Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

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Standardization Is More Than Ever a Timely Topic

IN LOOKING forward to the 1919 convention of the Engineering Association one tries to visualize what he would like to see in the program. Involuntarily his mind turns to standardization, now more timely than ever because everything costs so much more than it did before the war. Before anything new in this line is started, it would be profitable to ask why present association standards are not more widely used, so that future standards may be more closely fitted to the industry's needs. A lot of unused standards on the books do not add to the association's usefulness and prestige. Better a few in daily use than many "damned with slight regard," to paraphrase a well-known quotation. There are, however, some fields for new standards which might be entered at this time. Take, for example, the matter of car design. Here a beginning might be made in unifying certain dimensions for the purpose of utilizing standard materials and thus reducing cost. Many detail parts of a car and its equipment are subject to some standardization. Track special work also might come in for attention, a good place to begin being the report on spiral standardization by E. M. T. Ryder prepared originally for consideration by the committee on way matters and printed in the form of an article in the issue of ELECTRIC RAILWAY JOURNAL for April 6, 1918, page 649. Most important of all, the engineers should determine just what they can do best to help in the reconstruction work and then "get busy" in the coming year to do that and only that.

Why Not Stake the Manufacturer?

TEMPORARILY the electric railway industry is in the dumps, but perhaps for that very reason the manufacturer of electric railway devices has never tried harder to help his customers. It is our frank opinion, however, that electric railways are not meeting the manufacturer half way as often as they ought when it comes to the question of inventing or adapting something to meet their needs exclusively. They expect him to hear without murmuring all the development expenses and do not always give him at least the comfort of being without competition. Thousands of dollars are spent. Then, to cap the climax, the bidders may be told that the devices offered are not perfect, that the board of directors won't approve the appropriation or that the price is too high as compared with some stock article that weighs as many pounds, contains as much material or that stands as many inches high or wide!

As a matter of simple justice, any railway that wants something unusual should be willing to bear a part of the development charges—all the more so as the device, though satisfactory for its own conditions, may be worthless everywhere else and may also impose a future burden upon the manufacturer because of storage and other charges in connection with special patterns, jigs, tools, etc. No manufacturer relishes being put in the position of appearing to charge an excessive unit price just because the order is special. He would far prefer to sell at a price comparable with his standard output. This he can do only if the development charges for a special application are billed and paid for as a separate item instead of being concealed in the unit selling price. Then the customer will not look upon the manufacturer as a monopolistic profiteer, while the manufacturer will feel encouraged to develop his inventive facilities to the utmost.

What Equipment Tests Are Necessary or Desirable?

TESTS of electric railway equipment are of two kinds; those which are made during and immediately after the construction of the apparatus to determine the fitness of the materials used and to make certain that the workmanship is all that is desired, and service tests with the assembled equipment operated under every-day conditions. Tests of the latter type are analyzed in an article in this issue by C. W. Squier. The tests which he outlines are very extensive and are such as are frequently made on large electric railway systems. On smaller properties there are not the facilities or instruments for carrying out tests on such a large scale and on these properties the managers would, no doubt, consider the cost of making elaborate tests to be prohibitive. Certain of the tests discussed may, however, be within the reach of the smaller properties, and all can gain much information from this article as to how such tests should be carried out. For the purpose of enabling them to supplement and check manufacturers' claims, a number of roads maintain quite complete testing organizations. The care which they take in testing their equipment shows that they appreciate the importance of this work. The same conviction as to the value of careful testing should pervade even the smallest roads, where the spirit of getting at the root of difficulties by resorting to some form of test rather than by cut-and-try repair methods should be fostered.

For apparatus to be tested by a railway, is no disparagement of the exhaustive work of this character which is done by manufacturers. We all know that the latter have systematized testing procedure until it is well

nigh a science. Furthermore, it is the custom of manufacturers to follow up the performance of their equipment in service to enable them to make good any defects in design or workmanship. A little later we plan to publish some articles showing just what the manufacturers do along this line. However, even when the railways receive their equipment in perfect condition, it is necessary to maintain some kind of periodic testing work, with occasional special investigations, in order to determine whether or not the equipment continues to do what is expected of it.

Engineering Association Wisely Decides to Go Forward

THE ELECTRIC RAILWAY JOURNAL has deplored the fact that the American Electric Railway Engineering Association did not continue its activities during the war period, and has expressed this thought on several occasions. It seemed to us and to many others that the association was needed, if ever, to assist its members in doing their work well under adverse conditions. To be sure, it would not have been easy to work under war conditions, and the lines of activity would necessarily have been modified and curtailed; but much could have been done. In view of this conviction we are pleased to note that, after cessation of association activity for many months, the executive committee has opened the throttle and the machinery will soon be in operation again.

For the present attention will be focused on but a few subjects, but these will be selected by a specially appointed committee on subjects which will presumably have several considerations in mind, as follows: First, railway men competent to do effective committee work are heavily overburdened due to the run-down condition of physical equipment. Second, a very limited period is available for the preparation of reports. Third, the program for the convention should be made interesting, stimulating and constructive—in other words, the antithesis of tiresome. Fourth, whatever is done now, whatever is said and done at the convention, and whatever plans are laid for future work, all should be done with the definite object of helping to get electric railways back onto their feet.

To the above end a commendable step was taken by the executive committee in deciding to ignore the present committee organization in preparing a program, in order that the future work may be unhampered by tradition, precedent or committee personnel. As we have pointed out editorially before, there is in the electric railway association (and elsewhere as well) a tendency to keep committees going almost regardless of what they do. Committees are appointed for special purposes, but they are frequently not discharged when they achieve this purpose or prove their incompetence by failing to do so. It is a favorite diversion at public meetings to appoint committees for this or that purpose, sometimes without due consideration. The average committees so appointed do little, prepare perfunctory reports which make unattractive programs, and drag on a miserable existence until somebody suggests that they be "discharged with the thanks of the association." Now is a good time for a committee clean-up in all fields.

Temporary War-Time Construction May Now Have Become a Menace

TEMPORARY structures are quite as much a part of the necessary equipment of a construction company as are wheelbarrows and hammers. But useful as they may be while construction work is on they constitute a menace as well as a nuisance if permitted to remain, and, therefore, like the wheelbarrows and brickbats they should be carted away when the job is finished. We as a nation have just been engaged in one of the largest rush-order construction jobs ever tackled by any people—the creating out of nothing and over night, as it were, of a mighty military machine. We have done the job and in doing it we have had a perfect orgy of temporary construction. As a people we have spent enough money on such construction to build a Panama Canal, an Assouan Dam, and irrigate a chain of small deserts besides. It was all necessary, and we are not bemoaning the expenditure of time, money and materials. The electric railways have done their share along with the other industries. Some of their temporary structures were built because the money was not available to build otherwise, others because the need was known or thought to be transient.

Great as the immediate need of these structures may have been or may now be their presence carries with it a certain element of risk. Regarding them, the motto of the insurance companies is "Beware." Every insurance man knows that a temporary building once in service in the operating field is likely to remain where it is until it either falls down or burns down. In such service not only are they risks themselves but they constitute risks to neighboring property as well. This is the more true since, because of its convenience and general availability, wood is the building material commonly used. Owing to advances in the building art comparatively cheap temporary structures can be built with such materials as concrete, metal lath and plaster, and their use seems desirable wherever temporary operating structures are necessary. In any event, however, a temporary structure should be removed at once when its immediate purpose has been served.

What Causes Curve Resistance?

"CURVE resistance has never been exhaustively investigated, and our knowledge is in several respects deficient." So wrote A. M. Wellington many years ago. Despite the fact that we have developed refined methods of measurement and learned a vast deal about the mechanics of railroading since Wellington wrote the classic volume, "Economic Theory of Railway Location," the statement quoted pretty well sums up the present status of the matter. To engineers who have ever had anything to do with railway location or the selection of motive power, curve resistance possesses a certain fascination. This is because of the presence of some elusive variables which so far have escaped being charted to everybody's satisfaction.

Various theories have been propounded to account for curve resistance. By some writers centrifugal force is assumed to play a major part. Others account for it on the basis of obliquity of traction, that is to say, of the tendency of a train passing around a curve to draw itself straight. Still others believe that the skidding

of the wheels incident to the different distances traveled by the inner and outer wheels of an axle is the cause. In a paper contributed by Bulletin 207 of the American Railway Engineering Association, J. G. Sullivan discusses the older theories and presents one of his own which seems to possess some merit.

Mr. Sullivan discounts the centrifugal force theory because with proper superelevation of the outer rail the action of centrifugal force is simply to place more of the weight of the car body on the outer rail. He considers the obliquity of traction theory absurd since a locomotive will push practically as many cars around a curve as it will pull, and all experience has been that it is the outer rail head reather than the inner one that is cut away. Regarding the skidding of the wheels along the rails, Mr. Sullivan makes the point that, even assuming a coefficient of friction of 22 per cent, only one-fourth of the force usually assumed to represent curve resistance would be accounted for.

His own theory is that the reason that the outer wheels "exert a pressure against the outer rail on a curve is the fact that a revolving cylinder tends to rotate on a straight line perpendicular to the axis of rotation"; in other words, he attributes the attempt of the outer wheel flanges to climb the rail head as due to the gyroscopic action of the wheels.

It has been customary to express curve resistance either in terms of grade which would produce an equivalent resistance or as a certain number of pounds per ton per degree of curve. Such expressions neglect the effect of speed and track and truck conditions. If the gyroscopic theory is the correct one it would be expected that curve resistance would vary as some power of the speed. Tests reported in Bulletin 92 of the Engineering Experiment Station of the University of Illinois indicate the truth of this assumption. Other tests made by Prof. L. E. Endsley for the American Steel Foundries show that curve resistance is affected to a very marked degree by the condition of the track rails, truck frames, and wheel treads and flanges. While many experimenters have worked on the problem and a great many more engineers have formulated opinions relative to it, there seems to be nothing available inclusive enough to serve as a basis for general reasoning.

In view of the almost negligible amount of construction work in progress the matter of curve resistance is not of very great interest at the present time. It has never received as much attention as true train resistance because it is usually much smaller in magnitude and, besides, curves ordinarily form a small percentage of the mileage of a railway. These engineers, however, who have to do with mountain grade steam railway electrification could well make use of a more exact knowledge of the subject, as mountain roads have a great deal of curvature, and in some cases the use of special rolling stock is involved. For such equipment the old arbitrary figures of 0.7 or 0.8 lb. per ton per degree of curve do not necessarily apply. At any rate it is better engineering practice to base empirical formulas on known facts than on guesswork and tradition. With the possibilities of accurate power measurement afforded by electric traction and with the recent developments in methods of measuring track stresses, an extensive new investigation of the subject should yield results of considerable technical value.

How Far Can Wages Be Standardized?

IT IS NOW more than five months since the first wage awards to electric railway employees were made by the War Labor Board. The results to the companies following the fixing of comparatively high wage scales for these men have been reviewed from time to time in these columns, and it is conceded generally that these awards brought to a crisis the financial difficulties of many a transportation agency. The harm has been done, however, and there is no prospect of relief from the wage burden unless at the end of six months the companies are able to make a showing which will convince the board that an injustice has been done in any case or that new conditions have arisen which warrant a change.

In this connection some thought might be given to the question of requesting the War Labor Board to depart from its policy of attempting to fix standard wages. This principle undoubtedly was adopted as one of expediency during war times. But the point might well be raised as to whether this policy is strictly fair. In the November issue of the Monthly Labor Review of the United States Bureau of Labor there is an article entitled "Comparison of Food Costs in Forty-Five Cities." From this article one is likely to form the conclusion that if the establishment of a 48-cent maximum wage per hour in a number of cities is fair to some companies, it must inevitably work an injustice on others.

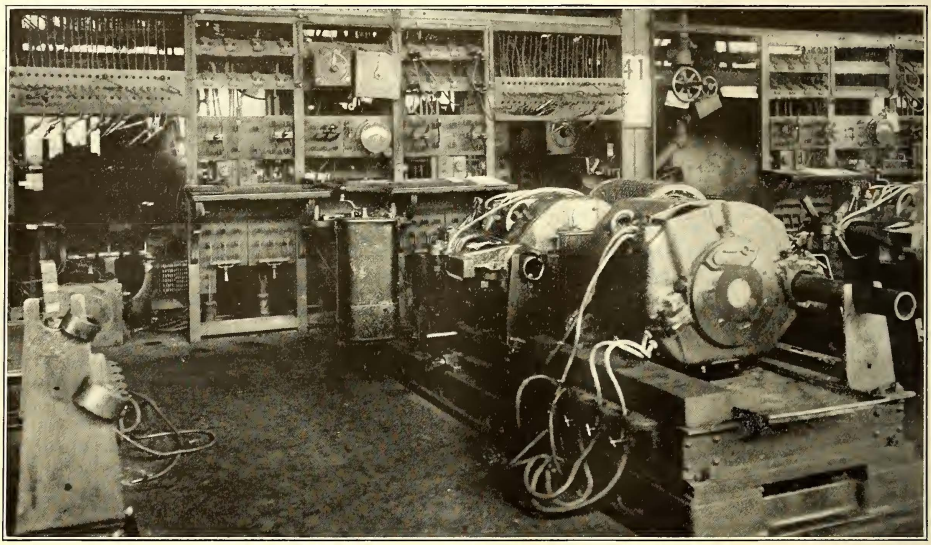
It is true that the board departed somewhat from a fixed standard when it established a 42-cent maximum in some districts, 45 cents in others and 48 cents in still another group of cities. But even these distinctions do not appear to have been based on a careful weighing of "local conditions," if one is to judge from the weighted averages of food prices as listed in the article mentioned above. One finds, for instance, that, as compared with an average of 100 for the United States as a whole, the food cost averages in four of the cities having a 48-cent maximum wage scale for trainmen are 94.20, 98.74, 99.63 and 99.95, while another city for which the 48-cent wage was recently established has an average of 115.02. It is true that these percentages are based entirely on food costs and on only a portion of the articles constituting the entire expenditure for food. Inasmuch as food costs take about 40 per cent of the average expenditure in the cost of living, it is not unlikely that similar differences would be found to prevail on the other items in family maintenance in various localities. To this extent at least there is shown a decided lack of uniformity as between cities. In fact, this contention has been made frequently by employers and employees alike in arbitration hearings where wage scales were the subject of discussion.

If some of the cases over which the War Labor Board has jurisdiction are to be reopened during the next few months the question might well be raised as to whether the interests of justice are best served by the continuance of the present policy of fixing standard wages.

Electric railways can now supply data to show just what effect the standardizing has had upon their operating problems.

Car Equipment Service Tests Determine Fitness of Apparatus

By C. W. SQUIER
Electrical Engineer



RAILWAY MOTOR TEST AT MANUFACTURER'S PLANT

The Author Describes the Methods of Making Operating Tests and Heat Runs, Tells How Sections of Test Track Can Be Best Laid Out to Represent Actual Service Requirements, Outlines the Organization Necessary for a Proper Test Force and Gives the Results Obtained in a Specific Test

BEFORE ordering the equipment for electric railway cars the operating and designing engineers of the railway devote a large amount of time to preparing specifications and working out the proper materials and apparatus necessary for satisfactory operation. As soon as the manufacturer begins his work on the various parts which enter into the equipment, inspectors from the railway follow the construction carefully to make certain that the material is proper and is used as called for in the specifications.

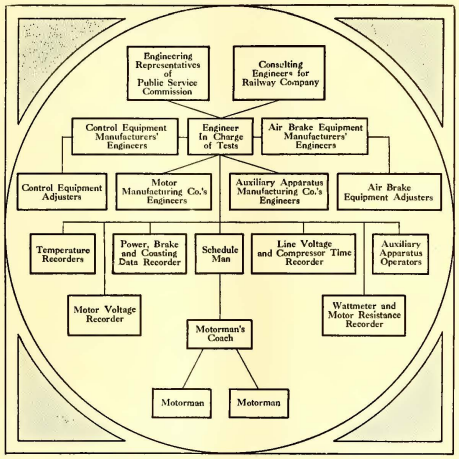
Preliminary tests are usually made at the manufacturer's plant for determining the fitness of the apparatus for the service conditions to be encountered. These commercial tests are intended to locate any defective material that may have been used and also to make certain that the workmanship is up to the standard expected. They are very important and the various manufacturing concerns have provided very complete testing facilities. Each separate piece of apparatus which goes to make up the complete equipment of an electric car is given test after test from the time that its construction is first started until it is assembled for the final running tests. After it has passed the commercial tests at the manufacturer's plant the equipment is usually shipped to the railway company for installation on the completed cars.

After the equipment is received and installed on the cars the officials of the road naturally want to know if it is going to give the service specified satisfactorily and otherwise meet the operating conditions laid down in the specifications. Tests are necessary if this is to be determined with any degree of accuracy. These should preferably be made under actual operating conditions approximating as nearly as possible the service as given in the specifications under which the equipment was purchased. These tests should extend over a considerable period. If made on lines where passenger service is maintained they will seriously interfere with regular operation. It is therefore preferable where possible to to make use of a section of track not used for regular service, but very few roads have such track. Sometimes by rerouting the cars on a portion of a line temporarily, or by using only one track of a double-track section for passenger traffic, a short portion of a line can be made available for test purposes. Most tests except the service-heating test can be made during the off-peak hours.

This usually requires from eight to twelve hours of continuous operation and if it is interrupted for even a few minutes the results become worthless, and the test must be made over again.

TEST RUNS SHOULD APPROXIMATE ACTUAL SERVICE CONDITIONS

With a certain section of track available for the test the first thing to be done is to lay out runs along this track of lengths so as to reproduce the service specified. To illustrate the procedure I shall describe briefly a series of tests of which I recently had charge. The cars were for operation in both local and express service on a high-speed line using train operation. The control equipment was of the multiple-unit type and two motors were used per car. The tests were carried out with a two-car train on a section of track about 3 miles in length. For the motor heating tests, local and express runs were chosen which represented the most severe conditions. Table I gives a comparison of the specification distances and the distances actually laid out for the test of express service. A complete trip was 43,380 ft. long and was made up of six runs of varying length. As the test track was not long enough to make a complete trip operating in one direction, the various runs were made by operating back and forth over the test section. It was, of course, necessary that the point of ending each complete trip should be the same as the starting point, for test operation must be continuous until the apparatus reaches constant temperature. In order to bring the runs back to the starting point the express runs of 9560 ft. and 9870 ft. as given in Table I were changed to 9650 ft. and 9780 ft. respectively by adding and subtracting 90 ft. from the actual distance of these runs. The chart given on page 130 shows the various runs as laid out with the different grades of the lines.



ORGANIZATION CHART OF TESTING FORCE

STOPPING SIGNS ARE OF GREAT ASSISTANCE

The various stopping points were indicated by large white signs with black numerals printed thereon. These stopping signs were located on the right-hand side of the track as they were being approached by the train. The motorman's operating cab was located on the right-hand side of the car when facing the front end, and this location of the signs was most convenient for the motormen. All lengths of runs were laid out so that the front end of the train would stop opposite the stop sign. Where the direction of operation was changed, as was necessary in operating back and forth on the test section of track, allowance had to be made, of course, for the length of the train, so that the motorman at each stop could bring the front end of the train to rest opposite the stop sign in each case. By using large signs with conspicuous numerals painted on them the motorman was able to see where the stop was to be made a considerable distance in advance of the stopping point. An accompanying illustration shows one of these stopping signs in position. For the test a two-car train was used and it was loaded with bags of sand to give a weight equal to that of a standing load of passengers. The motor equipment consisted of two motors per car mounted one on each truck. By the use of two cars the difference in temperature of the motors at the ends and in the center was obtained. For operating the train two motormen were used, one at each end of the train. This was necessary as the duration of stop was insufficient for the motormen to change ends. The complete test force was as follows: One engineer in charge; two motormen; one motorman's coach; one schedule man; one power, brake and coasting data recorder; one line voltage and compressor operation recorder; one motor voltage recorder; one wattmeter and motor resistance recorder; eight temperature recorders, and two auxiliary apparatus operators. The entire testing force was under direct supervision of the engineer in charge of the tests.

In addition to the test force the various manufacturers of the equipment under test had engineering representatives present and workmen ready to make any adjustment of the equipment that was considered necessary. Representatives of the Public Service Commission and various consulting engineers for the railway also assisted the engineer in charge of the tests. An organization chart of this test force is shown in an accompanying illustration.

TABLE I—DISTANCES AND RUNNING TIME FOR EXPRESS RUNS IN MOTOR-POWER-CONSUMPTION AND HEATING TESTS

Specification Distances, Feet	Distances Used, Feet	Running Time, Min.	Running Time, Sec.	Duration of Stops, Seconds	Total Time, Min.	Total Time, Sec.
6,770	6,770	2	34	30	3	4
9,560	9,650	3	32	30	4	2
3,930	3,930	1	43	30	2	13
9,870	9,780	3	35	30	4	5
8,110	8,110	3	4	30	3	34
5,140	5,140	2	12	30	2	42
43,380	43,380	16	40	180	19	40

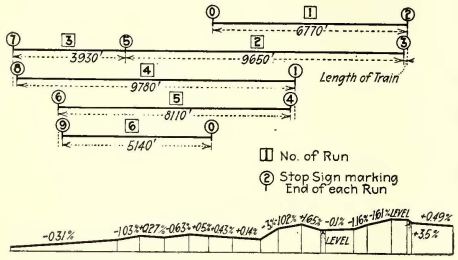
Average length run, 7,230 ft.; schedule speed, 25.05 m.p.h.

TEST INSTRUMENTS USED

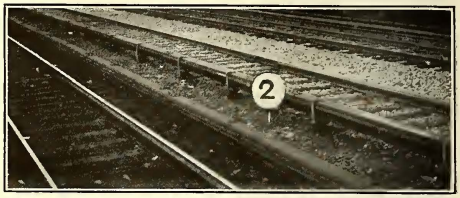
All test instruments were located in one car and the connections for the various instruments are shown in an accompanying illustration. Three wattmeters were connected as follows: The first in the main motor cir-

cuits measured the total power used for propelling the car. The second in the battery circuit measured the power used for operating the control, air brakes, door apparatus, signal system and other auxiliary apparatus using battery current. The third was connected in the compressor, heater and light circuits and was arranged with switches so that the power used by each could be measured separately.

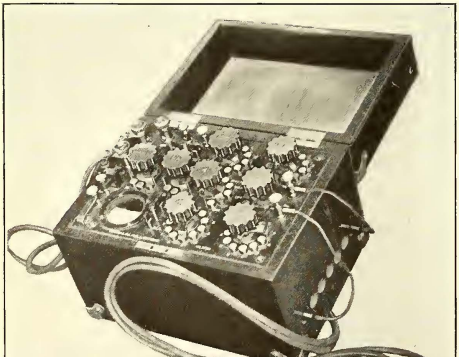
Indicating ammeters and voltmeters were also installed as follows: A voltmeter was connected to indicate line voltage. A second voltmeter was connected to show the voltage across No. 2 motor and by the use of a single-pole double-throw switch to read the voltage across the tapped field of the same motor also. A third voltmeter was connected to show the voltage of the battery. Ammeters were connected in the main motor circuits to give the total current used in propelling the car, in auxiliary circuits to show the current taken by the compressor, the lamps and the heaters, and in the battery circuit to indicate the current taken in operating the various pieces of apparatus using battery current.



HEATING TEST RUNS FOR EXPRESS SERVICE



STOPPING SIGN IN POSITION ON TEST TRACK



TESTING SET FOR MEASURING RESISTANCE

A Queen's "dial decade" testing set was connected across the full field of No. 2 motor on the test car. The resistance of this field was measured at the end of each complete trip and from these readings the temperature of the field winding was computed. As already stated this furnished an accurate method of determining when the temperature of the field had become constant.

An indicating lamp was connected in the circuit of the compressor governor so that this lamp remained lighted while the compressor was running. An observer was thus enabled by observing this lamp to record the time that the compressor was operating.

A Johns-Manville speed indicator with a friction device on one of the car wheels gave the speed at which the cars were operating at all times.

Thermometers were located inside the car, underneath the car at either end and in the center, and on station platforms, to give the temperature of the outside air. At the end of the heat test additional thermometers were placed inside the motors to give the temperature of the various windings and of the commutator.

Variations in voltage, current, speed, etc., are more accurately recorded where automatic recording instruments are used. In the particular tests outlined such instruments were not available but in a later series of tests made on this same equipment graphic recording ammeters and voltmeters manufactured by the General Electric Company were used. A chronographic mechanism was employed with these and with some pressure recording instruments installed in the air brake system. This provided a time record which was the same for all instruments and made it easy to transfer the records to a common sheet later. A graphic recording ammeter with time-marker clock is shown herewith.

Heating Test of Electric Car Equipment

SCHEDULE SHEET

Railway ..... Recorder ... John Burn

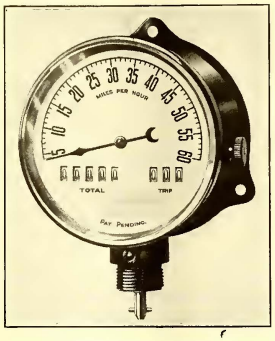
Date ... June 15, 1917 Checked By ... A. G. Mann

Service Express ..... Sheet No. ... 2

Run No.	Direction	Between Stations	Time at Start	Time at Stop	Schedule Time at Stop	Variation	Length Stop Sec.	Total Time Stops	Schedule Time Stops
		Trip No. 1							
1	West	0 to 2			2 Min 34 Sec				30
2	East	3 – 5			6 " 36 "				60
3	"	5 – 7			8 " 49 "				90
4	West	8 – 1			12 " 54 "				120
5	East	4 – 6			16 " 28 "				150
6	West	9 – 0			19 " 10 "				180
		Trip No. 2							
1	West	0 to 2			2 Min 34 Sec				30
2	East	3 – 5			6 " 36 "				60
3	"	5 – 7			8 " 49 "				90
4	West	8 – 1			12 " 54 "				120
5	East	4 – 6			16 " 28 "				150
6	West	9 – 0			19 " 10 "				180

SCHEDULE SHEET FOR ENTERING OPERATING RESULTS

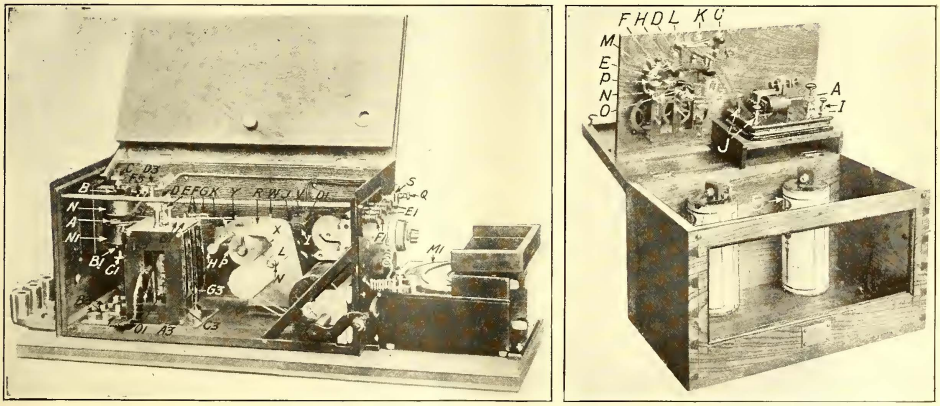
Previous to starting the tests several trial runs were made to determine the length of time necessary for power to be applied to the main motors to maintain the schedule speed desired. From the results thus obtained tables were made up, showing the time necessary to apply power in order to maintain the schedule as laid out for the various runs. To enable the motorman to maintain the schedule speed as laid out, a schedule man kept record of the running time and length of stop and also gave the signal for starting the train. These results were entered on schedule sheets, a sample of which is illustrated herewith. The schedule sheets contained the correct running time for comparison with the results obtained so that at each stop the amount that the motorman was ahead or behind schedule could be seen at a glance. The information was given to a second man who acted as motorman's coach. The coach had a set of tables, already referred to above, with the time that it was necessary to keep power on to maintain the schedule speed for the various runs. He was thus enabled to tell the motorman when to drop off or to resume power and where the next stop was to be. If the train was behind its schedule time the power was kept on slightly longer and if it was ahead of time power was dropped off sooner than for regular operation.



SPEED INDICATOR

voltages were read and recorded every five seconds, and the time that the compressor was operating was recorded. At the end of each trip the following readings were taken and records made: Readings of the wattmeters in the motor, compressor and battery circuits; resistance of the full field of No. 2 motor to check the temperature rise and determine when this had become constant; temperature readings inside the cars, underneath each end of the cars and on the station platform. On certain runs records were taken every five seconds of the speed of the train, the motor current, the compressor current, the battery current and the battery voltage. At each stop the doors and signal system were operated as they would have been in regular passenger operation. All parts of the equipment were thus subjected to operating tests representing the most severe conditions.

In making the temperature tests the various runs were continued for at least an hour after the resistance readings indicated that a constant temperature of the windings had been reached. When it was certain that no higher temperature would be obtained the runs were stopped and temperatures were taken by thermometer as follows: Air inside cars; air underneath each end of the car; air on station platform; and, armature coil, field core, commutator, main field and



GRAPHIC RECORDING AMMETER AND TIME-MARKER CLOCK
Letters are used to point out the essential parts.

This system worked out exceedingly well so that at no time there was a variation of more than a minute from the schedule. The braking was left entirely to the motorman, his only instructions being to make as smooth a passenger stop as possible at the point designated. He was also permitted entire freedom of operation in case of emergency.

The recorder of "power-on," coasting and braking time used a stop-watch and recorded the length of time that power was kept on and the amount of time used in coasting and braking. On the runs, line and motor interpole field, for each motor of the train. All runs were made with the covers on all motors, and in taking motor temperatures at the ends of the runs the motor covers were removed and the thermometers placed as rapidly as possible.

These cars were each equipped with a 32-volt storage battery which was of great assistance in providing light for reading the various thermometers. A separate 32-volt droplight, with a long flexible cord, was provided for each motor. These lamps were small so that they could be readily inserted in the various spaces inside

the motors and temperatures were thus able to be read without disturbing the thermometers. While such readings are being taken it is very important that all danger of shock from coming in contact with live parts be eliminated. The use of an auxiliary battery for the drop lights has a great advantage in this connection

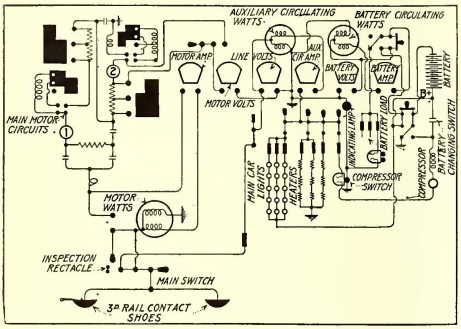
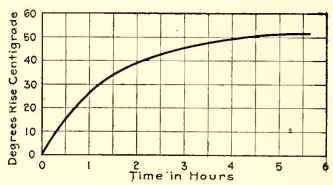


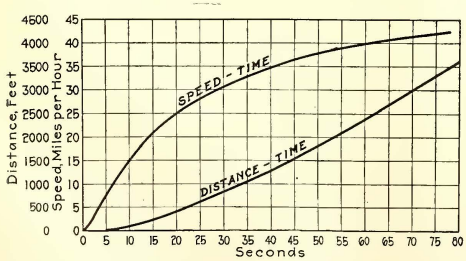
DIAGRAM CONNECTIONS FOR TESTING INSTRUMENTS

as all potential can thus be removed from all car equipment.

Before such a temperature test is started it is advisable to make certain that all covers can be readily removed from apparatus on which temperature readings are to be taken. In the first test of this nature with which I was connected it was almost impossible to remove several of the motor covers. The removal of covers out on the line is quite a different proposition from their removal in a shop provided with proper



MAIN-FIELD TEMPERATURE RISE AS COMPUTED FROM RESISTANCE MEASUREMENTS



ACCELERATION AND DISTANCE GRAPH FOR TEST TRAIN

facilities. Also such tests are usually made with cars loaded and the clearances between the tops of motors and the car body are often very small. In the particular case mentioned it took twenty minutes to remove the covers after the test was discontinued so that there was a considerable drop in temperature of the windings before the thermometers could be placed. This, of course rendered the results worthless.

Some Results of a Service Test

In the service heat runs which I have been considering in this article, runs corresponding to local service, express service and mixed local and express service were made on successive days. Constant temperature was reached in the main field winding of the motors in local service after six hours' operation, in express service after five and one-half hours and in mixed local and express service after five and one-half hours. The maximum temperature rise as taken by thermometers at the completion of the runs was 59 deg. Cent. above the surrounding air. This was found in the interpole

TABLE II—OPERATING DATA FROM TEST RUNS

	Local Service	Express Service	Mixed Local and Express Services
Average line voltage	537.6	550.0	551.6
Per cent of total time of "power on"	26.4	14.0	37.4
Per cent of total time coasting	44.1	53.6	34.6
Per cent of total time braking	11.3	17.9	11.6
Per cent of total time used by stops	18.2	14.5	16.4
Average rate of acceleration	1.5	1.5	1.5

TABLE III—COMPRESSOR PERFORMANCE, EXPRESS SERVICE

Trip No.	Total Time of Run, Min.	Total Time of Run, Sec.	Time Compressor Operated, Min.	Time Compressor Operated, Sec.	Per Cent of Total Time Comp. Operated	Av. Line Voltage	Kw.-Hrs. Used
1	38	56	15	28	39.72	529.3	1.0
2	38	11	15	42	41.11	547.3	1.3
3	38	27	16	37	43.21	533.5	1.3
4	38	02	15	38	41.10	543.9	1.0
5	38	16	13	35	35.50	547.4	1.2
6	38	43	13	30	34.86	546.0	1.0
7	38	30	16	16	42.23	557.2	1.2
8	38	36	15	16	39.55	557.6	1.2
9	38	50	15	05	38.84	564.9	1.4
10	38	44	14	22	37.10	556.3	1.0
11	38	52	16	08	41.51	556.7	1.2
12	38	21	15	32	40.50	552.7	1.2
13	38	39	15	12	39.32	552.7	1.2
14	38	42	16	00	41.34	555.0	1.3
Total,	539	49	214	21	39.39	550.0	16.5

Length of each run = 16.41 miles
Length of fourteen runs = 229.74 miles
Weight of car loaded = 120,000 lb. = 60 tons

$$\text{Compressor watt-hours per car-mile} = \frac{16{,}500}{229.74} = 71.82$$

$$\text{Compressor watt-hours per ton-mile} = \frac{71.82}{60} = 1.197$$

field windings after runs corresponding to local service were completed. The specification requirements were for a rise not to exceed 65 deg. when measured with thermometers. The motors thus met the requirements. An accompanying graph shows the temperature rise for express service as computed from the resistance measurements for the main field of No. 2 motor of the test car as already described.

Operating Results Corresponding to Different Service Conditions

In order to compare the operation of the test train with that of actual service the records obtained were averaged for the various runs. Table II gives the percentages of the various lengths of time that were consumed in coasting, braking and stops. Information is also tabulated for the percentage of total time that power was used and the average line voltage. The percentage of time taken by "power on" coasting and braking represent ideal conditions, as there were no extra stops or slow-downs for signals such as is encountered in regular service. Another accompanying

graph shows the acceleration of the test train on level tangent track up to a speed of 42.5 m.p.h.

The performance of the compressors on the cars in the test train, while operating in express service, is shown by the results given in Table III. This table will serve as an illustration of the type of data that are most desirable for comparing the performances of the various pieces of auxiliary apparatus comprising a complete car equipment. Similar data were compiled for other pieces of auxiliary apparatus making up the complete car equipment, such as heaters, door engines, signal equipment and lights, this latter being divided into head, tail, marker, emergency and main car lights.

TABLE IV—POWER CONSUMPTION MAIN MOTORS FOR TEST RUNS IN EXPRESS SERVICE

When Taken	Wattmeter Reading	Kilowatt-Hours
Start	2,174.2	
After run No. 1	2,240.6	66.4
After run No. 2	2,300.8	60.2
After run No. 3	2,362.7	61.9
After run No. 12	2,970.0	66.4
After run No. 13	3,037.2	67.2
After run No. 14	3,104.4	67.2

Total kilowatt-hours, fourteen trips, 930.2; multiplier, 1.047. Corrected total, kilowatt-hours, fourteen trips, 973.9194. Length each run, 86,760 ft. = 16.430 miles; length, fourteen runs, 230,020 miles; weight of car loaded = 120,000 lb.; kilowatt-hours per car-mile = $\frac{973.92}{230.02}$ = 4.234; watt-hours per ton-mile $\frac{4234}{60}$ = 70.567.

The power consumed by the main motors in propelling the car in express service is shown by Table IV. Similar results were worked out for all the different classes of service. These values were used to check the results obtained with theoretical values previously computed and later with tests made in actual service when passengers were carried in regular operation.

Costs of Maintaining Differential Gear Drive at Huddersfield

IN THE issue of the ELECTRIC RAILWAY JOURNAL for July 3, 1915, page 26, there was described a differential drive for electric railway cars which had been installed on a number of cars in Huddersfield, England. This has now been in use long enough to render data of maintenance costs both reliable and interesting. In response to a request for such data, R. H. Wilkinson, manager of the Bradford Corporation Tramways, has furnished Tables I and II. In each case ten cars are included and the tables cover two successive years, up to the end of September, 1918. The differentially geared cars operated on the Honley route, where the track is in very poor condition, but the other cars are running on good track.

Mr. Wilkinson calls attention to the fact that the comparison is hardly fair to the differential gears on account of the difference in track condition. The Honley route track is mostly single line with loops, whereas the cars with the ordinary gears were run on a double-track line with newer rails in first-class condition.

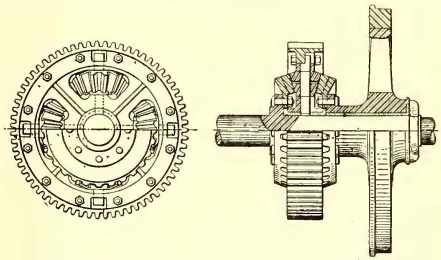
TABLE I—REPAIR COSTS OF TEN CARS EQUIPPED WITH DIFFERENTIAL AND ORDINARY GEARS, YEAR ENDED SEPTEMBER, 1917

	Differential Gears Labor	Differential Gears Material	Ordinary Gears Labor	Ordinary Gears Material
Gears	$110	$78	$66	$70
Axles and bearings	289	691	151	582
Car wheels, bushings and tires	184	935	113	848
Totals	$583	$1,704	$330	$1,500
Grand total:				
Differential gears				$2,287
Ordinary gears				1,830
Difference				457

TABLE II—REPAIR COSTS OF TEN CARS EQUIPPED WITH DIFFERENTIAL AND ORDINARY GEARS, YEAR ENDED SEPTEMBER, 1918

	Differential Gears Labor	Differential Gears Material	Ordinary Gears Labor	Ordinary Gears Material
Gears	$179	$507	$168	$317
Axles and bearings	447	655	271	594
Car wheels, bushings and tires	181	538	138	200
Totals	$807	$1,700	$577	$1,111
Grand total:				
Differential gears				$2,507
Ordinary gears				1,688
Difference				$819

He states further that the differential gears were introduced to eliminate rail corrugation trouble. Prior to the introduction of the new type gears on the Honley section the corrugations were ground out as far as possible by means of emery blocks attached to a car truck.



DIFFERENTIAL GEAR USED ON HUDDERSFIELD TRAMWAYS CARS

This work was done at night and it is possible that in a few places where the track was loose and uneven the grinding was not so effectively done as where the track was in good condition. Since October, 1914, this section has been worked entirely with the differentially-geared cars, and with a few slight exceptions corrugations have not reappeared. The exceptions are in places where the track is very loose on its foundation. Mr. Wilkinson is in doubt as to whether the corrugation is in consequence of the looseness of the track or vice versa.

The experience on the Honley section is significant in that one of the theories of corrugation is that it is due to the slipping and skidding of the wheels. These are, of course, absent with the differentially-geared cars. There is no difference in energy consumption between the cars equipped with the two types of drive.

The Chicago, Milwaukee & St. Paul Railway is making a total annual saving due to reclamation work estimated at more than $7,000,000. A special committee has recently been at work studying this matter with a view to determining whether the procedure could be improved. Discarded material is reclaimed for remanufacture, reclaimed for salvage or reclaimed for similar use. The principal items in the reclamation work are rubber hose, babbitt and lead, brass, bolts and nuts, waste paper, metal roofing, springs, hammered scrap iron, car wheels and lumber. The committee report states that materials are commonly reclaimed by means of oxy-acetylene welding, electric welding, forging equipment, rolling mills and miscellaneous means.

Collecting Zone Fares in Boston

Professor Richey Shows That Two-Zone Plan for Boston Elevated Railway Is Best First Step Toward the Ideal—Proposes a Concrete Plan for Getting the Fares

THAT a two-zone system of fares is practicable for the Boston (Mass.) Elevated Railway is the opinion of Prof. Albert S. Richey. The general conclusions of his report on this subject to the public trustees of the company were published in the ELECTRIC RAILWAY JOURNAL of Dec. 28, page 1141, but additional material from the full report now available will be presented below. The new material relates chiefly to the reasons for recommending a two-zone plan for Boston and the method suggested for handling the collection of fares.

REMOVING OBJECTIONS TO THE ZONE IDEA

According to Professor Richey, it is generally conceded that a rate scheme where the fare is in some way dependent upon the length of ride is more nearly equitable both to the passenger and to the company than the flat-rate system. Continuing, he comments in part as follows upon the most frequent objections to a zone system, *i.e.*, its sociological defects and the difficulty of collection:

The most frequently cited "proof" that a zone system produces congestion is the great congestion of European cities where the zone system of fares is commonly used. While it is true, in general, that most of the European cities are more densely populated than most of the large American cities, this statement is not specifically true, for although it is impossible to make accurate comparisons, there is nevertheless great congestion in some American cities. Boston has been shown to have a larger population per square mile than Vienna or Paris, and New York, Philadelphia and Chicago have been shown to have a greater population per square mile than London or Manchester. As to maximum density of population, Boston has been shown to equal London, and New York to be greater than either Paris, Vienna or London. The surface lines in Berlin and Hamburg have a flat fare, and both of these cities are as congested as Cologne or any other city where a zone system is used. The argument that the zone system has caused congestion in European cities disappears when it is realized that these old European cities had their congested areas long before the first electric railways were built and that the operation of these railways under the zone system has helped to relieve congestion.

Among the factors which tend to influence the place of residence, in addition to the amount of car fare required between place of residence and place of work, are (1) time of journey between home and work; (2) amount of rent in various localities; and (3) gregariousness, or the hesitancy of individuals and single families to separate themselves from those with whom they have been associated. The latter is especially to be noted in those communities where several races are living.

R. C. Chapin, in his report on *Standards of Living in New York City* to the Russell Sage Foundation in 1909, shows that the average expenditure for car fare of families in Greater New York having incomes ranging from $400 to $1,600 is from 1.1 per cent to 2.6 per cent. The rate of fare is only one of a number of factors which may affect congestion of population, and from such data as are available, it does not appear to be one of major importance. Furthermore, the objections which may be raised to the European zone system of small zones with constantly increasing rates of fare are not equally applicable to a system which divides a city such as Boston into two or three relatively large zones with a flat rate of fare in each.

The chief objections raised by the American electric railway operator to any sort of zone system of rates are the difficulties of fare collection. Many of these objections, however, disappear when instead of a series of short zones of a half mile to a mile in length, a modified system consisting of a fairly large inner zone and one or two outer zones is applied to a city such as Boston.

As to actual experience with the collection of zone fares, the following is quoted from a letter dated Oct. 17, 1918, from P. N. Jones, general manager Pittsburgh Railways:

"The only thing wrong with the new system of fares in Pittsburgh is that it does not bring in revenue enough. We think it is correct theoretically, and we believe it is the only practical scheme by means of which fares may be collected on large cars, approximately on the basis of the distance ridden. The pay-as-you-leave scheme . . . has not added to the congestion appreciably in the outer districts because the people do not leave the cars more than one-half dozen or so at each stop. There has been no confusion in the minds of the passengers as to which end of the car to board."

A zone system is also in use on one of the lines of the Northern Ohio Traction & Light Company, Akron, Ohio. Although this is a much smaller city than Boston, the ordinary type of pay-enter car, having a seating capacity of fifty-four passengers, is in use, and during rush hours loads of 100 per cent in excess of this number are not uncommon—"the average maximum number of passengers during rush hours is ninety." A combination of pay-enter-pay-leave system is in use, and F. I. Hardy, general superintendent of railways, states in a letter dated Oct. 18, 1918, that there has been no difficulty relative to confusion in the passengers' minds as to whether they should pay their fare in boarding or alighting, or as to whether they should enter or leave the car at the front or rear end. Further, in this connection, Mr. Hardy states:

"Replying to the question, 'To what extent does this system of fare collection slow up operation, especially in rush hours with heavy loads,' wish to advise that it does not slow our operation at all. This system is in effect on lines which have the fastest schedules that we operate. We have operated this system for many months and are very much pleased with its operation. In fact, we have devised a system whereby we believe it is perfectly feasible to operate a zone system of two to five zones without confusion or without the passengers being able to beat the company out of its revenue."

A similar zone system, with a combination of pay-enter and pay-leave fare collection, is in use between East Liverpool, Ohio and Chester, W. Va., located on opposite banks of the Ohio River. The total length of the line is 3.4 miles, divided into two 5-cent zones. The cars have a seating capacity of sixty and carry maximum loads of 100 to 135 people. C. A. Smith, general manager, states that no trouble is being experienced with the pay-leave system.

If a decision be made that a zone system of fares is desirable from other standpoints, I am firmly convinced that the fares can be collected and audited properly by a method closely approximating that recommended herein, provided the proper spirit of endeavor and co-operation prevails throughout the organization.

THE IDEAL RATE SYSTEM

In Professor Richey's opinion, the ideal rate system should, as nearly as it is possible to approach theory with practice, provide for each passenger paying his proportionate part of the "readiness-to-serve" cost, as well as his proportion of the "movement" cost, based on the distance traveled. As the "readiness-to-serve" charge varies as between the rush and non-rush hours, this ideal system should also make a variation in the initial charge as between those times. This would result in a unit initial fare, varying as between hours of the day, and increased by smaller increments for

each mile or fraction of a mile traveled. The further requirements of the ideal rate system are that it should not unduly delay traffic, that it should not be unduly expensive in its operation, and that it must be adaptable to the proper collection of fares. The latter qualification involves the collection of fares so as to avoid both error and dishonesty on the part of the passengers and the employees.

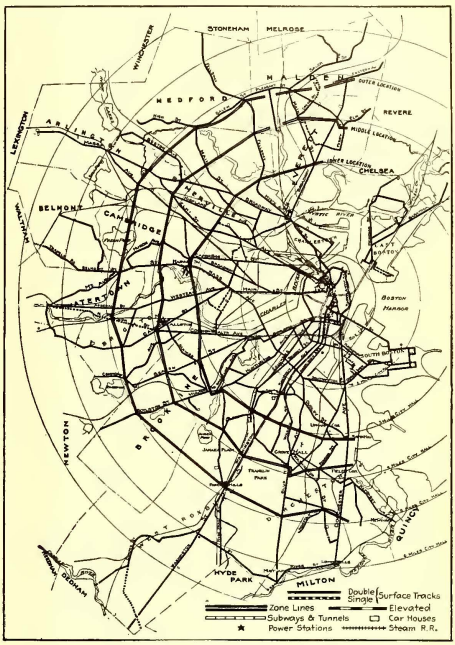
Various modifications of the ideal system have been used or proposed, each approaching more nearly to an equitable charge for the service rendered than the flat fare. They include (1) the transfer charge; (2) no transfer between surface and rapid transit lines; (3) an increased fare for passengers using rapid transit lines; (4) a zone system of fares on a strictly distance basis; (5) a zone system on a modified distance basis; and (6) a two or three-zone system. In regard to these Professor Richey says in part:

1. *Transfer Charge:* The principal and practically the only advantage of the transfer charge, as applied to Boston, would be the ease with which it might be effected from the fare collection standpoint, if it were applied universally. Its universal application would, however, work a substantial injustice on a large number of passengers. If it were applied only at such points and between such routes as to make it in effect an additional charge for a ride longer than the average, the effect would be: first, to reduce the number of transfers for which a charge would be made to a very small proportion of the total passengers; and second, to involve a segregation between free and charge transfer passengers at such points as Park Square as to make its actual application almost impossible.

2. *No Transfer Between Surface and Rapid Transit Lines:* The great disadvantage of a segregation of the two systems in Boston would be the tendency of such a plan to divert traffic from the rapid transit to the surface lines. As the company is at present committed to the large fixed charges incident to the ownership of the rapid transit lines, and as the operating costs (aside from fixed charges) per passenger are so much less on the rapid transit lines than on the surface, every endeavor should be made to increase the relative use of the rapid transit lines rather than to diminish it. The collection of two fares for a journey combining rides on both surface and rapid transit lines would induce a great number of people to make their entire journey, where possible, by surface cars. This would involve additional service on the surface lines which would be accompanied by no increase in revenue, and it is quite probable that the net result of the change would be a loss unless it was the desire and within the power of the company so to route its surface cars as to compel passengers from the outlying districts to transfer to the rapid transit lines.

3. *An Increased Fare for Passengers Using Rapid Transit Lines:* This plan, which merely would involve the collection of an additional increment of fare from passengers leaving all rapid transit stations, probably could be effected without involving any great practical difficulties, and it probably would be more fair to the passenger than a complete segregation of the surface and rapid transit lines. It is, however, open to the objection that it would impose an additional fare on the passenger who made his whole journey, however short, by rapid transit line, even though the actual cost to the company was less than that involved in carrying him the same distance and over practically the same route in a surface car. The objections relative to the tendency to divert traffic from rapid transit to surface lines, mentioned in connection with the previous plan, also apply to this.

4. *Zone System of Fares on Strictly Distance Basis:* This is the European system where (in English cities) fares are collected in penny or half penny units for zones varying from one-half to 1 mile in length. The cars in use there are much smaller than in this country and operate at much slower speeds and with much less crowding than is the case in rush hours here. The system is not used in any American city, and its only serious proponent among men with electric railway experience in this country is Peter Witt, formerly Street Railroad Commissioner of Cleveland. Fielder Sanders, the present Street Railroad Commissioner, has recently been doing some checking to determine the length of haul on some of the lines, but at present he has arrived at no definite conclusion as to the merits of such a zone system. Mr. Sanders says in a letter of Oct. 8, 1918: "The trend of our investigation leads me to suppose that no zone system, the maximum fare of which is 5 cents, would bring in for Cleveland as much revenue as we are now getting on the straight 5-cent fare." In other words, Mr. Sanders' investigation does not yet indicate to him that the loss in revenue on account of reduction in fare to a large number of passengers will be offset by new patrons drawn by the extremely low fares. While I am in accord with Mr. Witt in believing that a low rate of fare in some districts and under some conditions may attract some additional business, I am not willing to agree



LOCATION OF PROPOSED ZONE LINES, 3, 4 OR 5 MILES FROM BOSTON CITY HALL

that the initial fare should be as low as he suggests [on a 1-cent zone basis], for the reason that this does not at all recognize the substantial "readiness-to-serve" cost. Furthermore, it is extremely doubtful whether it would be possible to apply such a system of fare collection in Boston as is proposed by Mr. Witt, especially as an initial change from the present flat-fare system.

5. *Zone System on Modified Distance Basis:* Practically, the collection of a fare consisting of a flat initial charge plus an increment for each unit of distance traveled would be surrounded by as many difficulties as that of the strictly zone system as practiced in English cities. When it is considered, however, that a great proportion of the whole number of passengers begin or end their journey in the central portion of the city, something of the same order may be attained by the introduction of a central flat-fare area, with the lines radiating therefrom on a mileage fare basis. [Professor Richey's comments upon the use of such a system for the Bay State Street Railway and the Rhode Island Company were published in the ELECTRIC RAILWAY JOURNAL of Dec. 28, page 1142.—Eds.] Based on the experience of these companies, it is not considered advisable to recommend such a system for use in Boston, at least at present. Should the two or three-zone system be adopted and found to be practicable, it is entirely possible that the experience thus gained may result in the development of a fare collection scheme under which the plan mentioned above may be practically worked out for the

city of Boston. If this can be accomplished, it would be most desirable and probably the nearest approach to the strictly equitable fare system that can be hoped for.

6. *Two or Three-Zone System:* The two-zone plan has recently been adopted in a number of cities. In Holyoke, early in 1918, a large 5-cent flat fare area was considerably reduced, with a 5-cent fare for local rides in both the inner and the outer area, and a fare by means of tickets of either 6⅔ cents or 7½ cents for a ride extending through both inner and outer areas.

In Springfield a similar system was made effective on May 1, 1918. The 5-cent flat fare, with universal transfer, was retained in the inner area, with a similar 5-cent flat fare in the remaining or outer area. Reduced rate tickets at the rate of 6⅔ cents were good for a ride between any point in the inner area and points in the outer area within about 5 miles of the City Hall. Other reduced rate tickets at 8⅓ cents were good between any point in the inner area and any point in the outer area. The cash fare was 10 cents between any point in the inner area and any point in the outer area. The only difficulty which has been experienced in the collection of fares in Springfield has been that due to the complications introduced by the reduced rate tickets. The system as a whole has worked out satisfactorily and produced nearly the predicted amount of revenue. On account of greatly increased wages later awarded to the employees by arbitration, it was necessary to increase the rates, and in September the unit rates were increased from 5 to 6 cents and the ticket rates were increased about 1 cent in each case. No change was made in the general principle or in the zone limits. By use of the reduced rate tickets, Springfield practically is a three-zone system, while nominally, and on the cash fare basis, it is two-zone.

Through the changes at present proposed in the Bay State cities and recently made in Providence, these companies are proceeding toward this same plan, together with a number of outside zones varying with the length of line. In only the thickly settled portions of the cities, their new systems amount to either the two-zone or three-zone plan.

It is believed that it will be entirely feasible to establish either one or two concentric fare zone limits in the city of Boston, thus establishing either two or three zones; that a flat initial fare may be charged in any one zone which will include transfer privilege within that zone; that an additional fare (either the same or smaller than the initial fare) may be charged for a ride extending across a zone limit line. This is a zone system considerably modified by the flat fare idea in concession to the practicability of fare collection. While it is open to a great many of the same objections as may be urged against the universal flat fare, nevertheless this is a matter of degree, and the proposed system goes a long way toward making the charge proportionate to the distance traveled. It is flexible in that zone limits may be moved from time to time, the number of zones increased or diminished, and either the flat initial fare or the additional zone limit fare increased or diminished as necessity requires.

How To Handle the Fares

Professor Richey's first recommendation is for a two-zone system for Boston. To fix the zone boundary he considered the distribution of population and of traffic, the cost of service, the relation between initial and zone-line fares, competition and the method of fare collection. A complete check was made of all passengers on board and boarding and alighting in the section between circles with a 3-mile and a 5-mile radius from the City Hall. The map on page 135 shows three possible locations for the zone boundary line, at 3, 4 and 5 miles from the City Hall.

The tabulation on page 137 indicates the amount of the zone-line fare which will be required with initial fares of various amounts in order to produce approximately the same total revenue as various flat fares. Three such tabulations are shown, corresponding to the three possible locations of zone boundary lines. The flat fare which would be equivalent to any initial fare combined with a zone-line fare not shown in the tabulations may be obtained by interpolation, 1 cent of zone-line fare being equivalent to ½ cent flat fare if the boundary be established at the "inner" location, to ⅓ cent if at the "middle" location, or to ¼ cent if at the "outer" location.

If it should be agreed, Professor Richey says, that it is necessary to include the terminals of the rapid transit lines within the interior zone on account of the difficulty of the collection of an additional fare from passengers on these lines after passing a zone limit, the outer zone boundary may be adopted. However, as only about 13 per cent of the population served reside outside of such boundary, and only about 18 per cent of the total number of passengers ride across such boundary, it appears more equitable to establish the zone boundary line somewhat nearer to the center. He believes that the method of fare collection proposed will make it possible, at no prohibitive expense, to collect a zone-line fare from rapid transit passengers, as well as from those on surface cars, at points much nearer the center—about 3 miles from the City Hall.

The proposed fare-collection plan follows in outline:

Through Surface Car with Fare Box

Such cars to be equipped with fare box and one overhead register.

Outbound: In inner zone passengers prepay or pay-enter the initial fare, with free exit as at present. At zone line, conductor announces zone limit. In outer zone, passengers boarding pay-enter initial fare and receive identification check. All passengers pay-leave either zone-line fare or identification check.

Inbound: In outer zone, passengers pay-enter initial or total fare, according to destination as stated; if total fare is paid, conductor issues identification check. At zone line, conductor announces zone limit and makes inside collection of identification checks or zone-line fares from passengers without identification checks. Zone-line cash and tokens from inside collection are rung up on overhead register. On light routes and during non-rush hours, with loads such that conductor can remember the few local passengers, issuance and collection of identification checks might be omitted. On some heavy inbound trips, it will be necessary to have an extra collector board the car at the zone line and make the inside collection as the car proceeds. The extra collector should return the identification checks to the regular conductor; he should ring up zone-line cash or token collections on the overhead register, and turn over to the regular conductor the amount collected, as evidenced by the register; or, by an alternative plan, he should ring up such fares on a portable cash register, in which case he would retain the amount collected until the close of his day's work. In inner zone, passengers prepay initial fare, as at present.

Through Surface Cars Without Fare Box

Such cars to be equipped with two overhead registers, one for initial and one for zone-line fares.

Outbound: In inner zone, initial fare collection as at present—either in prepayment station or on car, in the latter case the fares being rung up on initial-fare register. At zone line, conductor announces zone limit and collects zone-line fare from all passengers then on car, using zone-line fare register. In outer zone, he collects initial fare from each passenger boarding car, as at present.

INITIAL AND ZONE-LINE FARES EQUIVALENT TO VARIOUS FLAT FARES UNDER PROPOSED BOSTON PLAN

Zone Boundary 3 Miles from City Hall
(51 per cent of total passengers subject to zone line fare)

Equivalent to flat fare (cents)	5	6	7	8	9	10	11	12
Initial fare (cents)				Zone-Line Fare				
4	2	4	....	....	....	....	....	....
5	0	2	4	....	....	....	....	....
6	....	0	2	4	6	....	....	....
7	....	....	0	2	4	6	....	....
8	....	....	....	0	2	4	6	8
9	....	....	....	....	0	2	4	6
10	....	....	....	....	....	0	2	4
11	....	....	....	....	....	....	0	2
12	....	....	....	....	....	....	....	0

Zone Boundary 4 Miles from City Hall
(35 per cent of total passengers subject to zone-line fare)

Equivalent to flat fare (cents)	5	6	7	8	9	10	11	12
Initial fare (cents)				Zone-line Fare				
4	3	....	....	....	....	....	....	....
5	0	3	5	....	....	....	....	....
6	....	0	3	6	....	....	....	....
7	....	....	0	3	6	....	....	....
8	....	....	....	0	3	6	....	....
9	....	....	....	....	0	3	6	9
10	....	....	....	....	....	0	3	6
11	....	....	....	....	....	....	0	3
12	....	....	....	....	....	....	....	0

Zone Boundary 5 Miles from City Hall
(18 per cent of total passengers subject to zone-line fare)

Equivalent to flat fare (cents)	5	6	7	8	9	10	11	12
Initial fare (cents)				Zone-line Fare				
4	....	....	....	....	....	....	....	....
5	0	5	....	....	....	....	....	....
6	....	0	5	....	....	....	....	....
7	....	....	0	5	....	....	....	....
8	....	....	....	0	5	....	....	....
9	....	....	....	....	0	5	....	....
10	....	....	....	....	....	0	5	....
11	....	....	....	....	....	....	0	5
12	....	....	....	....	....	....	....	0

NOTE.—An initial fare, as listed in first column, together with a zone-line fare as listed opposite, will produce practically (variation between 1.6 per cent less and 1.4 per cent greater) the same total revenue as the flat fare shown at top of column, if volume of traffic remains unchanged.

Inbound: In outer zone, conductor collects initial fare and rings up on initial-fare register. At zone line, conductor announces zone limit and collects zone-line fare from all passengers then on car, using zone-line fare register. (See above for possible necessity for extra collectors on heavy inbound trips.) In inner zone, conductor collects initial fare from each passenger boarding car, as at present.

As an alternative, the fare collection on cars without fare box may be by the same method as proposed for cars with fare box, except for the use of the two overhead registers, as described herein.

Rapid Transit Terminals or Other Prepayment Areas at Zone Line

Street Entrance and Exit: Collect initial fare from entering passengers, with free exit, as at present.

Bodily Transfer Between Surface and Rapid Transit and Vice Versa: Passengers in either direction pay zone-line fare in passageway between rapid transit and surface car platforms.

Through Rapid Transit Trains

Stations Inside Zone Boundary: Prepay initial fare, with free exit, as at present.

Stations Outside Zone Boundary: Inbound boarding passengers prepay total fare, or zone-line fare if from surface car by bodily transfer. Outbound boarding passengers prepay initial fare. Outbound alighting passengers pay zone-line fare at exit or at passageway to surface cars. Where paper transfers are used, boarding passengers may present surface car transfer as initial fare, and pay zone-line fare in addition. Alighting passengers may receive surface car transfer on payment of zone-line fare.

Paper Transfers at Zone Line

Transfers from routes in inner zone to routes in outer zone, and vice versa, should be printed on paper of a distinctive color and sold to passengers for the zone-line fare. Such cash would not be registered but accounted for by difference in serial numbers of such transfers issued to and returned by conductor daily.

General Recommendations for Fare Collection

In order to simplify and safeguard fare collection, it is recommended that two forms of metal tokens, representing the initial and the zone-line fare, be sold at all prepayment stations and also at other convenient distributing points. These tokens should not be sold by conductors on cars. Obviously, the zone-line fare token should be larger in diameter than the initial fare token.

It is further recommended that if the nominal initial fare is some amount between 5 and 10 cents, it should be paid either by a metal token or by 10 cents in cash, and that if the nominal zone-line fare is something less than 5 cents, it should be paid by a metal token or by 5 cents in cash, the intent being that conductors shall not be required to make penny change on the cars. This can be accomplished by a proper wording of the published fare schedule, as was done in Cleveland during the period when the nominal fare was less than 5 cents; 5 cents cash was collected from those passengers not provided with tickets.

It is earnestly recommended that all of the present non-prepayment cars be equipped with fare boxes, so as to make them suitable for pay-enter or pay-leave operation. As a temporary measure, proper fixtures may be installed on both the inside and the outside of the bulkhead door post, and a fare box can be hung in either of those positions, the outer position being used in mild weather, and the inner in extremely cold weather when it is necessary to operate with the bulkhead door closed. A short section of the longitudinal seat can be arranged on hinges to fold back to allow space for the conductor's position when necessary to use the fare box inside the bulkhead. It would also be desirable to install mechanical operation for the vestibule doors, so that these can be operated from either position of the conductor. Such changes are entirely practical, it is said, and have been made as emergency measures to convert non-prepayment cars for prepayment operation in a number of cities. The expense of such changes is small compared with the evident advantages of fare box operation.

While at the present time the fare box manufacturing situation is not normal, and one of the two manufacturers of registering fare boxes is at present engaged almost wholly in government work, Professor Richey states: "I have been informed by the other manufacturer that he is prepared to furnish a registering fare box capable of taking dimes, nickels and pennies, registering the total cash amount, as well as two sizes of metal tokens, and registering the total number of each separately. He has recently equipped the Kansas City Railways with such boxes, and he states that he could make delivery of such boxes in any quantity in Boston within about ninety days." The foregoing description of the proposed method of fare collection for the two-zone plan, however, includes a method for use on surface cars which are not equipped with fare boxes, which

may be used until such time as all cars can be so equipped.

The total added cost a year from such a method of fare collection, according to Professor Richey, will be $200,000 for a 3-mile inner zone, $135,000 for a 4-mile inner zone and $72,000 for a 5-mile inner zone. To balance this cost would require an increase of considerably less than 1 per cent in the total number of passengers carried. The difference in the total number of passengers carried as between a flat fare and an equivalent two-zone system would, it is said, be without much question nearer 5 per cent. Thus the net gain may be as great as $1,000,000 per year. While it possibly may be greater than that amount, the great uncertainty of such estimates is said to lead to the more conservative prediction of a traffic gain of about 3 per cent, or a net gain of about $500,000 a year.

As the first step toward the ideal system, therefore, Professor Richey recommends that the Boston Elevated Railway territory be divided into two zones by an arbitrary line drawn at a radius of about 3 miles from the City Hall. At the present time, about half the total passengers cross this zone line. It is estimated that an initial fare of 7 cents, with a zone-line fare of 5 cents, making a total fare of 12 cents for a ride extending across the line, will produce nearly the same revenue as a flat fare of 10 cents, which latter appears to be necessary to meet the present cost of service.

Central Traffic Association

Experience with 2000-Penny Book as Substitute for 1000-Mile Book Described—Other Important Actions of Year

THE principal work of the Central Electric Railway Traffic Association during the past year was summed up in the annual report of Chairman A. L. Neereamer, presented at the meeting which was held in Fort Wayne, Ind., on Jan. 14. After speaking of the five regular meetings held during the year and the two extra meetings in June, Mr. Neereamer said, in part:

During 1917 we had a membership of fifty-one lines representing 4334 miles, and for the year just ended fifty-four lines representing 4432 miles, making an increase of three lines and 98 miles. During that period one line was dismantled, another partially dismantled and one of the larger lines divided into two systems.

Joint and Local Baggage Tariff No. 9, I. C. C. 26, is still in force, although two supplements have been issued during the past year, effective July 25 and Oct. 25. One of these supplements contains the advance in excess baggage rates as allowed by the commission in Indiana. This tariff will have to be reissued in a short time in order to line it up with that of the steam lines.

Joint Passenger Tariff No. 17, I. C. C. 27, covering the interchangeable 1000-mile ticket, was canceled on June 15, by Joint Passenger Tariff No. 19, I. C. C. 29, which covers the interchangeable 2000-penny coupon ticket. This new publication started with nineteen lines, representing 1896 miles. Supplements have added four lines and 551 miles. During the first year of the interchangeable 1000-mile ticket, 5600 tickets were ordered and placed in the hands of the agents. From June 15 to Dec. 31, six and one-half months of the interchangeable 2000-penny coupon ticket, 8000 have been ordered and placed in the hands of the agents, a little more than 1200 per month which, to the writer's mind, demonstrates the popularity of this form of transportation.

Official Classification No. 43 has finally been canceled and its reissue and supplements are being filed for our member companies by R. N. Collyer. Joint Freight Tariff No. 13, I.C.C. 18, covering exceptions to official classification was canceled on June 1 by I.C.C. 22, Joint and Local Freight Tariff No. 14. This publication is participated in by thirty-five lines. Application covering a supplement is now pending with the Interstate Commerce Commission. Official Interurban Equipment Register No. 4, I.C.C. 21, was canceled on Nov. 1 by Official Interurban Equipment Register No. 5, I.C.C. 24, and is participated in by thirty-seven lines. Although a number of lines dropped out of this issue, enough other carriers became party to it to make it a larger publication than before.

Joint Passenger Tariff 18, I.C.C. 28, has been canceled for intrastate traffic in Indiana and Ohio. Application for cancelation interstate has been pending with the Interstate Commerce Commission for a long time and present indications are that this will soon be done and the extremely low rates eliminated. The association will then be in position to start anew and your chairman recommends that the committee having this in charge go over the old publication and eliminate as much as possible unnecessary headline points and stations to which tickets never have been sold. In this way the size of the publication can be reduced without detracting from its value and the expense would be kept down to the minimum.

Several changes have been made in the demurrage rules. Joint and Local Demurrage Tariff No. 3 I.C.C. 19 was canceled by No. 4, I.C.C. 23 on March 27, and the latter publication was canceled by No. 5, I.C.C. 25, on Nov. 4. This publication is participated in by thirty-eight lines. Joint and Local Storage Tariff No. 1, I.C.C. 20, is still in force, although the committee in charge is contemplating a reissue of this tariff.

At the meeting held in November the committee in charge of the official interurban map was instructed to make arrangements for all corrections to be made on the map plates, and at a meeting of the Central Electric Railway Association held in November provision was made for the expense of these corrections. It is expected that this committee will make a full report at this meeting.

For the first time during the history of this organization, death has entered our ranks and called to "That bourne from which no traveler e'er returns" one of our active members, L. W. Henry. Resolutions regarding his death have been presented before this meeting and acted upon, but the chairman is of the opinion that in addition to these resolutions mention should be made of his death in the annual report.

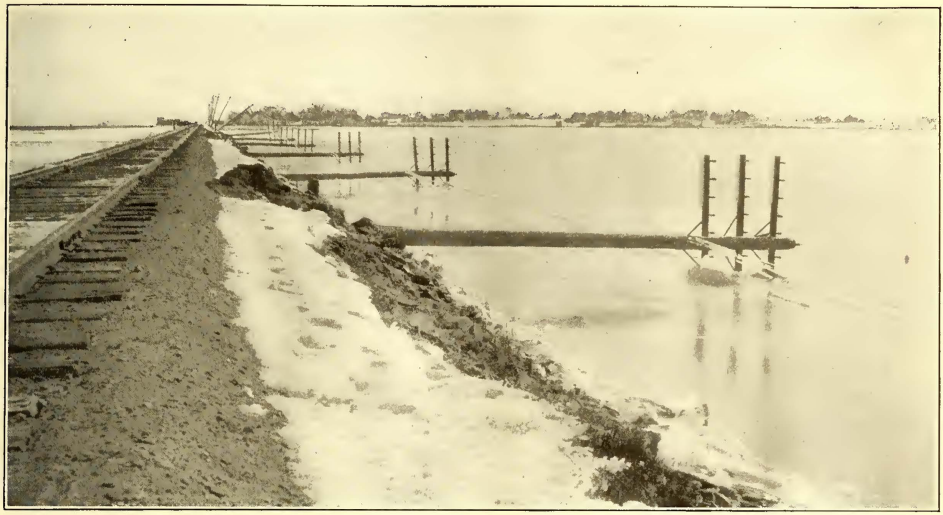
Bureau of Standards Issues Revised Circular on Electrolysis Mitigation

SINCE the now well-known Circular No. 52 of the United States Bureau of Standards on "Electrolysis and Its Mitigation" was published much progress has been made in this field. Consequently a new edition was found necessary and copies of this may be had by addressing the bureau at Washington, D. C. In the revision a rather full discussion of the three-wire method of railway power distribution has been added and the section on pipe drainage has been modified to conform to the latest investigations and observations. On the subject of automatic substations the circular points out that these have now been developed to such a point that they are entirely practicable and dependable for railway use. By making it possible materially to increase the number of feeding points they incidentally produce better electroylsis conditions.

There was no tramway service on Christmas day in a number of cities in Great Britain, and in other cities, including London, the service was very greatly reduced. This was in conformity with the desire of the men to spend as much time with their families on Christmas day as possible.

When a Line Pole Needs a Guy

BY CHARLES R. HARTE
Construction Engineer, The Connecticut Company, New Haven, Conn.



A DIFFICULT LOCATION FOR SUITABLE GUYING

Practice in Line Guying Has Been Standardized by the Telephone, Telegraph and Power Companies, Hence the Author Summarizes Their Experience as a Guide on Electric Railway Transmission Line Construction—The Desideratum is to Keep the Line "Put" Without Using Unnecessary Material in the Guys and Anchors

IN THE issue of the ELECTRIC RAILWAY JOURNAL for Nov. 16, 1918, we examined in detail the subject of pole-line guys. A logical sequel to this is an attempt to answer the question: "When should guys be used?" From the first the Bell Telephone Companies realized the importance, from every point of view, of standard practice in line work, and early developed a scheme of guying. The Western Union Telegraph Company, prior to its brief control by the American Telephone & Telegraph Company, had been somewhat less thorough, but as a result of that control went into more detail than the "A. T. & T.," varying from that company's practice in some respects but not radically. In 1914 the National Electric Light Association received from its sub-committee on overhead construction its monumental report which established similar standards in its field.

Obviously a guy, or some equivalent if conditions bar the guy, should be placed on every pole which may be subject to strains approaching its strength. Such strains may result from the nature of the line, as the pulls at horizontal and vertical angles, or from storms, or from both in combination. Those due to the nature of the line can be calculated readily, but the storm strains are not so easy to determine, since they depend upon the kind and severity of the storms to be anticipated, their direction relative to the line, and the extent to which the line is sheltered—all of which can only be guessed at in the light of previous occurrences—in addition to the known facts of the details of the line itself. The long experience, however, with the signal lines, using this term in the sense in which it is employed in the National Electrical Safety Code, has given a good basis to work on, both as to the lines themselves, and as to the relation between these lines and those of companies using different sizes of conductor.

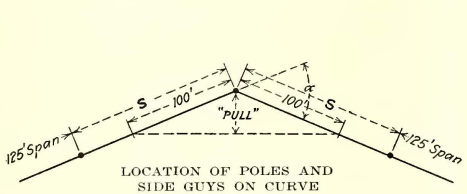
Considering first the strains due to corners, it is customary to measure the angles in terms of the "pull," so-called, which is the distance from the corner pole to a line drawn between points on the two branches of the line. The Bell companies and the N. E. L. A. measure out 100 ft. on each side, but the Western Union employs 130 ft., which is the standard length of span for their seven to sixty-wire lines. As a result, for a given angle, the Western Union "pull" is three-tenths greater than the value the others use, and conversely, the others find for a given angle a "pull" which is practically three-fourths (actually ten-thirteenths) of the Western Union.

On a paper layout it is a very simple matter to lay off the exact line from which to measure. In the field,

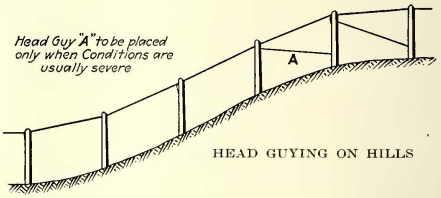
unless the adjacent poles happen to be each 130 ft. away, it is not so convenient although there is nothing complicated about the process. It is easy, however, to make a diagram which permits the use of the poles adjacent to the corner pole. If they are approximately equal distances from it one can, by sighting from one of these poles to the other, instantly find a point on their line and opposite the corner pole, and the distances from this point to the corner pole and from the adjacent pole to the corner pole, can be readily measured. The "pull" (on the 100-ft. basis) is then found from the diagram (see page 142) by locating at the left-hand side the distance measured, following this to the right to the inclined line marked with the distance between corner and adjacent poles, and then following the vertical line through that point to the bottom of the chart where the "pull" is read off. For example, if the adjacent poles were 70 ft. from the corner pole and the 120-ft., 110-ft., etc., lines downward. By taking the pull 39 ft. on the 130-ft. basis we get the ratio of 3 to 10 between the distance from corner to line and from corner to point fixing the line, and the offsets for that angle will be 36 for 120 ft., 33 for 110 ft., etc.

Strain Must Be Opposed by an Anchorage of Some Sort

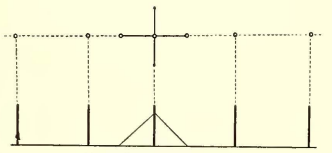
Opposed to the strain resulting from the corner we need some form of anchorage, the effective value of which is modified by the angle it makes with the strain, which, except in special cases where it is inclined to an extent which necessitates consideration of that fact, is taken as horizontal. This angle, it will be remembered, is measured by the relation of the "lead," the horizontal distance from the base of the pole to a point on the guy at that level, to the "height," the distance

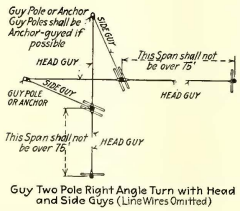


LOCATION OF POLES AND SIDE GUYS ON CURVE

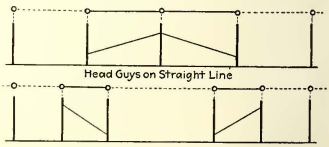


HEAD GUYING ON HILLS


Storm Guys on Straight Line



Guy Two Pole Right Angle Turn with Head and Side Guys (Line Wires Omitted)



SPECIAL PROBLEMS IN LINE GUYING

and the latter was 30 ft. from the line between the adjacent poles, we find 30 at the left, follow it to the inclined 70, and drop down vertically at 43 which is the "pull."

If the two adjacent poles are not equally distant from the corner pole the correct value for the pull is found by measuring from the middle of the line between them to the corner, and using the average of their distances for the value of the inclined line.

A similar diagram for the Western Union basis of 130 ft. is readily made by remembering that the distance from corner pole to line for any given angle is proportional to the distance from the corner pole to the point through which the line goes. If a diagram is laid off, except as to inclined lines, just like the one shown, the line at an angle of 45 deg., as is the 100-ft. line here, would then be the 130-ft. line. If we start where the horizontal 39-ft. line cuts this and lay off 3-ft. points on each side on the vertical 39 line, the inclined lines through these points will be respectively the 140-ft., 150-ft., etc., lines upward, from the base of the pole vertically to the point of guy attachment.

Coming down to "brass tacks" and business, the National Electric Light Association deals with a corner on the basis of its "pull" and the size of the line, cutting down the strain as the pull increases by shortening the adjacent spans, as shown in middle lower diagram above. This is reproduced from the N. E. L. A. Handbook on Overhead Line Construction. The N. E. L. A. rule is to head guy and side guy all corner poles, whether the turn is made on one or more, the side guys on curved lines being installed in line with the radius of the curve at that point.

Side Guying Has Been Fairly Well Standardized

The particular specifications are characterized as covering "construction methods for distributing systems as follows: Mechanically, for spans up to and including 130 ft.; electrically, for street lighting circuits and for constant potential circuits up to and including 6600 volts between adjacent wires on the

same crossarm." While such circuits are sometimes of much heavier section, the average line would be of about No. 4 weatherproof wire.

The American Telephone & Telegraph Company calls for side guying in accordance with Table I.

Where the line carries cable as well as open wires an additional 6000-lb.-strand side guy is to be placed, under the conditions shown in Table II.

This in turn calls for the open-wire equivalents of indicated velocity of wind of 70 m.p.h. (giving a pressure of 8 lb. per square foot of projected area of conductor and covering) and ice ½ in. thick all around. However, since the same wind and ice values are used on both open wires and cables, the equivalence is substantially as true for the higher values as for the lower ones.

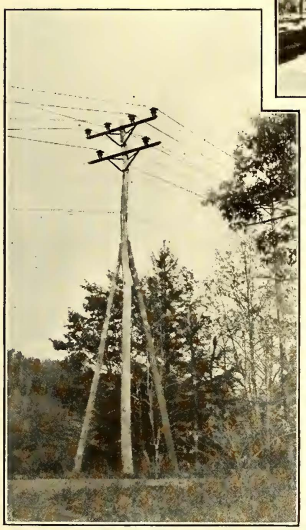
The odd pairs which are listed in the "actual" cables are the tracer pairs which are used for testing

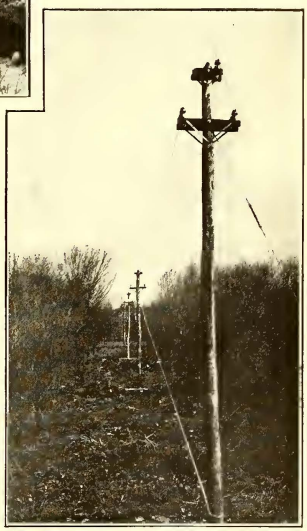
At bottom, left, push brace on a corner pole where a guy could not be installed.

At top, center, a long tangent on which failure resulted from lack of side guys.

At bottom, center, a case where failure resulted from lack of side and head guys. Note the dragging off of crossarms by the pull along the line.

Below, construction involving several forms of guy. Note side guy for corner and head guy from adjacent pole and, on the long tangent, side guy to anchor and head guy to base of pole. As line is on private right-of-way clearance under guy is unnecessary.





telephone cables given in Table III, on page 142, in which details of ordinary telephone cable are included. The equivalence is for wind of an indicated velocity of 50 m.p.h. and ⅜-in. of ice on the open wires in one case, and on the cable and messenger in the other, the cable being at the same height on the pole as the open wires, and both weight and wind pressure being taken into account. These values are somewhat lower than those often used, the more usual figures being an and are not counted in giving the "nominal" cable capacity.

As a further guide, for use on joint lines, the American Telephone & Telegraph Company uses these approximate equivalents: A No. 2, 4, or 6 B. & S. gage weatherproof wire is equivalent to two open wires; a No. 0 or 00 wire to three open wires, and a No. 0000 wire to four open wires.

As an example of the application of the tables, if we take the case of a pole which carries forty telephone open wires, one 150-pair nineteen-gage cable and six

TABLE I—SIDE GUYING, A. T. & T. CO. STANDARD

Number of Wires	Amount of Pull	Kind of Guy or Reinforcement
Ten	Less than 5 ft.	None
Ten	5 to 10 ft.	Ground brace or 6000-lb. strand
Ten	10 ft. or more	6000-lb. strand
Twenty or more	Less than 18 in.	None
Twenty to sixty	18 in. or more	6000-lb. strand
Sixty or more	18 in. or more	10,000-lb. strand
Forty or more	18 in. or more, and lead of guy less than one-fifth height	10,000-lb. strand
Forty or more	10 f t. or more and lead of guy less than one-quarter height	10,000-lb. strand

TABLE II—SIDE GUYING FOR POLE LINE CARRYING CABLES

Equivalent Number of Wires	Pull	Distance From Cable Guy to Lowest Crossarm Is More Than
10	18 in. to 10 ft.	9 ft.
10	10 ft. to 15 ft.	4 ft.
10	15 ft. or over	2 ft.
20	18 in. to 10 ft.	4 ft.
20	10 ft. or over	0 ft.
30 or more	18 in. or over	0 ft.

No. 00 weatherproofed lighting wires, we have, for the equivalent load in open wires:

Forty open wires	equals 40 open wires
One 150-pair nineteen-gage cable	equals 20 open wires
Six No. 00 weatherproof wires	equals 18 open wires
Total	78 open wires

This is practically an eighty-wire line.

The above is on the assumption that the several groups are at approximately the same level. If there was a considerable separation between some of the elements, as would doubtless be the case here because of the lighting circuits, allowance should be made for that fact, and the equivalent value increased or decreased according as the distant member was above or below the position which would be occupied by its equivalent in telephone wires.

It is in the matter of storm guying that, up to comparatively recently, there has been so little of definite rule that one large company, in a confidential letter of instruction to its employees, advised that the location of guys be left to the judgment of the line foreman! The telephone companies, however, go into the matter in considerable detail. They do this because the question is of much importance, both before construction, to insure the integrity of the line, and after trouble, either to prove the sufficiency of the protection against reasonable contingency, or, by showing to the company its insufficiency, to lead to a settlement of any claims out of court rather than after a costly suit has established that fact. Obviously it is no less the engineer's duty to keep his company from fighting a case in which they are bound "to be licked," than to see that such conditions do not arise. It will therefore pay to consider the telephone practice in some detail.

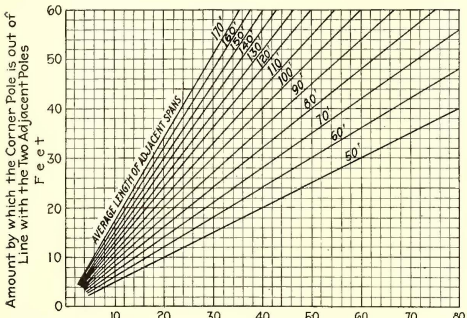


CHART FOR USE IN FINDING CORNER PULL OF POLE LINE

The Western Union practice for angle guys is as given in Table IV.

For lines having an ultimate capacity of more than 12 wires Table V is used.

It should be remembered that the Western Union uses 130 ft. as the basis of measurement of pull, and that the values of 1½, 10, 20, 30, 40 and 50 as given above correspond to the A. T. & T. and N. E. L. A. values of 1.17, 7.8, 15.6, 23.4, 31.2, and 39.0 respectively.

TABLE III—TELEPHONE CABLE EQUIVALENTS IN OPEN WIRES

Number of Pairs		Maximum Outside Diameter, Inches	Weight per Foot Pounds	Messenger, Pounds Capacity	Rings, Inside Diameter	Equivalent Number of Open Wires
Table	Actual					
			22 Gage Cable			
25						6
	26	¾	0.97	6,000	2	
30						7
50						8
	51	15/16	1.33	6,000	2	
60						9
	76	1 3/32	1.65	6,000	2	
90						10
100						10
	101	1⅛	2.13	6,000	2	
120						12
150						13
	152	1⅜	2.74	10,000	2½	
180						14
200						16
	202	1¾	4.07	10,000	2½	
240						18
300						20
	303	2 1/16	5.17	16,000	3	
360						22
400						23
	404	2 11/32	6.21	16,000	3	
	505	2 21/32	7.34	16,000	3½	
600						29
			19 Gage Cable			
10						6
	11	21/32	0.81	6,000	2	
15						7
	16	¾	0.98	6,000	2	
25						8
	26	⅞	1.23	6,000	2	
30						9
50						10
	51	1 3/16	2.01	6,000	2	
60						12
75						13
	76	1 ⅜		[illegible]		
90						14
100						16
	101	1 ⅝	3.76	10,000	2½	
120						18
150						20
	152	1 29/32	4.78	10,000	2½	
180						22
200						23
	202	2 5/32	5.72	16,000	3	
300						29
	303	2 9/16	7.45	16,000	3½	

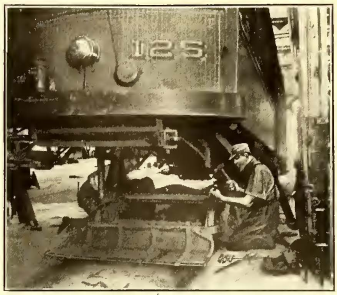
TABLE IV—STANDARD GUYING PRACTICE OF WESTERN UNION TELEGRAPH COMPANY

Ultimate Capacity of Pole	Existing Load	Pull	Size and Number of Side Guys
2 wires	2 wires	Less than 25 feet	No guying required
2 wires	2 wires	25 feet or more	1—No. 6 B. W. G. Steel
6 wires	6 wires	Less than 10 feet	No guying required
6 wires	6 wires	10 feet or more	1—4000-lb. strand
12 wires	6 or less	Less than 10 feet	No guying required
12 wires	6 or less	10 feet to 25 feet	1—4000-lb. strand
12 wires	6 or less	26 feet to 50 feet	1—6000—lb. strand
12 wires	7 to 12	Less than 5 feet	No guying required
12 wires	7 to 12	5 to 25 feet	1—4000-lb. strand
12 wires	7 to 12	26 to 50 feet	—6000-lb. strand

TABLE V—WESTERN UNION GUYING FOR HEAVY POLE LINE

Existing Load	Pull in Feet	Ratio of Lead of Guy to Its Height			
		From ¼ to ⅓	⅓ to ½	½ to ¾	¾ or more
0 or less	Less than 5 ft.	None	None	None	None
10 or less	5 to 50	1— 6,000	1— 6,000	1— 6,000	1— 6,000
11 to 20	Less than 1½	None	None	None	None
11 to 20	1½ to 30	1— 6,000	1— 6,000	1— 6,000	1— 6,000
11 to 20	31 to 40	1—10,000	1—10,000	1— 6,000	1— 6,000
11 to 20	41 to 50	1—10,000	1—10,000	1—10,000	1— 6,000
21 to 20	Less than 1½	None	None	None	None
21 to 30	1½ to 20	1— 6,000	1— 6,000	1— 6,000	1— 6,000
21 to 30	21 to 30	1—10,000	1—10,000	1— 6,000	1— 6,000
21 to 30	31 to 40	1—10,000	1—10,000	1—10,000	1— 6,000
21 to 30	41 to 50	2—10,000	2—10,000	1—10,000	1— 10,000
31 to 40	Less than 1½	None	None	None	None
31 to 40	1½ to 10	1— 6,000	1— 6,000	1— 6,000	1— 6,000
31 to 40	11 to 20	1—10,000	1— 6,000	1— 6,000	1— 6,000
31 to 40	21 to 30	1—10,000	1—10,000	1—10,000	1— 6,000
31 to 40	31 to 40	2—10,000	2—10,000	1—10,000	1—10,000
31 to 40	41 to 50	2—10,000	2—10,000	2—10,000	1—10,000
41 to 50	Less than 1½	None	None	None	None
41 to 50	1½ to 10	1— 6,000	1— 6,000	1— 6,000	1— 6,000
41 to 50	11 to 20	1—10,000	1—10 000	1— 6,000	1— 6,000
41 to 50	21 to 30	2—10,000	2—10,000	1—10,000	1— 6,000
41 to 50	31 to 40	2—10,000	2—10,000	2—10,000	1—10,000
41 to 50	41 to 50	3—10,000	2—10,000	2—10,000	1—10,000
51 to 60	Less than 1	None	None	None	None
51 to 60	1 to 20		1—10,000	1—10,000	1—10,000
51 to 60	21 to 30		2—10,000	2—10,000	1—10,000
51 to 60	31 to 40		2—10,000	2—10,000	1—10,000
51 to 60	41 to 50		3—10,000	3—10,000	2—10,000
61 to 80	Less than 1		None	None	None
61 to 80	1 to 20		1—10,000	1—10,000	1—10,000
61 to 80	21 to 30		2—10,000	2—10,000	1—10,000
61 to 80	31 to 40		3—10,000	2—10,000	2—10,000
61 to 80	41 to 50		3—10,000	3—10,000	2—10,000

Some Mysterious Car Ailments



Little but Important Troubles That Tend to Keep Equipment Men Interested in Their Work

CONTRIBUTIONS ARE INVITED FROM THE FIELD

Another Remedy for Ice on Control Contacts

IN THE Nov. 16 issue of the JOURNAL there was printed in this department the experience of one railway company with automatic control operated on a storage-battery circuit in extremely cold weather. In the case described the formation of ice on the control contacts insulated them enough to prevent the current at a battery potential of 14 volts from flowing from fingers to segments, making the control inoperative. The trouble was remedied by prick-punching the contact segments so as to raise sharp points on them. The pressure of the fingers caused the ice to break away at these points and allow the fingers to make contact.

On a large Eastern property similar troubles were experienced last winter with automatic control operating on a 24-volt battery and, as a different remedy was used, it will no doubt be of interest now as we are just beginning to experience severe winter weather.

The operating conditions were similar to those in the case mentioned in the previous article. That is, cars in making their regular trip, spent about one-third of the time in the subway and the remainder of the time on the surface, and to make matters worse most of the cars were out of doors all night. On cold days cars, after having been started from the barn without trouble, would frequently be reported "dead" or "losing power" and when they were brought into the carhouse for inspection nothing could be found. At the company's carhouse some of the pits were outside and this afforded the opportunity of examining the controllers reported "dead" without bringing them into the warmer atmosphere of the carhouse.

It had been the practice to use a small amount of grease on the control segments to prevent excessive wear and it was found that the grease mixed with dust and dirt, had formed a black, sticky film on the segments. This in extremely cold weather would harden and insulate the fingers from the segments and make the control inoperative. It was also found in many cases that the segments were coated with a thin film of ice due to the condensation of moisture when the warmer air of the subway came in contact with the cold metal parts.

For awhile attempts were made to improve the operation of the control by running it without grease on the segments, and all contact parts were cleaned at every inspection, but there was little, if any, improvement. It was then decided to try oiling the segments with a thinner oil, and the results were very gratifying. A thin engine oil with a good "cold test" was obtained and, after the segments were thoroughly cleaned of the sticky substance, the oil was applied freely to them with a brush. Although this did not prevent the black film from accumulating it kept the film soft so that the finger plowed through and maintained contact, instead of riding up on the hard black film as was the case before the thin oil was used. The oil also lessened the trouble due to the formation of ice on the segments. Ice will not adhere to a greasy surface as it will to a clean, dry one, and although it may have been formed on the segments, it is easily pushed off by the fingers. This point will be appreciated by automobilists who grease their windshields before driving in a sleet storm, as ice forming on a clean glass is difficult to remove, while that forming on a greasy glass can be easily knocked off with a stick. The use of the oil had a further advantage in making it very easy to clean the contact segments. Where it was usually necessary to use gasoline in cleaning them, the black substance can now be easily wiped off with a cloth. It should be borne in mind that if line potential is used on the control circuits, such free use of oil would probably cause short-circuits due to the collection of dust and dirt on insulating parts. On the other hand, however, very little control circuit trouble is caused by cold weather conditions when line potential is used, and the use of oil as described is for circuits of low potential only.

Sympathetic Behavior of Motors Had a Reason

ON A CERTAIN large property equipped with third-rail and operating trains with cars equipped with line-operated, non-automatic, multiple-unit control, considerable trouble was experienced with motors flashing over. A large percentage of the cars were equipped with non-interpole motors, and a common bus line ran throughout the trains. The third-rails were connected in parallel so that a voltage disturbance on one rail would be communicated to the others. The flashing would frequently occur without any apparent reason and often when one motor of a train flashed over others in the same train would also flash. This led the engineers of the equipment manufacturer, who were co-

operating with the company's representatives, to believe that the trouble might be due to voltage fluctuations on the line.

Tests to determine the cause were begun and it was found that sudden voltage variations were occurring. These were due primarily to grounding of motors, flashing of motors and more particularly to intermittent application of current to the motors due to sleet on the third-rail. Further tests on the trains in operation showed that if the voltage was suddenly reduced from 600 to about 400 and restored with the train running at high speed (motors in parallel), the motors would flash over. Other cars in the train and other trains in that particular third-rail zone would sympathetically flash over and blow the main motor fuses.

The engineers decided that the trouble could best be overcome by installing a line switch in the main motor circuit set to drop out promptly whenever an excessive drop in voltage occurred. Accordingly a train was equipped with pneumatically-operated line switches, with their operating coils connected to line through an external resistance. The resistance was so proportioned as to give the coil a range in voltage of from 600 to 400, corresponding to the minimum drop that would cause a flash-over. The pneumatic details of the switch were enlarged so as to provide an especially quick action, as it was, of course, imperative that the switch should be fully opened before the voltage was restored to normal. Results proved that the quick-break switch with large air ports was sufficient to take care of the trouble experienced and accordingly the additional switch was added to each equipment.

Preventing Flashing of Reversers on Multiple-Unit Control Equipments

A CONSIDERABLE number of multiple-unit cars on a well-known railway system were wired up in such a manner that when the master controller was moved entirely to the off position the reverser would break the circuit. There was a point on the controller which would hold the reverser in and allow the motor current to be broken in the controller, but occasionally a motorman would return his controller rapidly to the off position, and if the motors were drawing a heavy current the reverser would flash over. As these reversers were located under a seat in the interior of the car these flashovers caused a flash and flame in the inside of the car and generally the passengers sitting in the seat over the reverser would have their clothing scorched or otherwise damaged.

This condition had existed for some time and the company was seriously considering the installation of a circuit breaker to break the motor circuit and reduce the duty on the reversers. A careful study of the connection of the leads on the reverser, however, showed that the positive finger and the negative finger were adjacent to each other, with only a fraction of an inch clearance between the two fingers. There was thus a difference in potential of 600 volts between two adjacent fingers with but a very small insulating space. It was found that the connections on the reverser could be changed so that the voltage between adjacent fingers would be very materially reduced. This change in the wiring was made and since then the flashing over of the reversers has been entirely eliminated.

An Emergency Stop That Was Not on the Schedule

A CERTAIN large railway system operates multiple-unit trains in elevated service. On one occasion one of its motormen, on arriving at the terminal, reported his train as acting very erratically. He said that while running along with everything apparently working "O.K." the train would suddenly make an emergency stop and force all the passengers to the front end of the cars. On examining the equipment of his train immediately after such a stop, he found the brakes had not been applied but the emergency stop appeared to be due to a sudden reversal of the motors.

The electrician stationed at the terminal rode on the train the next trip but nothing unusual happened. He continued to stay on the train, however, for he said he had a premonition that if he stuck long enough the trouble would occur again. Sure enough, while leaving the opposite terminal of the line and ascending a slight grade there was a sudden flash from the reverser on the head car and all motors on the train were reversed.

A rapid examination was made by the electrician and he found that all the reversers had been thrown to the reverse position with the multiple-unit control switches closed for multiple operation. A thorough examination was impossible at that time and in order to avoid a long detention to passenger service he pulled out the jumper connecting the first and second cars, then with the motorman operating from the first car and himself operating from the second the train completed the remainder of its trip and was then taken out of service for a more careful examination.

At the inspection shop all of the equipment of the train was carefully inspected and tested, but other than that the reversers were burned and smoked up no defects were found that would properly explain the trouble. The jumpers were removed and were given a breakdown test, which consisted in passing a large current through the various wires and connections. This test was also met satisfactorily. The electrician who had helped bring the train in off the road insisted on making another inspection of the equipment, as he felt there must be some obvious cause for the trouble. A small black spot was found on the insulation in the head of the jumper which had been removed from between the first and second cars. This jumper was then entirely dismantled and it was found that the insulating compound inside the jumper head was cracked and that a strand from the positive battery train line wire had broken and was projecting through this crack and touching the reverser operating wire. The twisting of the jumper as the train passed around a curve had caused the contact to be made and the throwing of the reversers had caused the trouble.

While trouble of this particular nature was somewhat uncommon, some precautions in filling the jumper heads with the insulating compound were considered advisable. It was found that by forcing the compound into the heads under considerable pressure small interstices were more properly filled and there was less danger of the compound cracking away from the insulating head. To prevent air bubbles from forming in the compound inside the head, two holes were drilled in the casting. One was used for filling and the other allowed the air to escape readily.

Some Emergency Special Work Construction

Indianapolis Company Utilizes Acetylene Cutting and Thermit Welding in Building Up Curve Crosses

BY THOMAS B. McMATH
Engineer of Maintenance of Way, Indianapolis Traction & Terminal Company, Indianapolis, Ind.

THE maintenance-of-way department of this company has found it necessary to make emergency renewals of girder rail curve crosses and frogs, and has been very successful in making a fairly good-looking and serviceable job without any machine-shop work. The only tools used were an acetylene cutting torch, a thermit welding outfit and an Atlas track grinder.

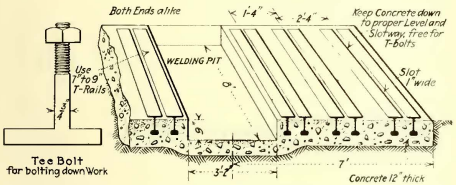


FIG. 1—THERMIT WELDING BED, 14 FT. LONG, 8 FT. WIDE

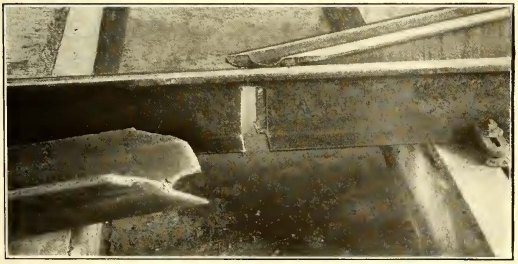
Made of concrete flush with ground. Old rails set with bases projecting 1½ in. above concrete. All rail bases set to perfectly level plane surface. Holding-down bolts used to bolt parts to be welded.

After making a few welds and finding the operation a success, we built a concrete bed for doing such work. This proved to be very convenient and insured the making of curve crosses true to angle and surface. Fig. 1 shows the welding bed. As we use thermit for all combination joints we do all such work on this same bed.

In fabricating a curve cross, we first make a template to correspond with the ball of the rail of the desired cross. The edges of the template that correspond with the gage line are painted red. In laying out the template we take as the through rail the one having the maximum traffic. This is bent to the proper curvature and bolted to the welding bed with the point of intersection over the pit. The rail for the intersecting arms is first bent accurately to the proper radius and then the pieces are cut of ample length to make the arms.

The abutting ends of the arm rails are coped as accurately as possible by means of an acetylene cutter, but this coping is at best a rough approximation. The guard of the through rail is next cut by means of the torch to permit the arm on the guard side to come within about an inch of the gage of the through rail. The through rail is then cut away for a length of 2 in. through the base and web up as far as the bottom of the guard. The photograph reproduced in Fig. 2 shows the job at this stage. One of the coped arms is shown lying on its side to indicate the general shape after coping. The other arm is in its final position. It will be noted that the webs are not in contact, but the weld will include all webs, although they are separated by not less than a half inch. The coped arms are adjusted to the template and are firmly bolted to the bed by U-washers and T-bolts as shown.

The openings are now all filled with wax and the wax is molded to the shape of the desired weld. The wax mold must be extended under the bearing parts of the intersecting rails to provide support for the load, and the weld must extend under the acute-angled points so as to support them. The wax when worked slightly warm is not at all difficult to handle or to work to the required shape.



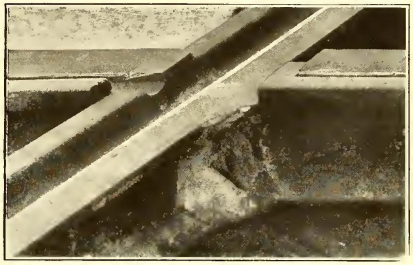


FIG. 2—THROUGH RAIL AND ABUTTING ENDS OF ARM RAILS CUT READY FOR WELDING. FIG. 3—"JUMP" INTERSECTION WELD COMPLETE

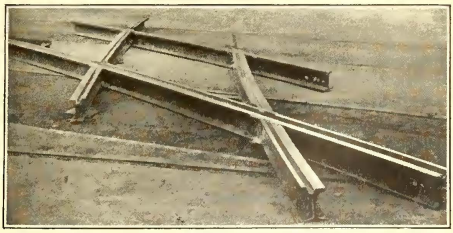


FIG. 4—VIEW OF A COMPLETED CURVE CROSS

We have found a small trowel and a farrier's knife to be the best tools for working the wax pattern into final shape. By knowing how much the wax weighs before starting and how much it weighs after the pattern is finished, it is easy to determine just how much thermit is required.

The flask is made up of four pieces of sheet iron cut at the ends to the shape of the rail. This flask must extend down 4 in. below the base of the rail and must permit 4 in. of sand to intervene between the flask and the weld. The sand used must be silica sand with sufficient fire clay added to make it tamp to a solid mass. It is not necessary to give any details of the thermit welding process here as these are so well known. After the pouring operation the frog should be allowed several hours to cool before removing the sand.

Most of our frogs take about 36 lb. of thermit and we find it most desirable to use two small crucibles rather than one big one. The frog is finished by grinding the tread of the rails if necessary and by grinding out the flangeway crossing.

Fig. 3 shows a close-up view of a finished intersection. The cross shown here, however, is for a "jump" or unbroken main line, with wheel opening for 4½-in. tread wheels. Such a weld will cost some $30 or $40 excluding the rail cost. We have had to make some thirty of these frogs, and we have had only two that we considered "missed," and even these were usable. A frog of this kind can be turned out in two days, or even more rapidly if conditions are such that a more rapid construction is required. Fig. 4 shows a view of a finished crossing.

Our men are intelligent laborers educated on our own work. With about three days' instruction from the manufacturers of the thermit, these men have gradually acquired their education with the acetylene cutter. They had had some experience with it and with the grinder before they began making frogs.

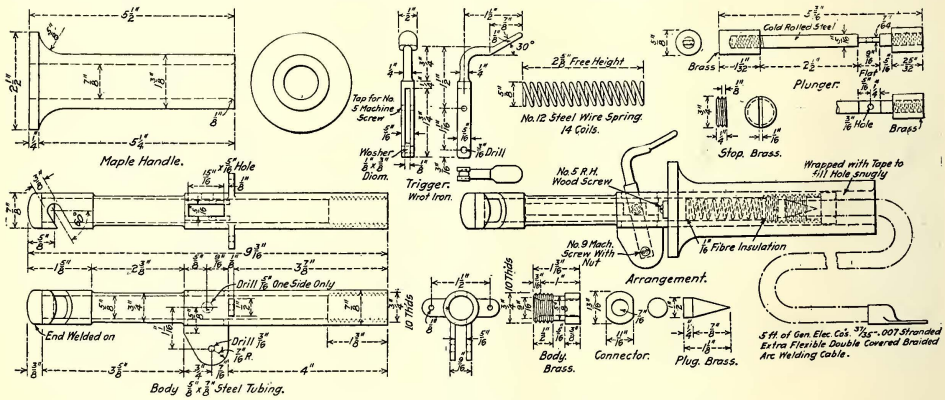
During these strenuous times when it is difficult to obtain special work, and when the cost is so great, we find this home manufacture to be advisable to enable us to tide over till normal conditions return. If the maintenance-of-way department were to order repair renewals sufficiently in advance to have them on hand when needed there would be too much money tied up in the storage yard.

Home manufacture permits one to hold on to the old job until it is gone and still be able to supply only the pieces wanted without tying large amounts of money in the supply yard. We do not know how long this kind of work will last, but we have had it in use for several months and have had no indications of failure.

Selecting Electrodes and Holders for Electric Arc Welding*

Definite Characteristics for Electrodes Are Being Studied and Marked Improvement Is Expected

AT PRESENT the question of electrodes for arc welding is in such a state of development that it is very difficult to set forth any definite data. Various treatments are being applied to electrodes of many kinds. Special electrodes with varying compositions are being made up and their welding characteristics are being studied. No doubt in the near future some definite information will be available as to the proper compositions of electrodes for various operations.



CONSTRUCTION DETAILS OF ONE TYPE OF ELECTRODE HOLDER

Wire for metallic arc welding must be of uniform homogeneous structure, free from segregation, oxides, pipes, seams, etc. The commercial "weldability" of electrodes should be determined by means of tests by an experienced operator, to demonstrate that the wire flows smoothly and evenly through the arc.

The following list indicates the maximum range of the chemical composition of bare electrodes for electric welding in connection with mild steel: Carbon, trace up to 0.25 per cent; manganese, trace up to 0.99 per cent; phosphorus, not to exceed 0.05 per cent; sulphur, not to exceed 0.05 per cent; silicon, not to exceed 0.08 per cent. The composition of the mild steel electrodes, commonly used, is around 0.8 per cent carbon, manganese not ex-

*From 1918 report of committee of Association of Railway Electrical Engineers.

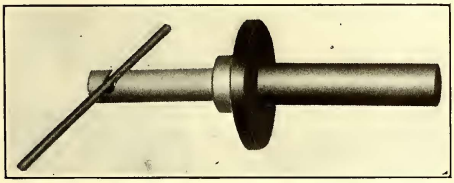
ceeding 0.05 per cent, and only a trace of phosphorus, sulphur and silicon.

The ordinary sizes required are $\frac{3}{32}$ in., $\frac{1}{8}$ in., $\frac{5}{32}$ in. and $\frac{3}{16}$ in., with only a small demand for the $\frac{3}{32}$ in.

The following table will serve to estimate the amount of wire in pounds required per operator:

Size of Bare Mild-Steel Electrode, In.	Actual Size, Inch	Length, Inches	Current Used, Amp.	Thickness of Work	Time to Deposit Seconds	Weight Deposited Pounds per Hour
$\frac{3}{32}$	0.0925	12	55	$\frac{3}{32}$ in. min.	63	1.3
$\frac{3}{32}$	0.0925	12	65	$\frac{1}{4}$ in. max.	53	1.5
$\frac{1}{8}$	0.1259	12	80	$\frac{3}{32}$ in. min.	67	1.9
$\frac{1}{8}$	0.1259	12	125	$\frac{1}{4}$ in. max.	60	2.5
$\frac{5}{32}$	0.1621	12	100	$\frac{1}{16}$ in. min.	98	2.5
$\frac{5}{32}$	0.1621	12	135	$\frac{1}{8}$ in. min.	87	2.9
$\frac{5}{32}$	0.1621	12	155	6x6-in. frame	75	3.3
$\frac{3}{16}$	0.1865	12	165	$\frac{1}{8}$ in. min.	82	4.0
$\frac{3}{16}$	0.1865	12	175	6x6-in. frame	71	4.6
$\frac{3}{16}$	0.1865	12	200	6x6-in. frame	64	4.8

The weight deposited for pound per hour is the amount of metal that could be deposited in one hour if it was possible to maintain the arc continuously without interruption for this period. In actual practice, however, it has been found that an operator will keep the arc going approximately 50 per cent of the time on average work, the remainder of the time being used in cleaning the metal, changing electrodes and preparing and handling the work.



SIMPLE, LIGHT TYPE OF ELECTRODE HOLDER

Coated Electrodes Prevent Oxidization

A coated electrode is an electrode which has had a coating of some kind applied to its surface for the purpose of improving the metal in the weld by totally or partially excluding the atmosphere from the metal while in a molten state when passing through the arc and after it has been deposited. By the employment of such a coating the use of electrodes of special alloy steel has been made possible. For example, manganese steel, carbon steel, nickel steel, vanadium steel and tungsten tool steel have all been deposited successfully with the metallic arc.

Until recently there was only one kind of a coated electrode in commercial use, which is commonly known as the "quasi-arc" electrode. This electrode gives some wonderful results, but owing to its cost its use has been limited in most cases to special high-grade steels. A cheap simple coating not only for the special steels but also for the commoner mild steel electrodes as well has always been needed, not only to improve the metal in welds made with the present grade of welding wire but also to make possible the use of a better grade of welding wire for some of the more important operations. Progress in this direction is being made.

An electrode holder should be designed to hold the electrode firmly in order that a good contact will be provided for the flow of the current between itself and electrode.

The holder for metallic electrode welding should be designed to permit the changing of electrodes with the least possible delay. It is also important that at least 5 ft. of the cable extending from the electrode holder be extra flexible, in order that an operator can readily change the angle of the electrode (with relation to the work) without having to twist a stiff cable. An operator's hand should be as free to move as that of a painter, if he is to accomplish his work properly.

There are many designs of holders on the market which are satisfactory, one of which is shown in an accompanying illustration. Holders for carbon arc welding where a heavy current is used are necessarily much larger than those used for metallic arc welding. Another simple, light and easily operated holder is shown in another illustration. This consists of a clamp designed to avoid overheating and to protect the operator's hand.

Holders for carbon arc welding should be designed to grip carbons of various sizes. The holder for carbon arc welding is two or three times as long as that required for metallic arc welding to permit the operator to be sufficiently far from the work. A fiber disk is provided also between the carbon and the handle to keep the heat of the arc away from the operator's hand.

1918 Fires Have Their Lessons for 1919

DURING the year just closed many fires were caused by carelessness in burning leaves, brush and general trash. Electric railways were not free from loss due to this cause. The following information regarding 1918 fires is given by the Fire Underwriters Electrical Bureau and is cited as proof of the reality of this hazard.

Fire occurred on April 7, 1918, at 6.30 p.m., at the plant of the Elevated Railway, Somerville, Mass. The cause of the fire as given in a statement of the general adjustment bureau and the sworn statement of the assured was the burning of grass in close proximity to a wooden building. The loss amounted to $300,000. Fire occurred on April 6, 1918, at 1.10 p.m., in the frame carhouse occupied as a storage house for out-of-season cars by the Ithaca (N. Y.) Traction Corporation. This carhouse was located outside the city limits. The fire was caused supposedly from burning grass, as fires had been noticed near by on the day of the damage. The loss paid was $27,000. On Nov. 8, 1918, a fire is reported to have occurred on the property of the street railways of Augusta, Ga. The possible insurance loss was $100,000. The fire is said to have been caused by a spark from burning trash which ignited some combustible material near by.

Park properties and outlying carhouses and shops are particularly exposed to the hazards of fire from the burning of grass, leaves, brush, etc., and from the flying sparks due to the careless burning of trash. The remedy, of course, is to keep leaves, high grass and brush well away from buildings, to burn trash only in wire-mesh covered receptacles, and to store all trash which cannot be immediately removed in covered bins well away from buildings.

Snow Sweepers Made from Open Cars

Emergency Conditions Made Unusual Procedure Necessary—Cost Was Less than $900 Per Sweeper

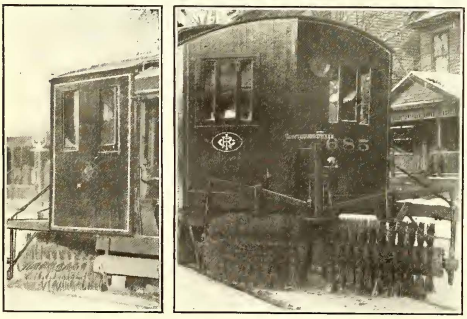
By J. W. HULME
Superintendent of Equipment International Railway Company, Buffalo, N. Y.

THE loss of four snow sweepers in a carhouse fire which occurred on this property early last spring made it necessary to provide the same number of equipments before the present winter set in. As the car builders could not give absolute assurance that they could make deliveries of new sweepers early in the fall, on account of the scarcity of labor and the difficulty in securing material, the company decided to equip some open cars as snow sweepers. The writer has always felt that a scheme of this kind could be worked out practically and would enable the rolling stock to be used to better advantage than otherwise.

It was decided to use four fourteen-bench cars which operate on the belt lines of the Niagara Falls division of the International Railway. These open cars are of double-truck type and are equipped with four GE-57 three-turn motors each. The cars weigh enough to insure good tractive effort, a necessary condition in any snow sweeper. The overhang of the platform on this type of open car is very small, making it possible to install the sweeper on the front end and still leave ample clearance on all curves.

In order to minimize the cost of converting the car from open car service to a snow-fighting unit and back again it was decided not to alter the bulkhead or bonnet of the open car, but merely to remove the vestibule and dasher. Of course the location of the controller and engineer's valve had to be changed.

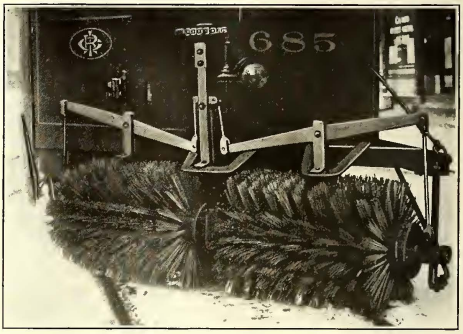
The construction decided upon is shown in the accompanying photographs. The cab is portable and is



DEVIL-STRIP SIDE OF VESTIBULE AND SWEEPER, AND FRONT OF OPEN CAR EQUIPPED WITH BROOM FOR SNOW SWEEPING

built up in five sections, as follows: The roof, which fits over the open car bonnet, the two sides and the two sections of which the front is composed. The broom is supported by a triangular frame made of ⅝-in. x 5 in. x 5 in. angle iron, and it is bolted on top of the two side sills. In order to stiffen the apparatus and eliminate vibration a 1-in. truss rod was run from the front end of the framework supporting the broom and extended back to the center of the car.

The broom is driven by a modern-type ventilated 60-hp. motor, being direct connected with it by means of shafts and bevel gears. This drive was used to obviate the chain troubles which so frequently occur with chain-driven brooms. A first-class motor was selected for the drive because experience has shown that delays and tie-ups are often due to the use of obsolete types of motors for the broom drive. To permit lowering of the broom as the rattan wears out, a set of levers is provided with control from the cab through an adjusting



CLOSE-UP VIEW OF BROOM AND LEVERS, SHOWING CHAIN CONNECTION TO ADJUSTING HAND WHEEL

screw. This is turned by means of a hand wheel with gear and chain connections. The controller and engineer's valve for the use of the motorman who operates the car is located back of the front window on the devil-strip side of the car. This location insures that the motorman will have a clear view of the track ahead when the broom is in operation and will not be blinded by the snow. At the same time the man who operates the broom is able to look out of the other front window to see where he is delivering the snow.

The cost of equipping the car exclusive of the motor and controller for operating the broom was less than $900. Since the cabs are built in portable sections the cost of converting at the end of each season will be less than $30 per car. Up to date we have not experienced any severe snowstorms but we have had sufficient opportunity to assure us that the use of an open car as a snow sweeper is entirely practicable. The motormen, conductors and broom operators are greatly pleased with this reconstructed equipment. Heaters are installed in both the front and the rear end cabs for the comfort of the crews.

In paying a tribute to the service of women conductors in Leeds, England, J. B. Hamilton of the tramways committee said that the employment of women had enabled the committee to maintain a service which, if not altogether adequate, had met the convenience of the public fairly well. It had been found, however, that with women the same standard of regularity cannot be obtained as with men and this increased the possibility of interruptions to service above what they otherwise would have been.

Supreme Court Decides D.U.R. Case

Says City Could Have Ordered Tracks From Street After Franchises Expired But Cannot Compel Company to Continue Business at Loss

A DECISION of importance as bearing on the right of public service corporations to a reasonable return on their investments was handed down by the United States Supreme Court on Jan. 13 by a 6 to 3 vote, in the case of the Detroit United Railway against the City of Detroit.

The case came up on appeal from the District Court for the Eastern District of Michigan, which had dismissed proceedings instituted by the railway company to restrain the enforcement of a city ordinance which sought to fix the rate of street car fares in Detroit. This ordinance (see footnote*) was passed by the City Council after it had turned down petitions from the company for permission to increase its fares.

It was contended by the company that the rates sought to be established were confiscatory and prevented the company from earning a fair return on its investment. The city authorities challenged this contention. The district court in dismissing the proceedings held that the remedy of the company was to abandon its service and take its property from the streets, and that the exception of the fifth section of the ordinance saved the company's contract rights from impairment.

In its decision rendered by Justice Day, the United States Supreme Court reversed the decree of the district court with costs and ordered a new trial. Justices Clarke, Holmes, and Brandeis dissented.

The Court holds that: "There can be no question that it was within the city's power to compel the company as to its non-franchise lines to remove its tracks from the streets of the city. This was settled in *Detroit United Railway Company* vs. *Detroit*, 229 U. S. 39. The city did not do so. Instead of taking such action it passed the ordinance in controversy, providing for the continued operation of the company's system." Where, however, it required certain duties of the company the latter was entitled to make a reasonable return upon its investment. Hence the District Court should have heard the case on its merits.

Company Entitled to a Reasonable Return

On this point the Court said:

"The allegations of the bill, which for the present purposes must be taken as true, are ample to the effect that the enforcement of this ordinance will result in a deficit to the company. We cannot construe the exception of section five, having reference to existing franchise contracts, in such way as to modify the requirements of section four which in explicit terms fixes the fares for trips over two or more lines whether franchise lines or not, and limits the maximum fare without charge for transfers. This must be read in view of the definition of a continuous trip in section five as meaning a journey from one point to another point in the city whether the same is made on one car line or by means of transfers from car to car or from line to line. The exception in section five can have no further effect consistently with the other provisions of the ordinance, particularly section four, than to regulate fares where trips are wholly upon franchise lines.

"A principal ground upon which the bill was dismissed by the District Court was the view of the learned judge that the power to compel the company to remove its tracks from the streets involving the non-franchise roads included the right to fix terms of continued operation upon such lines, whether remunerative or not. We cannot agree with this view. In our opinion the case in this respect is ruled in principle by *Denver* v. *Denver Union Water Company*, 246 U. S. 178. In that case the franchise of a water company had expired, and the city might have refused the further use of the streets to the company. Instead of doing this it passed an ordinance fixing rates and requiring certain duties of the company. We held that in that situation the company was entitled to make a reasonable return upon its invest-

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An Ordinance to fix and establish maximum rates of fares and charges which may be exacted and received by persons, corporations, or partnerships operating street railways for the carriage of passengers within the City of Detroit, and to fix a penalty for the violation thereof.

It is Hereby Ordained by the People of the City of Detroit:

Section 1. No person, partnership or corporation operating a street railway on the streets of the City of Detroit, for the carriage of passengers for hire, shall charge more than five cents for a single ride, or six tickets for 25 cents, per person for one continuous trip within the city over any line which is now operated or shall hereafter be operated without a franchise fixing the rate of fare.

Section 2. No such person, partnership or corporation shall charge a higher rate of fare upon any line now or hereafter operated under a franchise contract than is fixed by such franchise.

Section 3. Between the hours of five and six-thirty a. m. and four forty-five and five forty-five p. m. tickets in strips of eight for twenty-five cents shall be sold on all cars on all lines except where such sale would be contrary to the terms of a franchise contract, which tickets shall entitle the holder to the same rights between said hours as the payment of a five cent fare would.

Section 4. Where a trip is over two or more lines, whether franchise lines or not, the maximum fare shall be five cents, and no transfer fee shall be exacted which raises the total charge to more than five cents or six for 25 cents.

Section 5. A continuous trip means one journey from point to point within the city, whether the same is made upon one car or one line or by means of transferring from car to car or from line to line. Each such person, partnership or corporation, and the officers, agents, servants and employes thereof, shall, upon demand, furnish proper transfers to carry into effect the provisions of this section. The provisions of this Ordinance shall not be construed as an attempt to impair the obligation of any valid contract, but shall apply to and givern all such street railway passenger traffic in the city, except where the same is governed by the provisions of such contract.

Section 6. Any such person, partnership or corporation which shall violate the provisions of this Ordinance, or shall attempt to do so, and any officer, agent, servant or employe who shall order or direct any such violation or attempted violation of the provisions of this Ordinance, shall be guilty of an offense, and upon conviction shall be fined not to exceed five hundred dollars, or imprisoned in the Detroit House of Correction for not to exceed ninety days, or shall be both fined and imprisoned in the discretion of the court, for each violation.

Section 7. This Ordinance is passed for the public welfare in the case of an emergency involving the peace, health and safety of the people of the city, and it is ordered to take immdiate effect. It may be amended or repealed at any time by the Common Council of the City of Detroit. Unless so amended or repealed it shall remain in force for one year from August 9, 1918.

ment. So here, the city might have required the company to cease its service and remove its tracks from the non-franchise lines within the city. Instead of taking this course the city enacted an ordinance for the continued operation of the company's system, with fares and transfers for continuous trips over lines composing the system whether the same had a franchise or not. This action contemplated the further operation of the system, and fixed penalties for violations of the ordinance.

"By its terms the ordinance is to continue in force for the period of one year, unless sooner amended or repealed. This was a clear recognition that until the city repealed the ordinance the public service should continue, with the use of the streets essential to carry on further service. Within the principles of the *Denver* case this service could not be required without giving to the company, thus affording it, a reasonable return upon its investment. In the *Denver* case we said: 'The very act of regulating the company's rate was a recognition that its plant must continue, as before, to serve the public needs. The fact that no term was specified is, under the existing circumstances, as significant of an intent that the service should continue while the need existed as of an intent that it should not be perpetual.'

"In the present case the service upon the terms fixed in the ordinance is continued for a year, the city reserving the right to repeal the ordinance at any time.

"It is clear that the city might have taken a different course by requiring the company to remove its tracks from the non-franchise lines, it elected to require continued maintenance of the public service; doubtless because it was believed that it was necessary in the existing conditions in the city to continue for a time at least the right of the railway company to operate its lines. This amounted to a grant to the company for further operation of the system, during the life of the ordinance. For this public service it was entitled to a fair return upon its investment. Elements to be taken into consideration in valuing the property of the company in estimating a fair return are not involved in this case. If the allegations of the bill are true, and for present purposes they must be so regarded, the continued operation of the railroad system of the company upon the fares fixed in the ordinance will result in a deficit, and deny to the company due process of law within the meaning of the Federal Constitution.

"As rates of fare are fixed on some of the existing franchise lines at 5 cents without transfers, it would follow as to continuous trips over such franchise and non-franchise lines, such trips comprehending much of the transportation required, the latter lines would be without compensation for the service rendered. Furthermore, when a continuous trip begins on a non-franchise line and is over a franchise line and a non-franchise line, the former having the right to charge five cents for a trip over it, the effect would be to impair the obligation of the franchise contract. *Detroit United Railway* v. *Michigan*, 242 U. S. 252.

"In our view the allegations of this bill for the purposes of the demurrer sufficiently alleged violations of the Constitution of the United States in the action of the city in passing and enforcing the ordinance in controversy. The District Court should have entertained the bill, heard the application for a temporary injunction, and proceeded to a hearing and determination of the case in due course."

DISSENTING OPINION

In the dissenting opinion, presented by Justice Clarke, it was held that the ordinance did not require the company to operate its franchise lines at a loss, but it was an offer to the company of a right to operate its lines in the non-franchise streets, in which it had no rights, in conjunction with its other lines at what was alleged to be a non-compensatory rate for the entire system. The opinion of Justice Clarke also quoted, as applicable to the case, the language which Justice Holmes used in a dissenting opinion in the *Denver* case, already mentioned, as follows: "In view of that right of the city, which, if exercised, would make the company's whole plant valueless as such, the question recurs whether the fixing of any rate by the city could be said to confiscate property on the ground that the return was too low. . . . The ordinance of the city could mean no more than that the company must accept the city's rates or stop—and as it could be stopped by the city out and out, the general principle is that it could be stopped unless a certain price should be paid."

Some Additional Track Statistics

SINCE the publication of the statistics on new track constructed and track rebuilt in the statistical issue of January 4, reports have been received from seven additional railways as follows:

Name of Railway	State	New Single Track Mileage: City Track	New Single Track Mileage: Interurban Track	Miles of Track Rebuilt: Electrified Steam Road	Miles of Track Rebuilt: City Track	Miles of Track Rebuilt: Interurban Track
Bay State Street Ry.	Mass.	1.80	....	....	4.14	....
Galveston-Houston Electric Ry.	Texas	....	0.76	....	....	....
Houston Electric Co.	Texas	0.30	....	....	....	....
Illinois Light & Traction Co.	Ill.	....	....	....	0.76	....
New York Connecting R. R.	N. Y.	....	....	10.6	....	....
Philadelphia Rapid Transit Co.	Pa.	1.49	7.16	....	14.77	0.12
St. Paul Southern Electric Ry Co.	Minn.	....	....	....	....	9.00
Total		3.59	7.92	10.6	19.67	9.12

With these figures added to those previously published the total mileage for new electric railway track built in 1918 becomes 325.33, the electrified steam line mileage 286.3 and the total new electric mileage 611.63. The revised mileage of track rebuilt is 184.22.

Report on Tramways in Chosen, Corea

For the fiscal year ended March 31, 1917, according to the latest report of the Railway Bureau of the Government General of Chosen (Corea), the light railways and tramways opened to traffic totaled 84.4 miles, while those not yet open totaled 134.6 miles. The result of traffic on the operating lines was said to be very good. Private lines already in operation amount to 32.6 miles, while those not yet worked cover 34.7 miles. Since 1914 an annual subsidy sufficient to insure the payment of 6 per cent on the paid up capital, in case the net profit does not reach this amount, has been allowed to companies planning to lay down and work light railways, so as to encourage the development of the work.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

St. Louis Tax Adjusted

Agreement Reached Between City and United Railways for Payments Since Recent Court Decision

An adjustment of the United Railways mill tax suits, amounting to $2,300,000, was reached on Jan. 11 at a meeting of the Board of Estimate and Apportionment of St. Louis, Mo., composed of Mayor Kiel, City Comptroller Louis Nolte and Louis P. Aloe, president of the Board of Aldermen. Charles H. Daues, city counselor, represented the city, and Thomas H. Francis the United Railways.

Payments in Installments

The United Railways agreed that it would pay every dollar that it owes the city in mill taxes, including both principal and interest, and, also, a judgment against the St. Louis Transit Company for about $250,000. The obligations are to be paid in ten installments, with interest, amounting to approximately $250,000 a year. The company also binds itself to pay the mill tax in the future without contest as it falls due.

The company, it was stated, would go before the Circuit Court and contest judgment.

On April 4, 1903, a measure known as the mill tax ordinance became effective. This ordinance provided for a license tax of 1 mill per passenger on street railways doing business in St. Louis. The United Railways from the very beginning contested the validity of this tax, and litigation between the city and the company ensued, which ended, in so far as the original cases were concerned, by a decision of the Supreme Court of the United States in 1916 in favor of the city. As the result of this thirteen years' litigation the United Railways Company paid into the treasury of the city approximately $1,800,000. No tax has since been paid under the ordinance.

Another Suit Was Proposed

Immediately upon the final determination of the 6-cent fare case by the Supreme Court the Mayor instructed the law department to proceed to collect, if possible, the balance of the mill tax, not in judgment, and which amounts, in round figures, with interest, to $2,500,000. Suit for the major portion of this amount has been pending awaiting the fate of the rate case and was also passed awaiting the result of franchise compromise ordinances and settlements which were being suggested and proposed from time to time. Accordingly, the city counselor a few days ago made demand upon the company to file its answer in these cases so that steps could be taken by the city to force the tax claims under this ordinance to a judgment.

Seattle Wants Authority Established

A complaint has been filed in the Superior Court of the State of Washington, by F. A. Twichell, against the city of Seattle and the Puget Sound Traction, Light & Power Company, in which it is alleged that under present conditions the purchase of the railway property by the city from the traction company would be illegal. The plaintiff asks that the city and company be restrained by the court from proceeding with negotiations now under way to complete the purchase, and that a court injunction be issued forthwith. It is further alleged that the city, in making a part of the purchase contract a provision permitting the company to furnish power for the operation of the railway, has gone outside its jurisdiction. These actions are in final proceedings to establish the authority of the city to conclude the municipal ownership negotiations which have been under way for some months past.

Louisville Wages Again a Problem

The Louisville (Ky.) Railway and Amalgamated Association have been unable to agree on demands made by the men for a further increase of 7 cents an hour, with the result that the union has taken the matter up with the War Labor Board.

On Dec. 12 an ultimatum was sent to the company. The latter announced that the question would be discussed, and an answer returned by Dec. 23. The directors met on Dec. 20, but no report was made of the proceedings.

President Minary in a letter to the union stated that when the former labor schedule was arranged it was to have held until Jan. 1, when the union could reopen the question.

Mr. Minary calls attention to the fact that the company has been hoping to secure an increase in fares, but has been unable to secure any advance. Another increase in wages of 7 cents, or to a maximum of 45 cents an hour, is impossible under a 5-cent fare, with the present operating expenses. It is said that the company, aside from the considerations just mentioned, feels that the demands of the men are unjustified, particularly in the light of the lessened demand for labor in the war industries.

Service-at-Cost Now

Buffalo Veers Around from Municipal Ownership Talk to Cleveland Service Plan—Valuation Arbitration

An agreement has been reached between the International Railway and the municipal authorities of Buffalo, N. Y., whereby both parties will arbitrate the question of the valuation of the company's properties within the city of Buffalo. The valuation figures will be used in reaching an agreement between the company and the city modeled after the so-called Cleveland service-at-cost plan.

Valuation Board of Three

In an opinion issued by the city law department, it is held that one man should be selected by the company; one selected by the city and these two should agree upon a third man. There will be nothing to prevent any member of the board, on behalf of the party represented, from engaging experts to help in determining what is a just and reasonable valuation.

It is proposed that the company and the city shall be bound by the valuation made by the arbitration commissioners only to the extent that the award is to be used if an agreement is made. If the city decides the award is too high, it can reject the finding, and if the company believes the award is too low, it can reject the return. If an agreement is made, however, the award shall be the basis of it.

Attention is called by the city law department to the appraisal made for the city by John C. Brackenridge, New York, as of June 30, 1915, which fixes the physical value of the company's properties within the city at $18,013,808. The items entering this total, it is said, have been approved by H. E. Riexinger, the company's chief engineer, except that he claims the figures do not include contractor's profits. To this total Mr. Brackenridge has added for intangibles the sum of $2,620,925, making the total reproduction cost as of June 30, 1915, $20,634,733.

Control Plan Expected to Pass

It is generally believed that a resolution will be enacted by the City Council placing the International Railway under city control on a plan modeled after the so-called Cleveland service-at-cost plan, which has the approval of E. G. Connette, president of the railway. This resolution would also be subject to a referendum. It is proposed that the two resolutions be submitted to the electors at the same time at a special referendum.

Regulative Matters Discussed

New York Commission Points Out Limitations of Authority Under Existing Laws and Asks for Broader Powers

The Public Service Commission for the Second District of New York, in its annual report to the Legislature on Jan. 13 urged consideration by the Legislature of certain defects in the public service commissions law and recommended amendments to give the commission broader powers over questions of rates and service by public service corporation.

Adequate Rates a Matter of Necessity

In this connection the commission says:

It was undoubtedly the intention of the Legislature to provide in the Public Service Commissions Law for tribunals having the character, the ability and the facilities to determine the complaints, not only of consumers and patrons of the various public service corporations as to inadequacy and insufficiency of service, or undue profiteering in the condition of service, or discrimination between individuals and the like, but recognizing that the public service corporations have legal and business rights, to afford them also a tribunal which should impartially inquire and if necessary give relief by way of increased rates.

It is true that to a certain extent the incomplete and defective jurisdiction of the commission has been supplied by the waiver by certain cities and villages of franchise conditions, and by voluntary submission to the arbitration of the commission. These, however, are but temporary and makeshift devices and, in the judgment of the commission, neither it, nor the municipalities, nor the public service corporations, ought to be left to any such expedients. To carry a passenger, to transport property, to furnish a householder with light or heat, or with the means of communication by telegraph or telephone, is to render a useful and legitimate, in fact an indispensable service. To be able to receive an adequate compensation therefor is not only a matter of justice and fair play, but a matter of necessity. Unduly to profiteer in the rendering of any such service is an evil which should be prevented, and the Legislature has adequately provided for such prevention. But the Legislature has not provided reciprocally for needs which must arise for increased compensation.

The commission says that still another subject for legislative consideration is presented by a recent decision of the Court of Appeals to the effect that the commissions are without authority to require a corporation subject to their control to set aside from its operating revenues a specified amount to be credited to an account called "Accrued Amortization of Capital," which includes depreciation reserve.

Adequate Reserves Essential

In this connection the commission says:

It is scarcely open to argument that the commission cannot perform its duty of requiring public service corporations constantly to maintain facilities safe and adequate for the public service unless it may require, certainly before the payment of dividends and probably before the payment of interest, the setting up of an adequate reserve for replacements. Legislation which may confer upon the commission such power is urgently recommended.

The report states that abnormal economic conditions, precipitated by the war, affected the public utility corporations. At the same time, the acid test imposed has, according to the commission, brought into strong relief what is regarded as certain defects in the public service commissions law which should receive the immediate attention of the Legislature.

Reference is made to the action of the Federal War Labor Board in granting increases in wages to employees of public service corporations, advances in costs of fuel and structural materials and requests for approval of increased rates. The commission responded as well as lay within its power to the latter requests where the actual need was demonstrated by evidence after a hearing. Great confusion resulted, the commission reports, in a large number of cases from the fact that the Legislature had not conferred upon the commission the requisite power to give relief. It became plain that while adequate power over service had been conferred, together with plenary power to reduce rates, there was lacking a power to increase rates.

Rochester and Buffalo Cases

The report says nothing is clearer than that a public service corporation, in order to render an adequate and satisfactory service, must receive a compensation which will enable it so to do. The commission is vested with adequate power to require adequate service and to reduce rates if it finds after investigation that they are excessive. But in the case of street railroads, whose maximum fare is fixed by franchise agreement or condition, it was held by the Court of Appeals in the Quinby or Rochester case that the commission is without power to increase a rate so fixed, no matter how great the need therefor may be in justice and in fact.

A similar ruling has been made by the Court of Appeals in the matter of the International Railway versus Rann where the maximum fares in Buffalo are fixed at 5 cents by the terms of the so-called Millburn agreement. The commission has never made any investigation as to the insufficiency of the 5-cent fare in Rochester or in Buffalo, having been prevented from doing so by the issue of a writ of prohibition in the Rochester case and by the knowledge of the decision of the Court of Appeals in the Buffalo case. The commission continues:

Perhaps an investigation would disclose that the existing fares are sufficient; on the contrary it might show that they are insufficient. In the case of the International Railway, which operates in Buffalo and vicinity, the company claims that it is on the verge of bankruptcy by reason of insufficient fare, and there has been much local agitation concerning this claim. By reason of the decision in the Quinby case, however, there is apparently no authority or tribunal possessed of power to fix and determine a just rate of fare.

It is immaterial whether a public service corporation is prevented from charging an adequate rate by statute, by a franchise condition, or by an independent agreement between the corporation and the municipal authorities. The public service commission law ought to be sufficiently broad to cover all questions, both of rates and service.

The Public Service Commission for the First District of New York, the activities of which cover Greater New York, confines its report to the Legislature very largely to a review of its construction and regulatory activities during the previous year. Any suggestions that it has in regard to legislation are embodied in bills which are presented direct at Albany. In its present summary to the Legislature the commission says that in point of value of transit lines placed in operation, 1918 was the banner year since the dual subway contracts were entered into in 1913. The cost to construct these lines was $103,000,000, exclusive of the cost of the equipment used on them. All the work for the coming year, however, is dependent upon such action as may be taken by the Board of Estimate & Apportionment, the report points out.

Dayton Wants Consolidation and New Franchise

In a letter to J. Sprigg McMahon, representing the electric railway at Dayton, Ohio, the City Commission has made known its desire that the various companies operating in that city be consolidated within six months, in order that more economical operation may be secured. Failure to comply will be taken as sufficient reason for taking over the properties by the city, the letter stated.

It was also announced on Jan. 8 that the city will ask the companies to accept an ordinance, providing for a straight 5-cent fare. This ordinance was to have been presented at a meeting of the commissioners on that date, but it was withheld because of the absence of the Mayor and City Attorney.

In connection with the desired consolidation, the city proposes that the roads give up their present franchises and accept one that will give the municipality greater regulatory power.

Service Control Rights a Problem

The Cleveland (Ohio) Railway ordinance must be extended by May 1, 1919, or the city will lose its right to control operation and the company will be free to put into operation the maximum rate of fare in order to accumulate a fund to insure its safety at the expiration of the franchise on May 1, 1934. The only right the city would have left during the intervening period would be police power to require adequate service.

President Harry C. Gahn has suggested that in extending the franchise the grant be so amended that the rate of dividend to stockholders shall depend upon the rate of fare. If the rate of fare is low then the dividend shall be high and vice versa.

The city may, of course, exercise its right to purchase the property. The agreed price is the face value of the stock and bonds of the company plus 10 per cent. This would amount to approximately $37,400,000.

A Good-Will Message

General Manager McLimont of Winnipeg Boosts Christmas Offering for Soldiers' Families

A committee consisting of leading citizens of the city of Winnipeg, Man., on Dec. 9 started a campaign to obtain contributions to a fund to provide a "Citizen's Christmas Gift to Soldiers' Families" in Winnipeg. The committee wished to raise $60,000 by voluntary contribution, this sum to be divided among the soldiers' families in the city in accordance with the number of persons in each family, to provide Christmas presents for the children and Christmas cheer generally.

WINNIPEG RAILWAY'S APPEAL

A. W. McLimont, general manager of the Winnipeg Electric Railway, took an active interest in the campaign from its inception. The company's donation to the fund took the form of an expenditure amounting to $1,000 in advertising for donations. Mr. McLimont originated the plan of asking the public to "drop a bill in the fare box" for the Christmas fund. One of the ads run in the daily newspaper is shown herewith.

PLACARDS PLACED IN CARS

Placards similar to the ad were also posted in the company's cars. One of these posters was signed jointly by the Mayor of Winnipeg and Mr. McLimont. The company issues a paper each fortnight, 40,000 copies of which are distributed free on the cars, and the leading article of Dec. 16 issue was devoted to the campaign.

All members of the general committee comprising 200 leading citizens received copies of this issue of the *Public Service News* sent by the secretary of the committee.

The street cars in Winnipeg are equipped with protruding fenders, and a large banner requesting citizens to "drop a bill in the fare box" was placed on each fender. A full sized billboard was also erected on each side of a car and this car was operated during the rush hours through the principal streets of the city.

It was not expected that any substantial amount would be realized from the fare box collections, owing to the fact that the principal source of revenue for the fund was big contributions from the businessmen of the city. The rank and file of the general public, however, responded very generously to the appeal to place their money in the fare box and more than $1,000 was realized from this source, in addition to an order for a load of wood, Victory Bond coupons, etc. The employees of the company contributed $400 to the fund.

The newspapers of the city and the thousands of soldiers' families commented very favorably on Mr. McLimont's action in getting behind the Christmas gift fund. Mr. McLimont feels that the employees of the company have greatly benefited from being privileged to participate in the campaign and that working with other citizens in this way has been in mutual interest.

B. R. T. Message to Ex-Soldiers

The Brooklyn (N. Y.) Rapid Transit Company has established two bureaus where information and guidance may be obtained by men now in the military service with respect to employment opportunities available to them in all its departments.

One of these bureaus, known as the Borough Hall branch, has been established at 185 Montague Street, in the heart of the business district of Brooklyn. The other is at 438 Fulton Street, Jamaica, two minutes' walk from the Long Island Railroad. The Jamaica bureau was opened on Dec. 16. This bureau especially is handy of access by men in the camps on Long Island and a large number of soldiers from Camp Upton and Camp Mills who had either just been discharged or were about to receive discharges have already applied there for information concerning opportunities in the company.

The Montague Street branch and the regular employment bureau at 40 State Street have also received calls from many sturdy and intelligent ex-soldiers and ex-sailors.

An attractive little leaflet entitled "A Greeting and an Opportunity for the Men of Our Victorious Armies Returning From Overseas, From the Brooklyn Rapid Transit System" has been widely distributed where it will be most apt to reach discharged soldiers and sailors.

This leaflet briefly tells of the opportunities of employment with the company and gives the necessary directions to reach the information bureaus from Camp Dix, Camp Merritt, from the New York City Hall, from Camp Mills, Camp Upton and from the Long Island station at Flatbush and Atlantic Avenues.

The leaflet is 4 in. wide by 6 in. high. It contains four pages very artistically displayed typographically.

New Commission Bill Introduced

The bill outlined by Governor Smith of New York in his message to provide for the reconstruction of the Public Service Commission in New York City was introduced in the Senate on Jan. 9 by James A. Foley, minority leader, and in the Assembly by Charles B. Donahue.

The measure follows closely the Governor's recommendation that the present commission be abolished. It provides for the repeal of the present section of the public service commission law fixing the number of commissioners for the First District at five, and substituting a new section which provides that there shall be one commissioner, whose term shall be five years, and a transit construction commissioner to be appointed by the Governor with the consent of the Senate, for a like period.

Under the terms of the bill the single commissioner is to be concerned only with the regulation of public service matters, while the transit commissioner is to confine his entire time to construction work. This commissioner is to receive $15,000 a year and have the appointment of not more than four deputies at $7,500 a year each, one of whom may exercise the powers of the commissioner. The transit construction commissioner must be a resident of New York City, is to receive $15,000 a year, and is to have all the powers of the old Rapid Transit Commission.

The new Governor of New York is a democrat. There is naturally much speculation as to what attitude the republican Legislature will assume toward the measure.

Short Milwaukee Strike

A strike of the employees of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., which went into effect at 6 a.m., on Jan. 1, was declared off the evening of the same day, pending an effort by a committee of business men to have the Wisconsin Railroad Commission settle the controversy over the matter of an increase in fares. The company has maintained that it could not increase the pay of its employees out of its present earnings.

The employees' association had the books of the company examined by their accountants, who reported that the company was unable to pay increased wages without an increase in fares. The employees' association presented these facts to the Railroad Commission and the Governor, both of whom promised action before Jan. 1. The commission and the Governor declined to intervene and the strike went into effect as scheduled by the employees' association. The commission promised the Association of Commerce that it would make a prompt investigation of the allegations of the company and the employees and make the finding of the facts at the earliest practicable date. The findings in the report made for the employees' association were referred to in this paper for Jan. 11, page 117.

Meeting an Emergency

Publicity Plays Prominent Part in Putting Patrons in Possession of Plans Made for Their Benefit

The interurban cars of the Indianapolis & Cincinnati Traction Company were recently cut off from reaching the terminal station and business section of Indianapolis because of the collapse of the Virginia Avenue viaduct. Arrangements were quickly made for meeting the emergency thus presented, and the public was informed of the changes made in an advertisement, set across three columns, published in all the papers in the territory served by the railway. This ad the company reprinted in dodger form and hung copies of it in the cars on strings so they would be readily available to the public. The ad tells its own story. It is reproduced herewith.

QUICK WORK

INDIANAPOLIS & CINCINNATI TRACTION COMPANY

On January 6 the Virginia Avenue Viaduct in Indianapolis, a very old structure, gave way completely, cutting off our interurban cars from the Terminal Station and the main business part of the city. A temporary arrangement for handling passengers on both sides of the viaduct, carrying them on city cars to and from Keystone Avenue, was at once inaugurated. The freight was handled by us on auto trucks between the city freight house and our junction on Southeastern Avenue, at which point our freight cars were loaded and unloaded.

Much quicker than seemed at all possible the Indianapolis Traction & Terminal Company constructed a temporary loop at Louisiana Street, near the viaduct, and had it ready for use the morning of Jan. 9, and our passenger cars then began operating up to and around that loop.

In conjunction with the Interstate Public Service Company we secured from the Indianapolis Board of Public Works authority for the Traction & Terminal Company to construct a temporary track from Virginia Avenue over Louisiana Street to Alabama Street, thence on Alabama Street to South Street, thence on South Street to Delaware Street, there connecting with tracks already laid on South Street, over which to operate our cars to Kentucky Avenue and thence by Kentucky Avenue and Capitol Avenue to the Terminal Station. The city company, with wonderful management and energy, notwithstanding it was mid-winter, pushed this work with such speed that on Monday morning, Jan. 13, we commenced operating our cars, both freight and passenger, over it and into the Terminal Station.

We are pleased to call the attention of the public to this highly commendable handling of a very difficult situation. It was all done in a week's time.

Patrons of our road can now travel from any point on our lines to the Terminal Station in Indianapolis and can ship freight and express without transfer or delay of any kind.

We are proud of our people, and those of the other companies co-operating, for what they have done and what they have accomplished.

Until the steam road track elevations are completed over Virginia Avenue, our cars, both passenger and freight, are to operate into Indianapolis from Virginia Avenue over the South Street and Kentucky Avenue route, occupying only a few minutes longer than by the old route. When the track elevation is completed we will again run in by the old route on Virginia Avenue to Delaware Street.

We want to thank our patrons for their kind co-operation and good natured patience during these few days of troublesome and inconvenient operation.

RAILWAYS EXPLANATION TO ITS PATRONS

News Notes

Detroit Hearing Again Postponed.—The session of the War Labor Board in Washington to take testimony in the case of the women conductors on the lines of the Detroit (Mich.) United Railway, set for Jan. 14, has again been postponed. The new date is fixed at Jan. 18 at Washington.

Tacoma Again Operates Its Municipal Lines.—On Jan. 1 the city of Tacoma, Wash., through the Department of Public Works, took over the operation of the municipal tideflats car line, which has been operated by the Tacoma Railway, Light & Power Company under contract. There is now a deficit of $20,000 accumulated against the line, which Commissioner H. Roy Harrison believes can be turned into a surplus. The saving, it is said, will come in the operation of the line with a reduction in overhead expense; by more thorough methods of fare collection and by economy in management in other directions.

Votes to Revoke Railway Grants.—The City Commission of Jersey City, N. J., has adopted an ordinance revoking fifteen franchises granted by the muncipality to subsidiaries of the Public Service Railway on the ground that they were granted originally upon condition that not more than 5 cents should be charged for a continuous ride. The 7-cent fare case is now pending in the Court of Errors and Appeals. It is expected that an appeal will be taken by the railways in certiorari proceedings. In the meantime cars will run as usual and 7-cent fares will continue to be collected of the subway.

Commission Refuses to Approve Lease.—The Public Service Commission of Pennsylvania on Jan. 15 announced that it had decided not to sanction the agreement entered into by the Philadelphia Rapid Transit Company for the joint operation of the municipal lines in Philadelphia and those now operated by the company.

Bursting Water Main Ties Up Subway.—The Broadway subway in New York city operated by the New York Municipal Railway (B. R. T.) was flooded from 5 a. m. on Jan. 12 to 2.30 p. m. on Jan. 13. A torrent of water estimated at 3,000,000 gal. rushed into the subway at Fourteenth Street from a bursted 36-in. Catskill Aqueduct main. When completed this main will pass over the subway at that point, but due to the unfinished work the subway was open for the water to rush in. The water first entered a 60 ft. cut in the unfinished "Fourteenth Street" crosstown line which passes under the Broadway subway at that point. This was completely flooded and in the Broadway subway the water extended as far north as Twenty-eighth Street. At some places the water was 4 ft. over the tracks. Powerful machine pumps, fire department engines and a newly constructed pump car of the Brooklyn Rapid Transit Company were rushed into use. It took three hours to locate the break and shut off the water

Programs of Meetings

A. S. M. E.

The American Society of Mechanical Engineers has selected tentatively the dates June 17 to 20 for the spring meeting which will be held at Detroit, Mich.

M. C. B. and M. M. Convention

The Master Car Builders' Association and the American Railway Master Mechanics' Association will hold their convention this year in Atlantic City, N. J., June 18-25. This will be the first convention of these associations since 1916, meetings having been abandoned during the war. This year the associations expect to have a convention of the old-fashioned kind with a full exhibit. An invitation will be extended to all foreign trade bodies now represented in this country, and through the embassies at Washington all foreign nations (exclusive of the Central Powers) will be invited to send representatives. The railroad administration at Washington has approved the meeting.

American Wood Preservers' Association

The fifteenth annual meeting of the American Wood Preservers' Association will be held in St. Louis, Mo., on Jan. 28 and 29, with headquarters at Hotel Statler. Among other topics treated will be the zinc chloride and creosote oil situations, and a paper will be presented: "The Transition from Creosote Oil to Zinc Chloride in the Treatment of Cross Ties." Another paper will be one on "Developments of Uniform Practices in Procuring and Preserving Cross Ties," by John Foley of the Forest Products Section of the United States Railroad Administration. A number of committee reports will be presented, including those on preservatives, purchase and preservation of treatable timber and non-pressure treatments.

Financial and Corporate

Chicago Elevated Noses Out

Revenue Gains Beat Rise in Operating Expenses and Taxes by a Small Margin

Despite higher operating costs, due to wartime conditions and other causes, the elevated lines in Chicago were able in the fiscal year ended June 30, 1918, to increase their net income by the slight amount of $9,798, or about 0.7 per cent. Such is the showing indicated in the latest annual report of the Chicago Elevated Railways Collateral Trust, which controls the South Side Elevated Railroad, the Northwestern Elevated Railroad and the Metropolitan West Side Elevated Railway.

The gain in net was due to the increase in gross operating revenues by $487,251 or 5.2 per cent, this gain not being completely offset by the rise in operating expenses and taxes. Operating expenses jumped up $403,491 or 8.3 per cent, and taxes, etc., $69,074 or 8 per cent.

COMPARATIVE INCOME STATEMENT OF CHICAGO ELEVATED RAILWAYS FOR YEARS ENDED JUNE 30, 1917 AND 1918

	1918 Amount	1918 Per Cent	1917 Amount	1917 Per Cent
Gross operating revenue	$9,777,164	100.0	$9,289,913	100.0
Operating expenses:				
Way and structures	$284,458	2.9	$212,692	2.3
Equipment	593,113	6.1	523,156	5.6
Power	1,133,841	11.6	1,155,093	12.4
Conducting transportation	2,806,136	28.7	2,407,088	25.9
Traffic	21,185	0.2	27,677	0.3
General and miscellaneous	389,244	3.9	498,777	5.4
Total operating expense	$5,227,977	53.5	$4,824,486	51.9
Net operating revenue	$4,549,187	46.5	$4,465,427	48.1
Taxes, city compensation and other items	932,408	9.5	863,334	9.3
Operating income	$3,616,779	37.0	$3,602,093	38.8
Non-operating income	*150,490	1.5	* 151,589	1.6
Gross income	$3,767,269	38.5	$3,753,682	40.4
Deductions—interest and rents	*2,390,451	24.4	*2,386,662	25.7
Net income	$1,376,819	14.1	$1,367,020	14.7
Dividends	1,198,394	12.3	1,176,345	12.6
Surplus	$178,423	1.8	$190,675	2.1

*Inter-company rentals deducted.

It should be noted, however, that the foregoing figures are applicable to the period when wages were considerably lower than at present, for the increases granted by the War Labor Board dated from Aug. 1, 1918. Moreover, the gain in net income during 1918 was less than that during the preceding fiscal year, for in the year ended June 30, 1917, the net income was $100,902 or 7.9 per cent higher than in the year before.

The annual report of the Chicago Elevated Railways Collateral Trust, which is for the calendar year 1917, shows gross income of $1,387,682, compared with $1,372,475 in 1916. Total disbursements, chiefly for interest, amounted to $1,362,178, leaving a surplus for dividends of only $25,503, compared with $123,801 the preceding year. All the year's surplus and slightly more was absorbed by a charge of $26,100 for expenses incidental to extension of the $7,000,000 of secured gold notes, dated July 1, 1914, and miscellaneous debits.

Receiver for Spokane & Inland Empire

On petition of the First Trust & Savings Bank, Chicago, Ill., Federal Judge Cushman at Tacoma has named F. E. Connors, Chicago, receiver for the Spokane & Inland Empire Railroad, Spokane, Wash. Losses of the company for the last six months have averaged $10,000 monthly. Waldo G. Paine, vice-president of the company, said:

"Decreasing revenue made it impossible to pay interest on our bonds any longer. The influenza ban hit us hard. Where ordinarily the income reaches $1,400 daily it has gone down to $700 to $800 daily. The bondholders have demanded their money and say it is their intention to get it if they have to junk the system."

A writ of subpena in chancery was served on Mr. Paine. The company has twenty days in which to appear and answer allegations in an original bill of foreclosure. The issue on which the court action is based is the $15,000,000 authorized first and refunding mortgage 5 per cent bonds of the Spokane & Inland Empire Railroad, of which $2,699,500 are outstanding. This issue was dated May 1, 1906, is due May 1, 1926, and the trustee is the First Trust & Savings Bank, Chicago, Ill. Preceding this issue there are outstanding $422,000 of first mortgage 5 per cent bonds of the Coeur d'Alene & Spokane Railway, $96,000 of first mortgage 5 per cent bonds of the Spokane Traction Company and $201,500 of first mortgage 5 per cent bonds of the Spokane Traction Company.

The railway system includes city and suburban lines of more than 290 miles.

Mr. Connors as receiver has issued a circular announcing that the former executive officers of the company will be retained in their present positions while he is in charge.

Higher Fares Help Lexington

Company Reports Steady Improvement in Traffic with No Complaint at Increased Rates

The gross earnings of the railway department of the Kentucky Securities Corporation, Lexington, Ky., during the fiscal year ended June 30, 1918, showed an increase of $22,236 or 4.1 per cent. This gain reflected in part the generally satisfactory business conditions in the company's territory but in the main the higher average rates of fares. Because of the advance in operating costs, however, the net earnings of the railway department fell off $15,789.

The number of passengers carried, including transfers, was as follows:

	Year Ended June 30 1918	1917	1916
Lexington city lines	3,959,734	4,507,286	4,389,905
Interurban lines	1,660,133	1,599,197	1,482,881
Other cities	426,624	438,324	497,054

In comparing the number of passengers carried, as shown above, the decrease on the Lexington and city lines and the small increase on the interurban lines were mainly due to the restricted movement of cars during December and January, when there was unprecedented weather throughout the entire country. It is said that conditions for some time have been normal and indicate a steady improvement in the number of passengers carried with practically no complaint at the higher fares.

INCOME STATEMENT OF KENTUCKY TRACTION & TERMINAL COMPANY AND AFFILIATED COMPANIES FOR YEAR ENDED JUNE 30

	1918	1917
Operating revenue	$1,021,448	$912,540
Operating expenses	605,274	480,265
Net operating revenue	$416,174	$432,275
Miscellaneous income	45,180	39,289
Gross income	$461,354	$471,564
Taxes, rentals, etc.	73,449	46,462
Net income	$387,905	$425,102
Interest on bonds	229,006	218,034
Surplus for dividends	$158,899	$207,068

The fixed charges of the companies in the system have increased $43,546 during the last year. This is accounted for by a 30 per cent increase in taxes, a 5 per cent increase in interest, and twelve-months' rental of leased property in comparison with only two-months' rental in the preceding year. A comparative income statement of the Kentucky Securities Corporation, exclusive of inter-company charges, is shown in the accompanying table.

During the year just ended the operating companies spent $240,270 on new construction. Additions to the railway department required $16,694 of this amount, and paving for the railway department $21,188. Of the total expenditures 97 per cent was spent up to Jan. 1, 1918, and the remainder during the last six months of the fiscal year.

B. R. T. Receiver Confirmed

Federal Judge Denies Present Advisablity or Necessity for Co-Receiver for City or Commission

Judge J. M. Mayer in the United States District Court on Jan. 15 denied the applications of the Board of Estimate and Apportionment of New York City and of the Public Service Commission for the First District of New York for additional receivers to administer the affairs of the Brooklyn Rapid Transit Company. He made permanent, however, the appointment of Lindley M. Garrison as sole receiver. Mr. Garrison's temporary appointment was made on the last day of 1918.

Co-Receiver Now Might Destroy Efficiency

Counsel for the city and the commission urged that the city's investment in the rapid transit system warranted the appointment of a co-receiver, but there were evidences of dissension between them as to which body should be allowed to represent the public and who should be appointed as receiver. Judge Mayer stated that a time might come in working out the financial future of the company when the aid of a receiver representing at that time the "united view of the public authorities" might be of great service, but he thought that any co-receivers at present would destroy the efficiency of the receivership.

In this connection Judge Mayer indicated pointedly that a receiver is simply a representative of the court; that private owners in the case of a receivership cannot settle affairs outside without submitting their settlement to the judgment of the court, and that the duty of the court is to conserve and operate the property under existing contracts without favoring any faction or interest. He added that the court is entitled to a singularity of purpose in a receivership, and that a co-receivership now in the B. R. T. case "might transfer from a forum outside the receivership and the court the controversies which might properly be settled at some place and time other than by court."

Judge Mayer added that Mr. Garrison, besides being personally acceptable to all parties in the present case, is peculiarly fitted by training and experience to act as receiver. From 1904 to 1913 he was vice-chancellor of New Jersey, being in that capacity connected with a court of equity second to none in the country.

Receiver Reviews Company's Affairs

Mr. Garrison presented to Judge Mayer a preliminary report on his receivership covering a survey of the finances, general resources and obligations of the company, its rapid transit lines in operation and their equipment; and lines under construction by the city. The report also discussed the organization of the various departments of the company, the functions of each, the salaries paid to officials and department heads, and the cost of conducting each department. The receiver summarized the terms of the contract between the New York Municipal Railway Corporation and the city of New York, and discussed the present status of the contract obligations on both sides, and those items of the contract already fulfilled.

Obligations yet to be fulfilled were given as follows:

There are yet to be furnished and supplied by the New York Municipal Railway Corporation the following things, which it is estimated will cost approximately $10,000,000 exclusive of taxes, discount and interest during construction, the amount of which is chargeable to cost under the subway contracts, but cannot be determined definitely in advance. Neither do the figures include possible purchases of real estate or abutting property owners' damages on account of elevated railroad obstruction.

Completion of equipment of city railroads for "initial operation" (includes 100 additional cars not yet delivered)	$5,500,000
Completion of additional tracks on extensions of existing railroads	2,500,000
Reconstruction of existing railroads (includes yard at Coney Island and Thirty-sixth Street inspection shed if not furnished by city)	2,000,000
	$10,000,000

In respect to the above, obligations outstanding on account of work now under way or contracted for will call for approximately $5,000,000, which will be payable at monthly intervals within the next ten months in amounts of approximately $500,000 a month.

Included in the above total of $10,000,000 are items aggregating approximately $3,000,000, the expenditure of which will probably not be required until after July 1, 1920.

The report recommended that provision be made as soon as possible for 400 or 500 new steel motor cars, to cost approximately $20,000 each.

Chief Difficulty Is Lack of Cash

Work that remains to be done by the city, including the extension and construction of rapid transit lines, includes 47 miles of track out of a total of 115, and 19 miles of road out of a total of 41, of the lines which the city assumed to construct and which the company agreed to equip and operate.

The chief difficulty of the Brooklyn Rapid Transit Company at present was described as "lack of cash." Dividends on stocks of companies owned have been reduced or entirely suspended, the constituent companies are in arrears in payment of interest on their certificates of indebtedness, and the New York Municipal Railway Corporation has failed to pay the interest due Jan. 1 last on its bonds, most of which are owned by the Brooklyn Rapid Transit Company.

Under the heading "Increased Costs of Labor, Material and Supplies" it was stated that the receivership companies have suffered greatly from these causes. Taking the month of November, 1918, as a basis for the entire year, the increase for the fiscal year ending June 30, 1919, as compared with the fiscal year ending June 30, 1916, would be:

	1919	1916	Increase
For labor	$15,498,229	$11,324,998	$4,173,232
For fuel	3,190,874	1,422,606	1,768,068

Marked increase in the cost of material was also noted.

The effects of higher costs generally throughout the system were graphically set forth in a statement for the five months ended Nov. 30, 1918, compared with the same months of 1917, which shows that in these months the system earned only $318,729 over all charges, whereas in the corresponding period of 1917 it earned $2,395,750—a falling off of $2,077,021 or 86 per cent.

The financial requirements for the immediate future for the three receivership companies were given as follows:

NEW YORK MUNICIPAL RAILWAY CORPORATION	
For construction and equipment work now under way pursuant to city contracts, and payable at intervals during the next ten months	$5,000,000
Interest chargeable to construction to Jan. 1, 1919, and unpaid	809,500
Sinking fund due Jan. 1, 1919	190,500
BROOKLYN RAPID TRANSIT COMPANY	
Bills payable to banks and trust companies	3,350,000
Additions to power facilities (mostly under contract and payable within the next six months)	1,453,000
(Most of this work is being done by the B. R. T. as agent for the Broklyn Heights Railroad, and the cost will eventually be repaid by the latter company, but the facilities are needed to enable the B. R. T. to carry out its contract for furnishing power.)	
Purchase of fifty trailer cars with appurtenances (as agent for surface railroad companies)	417,000
NEW YORK CONSOLIDATED RAILROAD COMPANY	
Interest due Feb. 1, 1919, on underlying bonds	540,000
Conversion of surface cars for trailer operation (as agent for surface railroad companies)	200,000
Replacement of storage and dock facilities required by government's requisition of existing facilities, about	50,000
(Partly chargeable to constituent companies)	
Interest on 7 per cent notes due Jan. 1, 1919 and unpaid	2,020,725
Principal on 5 per cent notes due July 1, 1918	505,000

Financial requirements for the more remote future of the New York Municipal and the B. R. T., totalling $6,208,000 were also given.

In regard to the claims arising from the accident on the Brighton Beach line, Mr. Garrison said that provision will have to be made for raising money to meet these claims if they are to be paid. Damages still accruing on account of this disaster will probably total $1,100,000.

Mr. Garrison went into the matter of the welfare activities of the company. The amount for this work charged to the companies of which he is receiver was $52,604 last year. He recommended the continuation of the work.

Receiver for New Orleans Company

Abnormal Operating Cost and Persistent Public Attacks Destroyed Credit of Railway, Says President Curran

The United States District Court at New Orleans, La., has appointed J. B. O'Keefe receiver of the affairs of the New Orleans Railway & Light Company. The action was taken at the instance of the board of directors through a creditor company.

President Curran Explains

In explaining this action on the part of the directors D. D. Curran, president of the company, issued the following statement:

This action was taken by the board of directors because of the fact that it has been found impossible to meet operating costs, taxes and fixed charges with the present inadequate revenues. During the year 1918 this company fell short of earning operating expenses, taxes, and fixed charges by approximately $1,000,000, by reason whereof the company was unable to meet the interest due on Jan. 1, 1919, on its bonds, and therefore had to avail itself of the days of grace provided by its mortgages.

The company's present condition has been brought about by abnormal increases in operating costs, resulting in part from the excessive wage scale imposed upon it by the National War Labor Board and in part from the increased cost of supplies and materials used in and necessary for its operation. Furthermore, by reason of the persistent public attacks upon the company, its credit has been destroyed to such an extent that the continued operation of the properties was threatened and the interest of the public, as well as of the security holders of the company, could best be safeguarded by placing the property in the hands of the court, to be readministered and conserved in the interest of all parties.

The troubles of the company began to multiply early in 1918. Having certain maturities coming due on June 1 it applied to the War Finance Corporation for a loan. In its appeal the company was backed up by the Mayor and other city officials, who said that such an advance as the company had requested was necessary to prevent interruption of railway service. The War Finance Corporation refused, however, to make the loan unless the city agreed to put a fare increase into effect at once. To this the city assented and in the belief that the city would carry out its promise the corporation advanced $1,000,000 to the railway.

After two months had elapsed the War Finance Corporation called upon the city to act in the matter. Labor started to protest against the fare advance. Thereupon the National War Labor Board, which had passed upon wages in New Orleans, announced that where organized labor opposed advanced fares recommended by the board in connection with increased wage awards to employees of public utility companies, the entire award would be suspended.

Fares Finally Advanced

Meanwhile the Commission Council of the city passed the ordinance advancing fares. Labor then carried its case to Judge Cage in the Civil District Court of Louisiana in New Orleans and sought an injunction. He ordered the officers of the company to appear in court on Oct. 16 and show cause why the plea of labor to restrain the advance should not be granted. After several postponements the case finally came up for trial on Nov. 14. On Nov. 24 Judge Cage declared the 6-cent fare ordinance enacted by the Commission Council and put into effect by the company was legal and refused the injunction to prevent collection of the increased fare. The decision of the court in this case was reviewed in the ELECTRIC RAILWAY JOURNAL for Dec. 7, page 1027.

This did not still the opposition to the company, however, and late in December the Board of Public Utilities, acting upon the advice of Attorney General Coco, laid the foundation for a test suit to determine the power and authority of the board to regulate the public service corporations of the city by adopting a resolution abrogating and annuling the increase in fare and the advance in rates for gas and electricity and ordering the restoration of the old rates.

City Makes Survey

Shortly after the appeal of the company to the War Finance Corporation for financial assistance Mayor Behrman directed E. E. Lafaye, commissioner of public property, to proceed at once to make a full survey of the property and affairs of the company and to employ such assistance as he might deem necessary. Mr. Lafaye's report was made public on Jan. 1. His recommendations have been summarized as follows:

That the New Orleans Railway & Light Company be completely reorganized and recapitalized.

That the Cleveland plan be adopted of adjusting rates charged by the company on a sliding scale, according to the company's earnings.

That the Commission Council be given authority to fix these rates.

That Mayor Behrman, Commissioner Glenny and Mr. Lafaye withdraw from the directorate of the New Orleans Railway & Light Company.

That $38,000,000 be accepted as the present valuation of the company and that this figure be the one on which future earnings of the company shall be based.

That on this valuation the company be permitted to earn 5 per cent in 1919, 6 per cent in 1920, and 7 per cent in 1921, the latter figure thereafter being the maximum earning power of the company.

That the highest total recapitalization allowed when the company is reorganized should not exceed $45,710,400, thus eliminating entirely the existing preferred and common stocks of the company, which amount to $29,816,600.

Neither Mr. Lafaye's recommendations nor the report of E. W. Ballard & Company, retained by Mr. Lafaye as appraisal engineers and advisers to assist Mr. Lafaye in formulating his conclusions hold out any hope for relief from 6-cent carfares and the recent 30 per cent increase in electricity and gas rates.

Under Mr. Lafaye's plan of supervision of the New Orleans Railway & Light Company, the Commission Council would fix the service rates to be charged by the company. The rates would be on a sliding scale, to be lowered automatically when the earnings of the company reached a certain mark, or to be raised automatically when the company's earnings fell off.

For this purpose the Commission Council would receive weekly reports on the conditions and earnings of the company from the city government's own auditors. This adjustment of rates, so far as gas and electricity are concerned, would be made monthly. Changes in fares would be made from time to time as justified.

Experts Disagree

Mr. Lafaye's report to the Council showed there was considerable difference of opinion between the company, Mr. Ballard, and himself as to the value of the company's properties.

Mr. Ballard fixed the actual cost value of all physical properties of the company at $36,294,413. The company accepted this figure as a base and from it built up a valuation of $52,188,205. Mr. Ballard, on the other hand, due to depreciation, maintained that the value of the property was $32,739,193.

Mr. Lafaye believed Mr. Ballard's figure to be too low and called in General George W. Goethals as referee. General Goethals valued the property at $44,816,000. Thus Mr. Lafaye's valuation of $38,000,000 is higher than Mr. Ballard's and lower than that of the company or General Goethals.

Company's Figure $50,000,000

George H. Davis of Ford, Bacon & Davis, in a communication to the New Orleans Railway & Light Company, dated Aug. 16, 1918, stated that in his judgment the physical value of the properties of the company was in the year 1914 about $40,000,000 and that the physical value represented only about 75 per cent of the total actual value. Thus the full value, according to Mr. Davis, would be $50,000,000.

In commenting on this figure Mr. Lafaye said:

While it is true that the interests of the firm of Ford, Bacon & Davis have been identified with these and other similar properties in this country, both the firm, as a firm, and Mr. Davis, personally, are among the eminent engineers of this country, and such statements are not made without some basis in fact.

Trustees for Bay State

The Bay State Street Railway, Boston, Mass., has accepted the service-at-cost act, passed by the Legislature of 1918, and on Jan. 15 filed with the Secretary of the Commonwealth, as required by that act, a notice of its reorganization under the name of the Eastern Massachusetts Street Railway.

Immediately after being informed of the action of the company, Governor Coolidge sent to the Council the names of the following men to serve as trustees for a period of five years:

Homer Loring, Boston; Isaac Sprague, Wellesley; Frederick J. Crowley, Lowell; Earl P. Charlton, Fall River and Arthur G. Wadleigh, Lynn.

The trustees will take office on Feb. 1.

Changes in Columbus

New Officers and Directors Elected for Columbus Railway, Power & Light Company Following Recent Contest for Control

The contest between the stockholders' protective committee and the Clark interests in the Columbus Railway, Power & Light Company, Columbus, Ohio, came to an end on Jan. 10, when five of the representatives and supporters of the E. W. Clark Management Company resigned as directors.

Six New Directors

The new directors are R. H. Platt, A. S. Hammond, Walter B. Beebe, Emil Kiesewetter, Samuel Ungerleider and F. R. Huntington. Mr. Huntington was chosen to succeed Adolph Theobold, whose death occurred recently. The retiring directors are Clarence M. Clark, R. S. Warner, Samuel G. McMeen, E. R. Pomerene and Carl J. Hoster. Those who held over are Charles L. Kurtz, D. Meade Massie, Norman McD. Crawford, W. C. Willard, W. A. Gill and E. K. Stewart. There was no desire to prevent Mr. Crawford and Mr. Stewart from being represented.

On motion of C. M. Clark at the directors' meeting on that date the contract with the Clark Management Company was abrogated, so far as it pertains to management and the fiscal agency, although its connection as engineer and builder of the Walnut Creek power house, is still in force.

On the previous day the company resumed its franchise and the old rate of fare of eight tickets for a quarter. It had been rumored that the company would go back to this rate of fare, but nothing was actually known about it until this action was taken.

Reorganization on Jan. 9

The reorganization was brought about on the evening of Jan. 9, after a long conference between the members of the stockholders' protective committee and the representatives of the Clark interests. This committee made the fight apparently to protect the company and put it in a position where it can have the needed relief, which did not seem to be forthcoming, because of the character of the contest that had arisen between the management and the City Council. To a large extent this condition may rest upon the shoulders of the City Council, but it existed, and the reorganization seemed to be the only way out.

Charles L. Kurtz was chosen president to succeed Samuel G. McMeen. Samuel Ungerleider was chosen vice-president, and Harold W. Clapp was retained as general manager.

The hearing in the receivership case, which was begun during the previous week before Common Pleas Judge Kinkead, is regarded to have hastened the reorganization. During the proceedings on Jan. 9 Judge Kinkead said:

"The railway, having broken its contract, was a trespasser in the city streets and subject to an action by the city to forfeit its franchise and the use of the streets. The only way in which the company can extricate itself is for it to go back and voluntarily perform its contract."

In reality this is what has been done and at the same time the management has been localized. It is the hope of the present officials that this change will meet with the approval of the city officials and the City Council and that some step will now be taken to provide a rate of fare sufficient to take care of the increased expenses, due to the exigencies of war, until some permanent settlement plan is reached.

The old management endeavored to secure a new contract with the city that would provide for operation at cost. The City Council gave no heed to this plea, and twice refused a request for a temporary increase that would take care of growing expenses until some definite plan could be made. When it appeared that an increase must be had or let the company go into the hands of a receiver, the management in August, 1918, renounced its franchise and advanced fares from eight tickets for a quarter to straight 5 cents.

Many people refused to pay the fare increase and were allowed to ride for nothing. Slips were issued to those who paid the increased rate, entitling them to a rebate in case the rate was declared illegal. Then two suits were brought in the United States District Court, with the idea of testing the legality of the move that had been made. In the first one the court declared itself without jurisdiction. The other one went a little further, but both were in reality against the company. The first case was argued before the United States Supreme Court on Jan. 10.

As produced in the receivership case before Judge Kinkead, the contract with the Clark Management Company to act as fiscal agent was in the form of a letter to the railway company, dated Jan. 31, 1914, stating that the management company had acted in that capacity since May 1, 1912, for which it had received 1½ per cent of the gross revenues, and offering to continue the service on that basis. This was later ratified by the board of directors. The salaries of President McMeen and Vice-President Clark were paid by the Clark Management Company. The contract with the Clark Company for general engineering in connection with the Big Walnut Creek power plant was at cost plus 7 per cent. Judge Kinkead ruled that the two contracts should be considered together and that if it appeared that the Clark company was dominating the railway as against the company's own interests it would be illegal.

Financial News Notes

Dividend Deferred.—The payment of the dividend on the preferred stock of the Virginia Railway & Power Company, Richmond Va., due on Jan. 20 has been deferred to a later date.

Receiver for Montgomery Company.—Ray Rushton, president of the Montgomery Light & Traction Company, Montgomery, Ala., was appointed receiver of that company on Jan. 10 by Judge Henry D. Clayton of the United States District Court. The application for the appointment was made by the Commercial Bank & Savings Company, New Orleans, La.

Yonkers Abandonment Hearing Continued.—The hearing before the Public Service Commission for the Second District of New York on Jan. 9 upon the petition of the Yonkers Railroad for the abandonment of certain lines was adjourned until Jan. 30 when the city and any individuals who desire to be heard may appear in opposition. The hearing on Jan. 9 lasted from 9.30 a. m. until 3.15 p. m. Practically the entire time was taken up in the submission of the railroad's case.

Angola Line Faces End.—The Indiana Utilities Company on Jan. 7, 1919, received permission from the Indiana Public Service Commission to sell or dismantle the Lake James Railroad, the subsidiary 3.75-mile line between Angola and Lake James. This line is a summer road to the lake resort. The commission's engineers valued the road at $92,000, reproduction costs. The remaining property of the company, which is devoted to light and power service, is not affected. The headquarters of the company are at Angola.

Added Expenses Offset Fare Increase.—The Trenton & Mercer County Traction Corporation Trenton, N. J., has filed with the Board of Public Utility Commissioners its monthly statement for November as suggested in an order when the board allowed an increase of from 5 cents to 6 cents for fares. The report shows that the company carried 257,799 fewer passengers during November this year than were carried in November of last year. Despite this, however, the revenue from passengers in November of this year was $13,954 more than in November of last year, but this gain was practically offset by an increase of $12,404 in operating expenses for the comparative periods.

Company Upheld in Receivership Case.—Federal Judge Martin J. Wade has sustained the motion of the Des Moines (Iowa) City Railway to strike out certain allegations of the petition

of intervention filed by the city of Des Moines against the company in the receivership case. The motion declares that the action brought by the city is a prearranged plan to oust the jurisdiction of the State. According to Judge W. H. McHenry, counsel for the company, the ruling of Judge Wade establishes the legality of the receivership beyond a doubt. Judge McHenry announces that the next move by the company will be to file an application for an order of court to determine the rights of the company under the franchise.

Dismantlement Blocked by Injunction.—On Dec. 20 a temporary injunction continuing into 1919 was granted to restrain the dismantlement of the Southwestern Traction Company, Temple, Tex. This property, as previously noted in this journal, was sold at foreclosure sale late in 1917 to a committee of bondholders. The majority of the purchasers were desirous of dismantling the property and negotiated for the sale of the material. The operation of the line, however, has never ceased, and now the writ of injunction has been served. The plaintiff in the writ consists of many citizens of Temple and Belton, the terminal cities of the line, and citizens residing along the line. The writ was also joined in by the cities of Temple and Belton and the Commissioners court of Bell County.

Authorized to Defray Reorganization Expenses.—The California Railroad Commission has authorized the Sacramento Northern Railroad, successor to the Northern Electric Railway, Chico, Cal., to use $653,750 realized from the class "A" bonds to pay reorganization and foreclosure expenses and to satisfy a mortgage indebtedness of the Northern Realty Company. The bulk of the money, or $440,000 will be used for reorganization and foreclosure expenses, $137,500 to effect a settlement with the Sloss Securities Company and $76,250 to pay the mortgage indebtedness for the Northern Realty Company. The Sloss company has agreed to assume payment of the incumbrances on the property and cause the Union Trust Company, San Francisco, to dismiss its foreclosure action.

Dallas Gross Earnings Improve.—The elimination of the jitneys in Dallas, Tex., has resulted in greatly increased gross earnings for the Dallas Railway, according to the report for November. The gross earnings in this month amounted to $161,047, an increase of $50,716 or 45.97 per cent over the corresponding month of the preceding year, and an increase of $15,373 or 10.55 per cent over October, 1918. The November operating expenses plus appropriations to the reserve accounts totaled $133,623, an increase of $43,715 or 48.58 per cent over November, 1917, and an increase of $10,053 or 6.99 per cent over October, 1918. The amount available for the payment of the 6 per cent authorized return in November, 1918, was at the rate of 4.73 per cent per annum on the property value. Jitney competition was eliminated in July, but the increase in gross earnings resulting therefrom has been largely offset by higher wages and the like.

Sells Notes Direct to Public.—The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., is offering direct through advertisements in its home papers $3,600,000 of 7 per cent five-year bond-secured gold notes to finance the growth of greater Milwaukee's electric service system. The notes are being offered at par for cash. It is explained to the subscribers that there is no accrued interest to pay. Interest is payable May 1 and Nov. 1. The notes are due on Nov. 1, 1923. The sales office is at the securities department on the ground floor of the company's building in Milwaukee. Out of town buyers are advised to order through their home banks or direct from the company. The notes are in denominations of $50, $100, $500 and $1,000. The company says that to Dec. 31 more than 1000 Milwaukee and Wisconsin investors bought 126 of the $50 notes, 587 of the $100 notes, 204 of the $500 notes and 540 of the $1,000 notes, or a total of $707,000. Of the two weeks' total $645,000 was bought by Milwaukee people.

Hamilton Radial Line Suspended.—The Hamilton (Ont.) Radial Electric Railway, a 29.1-mile subsidiary of the Dominion Power & Transmission Company, has suspended its service. It is reported that proceedings are being taken in the Exchequer Court to declare the company insolvent and that this will probably result in operation being abandoned and the rails taken up. The company was confronted by an order from the Dominion Railway Commission to furnish the service designated by the by-laws of the municipalities through which it operated. It had failed to secure increased fares, notwithstanding the fact that it furnished proofs that it had been operating at a heavy loss and had attempted to curtail service. Although the commission ordered service to be given in accordance with the city regulations, it announced that the scope of its authority is not sufficient to compel a company to operate at a loss if it chooses to discontinue entirely. The municipalities are now considering acting upon the commission's advice to attempt purchase and public operation.

Electric Railway Monthly Earnings

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '18	$80,930	*$53,243	$27,687	$20,223	$7,464
1m., Nov., '17	76,081	*38,838	37,243	19,667	17,586
12m., Nov., '18	923,978	*584,563	339,415	238,490	100,925
12m., Nov., '17	876,070	*498,516	377,554	227,430	150,124

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

1m., Nov., '18	$167,118	*$130,580	$36,538	$29,470	$7,068
1m., Nov., '17	111,216	*112,519	†1,303	30,866	†32,169
12m., Nov., '18	1,799,071	*1,439,428	359,643	374,599	†14,956
12m., Nov., '17	1,335,115	*1,096,202	238,913	358,507	†119,594

COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO

1m., Nov., '18	$370,981	*$281,923	$89,058	$64,189	$24,869
1m., Nov., '17	359,990	*286,827	73,163	45,919	27,244
12m., Nov., '18	4,232,018	*3,117,986	1,114,032	681,840	432,192
12m., Nov., '17	3,975,871	*2,853,469	1,122,402	552,618	569,784

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

1m., Nov., '18	$2,022,847	*$1,322,140	$700,707	$526,397	$174,310
1m., Nov., '17	1,822,283	*1,186,101	636,182	466,230	169,952
12m., Nov., '18	21,735,128	*14,862,014	6,873,114	5,951,761	921,353
12m., Nov., '17	19,460,726	*11,919,695	7,541,031	5,255,160	2,285,871

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, ME.

1m., Nov., '18	$276,504	*$198,562	$77,942	$71,147	$6,795
1m., Nov., '17	243,036	*170,398	72,638	69,843	2,795
12m., Nov., '18	3,190,106	*2,302,101	888,005	826,461	61,544
12m., Nov., '17	3,078,224	*2,036,623	1,041,601	816,409	225,192

EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net income
1m., Nov., '18	$366,551	*$282,373	$84,178	$70,563	$13,615
1m., Nov., '17	329,267	*223,856	105,411	66,944	38,467
12m., Nov., '18	4,167,018	*3,217,484	949,534	812,237	137,297
12m., Nov., '17	3,630,797	*2,422,740	1,208,057	779,247	428,810

GRAND RAPIDS (MICH.) RAILWAY

1m., Nov., '18	$105,622	*$92,143	$13,479	$19,656	†$6,177
1m., Nov., '17	100,702	*77,491	23,301	18,619	4,682
12m., Nov., '18	1,277,930	*1,016,375	261,555	234,120	27,435
12m., Nov., '17	1,305,807	*884,788	421,019	216,010	205,009

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, ME.

1m., Nov., '18	$76,707	*$66,897	$9,810	$19,824	†$10,014
1m., Nov., '17	71,307	*57,327	13,980	15,457	†1,477
12m., Nov., '18	877,491	*783,452	94,039	223,540	†129,501
12m., Nov., '17	899,313	*672,771	226,542	186,425	40,117

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

1m., Nov., '18	$271,939	*$184,351	$87,588	$38,631	$48,957
1m., Nov., '17	212,264	*134,094	78,170	40,628	37,542
12m., Nov., '18	2,812,103	*1,834,609	977,494	483,411	494,083
12m., Nov., '17	2,452,118	*1,577,178	874,940	492,061	382,879

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

1m., Nov., '18	$636,539	*††$409,714	$226,825	$185,657	$41,168
1m., Nov., '17	525,811	†324,600	201,211	177,512	23,690
12m., Nov., '18	7,519,407	*††4,890,451	2,628,956	2,208,330	420,626
12m., Nov., '17	5,942,084	*3,554,411	2,587,673	2,156,100	431,573

* Includes taxes. † Deficit. †† For the month, $19,020; and for twelve months, $358,468, included for depreciation.

Traffic and Transportation

Baltimore Fare Confirmed

Maryland Commission Sustains Six-Cent Emergency Rate Which Has Been in Effect Since October

The Public Service Commission of Maryland has ratified the 6-cent fare of the United Railways & Electric Company, Baltimore, put into effect by the company on Oct. 1.

The commission has likewise ratified the increase to 6 cents in the fare charged on the buses of the Baltimore Transit Company, a subsidiary of the United Railways & Electric Company.

NEW RATE UNTIL DECEMBER

In ratifying the increase in car fare the commission stipulated that this action permitted the larger fare until Dec. 31, 1919, and that the continuance of a 6-cent fare after that date depended upon circumstances.

In its opinion the commission said:

"The company will be required by the commission's order to make regular monthly reports of its operating results under the new rates, and if it appears at any time that a reduction of less than the full 1-cent increase can be properly required, such reduction will be made in the sale of tickets in small quantities at such prices as may be deemed expedient from time to time. This commission has decided from the facts before it in this case that the fair worth of reasonably adequate street railway service to the community served by the respondent company and under existing conditions is 6 cents as the basic rate for adults, and 4 cents as the basic rate for children between four and twelve years of age."

I. T. S. Express Service

Plans for an exclusive express service on the Illinois Traction System electric railway lines are being made by H. E. Chubbuck, vice-president executive. Although the details of the new service have not yet been worked out it is understood that the traction lines will announce a complete express service on all of its several divisions within the next few weeks.

For several years the Adams and American Express Company service was offered on the traction lines and with the taking over of the express companies by the American Railway Express Company this service has been continued. It has been the policy of the government-operated express company, however, to divert most of the express business to the government-operated steam roads, with the result that practically all of this express business has been taken away from the electric carriers.

The territory served by the traction lines is said to be sadly in need of express service and it is with the idea of offering such service that the Illinois Traction System is now planning the innovation. The direct supervision of the new express department will be in charge of C. F. Handshy, assistant general manager of the interurban properties of the company.

Jersey Sounds Warning

A warning has been sounded by the Board of Public Utility Commissioners of New Jersey in its annual report, against the tendency to have legislation enacted amending the powers of the commissioners to abrogate contracts between municipalities and railway, gas and electric companies in questions involving rates and fares to be charged. The report says that such an amendment might work a hardship upon the patrons and customers of these public utilities. In this connection the report says:

"The larger utilities, in order that the number of their customers might be increased, or to preserve uniform rates throughout territories served by them, voluntarily fixed rates much lower than those specified in the franchises of many of the municipalities in which they operate. The rates so fixed by them cannot now be increased against the prohibition of the Board of Public Utility Commissioners. If, however, the Legislature should declare that these grants must be regarded as contracts with which orders of the Public Utility Commission shall not interfere the public utilities would be free to exercise their own judgment as to what rates they would impose provided they kept within the limits set forth in the franchises.

"It seems to us that with such a condition existing the utilities in many cases could so increase their existing rates as to impose a decided burden upon those who have adapted themselves to the use of their services. Having, to use a commercial expression, their trade established they would be, if not subject to regulation, in a position, while acting within franchise limitation, to make increases that would be neither necessary nor reasonable, but which their customers would pay rather than suffer the loss and inconvenience resulting from discontinuance of the service."

If the companies do not improve service voluntarily now that the war is over a warning is sounded by the Utility Commissioners that the companies will be required to do so. The same is said in connection with the making of improvements and needed extensions to give proper facilities for service.

Inter-company Transfers

Washington Railways Ordered to Exchange Transfers at Thirteen Important Points

An order was issued by the Public Utilities Commission of the District of Columbia on Jan. 15 providing for free intercompany transfers at thirteen important intersections of the lines of the Capital Traction Company and the Washington Railway & Electric Company. Reciprocal transfers were also ordered at Twelfth Street and Pennsylvania Avenue between the lines of the Washington-Virginia Railway and the Capital Traction Company.

Except at three points, where it was feared that the congestion difficulties would offset transfer advantages, the recommendations of John A. Beeler, traffic expert of the commission, were followed. The order becomes effective on Feb. 1.

There are certain limitations on the transfers to be granted, to prevent round-trip riding on one fare. A general limitation imposed for the same reason is that no transfer can be obtained on an intercompany transfer except on a cash fare. This does not prevail where transfers are now granted on transfers between the various lines of any one company.

The Washington, Baltimore & Annapolis Railroad is not mentioned in the order and there is considerable speculation as to whether it will be required under the order to issue transfers to Capital Traction lines at points where the Washington Railway & Electric Company is compelled to do so. This suburban line has no District franchise, operates on the lines of the Washington Railway & Electric and now grants transfers to the lines of that company. What attitude the Washington-Virginia Railway will assume also is a matter of speculation. The other companies agreed at the hearing that they would oppose no legal objection to whatever action the commission might take. The Washington-Virginia Company does not do much business in the District and did not ask for an increase to the 5-cent fare, although it willingly accepted the advance when it was granted.

The order provides for the discontinuance of 2-cent transfers and "dupiex" tickets being issued at points where free transfers are to be granted.

Express Rates Advanced

The Galveston-Houston Interurban Company announced that on Jan. 1 an increased baggage and express rate would be charged on shipments between Galveston and Houston and intermediate points. The rate for first-class interurban express between Galveston and Houston was formerly 45 cents per 100 lb. The new rate on the same shipment is 60 cents per 100 lb. There was also a rate of 25 cents per 100 lb. on shipments of 1000 lb. or over, and this rate was increased to 35 cents per 100 lb.

New Bay State Fares in Effect

Details Are Given of the Instructions to Conductors in Regard to the Zone Rates Effective from Jan. 8

The new fare tariff of the Bay State Street Railway, Boston, Mass., went into effect on Jan. 8 on the entire 950 miles of line. In every car and in every transfer station on the company's lines, tickets were placed on sale at 7 cents each, in strips of five. Passengers who prefer the cash arrangement pay 10 cents. The new city zones extend in general to the limits of the former 8-cent fare. Outside the city zones two of the former interurban mileage zones are in general coupled together to form the new interurban zone. The statement of fares made by the company in its general instructions for fare collection is as follows:

Fares

The rate of fare in the city zones is 10 cents cash or a 7-cent zone ticket (Form 1198), both with transfer privilege to the new city zone limits.

The rate of fare in the interurban zones is 5 cents cash for each zone with a minimum fare of 10 cents cash, good for any part of two zones, or a 7-cent zone ticket, good for one zone only.

The cash fare between a city zone and the first interurban zone is 15 cents, or using a 7-cent zone ticket in the city, is 12 cents.

The following other new tickets are good for fare:

(a) Limited commutation tickets (Form No. 1200) supersede the present workingmen's tickets and are good only in the hours formerly established for workingmen's tickets. This ticket has a city zone coupon and an interurban zone coupon, the later notched to show the number of zones for which it is good beyond the city zone limit.

(b) Pupils' tickets. Forms No. 1135, 1175 for day school pupils in city zones and No. 1173 for evening school pupils in city zones.

For interurban zones No. 1202 for one zone, No. 1179 for two zones, No. 1180 for three zones and No. 1181 for four zones, all being for day school pupils unless stamped for evening school.

Form No. 1178 is for a ride between the city zone and interurban zone and is notched to show the number of interurban zones.

(c) Complimentary tickets, police and employees' tickets the same as heretofore.

All workingmen's tickets, reduced rate tickets and other forms of city and suburban tickets heretofore in effect are no longer good for fare, and passengers presenting such forms must be so advised. Old tickets will be redeemed at their pro-rata value upon presentation at the offices of the company or other designated points.

In each carhouse are posted samples of tickets that are good for fare and no other forms must be accepted. Coupons from any new ticket with the exception of the 7-cent zone ticket (3 for 35 cents) to be good for fare must be presented with ticket or cover of same number. *All tickets when collected by hand MUST be cancelled with the hand punch in the presence of the passenger.*

Passengers in the city zone are in all cases to board by rear door. At transfer or other busy points, conductors announce "Please leave by forward door." On cars with folding doors passengers may leave by either door but it is the desire of the company to encourage the use of the front door. On cars without folding doors passengers leave by the rear door except that front door may be used when more convenient on a crowded car.

The instructions of the company in regard to fare collection follow:

Fare Collection

Conductors are required by law to sell 7-cent tickets but only in strips of 5 for 35 cents—single tickets will not be sold. Transfers will be issued only at time fare is paid and will be collected by hand but not registered, and will be deposited in trip turn-in envelope at the end of each half-trip.

Lines Entirely Within City Zone

Plan I. *Prepayment operation of cars equipped with fare boxes.*

Cars will be equipped with a fare box having two compartments, one for cash and the other for all revenue and free tickets.

Conductors will stand by the fare box and see that all passengers pay fare on entering. Cash and ticket fares will be deposited by passenger in proper compartment of fare box. Conductors are not permitted to handle fares but will issue change when requested.

Fares deposited in fare box will not be registered.

When cars are equipped with *ticket box only* passengers will deposit all revenue and free tickets in box as they board car and conductor will collect cash fares by hand and register them on "10-cent cash register."

Plan II. *Closed and open cars when operated without fare boxes.*

Cars will be equipped with two overhead registers—one for *10-cent cash fares* and the other for *revenue tickets only.*

Conductors must collect fares from passengers as soon after they board car as possible. All cash fare collected must be rung up on "10-cent cash register." Revenue tickets must be cancelled with the hand punch in the presence of the passenger and rung up on "ticket register." Free tickets and transfers will not be registered but must be deposited in trip turn-in-envelope at the end of each half-trip.

Fare Collection—Routes Extending Beyond City Zone Limit

Plan III. *Prepayment operation of cars equipped with fare boxes.*

Cars will be equipped with a fare box having two compartments—one for cash and the other for all revenue and free tickets for use in connection with initial fares, also one overhead register for revenue tickets only collected on inside collections, and a *Rooke register* for inside cash fare collections in interurban territory. See special rules governing use of Rooke register.

City Zone Collections—Out Bound

City zone collections will be handled in the same manner as on cars that operate on routes entirely within the city zone.

On reaching city zone limit conductor must post day card.

Interurban Collections

After passing city zone limit conductor must enter car and collect zone fares zone by zone. Each zone must be collected separately, starting from the front of cars with folding doors and from the rear of others. Five-cent cash fares *must be deposited by passenger in Rooke register* and revenue tickets collected by hand, cancelled in the presence of the passenger and rung up on ticket register. Free tickets and transfers will not be registered but will go in trip turn-in envelope.

Revenue tickets that entitle passengers to ride beyond the limit of the first outer zone must be picked up and an identification check (Form 1042) issued to such passenger punched for the number of zones the passenger is entitled to ride, i. e., if a limited commutation ticket notched for three interurban zones is collected in the first interurban zone, conductor will pick up ticket, cancel it and ring it up on ticket register and issue identification check with three punch marks in it as a means of identification for the next two zones through which passenger is entitled to ride.

As soon as collection is completed conductor must return to rear platform and collect fares from passengers boarding car in the following manner:

Passengers Boarding Car in Interurban Zone

Conductor will see that passengers deposit initial cash fare of 10 cents, or 7-cent ticket, in proper compartment of fare box. To passengers depositing 10 cents cash, issue an identification check without punch marks except for conductor's own identification so that he will know when he picks it up that it is one he has issued.

All forms of tickets, whether revenue or free must be deposited in ticket box and if ticket so deposited entitles passenger to ride beyond the next interurban zone limit conductor must issue identification check properly punched so that he will know the limit to which fare has been paid.

Interurban transfers will be collected by hand and put in trip turn-in envelope together with other city zone transfers heretofore collected.

Passengers boarding car in first interurban zone outside of approaching city zone must declare themselves as to destination. If going into city zone passengers will deposit 15 cents or 5 cents and 7-cent ticket in fare box and receive identification checks, otherwise 10 cents cash fare or 7-cent ticket must be deposited in fare box.

Interurban transfers will be issued at time of payment of fare for one of two purposes:

1. As a free transfer to permit passengers to reach point on connecting route to which free transfers are issued as provided for in general order No. 118.

2. To so collect fares that passengers will not be required to pay the minimum fare for only one zone when their whole ride will be more than one zone, but part of the trip involves riding one zone of the routes. In such a case the first conductor will collect, in addition to the fare on his own route, fare for one zone on connecting route (through Rooke register) and issue transfer punched for one zone.

At change-off points in interurban territory designated by local division orders conductors will issue to passengers on last collection an interurban transfer punched only as to time and direction which will indicate to conductor taking car that passenger is entitled to pay only a single zone fare. Fares of passengers boarding car at such points will not be collected prepayment but by conductor when making first zone collection.

On reaching city zone limit conductor must post day card for register readings of fare box, Rooke register and ticket register, and also note in proper column his best judgment of the number of 7-cent tickets deposited in ticket box in interurban territory.

City Zone Collection—In Bound

Having posted these readings conductor will enter car and collect city zone fare starting from the front of cars with folding doors and from the rear of others. Ten-cent cash fares must be collected through the Rooke register and tickets by hand. Revenue tickets must be rung up on ticket register and cancelled in the presence of the passenger from whom they are collected.

Passengers boarding car after passing city zone limit will board by rear door and collections must be handled in same manner as on any route entirely within city zone.

On reaching end of route conductor must post day card for reading of fare box register, Rooke register and ticket register and fill out trip turn-in envelope for free tickets and transfers collected enroutes, entering these on day card in proper column.

Plan IV. *Closed and open cars without fare boxes.*

Cars are equipped with two overhead registers, one for 10-cent cash fares and the other for revenue tickets, and a Rooke register for all cash fares collected in interurban zones and on in-bound trips to city zone and the city zone fare of passengers on car crossing the city zone limit.

City Zone Collections—Outbound

City zone collections will be handled in the same manner as on cars that operate on routes entirely within the city zone as shown under Plan II.

On reaching city zone limit conductor must post day card for ticket register and for Rooke register.

Interurban Collections

Follow the same plan as outlined previously for prepayment cars with the following exceptions—i. e. all cash collected from passengers boarding cars must be deposited in Rooke register and all revenue tickets collected must be rung up on ticket register.

Approaching city zone limit conductor must post day card for ticket register and Rooke register.

City Zone Collections—In Bound

City zone collections will be handled in same manner as on prepayment cars and passengers boarding in city zone will have their fare collected as already outlined for closed and open cars without fare boxes operating on routes entirely within city zone.

On reaching end of route conductor must post day card for reading of 10-cent cash register, ticket register, Rooke register and fill out trip turn-in envelope for all free tickets and transfers collected enroute, entering these on day card in proper column.

In a statement to the public the company said that every effort was being made to make the system of fare collection and registration as simple as possible so that the conductors would be able to adhere to the rules and passengers be certain that their fares were properly accounted for. Cars are being provided with prepayment devices as rapidly as possible and the co-operation of the car riders was asked in making their use a success.

New York Request Refused

Board of Estimate Rejects Plea for Increased Fares on Rapid Transit and Surface Lines

The Board of Estimate of New York City on Jan. 10 formally denied the application of the Interborough Rapid Transit Company to be permitted to charge an 8-cent fare on the subways and elevated, and that of the New York Railways for the right to charge 8-cent fares with 3 cents for transfers on the "green car" surface lines. A lengthy resolution, unanimously adopted by the board, in regard to the Interborugh, said in part:

The contract with the city is the foundation upon which the Interborough's securities rest. It is proposed, however, that the compensation of the Interborough be increased 60 per cent; that is, that it be permitted to receive an 8-cent fare instead of a 5-cent fare, as provided in the contract. In other words, the municipal authorities are asked to sanction an arrangement whereby every fare payer is taxed 3 cents to prevent any loss whatever falling upon Interborough security holders by reason of deficiency of income due to the war or other causes.

There appears to be no reason why the burdens caused by the war, or otherwise, should thus be shifted from the holders of the Interborough securities to the traveling public. There is no pretense that the income from a 5-cent fare is not sufficient to meet all operating or other current expenses. It is merely the question of whether the Interborough's security holders shall receive income not earned, or whether they shall wait for it according to the terms of their investment.

If the Interborough desires to cancel the present contract, terms can doubtless be agreed upon that will take into consideration the actual cash investment of the Interborough in the property, and avoid the necessity of the complete wiping out of the equities of its security holders, which otherwise must inevitably result if the present claims of the Interborough are true.

When the City of New York made the contract with the Interborough, it was upon the assumption that the Interborough was of sufficient financial responsibility to perform its obligations and would do so in good faith, giving to the public the benefit of the 5-cent fare for the forty-nine year period of the contract. It would be a matter of very serious concern to the members of the Board of Estimate and Apportionment, if the Interborough, either from unwillingness to perform its contract obligations, or lack of financial responsibility, should, as has been threatened by its representatives, seek the advantages of a receivership.

After the resolution had been read, Mayor Hylan remarked:

"In other words, if the Interborough is unable to comply with all of the terms of its contract with the city, all they have to do is to turn the lines back to the city and the city will operate them."

Atlanta Appeal Renewed

The Georgia Railway & Power Company, Atlanta, Ga., on Jan. 6 presented to the Council a petition asking for an increase in fares from 5 cents to 7 cents. The filing of this request was the most important feature of the last business session held by the City Council of 1918. This paper, together with communications from the National War Labor Board and from ex-Governor Joseph Brown, both dealing with the railway situation in Atlanta, were ordered filed, and Council then adjourned to again meet on the evening of the same day for the last time, at which time Mayor James L. Key was inaugurated and the Council of 1919 took charge of the affairs of the city.

The petition of the railway company, which asked for an increase of 7 cents instead of 6 cents as sought for formerly, as well as the other papers on the subject from Governor Brown and the War Labor Board, were not even read to the Council but were ordered filed.

The petition declares that the company must have immediate relief from its financial burdens if it is to maintain efficient service, and that because of the added burden that has been placed upon it by the increased pay awarded its employees by the War Labor Board, and because of the other greatly enhanced expenses, the company must have an increase in fares to 7 cents, as 6 cents will not be sufficient to bring the needed revenue. The increase asked for, the company says, is to continue only until normal conditions are restored.

Status of Kansas City Fare Case

The favorable decision of Dec. 31 by the Supreme Court of Missouri in the 6-cent fare case of the Kansas City Railways will probably not be effective for several weeks. The city is expected to file a petition for a rehearing by the Supreme Court. If it should fail in this, the city will file an appeal to the United States Supreme Court.

Should the State Supreme Court decide that the matter is not a federal one, the State Supreme Court may then order the conclusion of the matter. This will involve the disbursement of the excess 1 cent fare collected and impounded in Missouri, a sum which on Jan. 7 amounted to about $300,000. It is possible that even if an appeal is granted to the United States Supreme Court, the state court may order the disbursement of the money so far accumulated, and require the company to give a bond, instead.

There was temporary confusion in Kansas City because on some of its lines the railways was not giving the transfers bearing coupons, the day or so following the decision. It was explained that the lack of rebate coupons was an oversight. Coupons are now attached to all transfers.

The action of the Public Service Commission of Missouri in the 6-cent fare case of the Kansas City Railways was upheld in a decision written by Judge Blair and concurred in by other members of the Supreme Court of Missouri. Judge Blair pointed out that it was a matter of common knowledge that franchise street-railway rates existed generally, and that the Legislature passed the utilities act in view of this situation. For this reason Judge Blair held it would be absurd to accept the city's contention that the commission did not have rate regulatory power. Shortly after the decision was rendered the company said that "the court's ruling would appear to settle for all time the question of whether the Public Service Commission has the power to fix public utility rates."

Autos and Railways Co-operate

The Public-Service Commission of Illinois has issued an order granting a certificate of convenience and necessity for the transportation by motor trucks of freight, baggage and express between the freight terminal station of the Aurora, Elgin & Chicago Railroad at Laramie Avenue, in Chicago, and the Chicago, North Shore & Milwaukee Railroad at its terminal station in the city of Evanston, and the freight terminal of the Chicago & Interurban Traction Company at Eighty-eighth and Vincennes Avenue, Chicago, and between the freight station of the Chicago & Joliet Electric Railway at Archer and Cicero Avenues, Chicago, and the central freight station to be established by petitioner in the city of Chicago. The order authorized the issuance of capital stock in the amount of $10,000.

Objection was filed by the officers of the Chicago, Waukegan & Hammond Transportation Company because that company was granted a certificate of convenience and necessity to operate motor trucks for the transportation of freight and express between Chicago, Waukegan and Hammond and had ample facilities to haul all the goods offered for transportation between the points the Interurban Motor Despatch Company desired to operate. The commission overruled the objection on the ground that the character of the business to be conducted by the petitioner was different from that being carried on by the objector.

Old Fare Resumed in Columbus

On Jan. 9 the Columbus Railway, Power & Light Company, Columbus, Ohio, resumed the old rate of fare of eight tickets for 25 cents. Some few months ago the company put into effect a flat 5-cent rate, announcing at that time that it proposed to surrender its franchise as imposing conditions considered too onerous. This matter of the policy of the management with respect to rates has recently been injected into the contest for control of the company and is referred to in connection with the changes in the management of the company noted elsewhere in this issue.

Transportation News Notes

Wants Two Men Per Car.—The City Commission of Waco, Tex., has instructed the city attorney to draft an ordinance requiring the Texas Electric Railway, which operates in Waco, to maintain two men, a motorman and a conductor, on all cars in that city.

Akron Increase Up Soon.—The question of an increase in fare for the Northern Ohio Traction & Light Company in Akron, Ohio, will shortly come before Council on the report of Hagenah & Erickson, Chicago, Ill., who made an investigation of the need of an increased income from the local service.

Rhode Island Hearing Postponed.—The hearing in the Supreme Court of Rhode Island on the appeals of the towns of East Providence, North Providence, Johnston and Warwick from the Public Utilities Commission's authorization for the Rhode Island Company to increase fares, which was to have been held on Jan. 19, was again postponed to Jan. 27, because of the illness of the Rhode Island Company's attorney, G. Frederick Frost.

School Commutation Books.—The Syracuse (N. Y.) Northern Electric Railway, under special permission of the Public Service Commission for the Second District, will sell school commutation books, each book good for fifty single trips and limited as to use to thirty-five days from and including the date of purchase, on a basis of 1½ cents per mile, minimum $3 per book. No school commutation books have heretofore been issued.

Seven-Cent Zones on Northampton Line.—Announcement was made on Jan. 3 of the authorization by the Public Service Commission of Massachusetts of an increase in fares from 5 cents to 7 cents on the Northampton Street Railway. The advance will go into effect on Jan. 30 without changes in the present fare zones. The lines between Northampton and Easthampton and Williamsburg are affected as well as those in the city itself.

66 Per Cent Fare Increase Reasonable.—The Public Service Commission of Washington holds to be justified an increase of fare on the North Coast Power Company's railway from Vancouver to Sifton. The new rate is held not unreasonable, in comparison with the company's earnings and expense. The commission has dismissed complaints. The new schedule increases the through fare from 15 cents to 25 cents and allows graduated increases for way points.

Amends Its Fare Appeal.—The Arkansas Valley Railway, Light & Power Company, Pueblo, Col., which has had an application before the Public Utilities Commission of Colorado for permission to raise fares from 5 cents to 6 cents, has filed an amended application asking for a 7-cent fare. The company says a 6-cent fare will not prove sufficient to meet increased costs of operation inasmuch as the War Labor Board advanced the wages of trainmen effective as of Jan. 1.

I. T. S. Changes Traffic Headquarters.—Effective shortly after the first of the new year the headquarters of the traffic department of the Illinois Traction System will be moved from Springfield, Ill., to Peoria, Ill. For several years both the freight and passenger traffic departments have been located in Springfield, but under the new order the heads of these divisions and their assistants will be located in Peoria. Arrangements are now being made for their removal.

Shuttle as an Economy.—With the statement that it is making every effort to reduce operating expenses so that it will not be necessary to ask for an increase in passenger rates, the Los Angeles (Cal.) Railway Corporation recently announced that a new schedule would be used on a number of the more congested lines. On nine of the principal lines half of the cars will be run to certain designated points and will then be turned back and shuttle cars will operate from those points to the end of the lines.

Six Cents in Rome and Athens.—Increases in fares in Rome and Athens, Ga., in gas rates in Macon, and in electric light and power rates in Athens, Rome, Conyers and Lithonia have been authorized by the State Railroad Commission. In both the instances where the commission increased the rate a straight fare of 6 cents was substituted for the prevailing 5-cent fare to offset an increase in operation cost. The companies affected by the fare increase are the Athens Railway & Electric Company and the Rome Railway & Light Company.

Three Fives for Two Sixes.—The Public Service Commission for the Second District of New York on Dec. 20 ordered suspended for thirty days or until and including Feb. 4, the rates which the Fishkill Electric Railway proposed to put into effect on Jan. 6. Commissioner Cheney planned to hold a hearing in Beacon on Jan. 8. The suspended tariff, to which reference was made in the ELECTRIC RAILWAY JOURNAL for Dec. 14, page 1071, divided the railway into three fare zones, two with a 5-cent fare and one 6 cents, instead of two 6-cent zones.

Press Comments Reprinted.—Theodore P. Shonts, president of the Interborough Rapid Transit Company and the New York (N. Y.) Railways, has reprinted in a pamphlet of forty pages public opinion on the traction problem as represented in leading editorials in the daily papers and has included as part of the record three letters to the Board of Estimate, Public Service Commission and civic organizations with respect to transit matters. In concluding his appeal to the public, Mr. Shonts says that the situation was presented in detail in the letters to the public authorities reprinted in the pamphlet and "of them we bespeak your careful reading."

Rome Fare Case Started.—Upon the request of the New York State Railways the Public Service Commission for the Second District fixed upon Jan. 15 for an investigation of the company's petition for a 6-cent fare in Rome. The proceeding will be under the company's original petition for permission to increase its fare to 6 cents in Rochester, Syracuse, Utica, Rome, Oneida and Little Falls. Under the Court of Appeals decision in the Quinby case the company has been denied a 6-cent fare in Rochester, while in Utica and Syracuse the 6-cent fare is in effect. The company's petition relating to Rome, Oneida and Little Falls is pending before the commission.

Six-Cent Fare Remains.—The City Council of Beaumont, Texas., has adopted a resolution killing all proposed ordinances to repeal the 6-cent fare and to restore the fare of 5 cents. This action was taken by the Council after thorough investigation of the Beaumont Traction Company's earnings, the kind of service furnished, and complaints against service. The City Council some time ago, on petition of the company, enacted an ordinance authorizing a fare of 6 cents. This was immediately attacked by the traveling public, who charged that the promise of the company to improve its service had not been carried out. These complaints were investigated. An agreement was then reached whereby the company will make specific extensions and improvements on condition that the 6-cent fare ordinance would not be repealed.

Worcester Wants Seven Cents.—Officials of the Worcester (Mass.) Consolidated Street Railway have thrown their books open to Francis L. Blacker, an accountant employed by the Mayor to investigate the justice of the petition to the Public Service Commission for a 7-cent fare on the forty-six routes in Worcester and its suburban districts. Mr. Blacker has made a first report, showing that from what he has learned from the examination made by him to date and the information received from the officials of the railway the 7-cent fare will just permit the company to meet its expenses of operation and upkeep. He has been directed to make still further inquiry into the matter and to submit a written report to the Mayor as soon as possible. On the final report of Mr. Blacker, Mayor Holmes will make his decision on the question of the advisability of making official protest to the Public Service Commission against the proposed increase to 7 cents. The tariff of the company increasing the fare from 6 cents to 7 cents was filed with the Commission on Jan. 11 to become effective on Feb. 1.

Personal Mention

W. J. McCoy has been appointed treasurer of the Union Traction Company, Sistersville, W. Va., to succeed H. W. McCoy.

Samuel Ungerleider has been elected vice-president of the Columbus Railway, Power & Light Company, Columbus, Ohio.

Henry M. Brooks has been appointed secretary of the Seattle & Rainier Valley Railway, with headquarters at Chicago, Ill., to succeed M. Murphy.

Walter N. Munroe, general manager of the Paris (Tex.) Transit Company, has also been elected vice-president of the company to succeed C. E. Calder.

E. H. Adams has been appointed comptroller of the British Columbia Electric Railway Company, Ltd., Vancouver, B. C., to succeed W. Saville.

G. W. Smith has been appointed superintendent of maintenance of way of the San Antonio (Tex.) Public Service Company to succeed A. M. Courtney.

William Perdue has been appointed superintendent of the Montgomery Light & Traction Company, Montgomery, Ala. Mr. Perdue has been connected with the company for many years.

H. C. Onwald has been appointed secretary of the Lake Erie & Northern Railway, Brantford, Ont., to succeed Lloyd Harris, who last spring was appointed chairman of the Canadian War Mission to the United States.

Roy G. Smock, city railway supervisor since the Des Moines (Iowa) City Railway secured its new franchise three years ago, has resigned effective on March 1 and will go to Waterloo, Iowa, where he is president of the Cedar Falls Sand & Gravel Company.

Charles L. Kurtz, who has had long experience in the light and power business and in electric railway matters, has been elected president of the Columbus Railway, Power & Light Company, Columbus, Ohio, to succeed Samuel G. McMeen, resigned, who has also retired as a director as noted elsewhere in this issue.

J. S. Goodrell has been named by the City Council of Des Moines, Iowa, as successor to Roy G. Smock, who will retire on March 1 as city railway supervisor. Mr. Goodrell was for a number of years master mechanic for the Des Moines City Railway, but for the last year or more has been an inspector on government work.

J. P. Lake has recently entered the employ of the Bay State Street Railway, Boston Mass. He will have charge of the power saving department, which has been organized in connection with the installation and operation of approximately 1500 Economy railway meters. Mr. Lake formerly was with the Pacific Electric Railway, Los Angeles, Cal., as engineer in the efficiency bureau.

C. A. Hall has been promoted from assistant general manager to general manager of the Eastern Pennsylvania Railways and the Eastern Pennsylvania Light, Heat & Power Company, Pottsville, Pa., by the J. G. White Management Corporation, New York, N. Y., the operating managers of the Pottsville properties. Mr. Hall succeeds L. S. Cairns, deceased. In June, 1918, Mr. Hall entered the service of the two Eastern Pennsylvania Companies as manager of the electric light and power department and shortly thereafter was advanced to the position of assistant general manager. After leaving school in 1904, Mr. Hall entered the employ of the Consolidated Light Company, Huntington, W. Va. In 1907 he joined the organization of the Ohio Valley Electric Railway, Huntington, W. Va. He became superintendent of the Canonsburg Electric Light, Heat & Power Company, Canonsburg, Pa., in 1909, and following the purchase of this utility in 1911 by the West Penn Power Company, Pittsburgh, Pa., he was appointed local manager of that company in charge of the Canonsburg territory. Under Mr. Hall's management this property was entirely rebuilt and many improvements were made to the service.

C. A. HALL

William Clough has resigned his position as manager and engineer of Bury (England) Corporation Tramways in order to take up an important post with a large firm of paper makers. He has been manager since the municipality took over the tramways about sixteen years ago. In recognition of his work in connection with the production of munitions of war he was made a member of the Order of the British Empire. He also earned the commendations of the Admiralty for his work in the Shipyard Labor Department.

Joseph L. Tulley has been appointed division superintendent of the Worcester division of the Worcester (Mass.) Consolidated Street Railway. His new title will not alter the scope of his work, as he has been acting as superintendent for the last two years, during the illness of the late John B. Gorman. Mr. Tulley has been in the employ of the company for fifteen years, serving first as clerk and rising through the various grades to his present position.

Harry H. Lindley, chief clerk to the auditor of the Union Traction Company of Indiana, Indianapolis, Ind., has resigned to accept a position as office manager of the Lindley Box & Paper Company, Marion, Ind. Mr. Lindley entered the service of the railway in September, 1906, as bookkeeper, which position he held about three years, succeeding A. C. Moore as chief clerk late in the year 1907. Mr. Lindley's friends in the accounting department presented a leather traveling bag to him to speed him on his way.

Brig.-Gen. George H. Harries, head of the American commission for the repatriation of war prisoners, is reported in a dispatch from Amsterdam to have been narrowly missed by a bullet as he sat in his room at the Hotel Adion, Berlin, during the street fighting there on Jan. 11. General Harries, who in civilian life was a vice-president of H. M. Byllesby & Company and a former president of the American Electric Railway Association, was the ranking member of the three American officers first to reach Berlin after the signing of the armistice.

Major Samuel W. Greenland has received his honorable discharge from the chemical warfare section of the United States Army and has returned to take up his duties as general manager of the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind. During his absence from the railway, Major Greenland has been supervising the erection of a 20,000-kw. steam-driven generating station and a rotary station of the same capacity, at Edgewood (Md.) Arsenal. He also looked after the operation of the utilities at Edgewood.

Charles B. Stiffler, formerly traveling auditor of the Union Traction Company of Indiana, Indianapolis, Ind., but for the past sixteen months in the United States Army service, has accepted the position made vacant by the resignation of Harry H. Lindley as chief clerk to the auditor. Mr. Stiffler has had considerable experience in accounting work, having been connected with the accounting department of the Indianapolis & Cincinnati Traction Company for a period of seven years and with the Union Traction Company about eighteen months prior to entering the army.

Homer C. Bender has been appointed Superintendent of Public Utilities of Spokane, Wash., by Mayor C. M. Fassett. This is a new position provided for in the 1919 budget. Mr. Bender will be employed in making personal investigations, gathering data, inspecting utility work under way and in preparing for rate and other hearings before the Public Service Commission. Mr. Bender is a graduate of the Massachusetts Institute of Technology and has had four years' experience with the Stone & Webster interests in hydroelectric work. He has also had general engineering experience and has worked in the natural gas fields in Alberta.

Emil G. Schmidt, president of the Des Moines (Iowa) City Railway and the Inter Urban Railway, Des Moines, has announced that when the receivership of the Des Moines City Railway is lifted he will retire from active work in the electric railway field. Mr. Schmidt has been engaged in public utility work for more than thirty years. He went to Des Moines about five years ago from Springfield, Ill. He has served with the so-called Harris interest for many years. While he has made no definite statements as to his plans after retiring from companies at Des Moines Mr. Schmidt intimated that he would associate himself with his son, who is an engineer.

Capt. George F. Daggett has been appointed chief of the transit bureau of the Public Service Commission for the First District of New York. Captain Daggett succeeds J. P. H. DeWindt, who resigned several months ago to undertake the management of a munitions plant. The chief of the transit bureau is the officer upon whom the Public Service Commission relies to supervise the operations of the several transportation lines in the city, to investigate complaints and to inaugurate improvements in service where needed. Captain Daggett, who has recently returned to the commission after a year in military service, is well qualified for the position, as he is thoroughly familiar with all phases of street surface railroad and subway and elevated operation. He entered the employ of the commission shortly after its organization in 1907, and latterly has filled the posts of chief clerk and assistant secretary.

Col. Alexander R. Piper has been appointed superintendent of employment for the Brooklyn (N. Y.) Rapid Transit Company. Colonel Piper has instructions from Lindley M. Garrison, the receiver of the company, to employ 1500 additional men for work as motormen, conductors, guards and repair yard employees. Early in 1918, Colonel Piper, who was formerly general freight agent of the Brooklyn Rapid Transit Company, was appointed lieutenant-colonel of the Quartermaster's Corps of the National Army and Depot Quartermaster in command of the New York depot, being advanced from the rank of captain with which in April, 1917, he was called back into active army service by the President. He skipped entirely the intermediate rank of major. Colonel Piper was born at Fort Wadsworth, Staten Island, in 1865. He was graduated from West Point and served ten years in the regular army. He retired from active service in June, 1899, and between that time and his re-entry into the national service during the present war he was employed in civilian pursuits. In March, 1904, he was made general superintendent of the American Railway Traffic Company, a subsidiary of the Brooklyn Rapid Transit Company.

Obituary

H. L. Wales, who resigned recently as manager of the lines of the Connecticut Company at Waterbury on account of ill health, is dead.

Thomas D. Milne, formerly trainmaster of the Northwestern Elevated Railroad, Chicago, Ill., died in Boston recently. Mr. Milne went to Boston to accept a position with the Bay State Street Railway. There he contracted influenza and pneumonia, which resulted in his death. Mr. Milne is survived by his widow and four children.

Private Karl A. Schaller died on Jan. 9 from pneumonia at Jackson, Mich. Private Schaller was a former student of the University of Minnesota and finished his education at the Carnegie Institute of Technology, Pittsburgh. At one time he was superintendent of the St. Paul (Minn.) Southern Railway and was special sales agent for the General Electric Company at Jackson. He was thirty-one years old. He is survived by his widow and two children.

R. J. Thompson, junior superintendent of railways of the Toledo Railways & Light Company, Toledo, Ohio, died of pneumonia on Dec. 5. He was regarded as one of the brightest of the "cadet" engineers and had seen considerable service with Henry L. Doherty & Company, who operate the Columbus property. He was graduated from Ohio State University in 1910 with the degree of electrical engineer. His first work in the Doherty organization was as a "cadet" with the Denver Gas & Electric Light Company. Subsequently he was with the Cumberland & Westernport Electric Railway and at the New York office.

Daniel Wilkin McWilliams, prominent railroad man and banker and since 1881 secretary and treasurer of the Manhattan Railway, New York, N. Y., controlled by the Interborough Rapid Transit Company, is dead. Mr. McWilliams was born in Hamptonburg, N. Y., and at the age of eighteen he entered the employ of the New York & Erie Railroad. After devoting five years in the banking business, he was elected secretary and treasurer of the Toledo, Peoria & Warsaw Railroad. From there he went to the banking house of Henry Q. Marquand, becoming a partner in the firm. In 1904 he became treasurer of the Interborough Rapid Transit Company, holding that position for four years.

Harlan P. Cairns, long an employee of the Twin City Rapid Transit Company, Minneapolis, Minn., formerly in the operating department and for the past four years in the claim department, is dead. Mr. Cairns was born in Janesville, Wis., on May 26, 1883. With the exception of being in the railway business for a short time on the Pacific coast, most of his business career was with the Twin City company. Mr. Cairns is survived by his widow and one child. This is the third bereavement in the Cairns family within six months, Mrs. Ralph H. Cairns having died last June and Leonard S. Cairns, general manager of the Eastern Pennsylvania Railways, Pottsville, Pa., brother of Harlan P. Cairns, having died of influenza on Oct. 10.

George R. Sheldon, former treasurer of the National Republican Committee and a member of the brokerage firm of William C. Sheldon & Company, New York, N. Y., died at Carbondale, Ill., on Jan. 14, of injuries received in an accident at a mine there. Mr. Sheldon had long been one of the well-known business men and financiers of New York and his name had been connected with many of the country's largest industrial enterprises. He was born in Brooklyn, on April 16, 1857, and after an early training at the hands of private tutors was sent to St. Paul's School at Concord, N. H. He then entered Harvard from which he was graduated with the degree of A. B. with the class of 1879. Immediately upon leaving college he engaged in the banking business. Gradually he branched out into various enterprises and became closely associated with J. Pierpont Morgan in many of Mr. Morgan's transactions. Mr. Sheldon's business affairs were of wide range. He was treasurer and chairman of the board of the North American Company; chairman of the executive committee and treasurer of the Milwaukee Electric Railway & Light Company; president of the Electric Securities Company, treasurer and director of the Detroit Edison Company, director of the American Locomotive Company, the Bethlehem Steel Corporation, the Union Electric Light Company, St. Louis, the West Kentucky Coal Company, the Wisconsin Edison Company and other companies. He was a delegate to the Republican National Convention of 1900, treasurer of the New York county committee from 1899 to 1903, treasurer of the New York State committee in the campaign of 1906, and of the Republican National Committee from 1908 to 1916.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Physical Needs of Electric Railways

Cars and Rolling Stock Need Rehabilitation—Increased Rates Should Provide the Means

In 1907, in a letter to the Governor of Minnesota, the late James J. Hill once gave expression to the estimate that $1,100,000,000 a year in additional capital ought to be put into the steam railroads of the country to enable them to keep pace with the demands of the country for trunk line transportation. No statistics are available as to the amount of capital which would be required to keep the electric railways to their normal development, because it is difficult to tell at the present time what their normal development should be. But even if the question of new construction is disregarded in determining the extent of the expenditures which will have to be made during the next few years by the electric railways, the matter of deferred maintenance is a most pressing one.

For a number of years, even before the outbreak of the war, the inadequacy of the 5-cent fare had compelled many companies to economize in all directions, and during the war, this condition has not only been more severe but it has been difficult for the companies to get many kinds of materials, even when they had the money to pay for what they required.

What this situation may be in some cases was indicated at a hearing recently in a large city by a commission to determine the condition of rolling stock of the company operating there. The regular schedule on this property calls for the use of about a thousand cars, or forty-five less than the number a year ago, and the company has about 1400 cars available for use. According to the testimony presented by the officer in charge of equipment, more than a third of these cars were purchased more than fifteen years ago, and in a recent valuation report received a valuation of from 10 per cent to 40 per cent. An even larger ratio of the electrical equipment received the same valuation, showing its age. Other testimony was presented to the effect that 45 per cent of the track ought to be replaced.

The rehabilitation of the electric railways of the country cannot be postponed indefinitely, and when it is undertaken, worn out equipment of the kind described will have to be replaced. The longer such work is put off the more necessary it becomes. Some of it must be undertaken soon, whether the roads "can afford it" or not. The very extent of the economy which has been forced on the electric roads has compelled the attention of the public and authorities. No one can plead ignorance now of the economic state of the electric lines. They are recognized now as needing relief because of causes beyond their control, and provision is generally being made through higher rates at least for operating expenses and fixed charges. From this to a more liberal treatment by which some sort of rehabilitation program can be begun is the next step.

Some Nice Business for 1919 Already Indicated

Pneumatic Door and Step Control and Automatic Substation Equipment More Popular

Even when conditions look blackest the electric railways are laying plans for the purchase of new equipment and of materials for extension during the year. Reports received by the ELECTRIC RAILWAY JOURNAL, while they do not indicate that any great number of electric railways are going to make extensive purchases, do show that not all of the roads are afraid to buy equipment.

Prominent in the replies received is the intention of railways to purchase, where they have not already done so, pneumatic door and step control. From seven roads which indicated the number of such equipments that they were going to purchase, a total of 162 is recorded. Many other companies stated their intention of going into this market during the current year.

Another field that should be busy during 1919, if such early reports are to be taken as any indication of later buying, is the railway substation field. The automatic substation appears to be growing more popular.

At the present writing traction companies do not appear anxious to either build new or reconstruct old track. Some work, of course, is contemplated.

Whatever is contemplated being done in this connection so far as the reports show, is for short distances, the largest reported being 4 miles. One company in Ohio expects to regrade and reballast 12 miles of track, and a Canadian company reports its intention of replacing 10,000 ties.

On overhead work there are also some reports of business to be placed during the year. All of these, however, are for Canada. In fact, there seems to be more activity, relatively, in the Canadian field than in the United States.

The Labor Factor in Price Revision

Lines in Which Labor Is a Large Percentage of Cost Are Not Expected to Drop

The downward trend of prices is receiving considerable attention at the present time. It seems to be pretty generally felt by producers that prices in the immediate future will depend largely on the labor factor. Thus if labor represents a very large percentage of the cost of the finished product, the chances for prices coming down are not good. If, on the other hand, raw materials represent the predominant cost, prices will drop as raw materials drop. Dependent again upon the labor cost will be the extent to which the latter class of commodities follow the raw material downward.

Thus wire has followed copper down. The drop has not been the same percentage as the drop in copper. Rather has the same differential been kept between refined copper and copper wire base. Even here some of the wire producers were reluctant to lower prices.

On materials where labor plays a much larger part in the cost, such as motors, generators, transformers, etc., producers have not lowered prices, nor do they seem inclined to do so at the present time.

Current Electrical Market Conditions Good

While Sales Have Fallen Off from War Peak, They Are Not Poor for a January Market

Conditions in the electrical field are by no means so bad as some would have people believe. In fact, now that the excitement of the closing down of war activities is virtually over and people are again settling down, men prominent in the sale of electrical goods are becoming a lot more cheerful.

Business, in electrical lines at least, is not bad. In fact, in many places it is rather good for this time of the year. Generally speaking, the months of December, January and February are not particularly active. Sales begin to open up as a rule in March. These conditions, therefore, must be taken into consideration when speaking of current business.

To be sure, sales have dropped off from what they were prior to the signing of the armistice. Furthermore, it is probably true that sales would have been much larger had war continued. This, however, was a forced demand

and did not represent normal purchases.

With the war over the market again returns to normal purchases and therefore must follow, more or less closely, normal buying customs. Therefore it is reasonable to expect that the current demand for electrical goods will be less than October sales. If the sales, however, were away below those for the same period last year or before the war, there might be some occasion for feeling pessimistic. As a matter of fact, it will probably be found that the January and February sales, particularly those by jobbers, will surpass those for the first two months of 1918 and will be greatly in excess of the sales during pre-war Januaries and Februaries.

Incoming orders to manufacturers are, of course, smaller than they have been, but it is doubtful if they have fallen below what would be good business for this season. Certain it is that the total volume of current sales billed of electrical goods surpassed that of the first two weeks of January, 1914.

Individual incoming orders, it is true, are not large, but this is by comparison with the size of the orders during the war. In the light of normal winter business these orders will probably be seen differently.

More Cars Suggested for Brooklyn

Receiver Recommends that 400 or 500 New Steel Motor Cars Be Provided

The Brooklyn Rapid Transit Company, through Receiver Garrison in his report to the court, recommends that provision be made as soon as possible for 400 or 500 new steel motor cars to cost approximately $20,000 each.

The financial requirements for the immediate future for the three receivership companies, as outlined by the receiver, in addition to cars just mentioned, include for the Brooklyn Rapid Transit Company the purchase of fifty trail cars with appurtenances, as agent for the surface railway companies, at an estimate of $417,000, and under the New York Consolidated Railroad Company the conversion of surface cars for trailer operation, as agent for surface railroad companies, at a cost of $200,000.

Material in Hands of Government

The stock of machinery and engineering materials on hand not in possession of troops as of Dec. 1, 1918, includes a number of items in the electric railway field. Those of particular interest are 166 concrete mixers, 68 road rollers, 942 tons of paint materials, 1030 tons of copper wire, 772 tons of electrical material and the following track material and fastenings: Rails, 42,855 tons; spikes, 3539 tons; bolts, 1875 tons; angle and splice bars, 1908 tons; turnouts and switches, 4374 tons; miscellaneous track material.

Recent Incorporations

Danbury, Conn.—Application has been made by Charles E. Graham, New Haven, one of the bondholders of the Danbury & Bethel Street Railway, to the General Assembly for a charter for street railway lines in Danbury, with the powers and privileges of building, operating and maintaining all the lines that the Danbury & Bethel Street Railway is now authorized to conduct, and with the same powers to manufacture and sell electric current, and also the right to acquire all or a portion of the franchises and property of the Danbury & Bethel Railway and to issue bonds and securities in part payment thereof. This action is understood to be a preliminary step toward the reorganization of the Danbury & Bethel Railway and the taking over of that company by its bondholders for the purpose of restoring the road to proper condition and operating it.

Franchises

New Haven, Conn.—The following petitions have been filed by the Connecticut Company at the office of the secretary of state: To construct and operate a street railway beginning at Occum, in the town of Norwich, along the Norwich and Worcester turnpike, the Versailles road, the Jewett City-Norwich road, Main and North Main Streets in Jewett City and then to the connection with its tracks near Central Village; to extend charter rights in Taftville for the purpose of connecting its tracks through Norwich Avenue from South B to North B Streets; to construct and operate a railway in Hamden from the connection in Dixwell Avenue near Blake's Corner, along Dixwell Avenue to the connection in Whitney Avenue near the town hall. The Connecticut Railway & Lighting Company, a subsidiary of the Connecticut Company, has petitioned for an extension of its charter rights to ratify its action of Aug. 5, in the extension of its tracks from the end of the North Bridgeport line on Trumbull Avenue Road, along Boston Avenue to connect at East Main Street. This extension was carried out on a request from the United States Housing Corporation as a vital necessity to furnish transportation for munition workers, according to the petition.

Kansas City, Mo.—The Kansas City & Leeds Railroad has received a twenty-year franchise from the City Council to construct an electric line from Thirty-first Street and Hardesty Avenue in a southeasterly direction to Leeds. [Nov. 2, '18.]

Fremont, Ohio.—The Lake Shore Electric Railway is preparing to ask the commissioners for a new franchise through Sandusky County. The present grant expires within six years. The county is contemplating paving the Maude pike from Clyde to a point 1 mile west of Fremont and the electric line has offered to contribute toward the cost in exchange for a new franchise or an extension of the present one.

Track and Roadway

Phoenix (Ariz.) Railway.—This company reports that it will construct 1 mile of new track during 1919.

Sacramento Northern Railroad, Sacramento, Cal.—A survey has been begun by engineers of the Sacramento Northern Railroad for a proposed extension through the Sutter Basin. The proposed line will connect with a branch of the Sacramento Northern Railroad to Woodland, about 2½ miles out of Woodland, thence northerly about 6 miles, crossing the Sacramento River at a point about 5 miles below Knights Landing and thence up through the center of reclamation district 1500. The line, if constructed, will ultimately be extended northerly a distance of about 10 miles and connect with the Meridian branch of the Sacramento Northern Railroad. In so doing there will be a completed loop from Sacramento to Woodland, to Meridian and thence back to Sacramento via Marysville.

Trenton & Mercer County Traction Corporation, Trenton, N. J.—The Trenton & Mercer County Traction Corporation is conducting a series of conferences with the City Commission of Trenton for the purpose of speedily bringing about improvement to the system as ordered by the Board of Public Utility Commissioners of New Jersey. Since the company was given permission to charge a straight 6-cent fare, a total of approximately $80,000 has been expended for new work completed and under way and materials and supplies contracted for. The company has arranged for a large expenditure for track improvement at State and Broad Streets, where new switches and cross pieces will be placed.

New York, N. Y.—The Continuous Transit Securities Company, of which M. Everhart Smith is president, has filed with the Public Service Commission for the First District of New York a plan for the establishment of a moving platform in Forty-second Street in place of the present shuttle subway operation between the East and West Side subway lines. It is proposed to utilize two of the four tracks and to construct three moving platforms, the fastest of which will operate at a speed of 9 m.p.h., and its seating capacity be 31,680 passengers per hour. The cost is estimated at less than $1,000,000. The commission has taken the plan under consideration.

Interborough Rapid Transit Company, New York, N. Y.—Operation has been begun by the Interborough Rapid Transit Company on the Pelham Bay Park branch of the Lexington Avenue subway from 138th Street to Hunts Point Avenue.

South Fork-Portage Railway, Johnstown, Pa.—A report from the South Fork-Portage Railway states that during 1919 the company will complete and equip the remaining 3½ miles of its line connecting South Fork and Portage if the Capital Issues Committee approves the issuance of stocks and bonds.

Beaumont (Tex.) Traction Company.—The Beaumont Traction Company plans within the next couple of months to spend $87,000 for double-tracking certain streets, putting in new switches and extending the signal block system in order to better maintain its schedules.

Seattle (Wash.) Municipal Railway.—The City Council of Seattle has adopted a resolution providing for the sale of sufficient bonds to provide finances for the immediate construction of the west end of the municipal elevated railway. City Engineer Dimock believes that the road will be ready for operation of cars by Feb. 1. The government plans to discontinue the steam train service to the shipyards, and the city will make every effort to have the street car line ready by the time the steam service is abandoned.

Power Houses, Shops and Buildings

Western Light & Power Company, Boulder, Col.—It is reported that improvements and extensions will be made by the Western Light & Power Company to its plant and system to cost about $1,000,000.

Kansas City, Mo.—C. C. Peters, president of the Interurban Central Station Company, has announced that Hughes Bryant has been employed to push the project of the construction of the proposed interurban passenger terminal at the corner of Tenth and McGee Streets to be used by all interurban railways entering Kansas City. Architects will be employed during the coming month and the construction contracts let as soon as final plans are drafted.

Cleveland, Alliance & Mahoning Valley Railroad, Ravenna, Ohio.—This company reports that during 1919 it expects to purchase an engine lathe, wheel press, boring mill and three 200-kva. transformers for its substation.

Pacific Northwest Traction Company, Seattle, Wash.—Plans are being made by the Pacific Northwest Traction Company for the immediate erection of a building at Sixth Avenue and Olive Street to be used as a permanent station for the Everett interurban line. The structure will cost about $100,000.

Ashland Light, Power & Railway Company, Ashland, Wis.—It is reported that the Ashland Light, Power & Railway Company plans to begin work on a hydro-electric project on the Flambeau River, 14 miles north of Ladysmith, early in the spring, to cost about $1,750,000. L. E. Myers & Company, engineers, 53 West Jackson Boulevard, Chicago, will supervise the work.

Trade Notes

Harry De Steese, 30 Church Street, New York, N. Y., has reopened his office which has been closed during the period of the war. Here he will deal in tapes and compounds, line material, shop and track tools, armature and field coils and other railway supplies. Mr. De Steese has been in the business for twenty-four years.

Frederick A. Scheffler, formerly with the Babcock & Wilcox Company, has become associated with the Fuller Engineering Company of Allentown, Pa., as manager of the department devoted to the application and introduction of pulverized coal equipment for steam power plants in the United States. Mr. Scheffler's headquarters will be 50 Church Street, New York.

W. Jerry Stanton has resigned as sales manager of the Railway Improvement Company to become special representative of the National Railway Appliance Company, 50 East Forty-second Street, New York. Mr. Stanton is a native of Schenectady and for a period covering eighteen years was employed by the General Electric Company in its testing, engineering and sales departments.

Roller-Smith Company, manufacturer of electrical instruments and circuit breakers, New York City, announces the opening of a Detroit office in the New Telegraph Building in charge of C. H. Nicholson, formerly connected with the Chicago office of the company, who just returned from service with the Signal Corps. The company also announces the appointment of James E. Wood as manager of its Cleveland office at 711 Williamson Building, succeeding C. S. Ripley.

W. C. Lincoln has been appointed engineer for the National Railway Appliance Company, 50 East Forty-second Street, New York, effective Jan. 1. Mr. Lincoln was originally employed by the American Locomotive Company, Schenectady, leaving that company's service to enter Union University. After graduation and the completion of the General Electric Company's test course, he was assigned to special railway work by that company. Subsequently, he took up and completed the company's engineering extension course, after which he was connected for some time with the consulting engineering department. Later Mr. Lincoln entered the railway engineering department and in 1913 transferred to the General Electric Company's Philadelphia district as commercial engineer, railway department, after which he entered the service of the Railway Improvement Company, New York, as electrical engineer.

Edwin Besuden, for the past sixteen years sales manager for the Jewett Car Company, Newark, Ohio, which recently went into receivers' hands, has resigned from this company and is now temporarily located at the offices of the Ellcon Company, 50 Church St., New York City. Mr. Besuden expects to enter the electric railway supplies field as representative for a number of manufacturers supplying this market, but has made no definite plans yet in this regard.

Edward D. Hillman, for the past twelve years secretary and engineer of the National Railway Appliance Company, New York, has resigned from that company and has accepted a position with the new Consolidated Steel Corporation, 165 Broadway, New York. This company has just been organized and will handle the export trade of the following independent steel mills. Bethlehem Steel Company, Brier Hill Steel Company, Lackawanna Steel Company, Lukens Steel Company, Midvale Steel Ordnance Company, Republic Iron & Steel Company, Sharon Steel Hoop Company, Trumbull Steel Company, Whitaker Glessner Company and Youngstown Sheet & Tube Company.

Economy Electric Devices Company, Chicago, Ill., reports recent sales of Vulcan One-Man Kersosen Torches, for use in thawing frozen tracks and equipment and for shop work including preheating, to the following roads: Rockford & Interurban Railway; Dayton, Springfield & Xenia Southern Railway; Illinois Traction System; Grand Rapids, Grand Haven & Muskegon Railway; Keokuk Electric Company; Joliet & Eastern Traction Company; Fort Wayne & Northern Indiana Traction Company; United Railways & Electric Company; Capital Traction Company; Terre Haute, Indianapolis & Eastern Traction Company; Inter-Urban Railway Company; Chicago Surface Lines; Milwaukee Electric Railway & Light Company; Chicago Elevated Railways; Chicago, North Shore & Milwaukee Railroad; Philadelphia Rapid Transit Company; Atlantic City & Shore Railroad; Dubuque Electric Company and York Railways Company.

Capt. H. Fort Flowers, head Trench Warfare Materials Section of the Ordnance Department, Philadelphia zone, has recently been relieved from the service by the War Department. He has returned to New York to take up his work as president and general manager of the Differential Car Company, which was organized by him four years ago. The Differential Electric Dumping Car invented and designed by Captain Flowers and built under his direction is well known to electric railway track engineers. A large number of these cars are now in service in various parts of the United States. With the personal attention which Captain Flowers will be able now to give to his business interests an active business campaign may be expected. Major Leon Fraser, vice-president of the company, and S. G. Hughes, first lieutenant of field artillery, are still in France in active service. F. E. Scott, secretary of the company and first lieutenant in the gas warfare service, has also been relieved from military duty to take up his work with the company.