/4
Lead, heavy, cents per lb.	7	7
Zinc, cents per lb.	6	6
Steel car axles, Chicago, per net ton.	\$42.00	\$41.00
Old car wheels, Chicago, per gross ton.	\$31.00	\$25.00
Steel rails (scrap), Chicago, per gross ton.	\$35.00	\$30.00
Steel rails (relaying), Chicago, per gross ton.	\$55.00	\$55.00
Machine shop turnings, Chicago, per net ton.	\$17.00	\$16.00

RAILWAY MATERIALS

	Sept. 26	Oct. 3
Rubber-covered wire base, New York, cents per lb.	36	35
Rails, heavy, Bessemer, Pittsburgh.	\$38.00	\$38.00
Rails, heavy, O. H. Pittsburgh per gross ton.	\$40.00	\$40.00
Wire nails, Pittsburgh, per 100 lb.	\$4.00	\$4.00
Railroad spikes, 9/16 in., Pittsburgh, per 100 lb.	\$7.00	\$7.00
Steel bars, Pittsburgh, per 100 lb.	\$4.50	\$4.50
Sheet iron, black (24 gage), Pittsburgh, per 100 lb.	\$8.85	\$8.85
Sheet iron, galvanized (24 gage), Pittsburgh, per 100 lb.	\$9.55	\$9.55
Galvanized barbed wire, Pittsburgh, cents per lb.	4.85	4.85
Galvanized wire, ordinary, Pittsburgh, cents per lb.	4.65	4.65
Cement (carload lots), New York, per bbl.	\$2.22	\$2.22
Cement (carload lots), Chicago, per bbl.	\$2.31	\$2.31
Cement (carload lots), Seattle, per bbl.	\$2.65	\$2.65
Linsed oil (raw, 5 bbl. lots), New York, per gal.	\$1.20	\$1.22
Linsed oil (boiled, 5 bbl. lots), New York, per gal.	\$1.21	\$1.23
White lead (100 lb. keg), New York, cents per gal.	11	11
Turpentine (bbl. lots), New York, cents per gal.	44	47

ROLLING STOCK

Portland, Thomaston & Camden Street Railway, Rockland, Me., will purchase a snow plow.

Pittsburgh County Railway, McAlester, Okla., has placed an order for several pay-as-you-enter cars.

Point Pleasant (N. J.) Traction Company is in the market for one light-weight single-truck open car.

Harrisburg (Pa.) Railways has ordered from The J. G. Brill Company five double-truck semi-convertible cars, to be mounted on 27-in. M.C.B. trucks. The cars are for March, 1918, delivery, and are duplicates of cars now being operated by the Harrisburg company and built by The J. G. Brill Company.

Brooklyn (N. Y.) Rapid Transit System has sent out specifications for bids to be opened on Oct. 15, for 250 center-entrance motor or trail cars of steel or semi-steel and of dimensions, design and equipment substantially the same as the 101 center-entrance motor cars now in service. Bids are also called for to cover the complete installation of all operating equipment on each of the types bid upon. Two 40-hp. motors are specified in the case of motor cars with control of multiple-unit type or modified K. Couplers, draft, gear, etc., are specified to permit train operation. The pneumatically-operated door mechanisms are to be controlled through electro-pneumatic push buttons and are to be so interlocked with the control circuit that a car cannot start until the doors are closed nor the doors opened until the car has come to a full stop. The lighting fixtures may be similar to those in the New York Municipal cars instead of using bare lamps.

TRADE NOTES

Poole Engineering & Machine Company, Baltimore, Md., has recently opened branch offices in Minneapolis, Minn., and Pittsburgh, Pa. The Minneapolis office is at 716 McKnight Building, in charge of R. L. Lunt, and the Pittsburgh office at 433 Union Arcade, in charge of J. P. Flippen.

Holden & White, Inc., Chicago, have received an order from the Inter Urban Railway, Des Moines, Iowa, for thirteen Wasson air-retrieving trolley bases. These bases are for a complete equipment of the cars. An order has also been received by this company from the Chicago, North Shore & Milwaukee Railroad for twenty-two car equipments of Reliance air sanders.

Multi-Refillable Fuse Company, Chicago, has opened a branch office at 120 Liberty Street, New York City, with James W. Morey in charge as Eastern sales manager. A liberal stock of both refillable and non-refillable fuses will be carried at this branch. Mr. Morey has been actively engaged in the electrical supply business for the last ten or twelve years and is widely acquainted in the Eastern territory.

American Car & Foundry Company is now removing its purchasing and auditing departments from St. Louis, Mo., to New York City, where they will be located in the Hudson Terminal Building, 30 Church Street. Location in the Hudson Terminal Building is made necessary by lack of room in the Investment City Building, 165 Broadway, where the chief executive offices are quartered. The company will not be ready for business at its new address before Nov. 1. This will leave in St. Louis only the operating department, under the management of J. M. Buick, vice-president.

John E. Woods, formerly manager of sales of the Carnegie Steel Company, Illinois Steel Company and the Tennessee Coal, Iron & Railroad Company, Cincinnati, Ohio, has been appointed assistant general manager of sales with offices in the Carnegie Building, Pittsburgh, Pa., in succession to John W. Dix, who died on April 28. The appointment was effective Sept. 15. The advertising and statistical work of the Carnegie Steel Company has, however, been separated from the sales work proper, and, effective Oct. 1, R. B. Woodworth was appointed advertising manager and sales statistician.

Sanford Riley Stoker Company, Ltd., Worcester, Mass., has arranged for additional manufacturing facilities in Detroit, Mich., at the plant of the Murphy Iron Works. No change in the management or policy of the latter will

be made, but they will continue the manufacture of the Murphy automatic furnace, increasing their facilities as required for the production of Riley stokers. R. Sanford Riley of Worcester has been elected president of the Murphy Works. The B. F. Sturtevant Company of Hyde Park, Mass., will continue to manufacture and act as selling agents for the Sanford Riley Stoker Company.

Worthington Pump & Machinery Corporation, New York, N. Y., announces the opening of a new branch sales office in the American Trust and Savings Bank Building, Birmingham, Ala., to take care of a portion of the very large territory hitherto controlled by the Atlanta office. Edward Stauverman, formerly with the Atlanta office, will be in charge of the Birmingham office as manager. The territory controlled by the Birmingham office will be most of Alabama and Florida and part of Georgia. North and South Carolina and that portion of Georgia north of the Seaboard Air Line will continue to be served by the Atlanta office under the management of A. W. Jones.

Union Carbide & Carbon Corporation, New York, N. Y., organized in New York, with 3,000,000 shares of no nominal par value, will acquire the following companies: Union Carbide Company, National Carbon Company, Inc., Prest-O-Lite Company, Inc., and Linde Air Products Company. Myron T. Herrick will be chairman of the board of directors and George O. Knapp president. In addition to these two, the board of directors will consist of C. K. G. Billings, Charles A. Coffin, Jesse J. Ricks, Andrew Squire, Nicholas F. Brady, G. W. Davison, Conrad Hubert, James Parmelee, Roger C. Sullivan, F. C. Walcott and James N. Wallace. Other officers will be Edgar F. Price, Giles W. Mead, M. J. Carney and J. S. Crider, vice-presidents; H. E. Hackenbery, secretary, and Giles W. Mead, treasurer. In the exchange of securities Union Carbide Company stockholders will receive two and one-half new shares for each present share. Prest-O-Lite Company stockholders will be given two shares of new stock for each old share. Linde Air Products Company holders will have three and one-quarter new shares for each existing share. Stockholders are asked to send stock for exchange to the Central Trust Company, New York, up to Oct. 31. The Air Reduction Company, which it had been reported would be part of the combination, was not mentioned in the announcements issued this week.

NEW ADVERTISING LITERATURE

Link Belt Company, Chicago, Ill.: Book No. 342, describing "Casings for Link-Belt Silent Chain Drive," has been mailed the trade.

Du Pont Company, Wilmington, Del.: A "Handbook of Explosives" containing full instructions as to "how" to handle and use explosives.

"Automatic" Sprinkler Company of America, New York, N. Y.: A booklet entitled "The Present Safety," which goes into the method of fire control.

Walter A. Zelnicker Supply Company, St. Louis, Mo.: Bulletin No. 220, now ready for the trade, furnishes a revised list of the lines of apparatus, machinery, supplies, etc., in which they specialize.

Reliance Electric and Engineering Company, Cleveland, Ohio: Bulletin 1014 describing the Reliance adjustable speed motors, armature shifting design for direct current. The principles of operation and mechanical construction are treated in detail.

American Abrasive Metals Company, New York, N. Y.: Reprint of "The Common Cause and Prevention of Industrial Casualty," an address recently delivered before the American Society of Safety Engineers by H. W. Mowery. The subject is adequately discussed from essential angles.

Westinghouse, Church, Kerr & Company, New York, N. Y.: "Teering Up with a Suction Bridge" is a color-illustrated folder, describing the converting of a stretch of marsh land at Long Beach, L. I., N. Y., into an eighteen-hole golf links, protecting it from the inroads of the ocean. The work was done by the Westinghouse company as engineers for the Lido Corporation. The accomplishment of the proposition is in purpose one of the most unique things ever done by the company.