

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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Volume 58

New York, Saturday, July 16, 1921

Number 3

A Secretary of Proved Ability

THE association is to be congratulated upon the recommendation which its reorganization committee has made with reference to a permanent secretary to succeed E. B. Burritt, who resigned last March. J. W. Welsh, whom the committee has recommended to the executive committee and who will doubtless be appointed by that committee, already has the confidence of the entire membership of the association and has shown himself amply able to perform the duties which will devolve upon him.

As special engineer to the association, Mr. Welsh already had made his work felt in the association's activities, and when President Gadsden asked him to undertake, quite suddenly it will be remembered, the work of secretary, Mr. Welsh stepped into the breach and, in this rather trying position as acting secretary, has acquitted himself so admirably and has shown so satisfactorily his complete fitness for the permanent secretaryship that he was the only logical candidate out of a multitude of suggestions to be considered for the place.

The ELECTRIC RAILWAY JOURNAL is sure that the association headquarters activities are in good hands and congratulates both Mr. Welsh and the association upon the new relationship, which will probably be arranged at the next meeting of the executive committee.

Get Work Commensurate with Wages Paid

THE news columns of nearly every recent issue of this paper have recorded wage decreases on electric railways in almost every part of the country, but probably few of them have been equal in percentage to the demonstrated reduction in cost of living which has occurred since the peak of prices in the early part of 1920. Undoubtedly wages on electric railways are still due for a further decrease, but in this readjustment, an opportunity is offered to put the wages on a different basis than that which existed in most companies before the war. Reference is made particularly to companies which used to have a high labor turnover.

Statistics of the present rate of turnover on the average electric railway property are not available, but it is safe to say that generally it is much lower than six or seven years ago. It is also a matter of observation that the physical and mental and other standards which go to make up a desirable trainman are being exhibited in a higher degree than before the war. All of this helps toward efficient transportation, and, in the last analysis, toward economical operation. The higher wages paid on one-man cars tends also along these lines.

The future wage for motormen and conductors should be sufficient to attract men of a high grade permanently

to the service and not simply to take it as a stop gap between better paid industries. The companies should cut loose from the unskilled labor theory and should make employment on the platform attractive to the kind of men who can give economical service from every viewpoint. The public has got away from the 5-cent flat fare and will expect good service, regardless of the rate of fare. The companies will not be allowed to earn more than a fair return, and in their own interest as well as in that of the public, the most certain way of supplying good service should be followed. This is to pay good wages and get in return from their men faithful and efficient work, commensurate with the wage paid.

How Manufacturers Safeguard Their Products

THE attention which manufacturers give to the testing of the raw materials which enter into the apparatus supplied to electric railways and the extensive precautions that they take in testing such material are amply illustrated in the article by John S. Dean on testing insulating material, the second and concluding part of which is published in this issue. In reading these articles one cannot but be impressed by the large variety of insulating materials which are used in the construction of railway apparatus. In the selection of such materials it is most essential to take into consideration the operating conditions, which are extremely severe for electric railway equipment. High temperatures are encountered, the trolley voltage is most variable and line surges are frequent. The equipment is exposed to considerable moisture, dust and dirt, and is subjected to severe mechanical strain, as well as excessive vibration and frequent abuse by rough handling. Ruggedness in construction is as essential as high dielectric strength.

The proposed tentative methods of testing insulating varnishes which were included in the report of committee D-9 on electrical insulating materials for the American Society for Testing Materials at its recent meeting follow along the line outlined by Mr. Dean for the testing of liquid insulating material. The tests given are intended for varnishes which are applied by brushing, dipping or spraying, in order to provide high electrical insulation. The dipping of coils and even complete armatures by electric railways has increased considerably during the past two years, and the reduction of troubles which has resulted has shown the great advantages to be obtained. Those who have had experience in dipping and baking processes have found water absorbing tests and endurance tests to be most desirable. Another important consideration which directly affects the time that cars are withheld from service is the time necessary for drying. Tests for determining insulating compounds which will have a short period for drying and at the same time possess the necessary dielectric strength and other insulating properties are

of interest. Aside from the essential characteristics that are necessary for insulating materials, this description of the method and apparatus used by a prominent manufacturer for determining these characteristics should give those interested a broader conception of the care used to safeguard the various products which they purchase.

Capitalize— or Amortize?

THE brief which sets forth the arguments of the Public Service Railway in support of its valuation is one of the most interesting documents in this line which has appeared for some time. It is thorough, it is out of the ordinary, it is legal, and it has touches of appreciation of the lack of conception of the railway problem by the usual citizen.

But there are two or three points with reference to which questions of best valuation policy—or public policy, perhaps—may well be raised.

One of these is the advisability at this time, if ever, of arguing in favor of unit prices on a particular date. This is admittedly in line with the association's valuation committee recommendation, but that makes it all the more important that this question be examined with due care and consideration. Prices of many articles are admittedly going down, and while pre-war value will probably never be realized, the public consciousness cannot but carry the feeling that it is the future return upon the value of the property which is of most importance. Legally, present value—present-day value—has much to support it. Any modification of that to certain trend conditions or estimated future conditions can of course be supported only as a question of public policy, but that is worth considering seriously when companies are presenting final arguments on definite figures.

Another point which it will be most interesting to have determined, as mentioned editorially in these columns under a discussion of the Ford, Bacon & Davis valuation of this same property (see *ELECTRIC RAILWAY JOURNAL*, April 23, 1921, page 758) is that of capitalizing the "power contract." As the brief states, every witness testified as to the value of this contract to the railway company. The question it will be interesting to have decided by a court, if possible, is whether the value of such a contract should be reflected by an increased legitimate capitalization or rather by an increased rate of return in recognition of the good management which is evident in thus obtaining power at a lower rate than the railway company could realize under its own operation.

The third, and perhaps most important, point from the standpoint of policy is the question as to whether certain sums of money, admittedly invested and invested legitimately, should be added to capital or should be set up as a fund to be amortized. Reference here is to consolidation value—again possibly a question of good management rather than either capitalization or amortization sums—superseded property and certain other elements of value which, in any private business, would be amortized as early as possible. This is not an argument in favor of eliminating such amounts from consideration on the theory that they should have been amortized out of excessive dividends in the past; there probably were no excessive dividends, and there certainly is no basis to assume them without positive

evidence of them. This is rather a suggestion of much better public policy to set up such expenditures as amortizable funds so that they may be eliminated from the perpetual charge upon the community. This may not be the best for the market value of the securities at the instant, but it is apparently the best business in the long run. There is also the question as to whether or not there is much more probability of having such sums allowed in their entirety when set up as amortizable funds than when added to capital. Virtually, of course, when it is probably impossible to earn enough to pay a return on the allowed valuation and to pay off installments on amortizable funds the fund to be amortized is added to capital for the length of time it still exists in the accounts of the company. The same end is realized, then, in a manner which has much to support it as being a more logical plan to present to the public, one which will appeal more to men in other lines of business who are accustomed to write obsolete equipment off of their property accounts and one which, to repeat for emphasis, is better public policy. Legally, either may be correct. To amortize where possible seems better business.

Material Testing Specifications Are Important

SOME of the advantages to be obtained by the adoption of standards of materials were given briefly at the last meeting of the Society for Testing Materials by George S. Webster, the retiring president. The list follows: (1) Ease in specifying the quality of the material required; (2) ease in testing materials delivered under the specifications through the use of standard methods; (3) ease in obtaining standard products; (4) an effective means for minimizing controversies over purchases of materials, and (5) a feeling of security that the materials used are satisfactory as a result of the knowledge of how the standard specifications are formulated and that they reflect the latest knowledge and experience.

For a number of years this paper has abstracted the discussion on specifications of interest to electric railway engineers at meetings of the American Society for Testing Materials, and an account of the action taken by the society at the recent meeting at Asbury Park appears on another page. The importance of testing the various materials used by electric railways is being given increased consideration by those responsible, and the American Society for Testing Materials has long been considered as foremost in formulating specifications for this particular branch of engineering. This year the society achieved a remarkable performance—probably without precedence in its history—by dealing with more than 150 specifications. Of these seventy-one were new, being presented for the first time and adopted as tentative standards, while sixty-three were revised. Others were advanced from tentative to standard rank. Some forty steel specifications were disposed of in bulk by a single ballot. The flatness of this procedure was relieved somewhat in the closing session by an animated discussion over chilled-iron car wheels. This discussion brought out the desirability of chemical limits for car wheels and for making wheels safer by requirements more severe than those set up by the Master Car Builders and the American Railroad Association as well as those with which the committee on cast iron of the American Society for Testing Materials was content.

The method of procedure for the various committee reports and the care used in the adoption of specifications by the society are shown in the specifications of concrete which are now being formulated.

At last week's meeting the preliminary report was made public and in the form now written it will be circulated among the members of five contributing societies—which means about 16,000 engineers. This report will be a subject for discussion among those engineers and their committees during this year, and the committee of the American Society for Testing Materials will then proceed to the writing of the final specifications with due consideration of the various points brought out in discussion.

A number of the standing committees of the American Electric Railway Association are now co-operating with committees from the American Society for Testing Materials toward bringing into agreement similar specifications, therefore the work of the society accomplished this year is given added interest to electric railway men.

Reorganization Committee Suggests Constructive Program

AS INDICATED on another page of this issue, the special reorganization committee appointed by President Gadsden to make recommendations to the executive committee with reference to the reorganization of association headquarters and any other modifications of existing activities or rules of the association which it thought advisable now has its report in the hands of the executive committee in practically final form. In order, however, that there shall be "open covenants openly arrived at," the committee is making public the gist of its recommendations to the executive committee before the meeting of the latter committee in order that it may have the benefit of comments from the field with reference to the recommendations made by the reorganization committee.

The recommendations are constructive. They are all an effort to make the association's activities more useful to the membership—the only reason for the existence of the association. It is recognized that the association is a voluntary organization and all that is done is to modify the machinery so that, judged from past experience, it will run more effectively. That considerable revision of the constitution was advisable is not unexpected. The revisions, however, are not radical, but only provide those things which leading opinion in the industry have felt for some time were either necessary or advisable.

The fact that the executive committee will meet monthly if the recommendation is adopted will of itself mean more virility in the association and more active interest in the conduct of its affairs by its officers. That membership modification should be made so as to allow in special cases admission of trackless transportation systems and to allow management companies, consulting engineers, investment bankers, etc., to assume a formal place in the association is a logical development. Provision for regular standing committees with obligation of monthly progress reports should also tend to add life to the association activities.

Of the questions recommended to the executive committee for its own consideration, those concerning co-operation with the various sectional railway associations, those having to do with an adequate geographical

distribution of the executive committee and other committee meetings, as well as geographical representation on all the committees, and the one regarding admission of municipally owned or operated railways deserve consideration by the membership at large. All but the last speak for themselves. On this question there is bound to be considerable honest divergence of opinion, some of which has already developed, but the question has been raised and must be met squarely and settled. The editors of this paper believe that the association and the industry would benefit by permitting such municipalities as desired, when they operate their own railways, to enter the association and discuss problems in which all railways are mutually interested. The editors of this paper do not believe that the American public is so organized at present as to be able efficiently to operate transportation systems, but where municipalities have taken over the responsibility, it is to the interest of the entire electric railway industry that the municipalities understand all the problems which they have assumed. Furthermore, it is only by sitting down at the same table with experienced transportation men that municipal officers will be able fully to appreciate the magnitude of what they have undertaken. But on this question the executive committee deserves especially to have advice from the industry. It is probable that the final discussion on this point will not be conducted until after prolonged, and, it is to be hoped, intelligent, debate at Atlantic City in October.

As a whole the report means progress. That the final action be word for word in line with the recommendation of the committee is immaterial. A frank discussion of the questions which have been raised and action by the association on them is in itself worth while and the association will be better for it in the end.

Covering Up Their Deficiencies

SEATTLE continues to go behind in the operation of its municipal railway. The fact sticks out like a sore thumb, for Seattle is at present on the cash-and-carry basis. Explanations may tend to mitigate the feelings aroused by the fact that things are bad with the road from the standpoint of earnings, but excuses don't remove the evidence. Every month new explanations for the poor showing have to be thought up. This has taxed the ingenuity and strength of the representatives of the city, but they have not run out of ideas entirely. Thus Councilman Erickson has hit upon the clever scheme of overcoming this need for establishing the monthly alibi by charging a 3-cent fare on the lines and meeting out of general taxation the difference between the receipts of the road and the cost of operation.

Apparently, Seattle cannot and will not pay more for fare, so that the avenue of escape is closed which that procedure might open. If car riders won't pay more, then let them pay less. The psychology behind the idea is correct from the standpoint of good politics. And with the railway supported by the tax rolls the sky of course would be the limit on expenditures. The plan would seem to be so palpably absurd as to preclude its adoption, but then there is no telling to what lengths a community will go in continuing to fool itself that municipalized its railway in spite of the preponderance of evidence against such undertaking.

Bond Testing Cars

To Test Bonds at a Faster Rate than Can Be Done with Hand Bond Testers and to Provide Automatic Permanent Records of the Test a Car Containing the Necessary Instruments Is Most Convenient

BY G. H. MCKELWAY

Engineer of Distribution Brooklyn (N. Y.) Rapid Transit Company

WHEN a car is used for bond testing it is necessary to insulate the front and rear trucks, or front and rear wheels in a single-truck car, from each other. With a single-truck car the truck must be cut and insulation inserted between the two sections. Much better results in maintaining the car, although not in testing the bonds, will be obtained from a double-truck than a single-truck car as the cutting of the frame weakens the latter and permits the two ends to sag.

Either a motor-generator set is necessary to supply the current for the test at a low voltage or a resistance to reduce the voltage of the current from the trolley wire or third rail sufficiently to permit of its being used in the test. The motor-generator set or resistance should be large enough to supply 800 to 1,000 amp. at 5 volts, although so large a current will seldom be needed and the average amount will be only about one-half of the maximum capacity.

In addition to the motor-generator set there should be in the test car a table upon which all of the testing instruments can be mounted and grouped so that they can be conveniently read by a single operator. The instruments should comprise an ammeter and two millivoltmeters, together with apparatus for protecting the latter in the case of bad joints which might otherwise throw a high voltage across them and burn them out. The ammeter measures the current supplied to the test circuit by the motor-generator, while the voltmeters indicate the drop across the joints as the car passes over them, one voltmeter being in position to measure the drop across the joints in one rail of the track and the other being similarly placed in regard to the other rail.

The voltmeter circuits are continued to the track through brushes which rub on the rails and which are spaced 4 or 5 ft. apart so that they will always be certain to span the joints no matter how long they may be. It is very difficult to pick out and record the locations of all of the bad joints by this method, even when the car is moving quite slowly, especially if the poorly bonded ones are close together. With the car moving at a speed of only 5 m.p.h. and with all rails fully 30 ft. long, the contacts will pass over one joint in each rail every four seconds. If the joints happen to be staggered, one voltmeter or the other will be swinging every two seconds. When a line of bad track is being tested the open joints come so frequently that it is almost impossible for the locations of all of them to be recorded unless the car is stopped occasionally to allow the observer time to catch up. If this is done it will "drag" the cars behind it and spoil their running schedules.

One way of directly marking bad joints, not so permanent as with the hammer and chisel, but which lasts long enough to permit the bonders to find the joints, and which does not require stopping the car, is by squirting a little white paint on the rail, tie or pave-

ment as the car passes along. Most of the cars now in use are equipped with recording instruments. The record shows the condition of the bonds and indicates the moment that the bond is passed over. These cars are known as "autographic" bond testing cars and are the invention of A. B. Herrick. Their equipment, however, is so complicated that a perpetual inducement is offered to change some of the details in an effort toward greater simplicity or less troublesome maintenance. A short time ago the writer asked another railway engineer if there was not a "Herrick" test car on his line. The reply was that it was a Herrick car when first bought, but did not look much like one now. In fact, all of the cars that the writer has seen or heard of appear to differ considerably among themselves, although the general principles on which they operate are the same.

AUTOGRAPHIC RECORDS

On the autographic cars the record is made on a long roll of paper which is unrolled and carried across the table, a small motor furnishing the power for operating the drive. The strip of paper is 11 in. in width, and as it passes five pens, two for each rail and one for marking locations, make continuous marks upon it. Two of the pens merely mark the zero lines, indicating where the millivoltmeter lines would be if there was no drop in the rail, while two others are for the purpose of locating open joints, which is done by the pen moving from side to side whenever the voltage across the joint is so high as to make the relay, which protects the voltmeter, operate a cut-out. The fifth pen, for marking locations, is moved through a switch closed by the operator or his assistant whenever the car gets opposite some point, for instance a house or trolley pole, which will serve as a permanent location for the starting point of measurements to give the exact location of the bad points in its vicinity. On one window on each side of the car and directly opposite the seat of the operator is painted a plain, vertical stripe. When the object whose location is to be recorded is covered by the stripe the operator presses a key and the pen, which has been making a straight line down the center of the paper as it moves past, makes a jog. This jog is given a number by means of a numbering stamp, the numbers of which increase by one each time it is used and so numbers the pen jogs consecutively. A sheet of paper already numbered is used to record the house or pole number, or name of intersecting street or something else that will definitely mark the location of the car at the time that the pen moved. Where the bonds in the track under test are in good condition the location points need be taken only occasionally, but the worse the track the closer they should become, and with bad track 400 or 500 ft. apart is a good spacing distance.

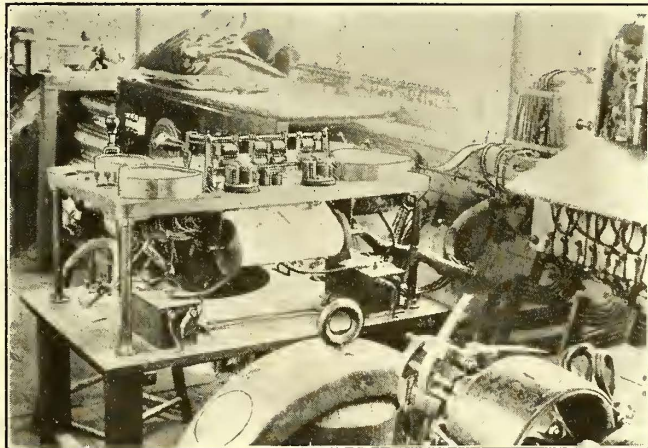
A toothed wheel revolving in the center of the table punctures the paper at intervals, each space be-

tween the holes being equivalent to 10 ft. on the track. At each tenth hole an additional hole is punched about one-quarter of an inch outside of the center so that the 100-ft. lengths are easily counted and it is not necessary to count all of the dots representing 10 ft., but only those to the nearest 100-ft. mark.

As the car moves along, the current in the track and the current from the motor-generator set cause the voltmeter needles to deflect a certain amount, which is comparatively constant, and which shows the difference of potential between the two brushes on a piece of unbroken rail. The current in the rails due to the operation of the cars may be either added to or subtracted from that produced by the motor-generator set and occasionally the latter should be cut out, by opening the switch, in order to see in what direction the current in the rails is flowing and its value.

RECORD PAPER MOTOR DRIVEN

In addition to the generator which is used for supplying a heavy current at a very low voltage there is also a smaller one supplying current at about thirty volts, which current is used for the paper drive and also,



other stamps reading "special work," "railway crossing," etc., in order to explain the sudden throws of the voltmeter needles not attributable to bad bonds. He also stamps "right rail" or "left rail" and "inbound" or "outbound," as the case may be, on the record occasionally so that there will be no mistake in reading the record later and, from time to time, he opens the generator circuit and tests the direction of the flow of current in the rails. This should always be done when there is reason to believe that its direction has changed as, for instance, just after passing a point where return wires or tracks are expected to lead the current to a power or substation, and at fairly frequent intervals elsewhere.

The voltmeters are supplied with two scales, one giving a reading about twice as high as the other. By making use of the proper scale and regulating the output of the motor-generator it will always be possible to get the record on a fairly large scale and yet not have "opens" shown where they should not appear, whatever may be the weight of the rails and the condition of the joints.

After the record has been made that portion of the



INTERIOR ARRANGEMENT AND LOCATION OF APPARATUS IN BOND TESTING CAR

after passing through a make-and-break device of some sort, and through condensers, is used in recording the difference of potential between the brushes on the rail. One side of this circuit is connected to the voltmeter needles which swing over the paper and also over contacts which are underneath the paper. Between the ends of the needles and the contacts below sparks are drawn which puncture the paper, each needle making a dotted line of little holes which are burnt in the paper and which show every swing of the needle and its amount except in those cases where the drop is so great that the relays have to act to protect the instruments. In those cases the little holes will run up to a peak at the point where the relay cuts out, and on the pen line underneath the peak and near the edge of the paper will be found a sharp jog, showing that the joint is "open."

Although some cars have been operated with only two men, a motorman and an operator, yet such an arrangement throws so much work on the latter that, as a rule, it will pay to use at least one more man in order to pick out and record the locations on the separate sheets of paper while the operator stamps the corresponding numbers on the record at the points shown by the movement of the pen. In addition to marking the locations on the record the operator will make use of

paper containing it is cut off from the rest of the roll and gone over to be put in permanent condition for filing and to have the locations of the bad bonds placed in more convenient form for handling and carrying about in the field, so that the poor joints can receive attention as soon as possible.

The first step is to mark at each of the numbers what that number is supposed to indicate, as then no time is lost by having to refer to the separate sheets, which need be kept no longer as all of the information is then on the large roll. These locations can be written on with pen and ink, although the neatest way is to type-write them at the proper points. Then, having determined on the maximum resistance of the joint expressed in terms of feet of continuous rail that can pass as good, find all of the joints the resistance of which was higher than that amount and mark them for rebonding. If only the "opens" are to be considered as bad the task is comparatively easy, as it is necessary only to follow the two pen lines and mark down those places where the jogs in the line show that the voltmeters had been cut out of circuit. Where the bonding is to be kept in better condition and joints of a lower resistance are to be rebonded the curves made by the arcs from the voltmeter pointers must be closely followed, and whenever the height of a peak exceeds the predetermined ratio

between that of the joint and the uncut rail the location must be marked for rebonding.

Some of the papers used for these autographic records are chemically coated so that the minute burns in it show up black and can be readily seen, but such paper is more difficult to puncture than the plain paper and often cannot be obtained. Another method of blackening the holes is, after the record has been made, to paint the underside of the paper along the general lines of the curves with ink or thin water color paint so that some of the color will pass through the holes and show on the upper surface of the paper. This takes additional time and is not reliable as the color does not always come through. Probably the best method of following the curves is to pass the record before a light and have the light shine through the little holes. This can be done either by holding the record up in front of a window or, better still, by passing it over a box in which is contained an incandescent lamp or lamps.

TABULATING RECORDS FOR FOREMEN

In order accurately to locate the bad joints for the bonders, their locations are generally copied on sheets of paper, which are given to the foreman in charge. A well-planned sheet of this type is printed with spaces to be filled in, giving at the top the name of the street, the streets between which the test was made and the date of the test. Below are columns in which to locate the joint as a certain number of feet in a given direction from an easily found point; the direction of traffic on the track, if there is more than one track on the street; whether on the right or left rail of that track; the date repairs were made, and the type of bond used in making the repairs. By the use of such a sheet not only does the bonding foreman receive all of the information that he requires but, when he returns the sheet after finishing the work, the office has a complete record of all of the bad joints and when and how they were repaired.

The records made by the testing car should be valuable, not only at the time of making the test, to point out the bad bonds, but also as legal evidence in case of any suit brought on account of the alleged defective condition of the bonding. The writer has found, however, an unwillingness on the part of several lawyers to make use of the records in such cases, as they feared that the height of the peaks of the curves would be misunderstood by the non-technical members of the jury, who would not be able to understand that what appeared to them to be very sudden sharp rise in potential would, in fact, be only a very few millivolts and therefore negligible in considering the question before the court. It would seem, however, that such records could be used very effectively in some cases if the curves were carefully explained, in a manner that all could understand, by some one who knew just what the records showed and could bring out those points to the best advantage.

During this year the Grosse Berliner Strassenbahn, the tramway system in Berlin, celebrates the fiftieth anniversary of its founding. Long operated by a private corporation, the system has recently been taken over by the municipality and consolidated with the other surface lines in Greater Berlin, so that it now serves all parts of that district, which embraces about 5,000,000 inhabitants. The property itself consists of 1,250 km. (800 miles) of track.

Factors Affecting Electrification

COMMENTING upon the elaborate analysis of electrification conditions on the Northwestern Railway of India, which has been running in its columns for some time, the *Railway Engineer*, London, calls attention editorially to some of the points that have been brought out. These illustrate the importance of a knowledge both of electrical engineering and of railway working in making a decision on the electrification question.

The editorial states that the author of the article in question shows that for the same adhesion weight electric locomotives can be designed to develop two or even three times the power of the heaviest steam locomotive in India. By articulating the design, the number of driving axles could be multiplied indefinitely with the same permissible axle weight and it would be possible to put a 3,000-hp. electric locomotive on the Northwestern which could run anywhere where two coupled or doubled engines of the 0-6-0 standard type can now run and would be capable of hauling loads five times as heavy.

The large number of heavy grades on the Northwestern are an extremely important factor in the electrification problem. The present and previous articles show that electrification will pay on many lines with heavy grades where for the same traffic on the level it would be out of the question. On a 4 per cent grade the electric locomotives can do at least 40 per cent more work than a steam locomotive with the same expenditure in energy. To this must be added the economy resulting from regenerative working, which also saves rail and brakeshoe wear. It is said by the engineers that on the Giovi tunnel line near Genoa the rail saving was enough to pay the whole interest on the cost of power station and transmission line. The enormous increase in the cost of coal and repairs has more than offset the increased cost of electrical apparatus, and the *Railway Engineer* expresses the belief that it will be found by those engineers who have the time to make a really accurate study of the conditions obtaining today on many lines that the changed conditions often make electrification worth much more serious consideration than before the war. As for the capital outlay, the difficulties here are apt to be lessened when the directors are really convinced of the savings which can be effected through the application of electricity to heavy traction.

Toronto Retains Odd Gage

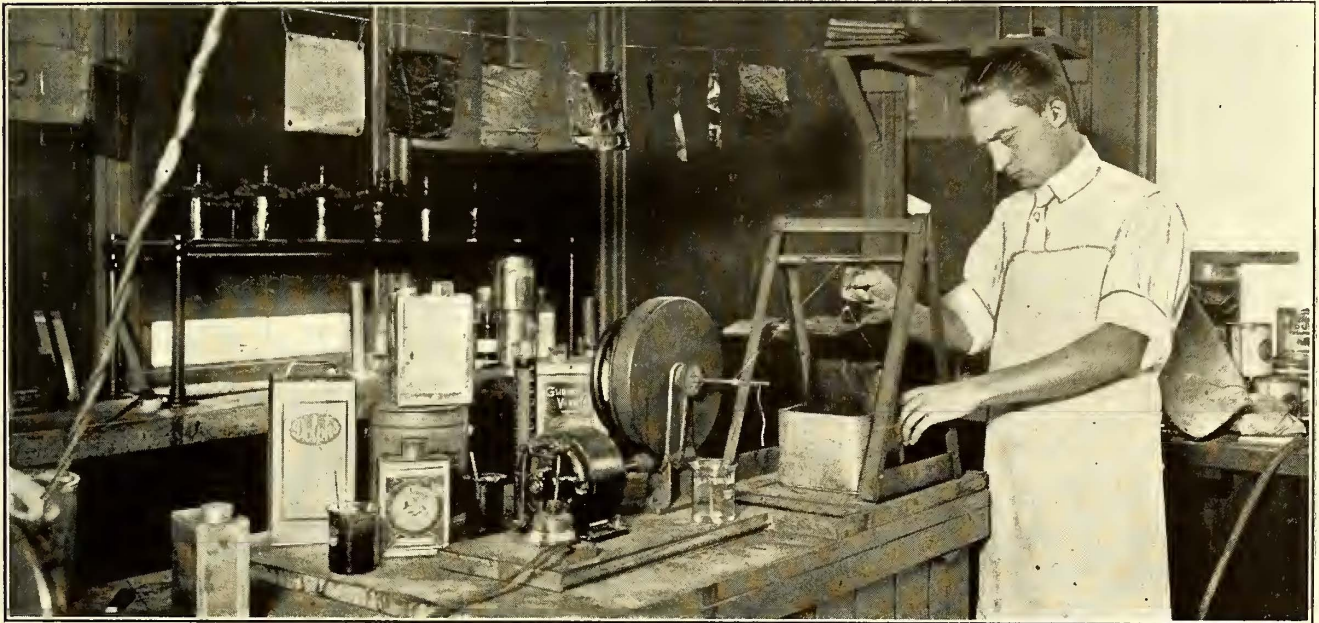
CONTRARY to what was popularly expected, according to the *Canadian Engineer*, the 4-ft. 11-in. gage at present existing on the lines of the Toronto Railway, Pacific Railway and the MacKenzie Radials, with the exception of the Metropolitan, will be retained by the Toronto Transportation Commission when it co-ordinates and rehabilitates the several systems within the city. The Commission felt that a change of gage, the estimated cost of which had been figured at \$1,500,000, showed no immediate advantage and would be likely to increase the operating difficulties until the work was completed. One point which swayed the Commission in reaching its decision was that outside systems will not be able to get running rights over Toronto tracks, as their cars would be of the wrong gage. It is said this was why the odd gage was originally chosen for the Toronto system.

Testing Insulating Materials—II

Aging and Weather Tests Are Important to the Users of Railway Insulating Materials as They Show What Life Can Reasonably Be Expected and the Deteriorating Effects that Result

BY JOHN S. DEAN

Railway Motor Engineering Department, Westinghouse Electric & Manufacturing Company



IT IS ESSENTIAL THAT SPECIMENS FOR THE DIELECTRIC TEST ARE PROPERLY TREATED

IN AN article published in the May 21 issue of the *ELECTRIC RAILWAY JOURNAL* some strength and dielectric tests of treated and untreated insulating materials were described. In the following, attention will be given to tests showing the effects of heat, acids, oil, weather, etc., on treated materials, together with various essential tests on composite materials.

AGING TEST OF FLEXIBILITY

To determine the ability of a varnish to retain its flexibility under the action of continued heat such as is found in a railway motor in service, the only apparatus required is a suitable baking oven fitted with a high-reading thermometer or an indicating or recording pyrometer. Test specimens consist of strips of sample cloth cut 6 in. x 3 in. which are given several dippings of the varnish to be tested. A space is left untreated at the top of the samples to record the test data.

Four samples are prepared and placed in an oven which is maintained at a temperature of 100 deg. C. The samples are removed one at the end of 100 hours, the second at the end of 200 hours, the third at the end of 250 hours and the fourth at the end of 300 hours.

These samples are then tested by folding or bending over rods of different diameters and noting the smallest diameter around which they may be formed without cracking.

A test specimen which after baking 300 hours at 100 deg. C. and allowed to cool to room temperature can be folded and creased without showing any indications of cracking is considered very satisfactory.

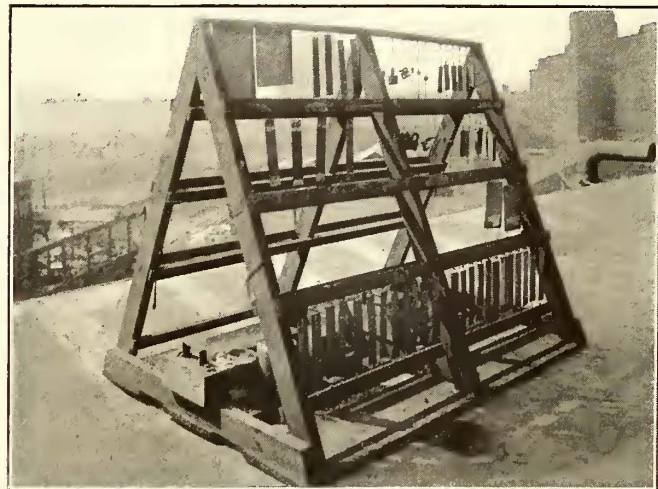
In the operation of railway motors, due to careless

and in some cases too frequent oiling of the bearings, excess oil finds its way inside the motor frames. In this connection it is important that the varnish used for insulating purposes should not be affected by this oil, and to this end it is advisable to use an oil-proof grade of varnish. To make an oil-proof test samples of cloth are prepared similar to those used in connection with the aging test, and after being thoroughly baked they are placed in a mineral-oil bath, which is held at a temperature of approximately 60 deg. C. for several days. If the varnish on the treated sample shows no signs of softening or becoming tacky, this is an indication that it is proof against the action of the oil. A similar test can be quickly made on the baked treated samples of cloth by rubbing them with oily waste. Under these conditions, if the varnish is oil-proof, it will not soften and cannot be rubbed off the surface of the cloth. The acid, alkali and salt-water test is made on insulating varnishes used in treating coils, etc., to determine ability to withstand their action.

TESTS FOR OIL, ACID, ALKALI AND SALT WATER

To make the test a large rectangular glass jar is fitted with a wood rack and a number of metal test rods and a testing circuit with a light in series is arranged. Test specimens consist of $\frac{3}{8}$ -in. round steel rods 12 in. long, well rounded at the lower end, which are given a uniform coating of varnish $2\frac{1}{2}$ mils thick baked on the entire surface to within several inches of the top of the test rod. In preparing these test specimens the bare rods are first thoroughly cleaned and dipped in the sample of varnish and baked. This operation is repeated not less than three times, and

sometimes more, depending upon the fluidity of the varnish in order to get the desired $2\frac{1}{2}$ mils thickness of film which is specified for this test. The treated test rods are then placed in the rack which insulates individual rods and are suspended in the acid, alkali or salt-water solution contained in the glass jar. During



PAINTS AND VARNISHES ARE SUBJECTED TO ACTUAL WEATHERING TESTS

the first four hours of the test an alternating current from a 110-volt circuit with a light in series is applied every fifteen minutes through the terminals one of which is connected to the liquid solution and the other is applied to the individual test rods for a short interval of time to locate any breakdowns. After this set of short-time readings is taken similar tests are made each morning and evening until the insulation breaks down or the test has run its specified time limit. In connection with these tests either a saturated acid, alkaline or salt-water solution is used, depending upon the nature of the test. The final results are represented by the average on three test rods of each grade of varnish.

The amber insulator used in connection with the dipping and baking of railway motor armatures when tested under the above conditions shows an average of 880 hours in a saturated solution of salt water.

CEMENTING AND STICKING QUALITIES OF VARNISH

To determine the ability of a dipping varnish to cement the treated coil into a solid, tough, elastic mass, which will be strong mechanically as well as electrically, a sample coil is wound up, using about No. 20 B. & S. gage double-cotton-covered wire, is given two dips of the test varnish and is then baked for 300 hours at a temperature of 100 deg. C. The coil is then removed from the oven and inspected for its toughness and elasticity as compared with a similar coil that has not been treated.

In order to improve the distribution of the heat which is generated in the various parts of the winding of a motor it is essential to use a varnish with good heat conduction and radiation properties, to insure a more uniform temperature of the motor under service conditions.

To test for heat conduction and radiation two coils are wound up with the same size of wire and the same number of turns, identical in every respect. One of these is treated with the varnish and baked, while the other is left untreated. These coils are connected in series and the resistance at room temperature is

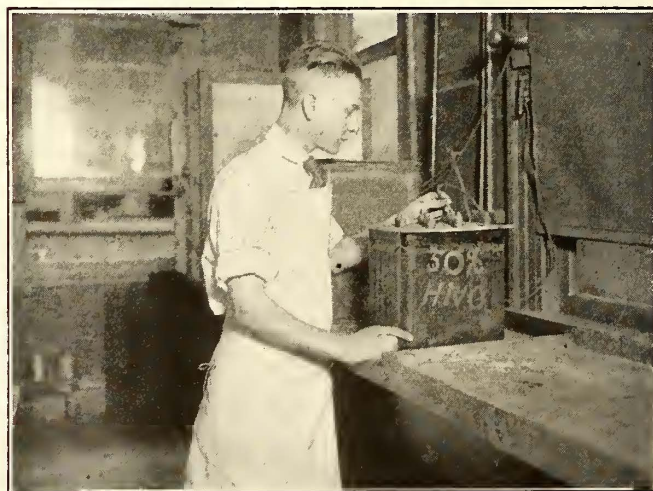
carefully measured by means of a Wheatstone bridge-testing set. A current is then passed through these two coils in series, resistance measurements are taken of each coil at stated intervals of time and temperatures are calculated from the increase in resistance. The difference in temperature of these two coils is an indication of the heat-conducting and radiating properties of the test varnish.

It is necessary to know something about the time and temperature required thoroughly to dry or bake out the insulating varnish. To get the best results with the least possible delay to production, samples of cloth or tin are dipped in the air-drying varnish and are hung up in the open. The time required to dry is noted and recorded. In testing the baking varnishes, the test samples after being dipped in the varnish are placed in the oven and baked at a constant temperature for a definite period until thoroughly dried. The temperature is then increased and the time noted. In this manner a number of tests are made with varying temperatures through a range of from 90 to 120 deg. C., noting the time required to bake thoroughly. The maximum temperature which will not damage the texture of paper or cloth to be treated is taken, as this temperature will expedite the production in the factory.

It is also very important to know just how certain paints and varnishes resist the action of weather under varying conditions, and to determine this a weather rack, such as shown, is constructed and placed on the roof of one of the shop buildings. On this rack the various treated samples are securely suspended and exposed to all weather conditions over a long period of time and are carefully inspected at stated intervals of time to determine their deterioration. These observations are recorded and comparisons made of the condition of the various samples of paints and varnishes under test.

ADHESION TEST FOR FRICTION TAPE

To determine the adhesion or sticking properties of friction tape and cloth, which is very important with this kind of material, an adhesion testing machine



IMPORTANT THAT INSULATING VARNISHES WITHSTAND ACTION OF ACIDS, ALKALI AND SALT WATER

especially designed for testing friction tape is used. It consists primarily of an upright support having a small swivel clamp which is connected to the pencil on a Thompson steam indicator through a system of levers. The lower clamp, which holds the test roll of tape, is connected to the cylinder on the Thompson indicator

and is driven in a vertical direction through a worm drive by a small electric motor.

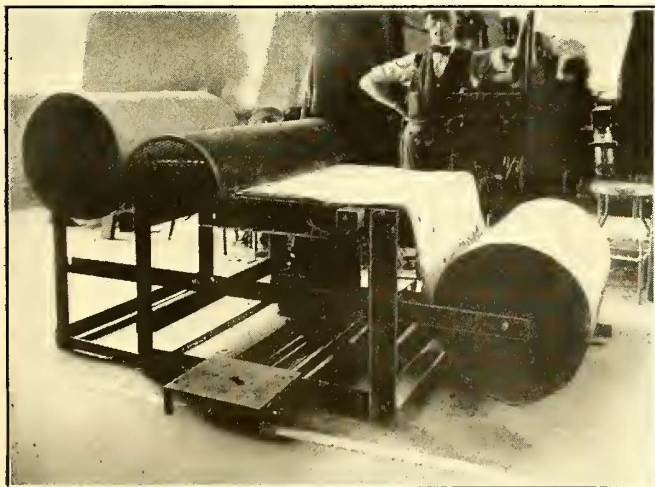
The test specimens are cut 22 in. long from standard rolls of friction tape. In the testing of friction cloth the strips are made 1 in. wide, cut from the rolls of cloth.

The 22-in. specimen of test tape is rolled up on a test spool under a uniform tension of 5 lb. The test spool is then placed in the lower clamp of the machine, free to turn, while the free end of the tape is attached to the upper clamp. With a chart in place on the cylinder of the Thompson indicator and the pencil adjusted, the driving motor is started. This unwinds the tape at a uniform rate of speed, registering the pull due to the adhesion of the tape on the rotating chart. The readings in pounds are taken from ten uniformly spaced points on the chart and averaged. This test is repeated on a similar sample after the tape has been baked for sixteen hours at a temperature of 100 deg. C. The loss in adhesion, due to aging by heat, changes with different grades of tape. In general, it will vary from 35 to 50 per cent, depending upon the quality.

Paper treated on one side with shellac or bakelite varnish and used in the manufacture of micarta tubes, sheets, etc., should stick together thoroughly when subjected to heat and pressure during the process of manufacture.

Special detail apparatus, consisting of two electrically heated irons with controlling rheostat to regulate the heat and a 300-deg. C. thermometer for measuring the temperature of the heated irons is used for the test.

The test specimens are cut 2½ in. wide and 12 in. long and are taken from the rolls of paper during the process of treatment. The test strip of paper is folded lengthwise, with the treated sides together, and pressed between the two electrically heated irons, which are held at a temperature of 105 deg. C. The crease is placed between the two irons with the two free ends extending out from underneath the irons. To the lower free end is attached a 30-gram weight, while the upper



BUILT-UP MICA AND PAPER SUBJECTED TO A DIELECTRIC TEST BEFORE GIVEN FINAL GAGING TEST

one is held to the side of the iron. After thirty seconds' application, or pressing, the top iron with the free end of the test specimen is lifted, allowing the treated surface of the test strip to be pulled apart due to the action of the 30-gram weight suspended from the lower free end. The adhesive property of the test specimen

is gaged by the amount of separation at the treated surfaces as measured on one side of the folded test specimen.

This method of testing gives comparative results only and is a check on the uniformity of the treated material. Under these conditions a piece of treated



MICA FOR RAILWAY MOTOR COMMUTATORS IS TESTED FOR UNIFORM THICKNESS

paper used to make micarta tubes, etc., as used for insulation on railway motor parts, will show a separation of from ¼ to 1¼ in.

TREATING TEST SPECIMENS

In connection with the preparation of samples of treated cloth and paper for the dielectric test it is very important that the untreated materials be given a uniform and even coating of the varnish. This makes it necessary to draw the samples through the varnish at a slow uniform speed so as to eliminate any variation of the coating on the surface of the treated samples which are being prepared for test purposes. The apparatus used consists of a motor-driven hoist, to which the sample test sheets are attached and pulled through the test sample of varnish.

The sample varnish, which is poured into the glass jar, is diluted to have the same specific gravity as is used in the factory and is kept at room temperature. The test sheets of untreated material, which are cut 6 in. square, after being thoroughly dried out, are attached to the hoisting mechanism and drawn through the varnish at a uniform rate of about 14 in. per minute, after which the samples are baked in an oven for a certain number of hours at a definite fixed temperature, which depends upon the grade and quality of varnish being tested. Amber insulator samples require baking at from six to eight hours at 110 deg. C. From two to four dips are given all samples and in making successive dips the direction of drawing the sample through the varnish is reversed to insure uniformity. All test samples are gaged with a micrometer before treatment and after final treatment in order accurately to determine the thickness of the coating of the varnish on the test specimens, which should be approximately 3½ mils total for both surfaces.

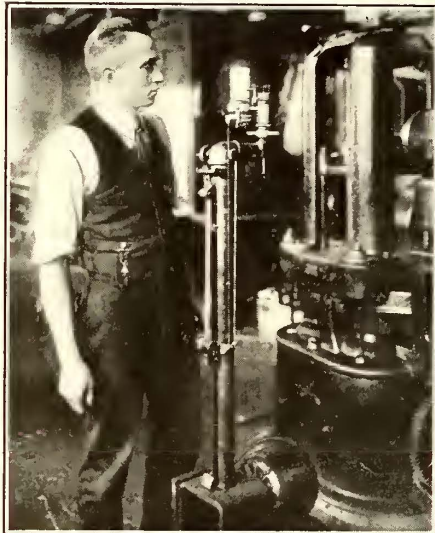
To determine the dielectric value of sheet insulating materials in their original plain unincreased form a high voltage (at least of 1 kw. capacity) transformer is used. This is provided with a number of taps and is arranged for voltage control using a regulator so designed that the circuit is not broken between

steps. Two circuit breakers, one on each side of the low-voltage line, and a voltmeter are required. A testing board is fitted with two short brass terminal rods 2 in. in diameter, having the edges on one face well rounded. One of these terminals is permanently mounted upon the baseboard and the other is hinged to the board and so located as to rest on top of the fixed terminal when swung in position on the test sheet.

Test specimens cut 8 in. wide and 2 ft. long are taken from the treated rolls and should be selected free from defects such as creases or rough lumpy surfaces. The test sheet is placed between the two brass test terminals so adjusted that each terminal makes a good face contact with the material. The test voltage is raised rapidly and steadily and the reading of the meter is noted when breakdown occurs. While making this test care must be taken that a puncture and not a flash over the surface is obtained. The average of five or ten breakdowns is taken as the final dielectric test of the sample.

To determine the amount of moisture that a treated sample of cloth or paper will absorb under conditions

of exposure to water, the sample, which consists of a section of the treated material 6 in. square, is carefully weighed and then immersed in a jar of water and kept at room temperature for twenty-four hours, after which it is removed and all surface water wiped off with a dry cloth. The sample is again weighed. The percentage of



EVEN THE ADHESIVE PROPERTIES OF FRICTION TAPE ARE DETERMINED

moisture absorbed is then figured by dividing the difference between the weight of the sample before immersion. Immediately after the moisture test has been made the test sample is given a dielectric test to determine its relative dielectric strength before and after immersion.

It has been found that a good grade of treated cambric such as used for railway motor insulation will absorb from 3 to 4 per cent of moisture under these conditions. This same sample of treated cambric will show a dielectric test before immersion of 9,440 volts and after immersion of 1,780 volts.

In making the above dielectric tests two samples are used, one for the "before immersion tests," the other for the "after immersion tests." These values represent an average of five breakdown tests, which are made at different points on the surface of each test specimen.

To insure a uniform thickness of the built-up mica used principally in the manufacture of railway motor commutators a metal surface plate on which is mounted an indicating micrometer is used. The jaws of this plate are actuated by means of a quick-acting lever.

The readings are indicated by a needle on a uniformly divided scale on a large upright mounted dial conveniently located so that it can be read easily by the operator.

The test specimens are commutator mica segments and sheets used to make commutator V-rings and bushings. The material to be tested is placed on the surface plate and is drawn by the operator between the open jaws of the micrometer, while at the same time the controlling lever is pressed down with a uniform pressure, bringing the face of the jaws on the mica board and registering the thickness in thousandths of an inch on the dial. The operation is repeated a number of times over the surface of the sheet, and in general if material varies more than one-thousandth of an inch above or below standard gage it is rejected. Commutator segments that are 0.0005 in. over or under size are rejected.

All built-up mica sheets used in connection with the above work and before they are given this final gaging test are subjected to a light test by placing the sheets on a large pane of glass backed up by brilliant illumination, where they are carefully inspected for foreign particles and light spots. In this manner all impurities are removed from the sheets and the light spots are reinforced and built up, thus securing a clean, uniform product.

Mica cells for insulating railway motor field and armature coils are tested in order to weed out the defective sections due to poor workmanship and material. The apparatus used is a special testing machine built by the Westinghouse Electric & Manufacturing Company. The roll of composite material is mounted at one end of the machine as shown and as it unrolls the sheet passes over a plate and under two rows of spring-supported contact fingers about $\frac{1}{4}$ in. apart which are staggered, so that they cover the entire width of the sheet as it is fed through the machine. The material is subjected to a voltage test ranging from 1,000 to 10,000 volts, depending upon the grade of the material being tested, by connecting one side of the test circuit to the plate of the machine and the other to the sliding contact fingers. When a defect in the sheet is located by the material being punctured by the high-voltage test the machine automatically stops. The defect is plainly stenciled and the machine is again put in operation. This test insures the selection of a good grade of material for winding coils free from electrical defects and able to stand the final high-voltage test given the completed motor before shipment.

To eliminate the defects in connection with the commercial production of treated materials an experimental treating tower is used to treat materials on a larger scale than is possible by using strictly laboratory methods. This tower, which is under the direct supervision of the research laboratory experts, consists of a motor-driven series of rolls over which the material is drawn at from 10 to 40 in. per minute and is fitted with a combination of treating vats so arranged as to coat the material on either one or both sides, depending upon the requirements to be met in the factory. The tower is provided with a steam-heated chamber, the temperature of which can readily be adjusted and controlled to secure the range of baking temperatures, which will vary with the different grades of baking varnishes used in the treatment of the cloths and paper. This tower has greatly facilitated the commercial productions of the various grades of treated paper or cloth.

Preparing for Pageant of Progress

Extensive Terminal Facilities Have Been Built at the Municipal Pier in Chicago by the Chicago Surface Lines to Handle the Large Crowds Which Are Expected July 30 to Aug. 14

CHICAGO is to have a Pageant of Progress on July 30 to Aug. 14 which is expected to approach a World's Fair for exhibits and interest. It is to be held on the mile-long Municipal Pier, used primarily for shipping purposes but including at its outer end a large recreational center. The entire upper level and outer end of the pier are to be used in the pageant.

The Chicago Surface Lines built an extension to its Grand Avenue line at the time the pier was erected, extending the tracks out to the far end of the pier to serve directly the people using the recreation center. These tracks were built on the upper level of the pier, one track on either side with a loop at the outer end, and another loop at the land end of the pier for short-routing in winter. In making arrangements for the pageant, the city authorities desired to have the complete use of the upper level of the pier and therefore required the Surface Lines to remove its tracks from the upper level and re-lay them through the center of the lower level or main driveway. The entire work of tearing up the track and rebuilding it, largely from the same materials, on the lower level was completed in twenty-eight days, including the construction of extensive additional terminal facilities at the approach to the pier. Altogether 2 $\frac{3}{4}$ miles of track were laid, most of which was of the open-type construction.

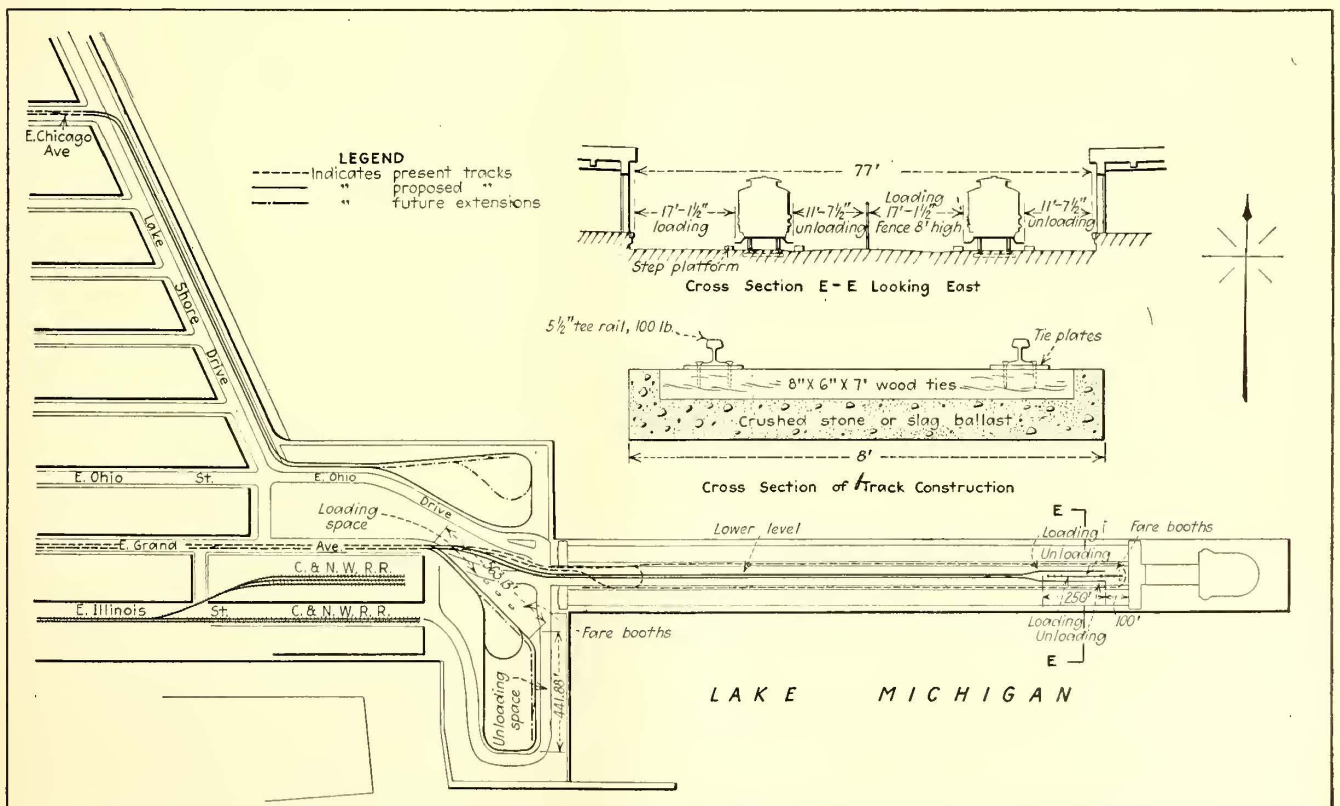
In the construction of the tracks extensive use was made of machines to save labor and speed up the work. Three electric shovels were simultaneously employed. The first took up the asphalt which was hauled away.

The second excavated the crushed stone used underneath the paving and placed it along one side of the trench for reuse. The third shovel then dug out the trench to the subgrade. Steam rollers were used to roll the subgrade and the 8 in. of crushed stone placed underneath the ties.

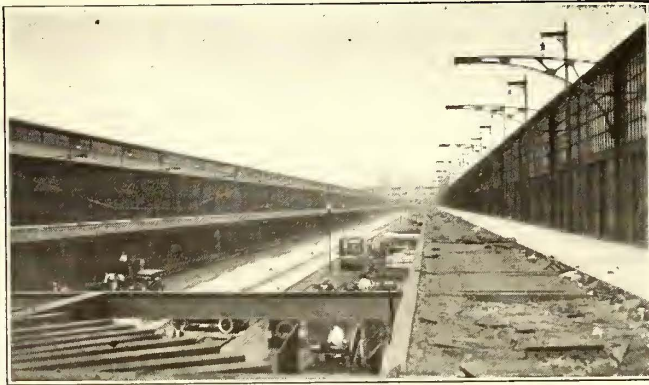
The 100-lb. T-rail and the wood ties were expeditiously transferred from the old to the new location by simply sliding them down ramps. The gravel ballast which had been used under the ties on the upper level was transferred to the lower level by shoveling into rough troughs which carried it to the edge of the lower track trench. Except for the fact that this transfer of gravel ballast took place on a rainy day, which changed the angle of repose of the material, it would have been possible to discharge the ballast directly into the lower trench. As it was, however, the pitch of the trough had to be steepened and the ballast discharged along the side of the trench, whence it was distributed. An Ingersoll four-tool air tamper, a Buda two-tool direct-current electrical tamper and a Jackson two-tool alternating-current electrical tamper were used in tamping the tracks.

The type of track construction used on the pier is largely shown in the cross-section in the accompanying drawing. The six-bolt Weber joints used on the upper level were reused below. Pin-type bonds were used and were placed under the fish plates in the open tracks and outside the fish plates where the track was to be paved.

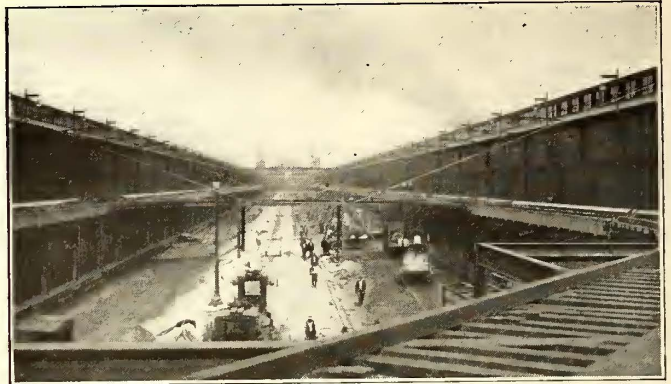
Terminal facilities for this track extending out on



LAYOUT OF NEW TRACK AT CHICAGO'S MUNICIPAL PIER, WHICH PROVIDES THREE TERMINALS FOR HANDLING CROWDS



THE STREET CAR TRACKS WERE REMOVED FROM THE UPPER LEVEL TO THE CENTER OF THE LOWER LEVEL OF THE PIER



LOOKING DOWN THE CENTER OF THE PIER. THE VIEW SHOWS NEW TRACK UNDER CONSTRUCTION AND METHOD OF SUSPENDING OVERHEAD

the Municipal Pier were provided by widening out the devil strip, stub-ending both tracks and providing a double crossover at the approach to the terminal. Each of these track ends has a capacity for five cars and the double crossover will make it possible to route the cars into either stub. Unloading will take place on one side of either track while the loading takes place on the opposite side.

On the upper level tracks the trolley was supported directly on steel brackets attached to the building and extending out over the tracks. When the overhead for the new track on the lower level was erected the old trolley wire was taken down, and these same brackets were used to support long span wires extending across the center driveway to the bracket opposite on the other building. The double trolley was suspended from these cross spans, over the lower level tracks. These span wires are about 100 ft. long but are under very little strain, as there is so much sag. Standard $\frac{3}{8}$ -in. stranded steel span wire was used. A wood strain insulator at the bracket, another adjacent to the trolley, and the trolley ear, provide triple insulation. This overhead construction is shown in accompanying views.

In addition to the stub-end terminal facilities at the outer end of the pier, the terminal capacity of the Grand Avenue line, which has served the pier alone heretofore, was greatly increased by the building of a long and short loop in front of the pier. This will be used particularly during the pageant, as the crowd, in order to see the exhibits, will leave the cars at the shore end of the pier and walk down one side to the far end

and back on the other side. This will bring the principal loading and unloading requirements at the shore end of the pier. The short loop in the new terminal will be used when there is light traffic and the long loop only when traffic is heavy. Under heavy traffic conditions the cars will stop for unloading at the space indicated for that purpose on the accompanying drawing and then pull up to a new stop for loading.

The capacity of the surface lines to handle the expected crowds was also materially increased by extending the Chicago Avenue line down the lake shore and terminating it in a large loop in front of the pier. This track extends in the parkway adjacent to Lake Shore Drive for a distance of five blocks along the lake shore and is the only piece of track the Surface Lines has immediately adjacent to Lake Michigan. This track is almost entirely of open-type construction, employing center poles for the overhead along the parkway. It is planned to install cashiers' booths with fare registers or turnstiles and establish a prepayment area or sell tickets to speed up the loading.

They Crowd Them in Italy

MARQUIS FERDINAND CUSANI, a member of the visiting Italian delegation of engineers, provided the illustrations from which the two accompanying half-tones were made. In presenting these for publication for American readers, Marquis Cusani remarked that this would give proof that the United States was not the only place where it has become necessary to load street cars to their ultimate limit.



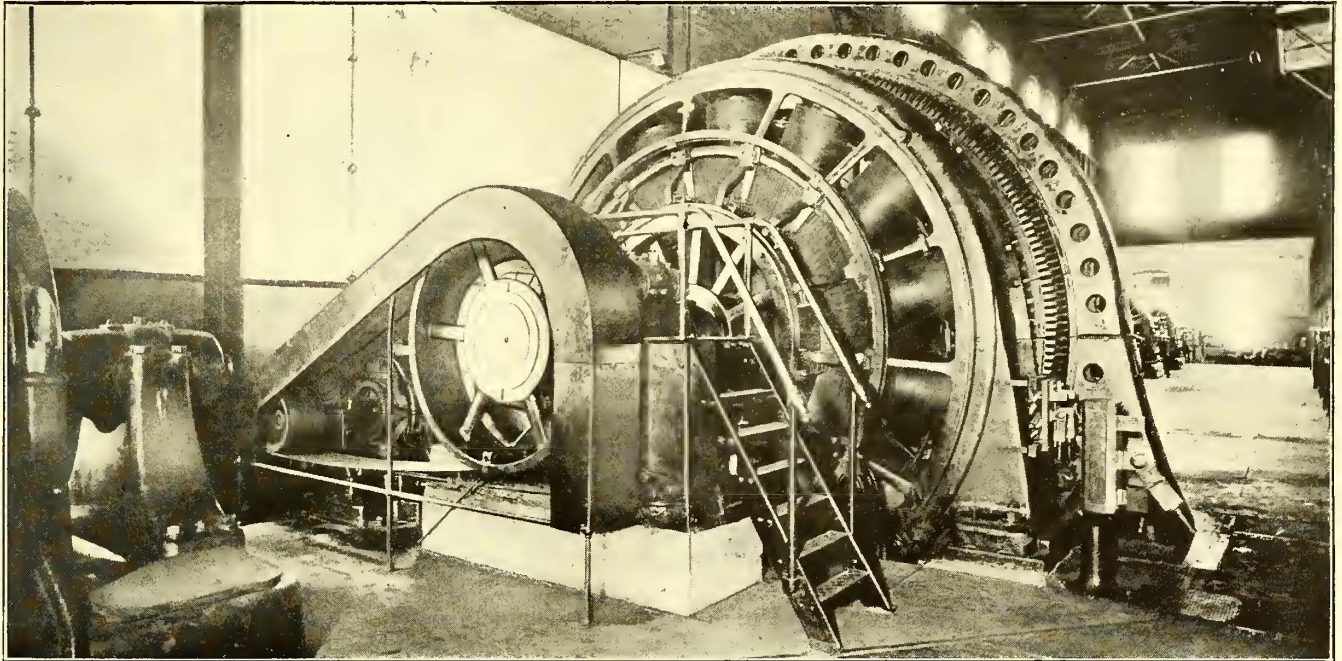
"COMPRESSION DES VOYAGEURS," AS THE FRENCH EXPRESS THIS ITALIAN SCENE

Railway Motor-Generators in Winnipeg Rebuilt

Three Old Direct-Current Generators and Two Alternators Direct Connected to Corliss Engines, Already in the Shadow of the Scrap Heap, Reassembled Into Two Motor-Generator Sets—Additional Capacity Has Been Obtained

BY W. NELSON SMITH

Consulting Engineer Winnipeg Electric Railway



MOTOR-GENERATOR SET REBUILT FROM OLD GENERATORS

One 800-kw. alternator in the center operating as a synchronous motor driving two 400-kw. direct-current generators for three-wire service.

IN AN article published in the *ELECTRIC RAILWAY JOURNAL* for March 26, 1921, the writer describes the rearrangement of the substation equipment and the trolley distribution system of the Winnipeg Electric Railway. In the course of changing from two-wire to three-wire operation, for the purpose of electrolysis mitigation, additional motor-generator equipment became necessary. The prices asked and the time required for delivery by manufacturers during 1918 and 1919 were so unsatisfactory, however, that we made a study of the possibilities of converting some old station equipment to this new use and succeeded in accomplishing the desired results within the required time and with a small expenditure of additional capital.

The steam plant that had constituted the original source of the company power supply, located on Assiniboine Avenue, was permanently closed down in the spring of 1918. It dated back to 1898 or earlier and was fitted entirely with engine-type generating units, both alternating and direct current. The alternating-current units had been superseded since 1911 by a modern turbine power station which relays the hydroelectric system that has supplied nearly all the company's power since 1906. The old direct-current steam units had since been used only on rare occasions, such as heavy blizzards.

The engine-type direct-current generators comprised one 850- and two 400-kw. machines, the latter shown in an accompanying illustration in their original condition in the old generating station. The former ran at 85 r.p.m. and the two smaller machines at 100 r.p.m.

Among the engine-type alternators there were two 800-kw. machines operating at 90 r.p.m. The fact that the speeds of the direct-current units were so near those of the alternating-current units immediately suggested the possibility of yoking them up together, with one 800-kw. alternator driving the 850-kw. railway generator, and the other 800-kw. alternator driving the two 400-kw. generators as a three-unit machine. There was no doubt that an 85-r.p.m. railway machine would generate 575 to 600 volts when run at 90 r.p.m., and a test performed for the purpose showed that each of the 400-kw. railway machines could generate 575 volts at 90 r.p.m. With these facts established, it appeared feasible to create an addition to the motor-generator equipment of the company to the extent of at least 1,600 nominal kilowatts out of equipment on hand. The engineering problem was thus reduced to the mechanical design and assembly of these machines as motor-generators, on suitable shafts and bearings. The new substation at St. Boniface was then being constructed, and provision was being made for space for a railway motor-generator to take care of the trolley lines east of the Red River. It was thought worth while to reconstruct a three-unit machine for the substation out of the two 400-kw. generators and one 800-kw. alternator.

The old engines on which the two 400-kw. machines were mounted were of the cross-compound Corliss type. One of them was of so old a pattern that the engine frames and the pillow blocks were in separate pieces bolted together, and this suggested utilizing the two engine pillow blocks as the center bearings of the three-

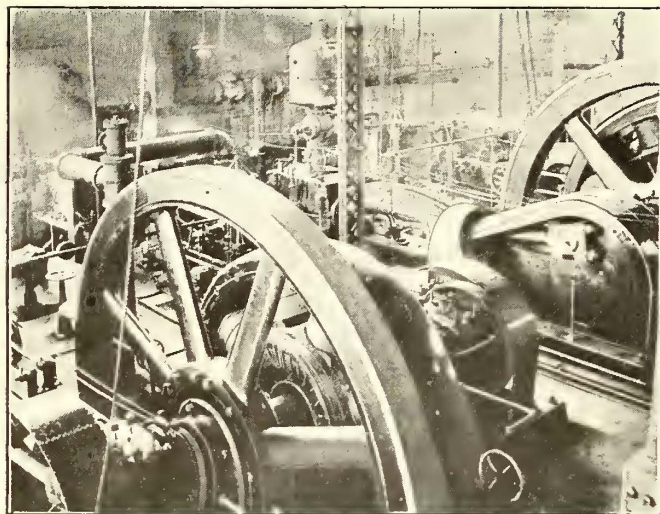
unit machine, between which the alternator would be mounted as a motor. A pattern of a ring-oiling bearing was found in a local foundry which proved to be easily adaptable for the two outboard bearings required. The shaft from the oldest Corliss engine was found to

When the two new armature shafts were ready they were brought back to the power plant, each with its half-coupling and the necessary keys, and the two direct-current armatures were then pressed on. Meantime the central piece of shafting was also fitted with the heavy bushing of 22 in. external diameter for the hub of the rotor of one of the 800-kw. alternators, the cast steel bushings for forming new journal bearings upon it, and the other halves of the couplings. The new outboard bearings were then completed and all the parts, bearings, shafts, armatures and fields taken to the substation and assembled. All the machine-shop operations consumed about two and one half months and the field work of mechanical and electrical assembly at the substation took about two months. The mounting of the alternator rotor upon the motor shaft was quite simple, because the rotor is built in halves bolted together and therefore did not require a press fit.

No bedplate was thought necessary for holding this machine in alignment. The stationary parts are very heavy and are bolted down to separate foundation piers which are joined together at the bottom by masses of concrete and at the top by the reinforced-concrete floor. The machine foundation piers all rest on a single concrete slab about 32 ft. long, 22 ft. wide and 1 ft. thick, reinforced with old 60-lb. rails.

The exciter for the field of the alternator is a 30-kw. slow-speed machine, which had formerly been belted through a pulley on the engine shaft. In the new substation this exciter is driven through an inclosed silent chain by a 40-hp. induction motor.

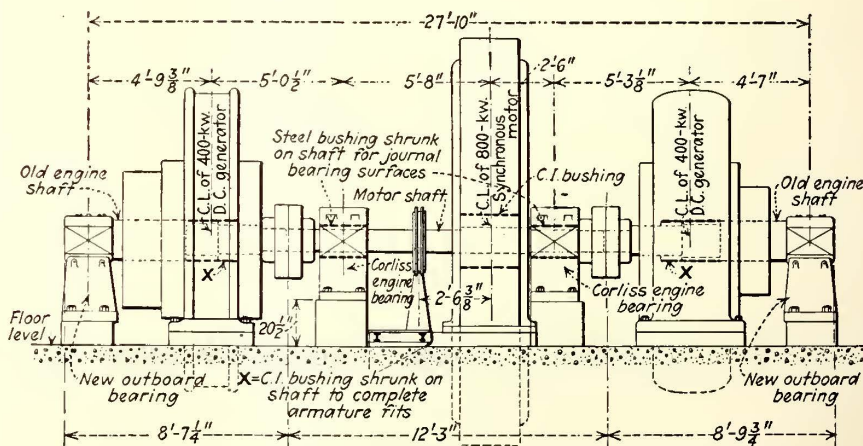
The old pillow blocks are fitted with the four-part babbitted bearings and adjusting wedges with which they were originally provided, so that close adjustment is possible. The two new outboard ring-oiling bearings are adjustable vertically by means of shims and horizontally by means of adjusting bolts.



RAW MATERIAL FOR REBUILT MOTOR-GENERATOR SETS
Corliss engine-driven units in the old generating station, one of two 400-kw. direct-current units in the foreground, and one 850-kw. direct-current unit in the background.

be just long enough to provide shafts for mounting the direct-current generator armatures, after being cut in half. It remained to find a suitable central shaft on which to mount the rotor of the alternator which was now to be turned into a motor. An old engine shaft was discovered at another machine shop, which was just large enough so far as its strength was concerned, though not sufficiently large in diameter to fit the hub of the alternator rotor which had been fitted to a 22-in. engine shaft. This fit was accomplished by providing a heavy cast-iron bushing, and the remaining necessary elements were two cast-steel face couplings and the necessary keys, with some smaller cast-steel bushings for filling out certain places on the generator shafts that were too small for the direct-current armature fits. How these elements were all assembled to create the newly reconstructed three-unit machine is shown in an accompanying illustration, and another view shows the finished machine operating in the substations.

The order of operation was as follows: The flywheel of the oldest Corliss engine connected to a 400-kw. direct-current generator was taken off the shaft, the crank disks pulled off and the old engine frames separated from the pillow blocks. The armature of the generator was then pressed off the shaft, and the latter was sent to the machine shop to be cut in two, turned up for coupling seats and journals and fitted with the necessary bushings and keys for completing the altered armature fits. The other Corliss engine was of more modern design, and it was thought best to save it for possible sale, so that the shaft was dismantled, one crank disk was pulled off and the armature was removed.



ASSEMBLY OF THREE-UNIT MOTOR-GENERATOR SET SHOWN IN ANOTHER ILLUSTRATION

The bearings of the old Corliss engine were used for center bearings, and two new bearings ordered for outboard bearings. The old Corliss engine shaft cut in two served for the two direct-current machines. A second-hand shaft was found for the alternator. Cast-iron bushings of suitable diameter were shrunk on these shafts to fit the bore of the three machines, and steel bushings were used to enlarge the shaft and provide new journal surfaces in the center bearings. Note the concrete pedestals or pads necessary to bring the bearings and machines in correct alignment.

The machine went into permanent operation about Sept. 1, 1919, and has since given very satisfactory service excepting for a period of several weeks during the summer of 1920, when one of the main pillow-block bearings burned out, owing to a failure of the lubrication.

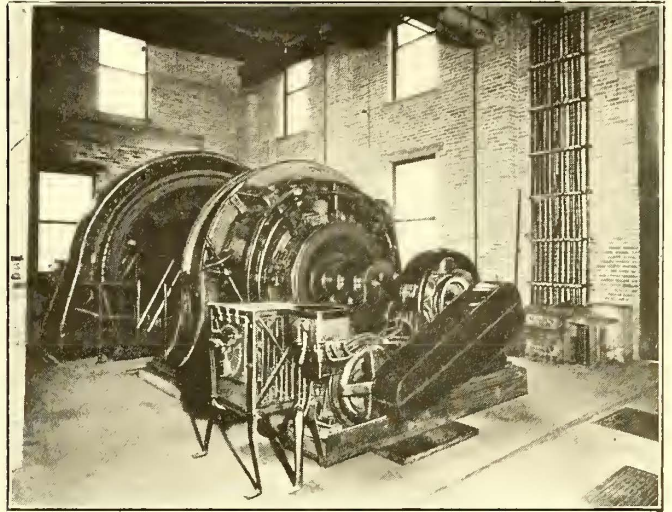
The two generators when running in parallel operate

together much better now than they ever did when they were mounted on separate steam engines in the old steam plant. Occasionally they run two-wire, but the usual operation is three-wire with the generators in series.

The success of this reconstructed motor-generator set was sufficiently marked to justify the conversion of the two remaining engine-type machines into a two-unit motor-generator. It was therefore decided to scrap the 1,200-hp. Corliss engine which had been driving the 850-kw. direct-current generator, excepting its armature shaft and main bearings. Careful measurement had indicated that if the flywheel, eccentrics and crank disks were removed from the engine shaft there would be just room enough in the space formerly occupied by the flywheel to mount the rotor of the second 800-kw. alternator and at the same time provide sufficient space in the pit for shifting the alternator stator to uncover either field or armature for inspection or repairs. Fortunately, this could be done without moving the heavy direct-current armature from its position on the shaft, for it is about 10 ft. in diameter, weighs something like 36 tons and had required a force estimated at 400 tons to press it on the shaft. The shaft and bearings being therefore on hand and all made to size, the mechanical operations were simple and consisted in cutting away all unnecessary metal from the heavy cast-iron engine-frame housings in which the main pillow-block bearings were set; taking off the 50-ton flywheel with the eccentrics and crank disks; cutting a new keyway for the hub of the alternator rotor; pro-

60-in. pulley for the belt drive to the exciter. The remainder of the engine was sold for junk.

The layout of this assembly, excepting the exciter drive, is shown in one of the illustrations herewith, and another shows the complete unit including the exciter.



REBUILT TWO-UNIT 800-KW. MOTOR-GENERATOR SET

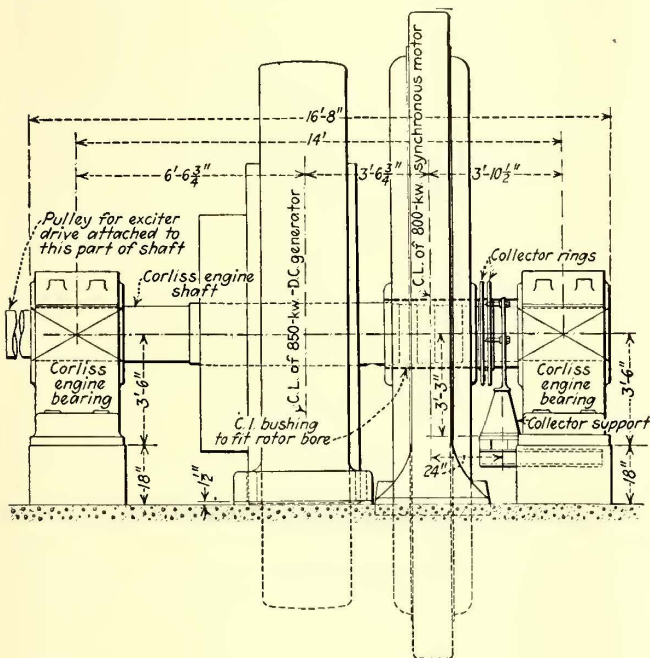
Built up from the 850-kw. direct-current generator visible in background of another illustration herewith, and from one 800-kw. engine-type alternator serving as a synchronous motor.

No electrical changes were made on the generator. This machine, as well as the three-unit set, is started from the direct-current end. Work on it was started Feb. 1, 1920, and the rebuilt machine was ready to turn over early in July. It went into regular operation in October, 1920.

As in the case of the first reconstructed machine, the only trouble that developed was in the bearings, one of which had a crack in the babbitt of the lower portion, inherited from its steam-driven service, and after several ineffectual attempts to remedy this, the bearing was rebabbitted. There was some further trouble from oil throwing as the shaft was of sufficiently large diameter to make its peripheral velocity greater than in the case of the first machine, where this trouble had not developed. This was finally overcome by the addition of disks inclosed in sheet-metal guards.

Electrically, both these reconstructed motor-generator sets operate perfectly. Mechanically, there are only two or three elements that would be changed if the work had to be done over again. In the case of the three-unit machine it would have been better to have provided cast-iron sole plates about 15 in. deep underneath the two center bearings so designed that they could be readily withdrawn from underneath the pillow blocks, in order to permit the lowering of the pillow blocks when any repairs were required on the center bearings, as this would save the trouble of uncoupling the motor shaft and lifting it out of the center bearings at such a time. It would also have been better to have designed a modern lubricating system for the old engine bearings on both machines, prior to the construction, including the oil-throwing disks required for the 22-in. shaft.

The original cost of the five old generators purchased between 1898 and 1905 was about \$93,000. An engineering appraisal of the property made in 1915 had set the present value of these machines at about \$41,000, but at the time the steam plant was ordered discontinued these generators were regarded as obs-



ASSEMBLY OF TWO-UNIT 800-KW. MOTOR-GENERATOR SET SHOWN IN ANOTHER ILLUSTRATION HEREWITH

The 850-kw. direct-current generator, its shaft and bearings were left untouched. The flywheel and other parts of the Corliss engine were removed from the shaft and replaced by the rotor of one of the 800-kw. alternators, with a suitable cast-iron bushing to fit the rotor bore. Note the concrete pedestals or pads necessary to bring the direct-current machine and the bearings in the correct alignment, while the alternator feet were dropped slightly below the floor level for this purpose.

viding a cast-iron bushing of about 22 in. inside and 24 in. outside diameter and long enough to carry the rotor hub and the collector rings, and a suitable bushing to fit on the external shoulder formerly occupied by one of the crank disks, where it was decided to mount the

lete. The cost of reconstructing them and setting them in operation, as described, exclusive of foundations, was about \$31,000 for labor and material on a war-time basis. In pre-war days the same work would probably not have cost more than \$18,000.

Quotations on new motor-generator equipments in 1918 were on the basis of more than \$40 per kilowatt at the factory, or say \$45 per kilowatt erected in Winnipeg, which would have amounted to about \$72,000 of new capital for 1,600 nominal kilowatts. The construction herein described is therefore believed to have saved the railway company more than \$40,000 and prevented what would otherwise have been a deliberate waste of valuable equipment, for these machines have proved their title to a new lease of life and are able to render the same service they did twenty years ago.

Impairing and Repairing Street Railway Rates

Owing to the Increase in Commodity Prices the Nickel Fare in 1914 Had Already Become Too Small—Decreases Not Now Possible Until Balance Is Reattained

WALTER H. BURKE has contributed an interesting article on street railway rates to the June number of *Stone & Webster Journal*. At the beginning of this article he points out that even before the war a great many city railway companies could no longer make both ends meet on the universal 5-cent fare. This was the cause of the gradual but steady increase in commodity prices and wages which began in 1896. Statistics of the United States Bureau of Labor show that wholesale commodity prices, rated at 66 in 1896, had advanced to 100 in 1913. Average hourly wages also had increased during the same period from 69 to 100. On the other hand, street railway fares on the whole had decreased during the period, due to various factors, including the extension of the use of free transfers, the sale of tickets at reduced rates, etc. Thus, the beginning of the war found the industry as a whole like a man, already in poor health, who suddenly contracts an acute illness.

The condition since 1914 is shown by the chart. The index numbers for commodity prices and of wages in this chart are from publications of the United States Bureau of Labor Statistics. The fares are an average for all cities in the United States of more than 50,000 population except New York City and are weighted according to population. The data on fares were prepared by Prof. A. S. Richey. The latter portion of Mr. Burke's article, considerably abstracted, follows:

The point to be particularly noted from the chart is the lag between railway fares and other prices, no appreciable increase having been shown in the former until the middle of 1918, i.e., a few months before the close of the war, whereas commodity prices had practically doubled in the meantime, and the hourly wage rate had advanced some 65 per cent. This in a nutshell was the trouble with the street railway situation.

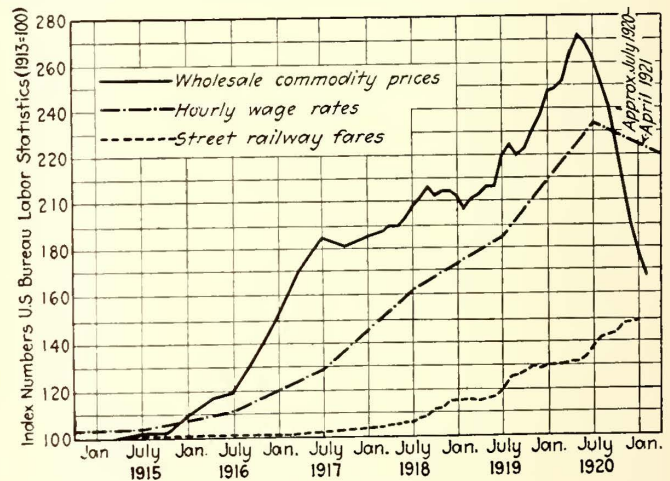
The future trend of prices is uncertain, but economists quite generally agree that for a number of years at least the average will be from 50 to 60 per cent above pre-war figures.

Assuming a 50 per cent higher price level for the future, it is evident from the chart that street railway fares, even with the increases of the past few years, still are short of what they should be to meet the permanently changed conditions. This, however, takes no account of the tremendous discrepancies of the past five years between the prices of street railway transportation and those of other commodities and of labor. This is a disparity which must be compensated for in the long run if the companies are to go along on a comparable basis with other industries. The fact must not be lost sight of that while the increases in fares of the

past few years or so have helped conditions, they have by no means repaired the damage which resulted from failure to allow this relief more promptly. This can be accomplished only by continuing the increases in force for such period in the future as may be necessary.

The under-development of the properties during recent years, in the face of the rapid and continued growth of the communities served, means that, in addition to refunding their short-term obligations, a tremendous amount of new money will be required to bring them back to pre-war standards of development and enable them to keep pace with future city growth. What rate of interest the street railways must pay to get this money can only be guessed at. If, as generally agreed, from 7 to 8 per cent was the minimum fair return for the public utilities before the war, and if we are now to find ourselves on a 50 per cent higher price level than at that time, then, to use a rough yardstick, the fair rate of return becomes at least 10½ to 12 per cent.

The above situation is emphasized because recently there has been some scattered sentiment in favor of reducing existing fares on the general theory that "the price of everything else is coming down and the street railways should take their medicine along with the rest of us." It is only necessary to refer again to the accompanying chart to show that for several years past the street railways have been "taking their medicine" in double doses at a time when other business has been getting the largest profits in its history. It is just now approaching what might be termed the convalescent stage of its illness. It would have been to the best interests of all concerned if, beginning in 1916, street railway fares had more nearly kept pace with the increases in other commodity prices and wages. Unfortunately, this policy was not followed, and the penalty is the



RELATIVE INCREASES IN WHOLESALE COMMODITY PRICES, HOURLY WAGES AND STREET RAILWAY FARES

continuance of higher prices for a longer period than would otherwise have been necessary, assuming that the street railways are to function and meet the needs of the public for adequate and dependable transportation service.

Nevertheless, there are a great many encouraging factors in the present outlook. The fundamental soundness of the business has been proved without doubt. There are few if any other industries which could have withstood such a test as the street railways have had to face during the past five or six years. The companies have no large inventories, carried on their books at inflated war prices, which must be liquidated. Again, while the street railways have been forced to suspend practically all new development work for five years past, their new construction work of the future will require a substantially smaller capital expenditure than would have been the case under war conditions. The war has naturally stimulated previous efforts to effect economies in operation, like the Birney car. Finally, the general public is coming to appreciate that the street railway fills a vital need because it furnishes a service which the cities cannot do without. As a result of the companies' efforts a great many of their patrons now own securities in the properties, and this is one of the most effective means of securing and holding the public interest. The regulatory authorities also are devoting their efforts to a correct solution of the problem; the same is generally true of the press. It is this co-operation which will accomplish more than anything else toward working out the street railway situation on a permanently sound and satisfactory basis, fair alike to the public and to the companies.

Public Service Railway Offers Valuation Argument

Extensive Brief Which Is Presented to the New Jersey Board of Public Utility Commissioners Gives All Details on Which a Value of \$200,898,906 Is Claimed and 10-Cent Fare Petitioned

IN ONE of the most complete valuation briefs which have so far made their appearance, the Public Service Railway of New Jersey presents its argument to the New Jersey Board of Public Utility Commissioners to support its own figure of valuation and its petition for a 10-cent fare. The brief contains a complete review of the total valuation history of the Public Service Railway, giving all details of previous valuation, and it is replete with arguments, some of them novel but convincing, to support contentions for various elements of value.

Commencing with a description of the Public Service Railway property, the brief then takes up the argument that the property is private property and on this has to say:

The reason for here stating them (these arguments) is simply to plant upon them the further proposition that the value for rate purposes of a street railway property—the same being private property—must be determined in accordance with established legal principles, and is the value of the property and not merely a sum of money, on which, in the discretionary opinion of the commission, the owner of the property should be permitted a return.

The various elements of value which the brief considers are:

1. Structural value.
2. Value of the land.
3. Going value, which includes:
 - a. Development costs including:
 - a1. Money expended in attaching the business.
 - a2. Money expended in tuning up the property.
 - a3. Carrying charges until the property becomes self-supporting, including deficit of earnings.
 - b. Consolidation of a number of small properties into one property under one management.
 - c. Superseded property due to advance in the art, obsolescence, inadequacy, etc.
 - d. The value imparted to the property by reason of its favorable location, referred to by the court as its adventitious value.
4. Value of the power contract (discussed under a separate heading).

Considerable attention is paid to the item "Going value," for which an allowance of 30 per cent of the physical value is claimed. In connection with the element of going value due to consolidation of the smaller properties, the brief has to say:

The properties necessarily purchased or leased to effect this consolidation were not so purchased or leased at the cost of their physical parts. Their "going value" was recognized and it entered into the price which this company paid for them. This cost of consolidation was a cost necessary to the creation of the existing railway, and it added largely to the value of the property which is to be determined in this proceeding.

Superseded property and attaching business to the lines of the company are also supported by argument. The cost of training a staff to make it familiar with the needs of the communities served and conversant with the routes and rules of the company, the rules of the commission, the traffic rules and ordinances of the communities and the various intimate details of operation that come only from experience and practice and in the perfection of the company's personnel in the knowledge of its duties is portrayed. The report says "an example of the nature of this cost is found again in

the fact that prior to the putting in service of the so-called safety cars, trainmen were given five days' course of actual operation on cars that were not transporting a single paying passenger. Through the year with its frequent changes in both means and methods of operation, this cost has enlarged, and there is nothing to show for it in the physical property inventory. It is a part of the cost of the present railway, and its results constitute an element of value in that railway."

The power contract, as a separate element of value, is supported in the same manner that it was supported in the appraisal made by Ford, Bacon & Davis outlined in *ELECTRIC RAILWAY JOURNAL* April 23, 1921, page 767. The state valuation and the Cooley appraisal are reviewed. An argument of the significance of present value is followed by a summary of all the valuations which have ever been made of the property, with some of these modified to make them represent present-day figures.

The brief goes into detail in discussion of the qualifications of the various witnesses who have appeared before the board in connection with the valuations which have been made.

The inventory, unit prices, general contingencies, engineering and superintendence, law expenditures and administration, interest during construction, taxes during construction, organization and development, cost of money, promoters' remuneration, working capital and material and supplies, franchises, land, non-deduction of depreciation, the property of miscellaneous subsidiary companies, historical costs, are all chapter headings under which extensive argument and citation of cases are given. This leads the brief to the statement of the value of the property as follows:

The value of the property of the Public Service Railway fixed in the report of the engineering concern (Ford, Bacon & Davis) employed by the state is \$125,000,000, and under the acts of the Legislature this is the presumptive value of the property.

The only evidence before the board that can possibly overcome the legal presumption in favor of \$125,000,000 is the Cooley appraisal, as brought down to date, and the testimony of the numerous expert witnesses sustaining and supporting the same.

The value of the property of the Public Service Railway is:

Physical property with additions to May 31, 1921 (Cooley appraisal)	\$149,922,236
Development cost, going value, including location and consolidation values (30 per cent of structural cost, as allowed in the Passaic gas rate case)	44,976,670
Value of power contract (the lowest value placed upon it by any witness)	6,000,000
Total value	\$200,898,906

The brief then points out that the value of the property must be found independently of the rate of fare and allow the return upon the value of the property as found. "This does not mean," says the brief, "that this company should necessarily be permitted to charge the highest rate that the traffic will bear. We are now only discussing the relation between the value of the property and the rate of fare and pointing out

that the value of this property cannot be reduced because there is no rate that will net a return upon it. . . . We suppose that the New York subway constructed out in the country somewhere between two small places would be so expensive that no rate of fare would net a return upon it. But that is not this situation. This property is not overbuilt. It is not constructed in the Sahara Desert; it is right here in New Jersey, connecting the principal cities of the state and furnishing the only complete system of urban transportation available in all these great populous centers."

The brief ends with a plea for a just and reasonable fare and recites various cities in the country in which a 10-cent fare is charged and gives supporting testimony from officers of other railway companies which charge 10 cents. In the discussion on rate of fare, the brief takes up the claim of people that the company has valuable rights because it is allowed to do business in the streets. The brief continues:

It is just as sensible to talk about the valuable rights of the policeman because he is allowed to perform his service to the public in the street, or the fireman because he is allowed to perform his services in public places. The policeman and the fireman perform honorably and are paid for their labor by the public, notwithstanding the fact that such labor is performed in the public streets. The street railway company also performs a valuable service in the public streets, and it should be paid for its service, notwithstanding the fact that it is performed in the streets. That is all the company seeks to obtain in this case, and yet the idea is continually advanced that perhaps the company ought not to be paid or ought to be paid less because of this valuable "privilege" it enjoys.

The entire brief is filled with innumerable citations from court and commission decisions and with many direct quotations from the testimony of witnesses before the board.

Letter to the Editors

Why Baltimore Departed from the Standard Car

UNITED RAILWAYS & ELECTRIC COMPANY
BALTIMORE, MD., July 11, 1921.

To the Editors:

The letter published in your issue of June 11 from W. G. Gove, superintendent of equipment, Brooklyn Rapid Transit Company, it seems to me, merits comment, because it fails to recognize the fact that more than one type of one-man car is required because of traffic conditions.

To quote the first phrase in the third paragraph, "it is particularly unfortunate" that the idea of "something different" should be allowed to confuse the need for clear vision on the part of the operating men to develop such types of one-man cars as are essential to meet varying traffic demands.

In the study and discussion that are going on concerning one-man car design, I do not think that those "in responsible charge of executive and operating departments" are concerned with "measuring up" by means of having equipment of their own design in service on their properties. Certainly as far as the situation in Baltimore is concerned, we have conscientiously studied the problem with the idea of providing a car best suited to handle heavy interchange traffic in this city.

If we are to "sell" the one-man car idea in toto in the large cities, we must do so by providing a car that will give adequate facilities for the loading and unloading of passengers. Why should we adhere to the present standard car if improvements can be made? Is it not inconceivable that we have reached a stage of development where initiative on the subject of car design is to stop? This is particularly true where a principle of operation is concerned.

May I repeat again that I am not desirous of entering into a controversy in the matter but endeavored dispassionately to point out what I felt and feel was a development in the design of this car which has been overlooked by the manufacturers and equipment men in their efforts to standardize on a single type of car.

We believe that the car we have just purchased for Baltimore will give higher efficiency and greater economy than the so-called standard type for the conditions we have to meet. As our general manager has recently well stated, the problem before us was that "the public of Baltimore was beginning to show a decided dislike to the safety car on account of the congestion at the entrance and exit point." Appreciating the value of the one-man idea, we decided to correct this manifestly incorrect design. At this point we suggest turning to the cut on the inside back cover of the *ELECTRIC RAILWAY JOURNAL* of July 2, 1921; we think the picture is a good ocular demonstration of just what we are trying to avoid. Here are four persons encumbered with luggage, etc., waiting to board a standard one-man car, while four passengers are ambling gracefully off. This condition is much worse in rainy weather. It is just what we are overcoming in our new design.

And now a final word in reply to my friend Walker's letter of June 15. The standard whereby car design with reference to passenger interchange facilities should be measured is not in cents per car-mile but in the volume of passenger movements in and out of the car. On a line where traffic is heavy and frequent transferring is the rule car-mile earnings do not express the density of use by the public, so that an erroneous conclusion might well be arrived at in setting a standard based on earnings per car-mile.

The proper way to determine what is the best design for given conditions is to put the several types of cars in service under identical conditions and take observations with stop watches, over a sufficient period of time to get average conditions and data, and then compare results. Any other method of arriving at a decision will not be based upon figures and results but upon judgment and opinion.

L. H. PALMER,
Assistant to President.

Metal Ceiling Used for Head Lining on Little Rock Railway

The Little Rock Railway & Light Company, Little Rock, Ark., is using metal ceiling for head lining in repairing and rebuilding some of its cars, where the head lining needs renewal. The metal ceiling, which is the same as used in buildings, comes in 24 in. x 48 in. sheets, and the metal for one car costs about \$12. Labor and painting cost about \$18. This total cost of \$30 compares most favorably with the previous cost of \$100 for replacing bird's-eye lining in kind, and the car interior presents a very satisfactory appearance.

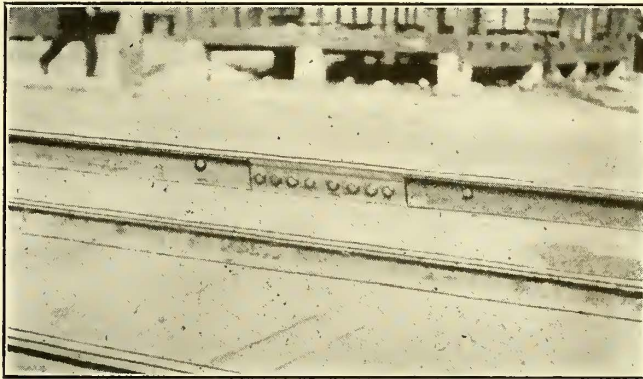
Equipment and Its Maintenance

Short Descriptions and Details of New Apparatus of Interest to the Industry. Mechanical and Electrical Practices of All Departments

Tracks Rebuilt on Old Ties

Creosoted Ties Set in Concrete Thirteen Years Ago Used in Place for New Rail—City Raises Street Grade 2 In. to Allow New 7-In. Rail in Place of 5-In. to Avoid Disturbing Base

WHEN the city of Memphis, Tenn., decided to repave South Florida Avenue it became necessary for the Memphis Street Railway to relay its tracks at the same time that it did its part of the paving. The old track had been 5-in. girder, which had been in



THIRTEEN-YEAR OLD CREOSOTED TIES IN CONCRETE TO RECEIVE NEW RAIL

place since 1908 and was badly worn. The previous paving had been brick and the new paving was to be asphalt. The standard construction of the Memphis system is now 7-in., 105-lb. girder rail for use in asphalt paved streets, and it was decided to use this rail on Florida Avenue.

When the old pavement was taken up and the original concrete base and ties uncovered it was found, upon close examination and test by boring, that the original ties were in as good condition as they were when first laid, so far as could be told. These ties were some which had been laid in 1908; they were laid in concrete which was finished off level with the upper surface of the ties. Seeing that the new rail to be put in was 7 in. in place of 5 in. the city authorities were approached with reference to raising the grade of the streets to allow the new higher rail to be put in without removing the concrete foundation and ties, which of course would prove very expensive. It happened that the raising of the grade was beneficial to the city in this case, also, as a particularly high curb had been installed in the first place, and when the grade of the street was raised a normal height of curb was obtained. More material in street paving was used, but it is understood that the electric railway took care of this part as an offset to its saving in not having to take up the old ties and put down new ones.

Accordingly, the pavement in the railway area was removed and track labor cleared off the concrete, level-

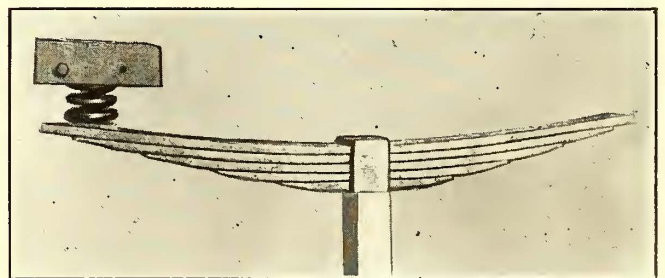
ing down to the ties smoothly, the old rail was removed and the new rail installed. Temporary crossovers were laid so that one-half of the street was done at a time. An accompanying illustration shows the appearance of the work after the rail and pavement had been laid on one side and the pavement removed on the other side. This illustration also shows the type of 8-hole joint used on the new construction.

The standard construction used in laying the new rail is to use tie plates on all ties and to use a 26-in. by 10-in. base plate under all joints. A 34-in. 8-hole angle bar is used and this is beaded along the bottom of the plate. The rail is welded to the base plate for the entire length of the base plate, a Cleveland electric welder being used for this work. Screw spikes are used at joints and cut spikes elsewhere.

Improving Riding Qualities

THE Southern Public Utilities Company, Charlotte, N. C., is an enthusiastic operator of one-man cars, claiming that they show reduced operating expenses and allow closer headways and consequently better service. During part of the day, however, these cars operate under light load, but being equipped with springs which are rigid enough to carry heavy loads successfully and heavy enough not to break under such loads, the riding qualities are not exceptionally good when they are lightly loaded.

In an effort to improve the riding qualities of the one-man cars under this condition M. F. Osborne, master mechanic, decided to install a coil spring at each body bearing point, which coil spring would carry the body at light load and would compress so as to allow the semi-elliptical spring alone to carry the body at heavy load. The Charlotte cars are arranged so that the inner



COIL SPRING ADDED TO SEMI-ELLIPTICAL SPRING

end of the semi-elliptical spring is fixed and the car body borne at the four outer ends of the springs. The body formerly rested at these points on blocks of wood 4 in. thick and about 8 in. square, which in turn rested directly upon the free outer end of the springs. To install the coil springs these blocks were reduced in thickness to 3 in., a 5½-in. hole bored in each of them and a coil spring 5 in. long, consisting of five turns of ½-in.

wire, placed in this hole and fitted with spring caps, which provide the actual bearing surface. The 2-in. play thus allowed is sufficient for all light loadings of the car and when the car is fully loaded the spring compresses so that the blocks come in contact with the heavier semi-elliptical springs, which thereby assume the load direct.

The improvement in the riding quality is said to have been so great that, unsolicited, patrons of the road have inquired what has been done to certain cars to make them ride better.

An accompanying illustration shows the spring arrangement which Mr. Osborne is now using.

Reclamation Department Shows Large Savings

New Welding Shop and Reclamation Department Installed by Washington Railway & Electric Company Provide Better Facilities for Carrying on This Work—Accurate Cost Records for Work Done Are Being Kept

ON ACCOUNT of the rapid increase in the amount of reclamation work necessary at the shops of the Washington Railway & Electric Company, it was decided some months ago to build a larger shop to house the electric welding equipment. The interior of the new shop is shown in the accompanying illustration. It is an addition to the main shop, 34 ft. long by 18 ft. wide, built of brick and well lighted on three sides. The floor is of cement and the roof of galvanized iron provided with large ventilators. An overhead track carries a 1½-ton chain hoist for use in handling heavy parts. Convenient benches, racks, etc., together with the welding equipment, are included.

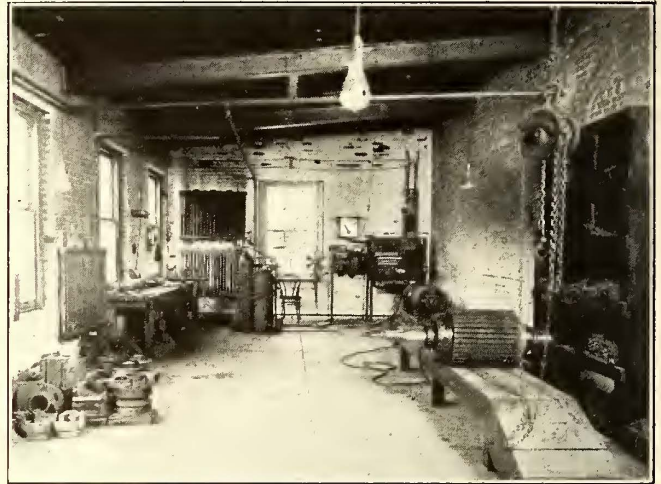
For electric welding a Wilson "plastic arc" machine that will accommodate two welders is used. In the construction of the building additional room is provided so that additional machines can be added should future needs make them necessary. Since the installation of this machine an accurate cost record has been kept for every job done in the shops and a recapitulation for the first three months of the shop's operation shows a net saving of approximately \$2,000 per month with two operators working. Since that time new and different kinds of work have been constantly coming in and it has now been found necessary to increase the working force. Electric welds are made on steel, cast and wrought iron, bronze and malleable iron. In welding cast iron the parts are carefully studded with steel pins before the welding work is undertaken.

At the present time the company is testing out a special metal which has been developed by the Wilson Welder & Metals Company for cast-iron welding. On small sections of cast iron and brass the oxyacetylene method of welding is used, which is found preferable by this company and more satisfactory for these small jobs. The oxyacetylene torch is also used almost entirely for cutting.

A partial list of some of the work being done in reclaiming various parts includes building up axles and armature shafts, repair of truck frames when broken or badly worn, filling in dowel holes in brass and malleable axle-bearing shells when badly worn, building up and welding brushholders when burnt or excessively worn, filling in armature-housing bolt-holes where the threads have stripped, repairing journal boxes and axle-bearing caps, welding and straightening resistance grids when broken or warped, building up axle-bearing

collars on brass shells, welding and repairing gear cases and adding metal for rethreading bolts, nuts, center bearings, motor cases, etc.

It is frequently desirable to build up or repair parts which cannot be easily transported to the welding shop. In order to take care of this work, leads have been provided from the welding machine with plug-in sockets in



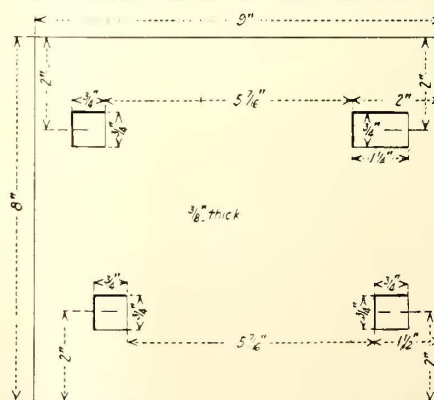
INTERIOR OF NEW RECLAMATION SHOP IN WASHINGTON

the truck shop, carpenter shop, etc. By this arrangement welding of large parts can be conveniently taken care of on the job, and the removal and transporting of the large parts to the welding room is avoided.

At present consideration is being given to the purchase of an automatic welding machine complete with a single-arc motor-generator. This outfit when attached to a lathe will automatically build up axles with worn bearing seats, as well as worn armature shafts, and will, in the opinion of the officials of this road, do much better and cheaper work than can be done by hand operation.

A Universal Tie Plate

THE Georgia Railway & Power Company, Atlanta, Ga., uses steel tie plates in all of its construction. Formerly three kinds of tie plates were used to suit the various kinds of rail on the system. The usual



UNIVERSAL TIE PLATE USED IN ATLANTA

difficulties incident to a variety of tie plates, both in the storeroom and on the job, led the company to desire a single tie plate which could be used and, finding none with a spacing of holes which was exactly suitable to its conditions, designed one to fit them. The accompanying drawing shows the dimensions of the new tie plate, which of course can be furnished by any steel concern, with which any rail 5 in., 5½ in., 6-in. can be used. There are no shoulders on this tie plate, it being a plain piece of steel punched as indicated.

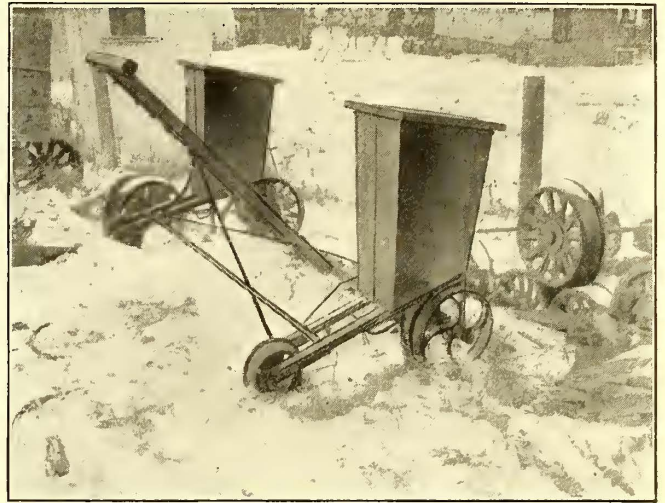
Shop Notes from Newark, N. Y.

Rochester & Syracuse Electric Railroad Has Well-Equipped Shops Where Many "Stunts" for Solving Maintenance Problems Have Been Developed

THE shops of the Rochester & Syracuse Electric Railroad, the offices of which are at Syracuse, N. Y., are at Newark, about 32 miles east of Rochester. Due to the destruction of its Newark shops by fire in 1912 the Rochester, Syracuse & Eastern Railroad, the predecessor of the present company, had the opportunity to rebuild along modern lines. New shops, similar in general plan to the then new Lakeland shops of the company near Syracuse, were constructed early the following year. They were described briefly in an article in the issue of this paper for Sept. 20, 1913, where a plan was reproduced. The views grouped on this page are typical.

These shops have proved to be admirably adapted to the demands upon them and no important changes have since been made. A number of minor improvements have, however, been introduced. Several of these were photographed by a representative of the paper on a visit to Newark several months ago.

The shop property comprises a shop building, approximately 204 ft. by 105 ft.; a carhouse about 240 ft. by 82 ft., and a two-story office building. Most of the shop work is done in one large room, which contains practically all of the machines and has three tracks at one side, two of which are partly over pits. On the side of the pits the floor is depressed 18 in. to facilitate inspection and repair work without unnecessary stooping on the part of the workmen.

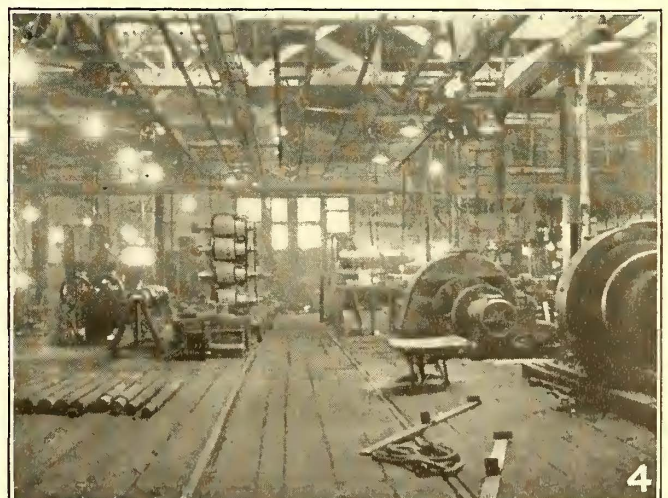
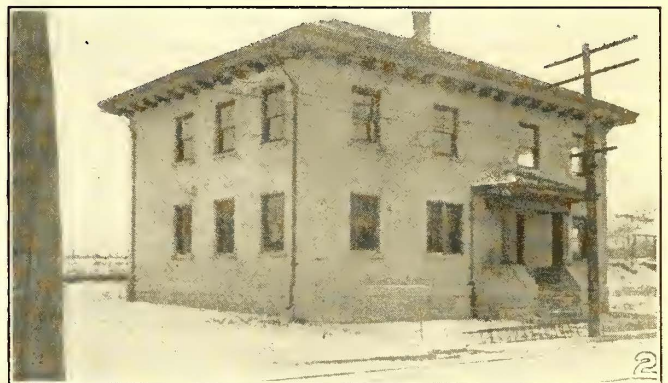
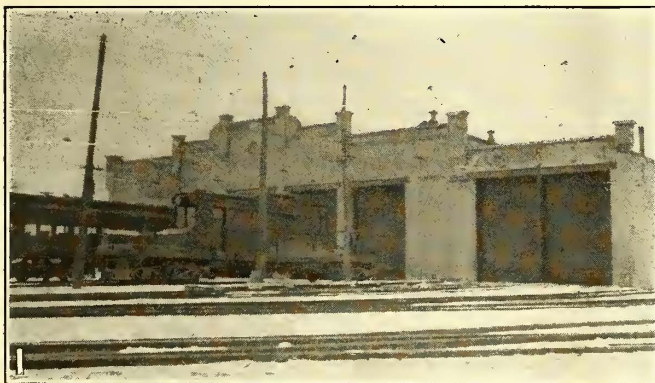


THIS MACHINE SIMULTANEOUSLY SANDS BOTH RAILS

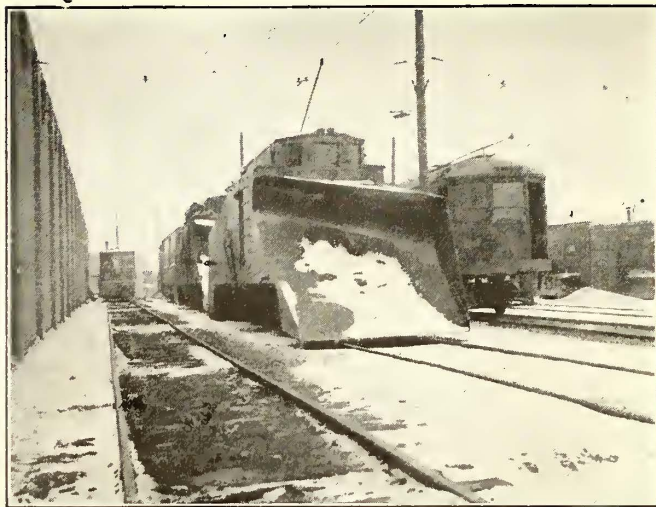
The shop is liberally equipped with labor-saving devices, such as a trolley crane, transfer table, turntable, etc.

For dipping and baking purposes, a combined tank and oven has been constructed in one corner of the machine and erecting shop, as illustrated, being built out of concrete blocks. Over the dipping and baking sections are metal-covered wood lids. A trolley crane bar runs over the two. The oven is heated by means of electric heaters, controlled by snap switches located on the wall behind the oven and visible in the picture.

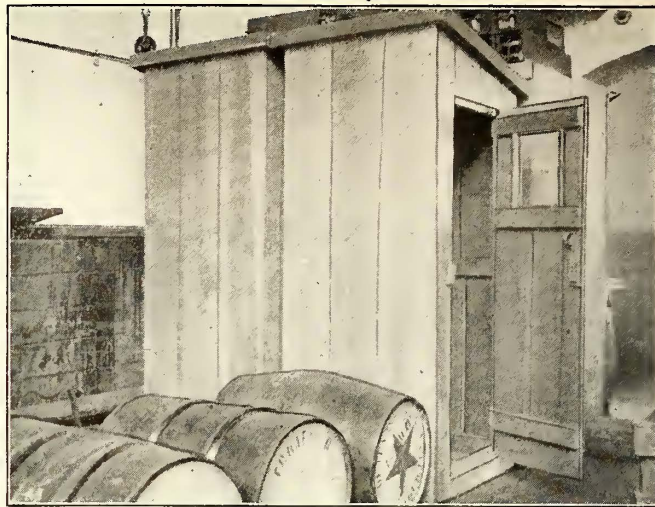
The shop contains no special welding room, but apparatus is taken as required to the work. A convenient



No. 1—ONE OF THE BIG INTERURBANS IN FRONT OF THE MAIN SHOP. No. 2—THE SHOP ADMINISTRATION BUILDING IS ATTRACTIVE.
No. 3—A HOME-MADE SELF-CONTAINED OIL HEATER. No. 4—TYPICAL VIEW IN THE NEWARK SHOPS



A REMINISCENCE OF THE SEASON OF HEAVY SNOW



THESE SHELTERS MITIGATE THE RIGORS OF WINTER

two-wheel truck for carrying a pair of gas tanks has been constructed and has given a good account of itself. As shown in one of the illustrations, it consists of a light steel frame, normally vertical, to which the tanks are held by a steel strap clamp, the weight being taken on a platform just above floor level. A $\frac{1}{2}$ -in. steel rod attached to the front of the platform on each side is bent backward to form an extra guide for the tanks and also a handle bar.

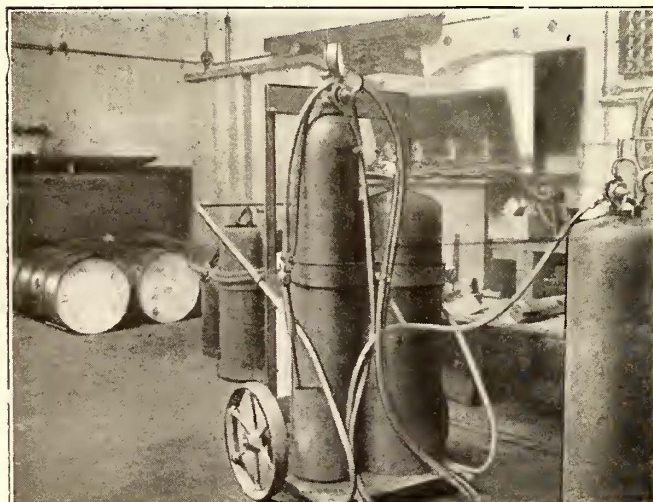
For heating soldering irons and solder pots, a homemade oil torch is employed. A frame such as is used with gasoline solder pots is mounted on the top of an air tank, a supply of oil is poured into the air tank and air pressure is pumped up to 60 lb. or so. The oil jet spurts up through a carbureting cylinder, where it is vaporized and ignited. One pumping up of the tank lasts for several days of intermittent work. The outfit is shown in one of the illustrations, in use for heating soldering irons for armature banding.

An interesting small job recently put through the shop was the construction of portable shelters for the use of flagmen and others obliged to be out on the line during severe weather. A picture of a pair of these is reproduced. The shelter is made in sections which hook together, four sides, a roof and a floor. Electric heaters are provided to be used in very severe weather. The roof has a frame around the edges which drops over the sides, thus making a watertight joint.

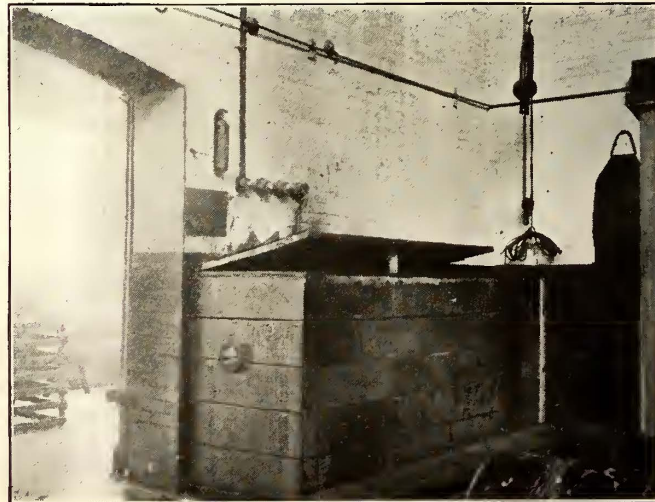
The only window provided is in the door. A shelter like this can be taken apart, loaded on any kind of a work car, freight car or truck and quickly transported to the place needed and set up.

As the pictures indicate the writer's visit was made before the snow left the ground. He was able to snap one of the big snowplows used by the railway, alongside the carhouse. An interesting device seen in the shop yards, also, was a track-sanding apparatus, consisting of two sand boxes, mounted on a light truck, with a handle bar to assist in propelling it along the track. This equipment permits the rapid sanding of a stretch of track where there is not enough work to be done to warrant the use of a regular sand car.

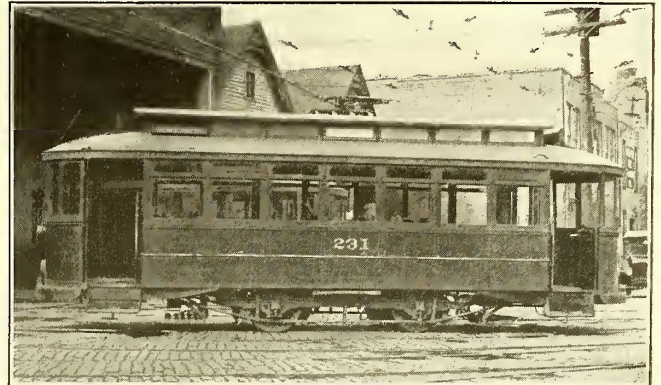
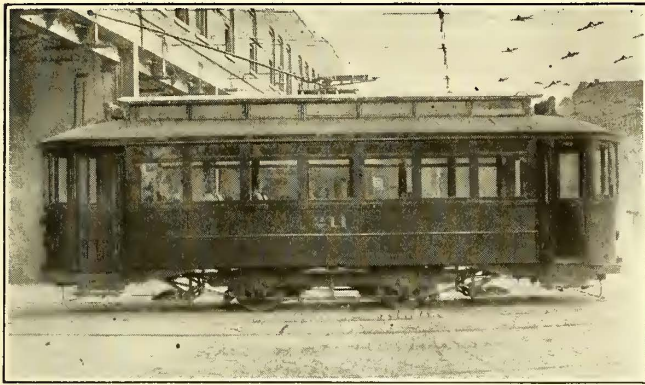
The Jamaica government two years ago voted 1,000 pounds sterling for investigations of the possibility of the electrification of the government railway, according to the issue of *Commerce Reports* for May 25. This forms the only means of transportation across the island, either for passengers or for freight, except by truck and wagon on the public roads. The lines have a total mileage of 197. Since this railroad is entirely dependent upon imported coal, which is very expensive here, the authorities have desired to make use of the water power on the island. Experts from both American and English companies have made investigations and formed estimates for the needed equipment.



PORTABLE GAS WELDING AND CUTTING OUTFIT



DIPPING AND BAKING CORNER



ATLANTA SINGLE-TRUCK CAR BEFORE AND AFTER REMODELING TO INTRODUCE P.A.Y.E. FEATURE

Remodels Single-Truck Cars

WITH about 163 single-truck, twenty-eight seat two-man cars on its hands, the Georgia Railway & Power Company, Atlanta, Ga., has been studying the best manner of applying these cars to the service requirements. They are all of one type, with open platforms and bulkhead doors and thus arranged only for inside fare collection.

The Atlanta management has not yet decided to make use of the one-man car principle, but did want to install the pay-as-you-enter feature as far as possible. At first it was decided to remodel one car only as an experiment and the following changes were made: The doors in the bulkhead were taken out and a stanchion placed at each side of the opening thus left in the bulkhead; folding doors and steps were installed on each side of each platform, the cars being arranged for double-end operation; a guard rail about 30 in. long was placed on the platform in front of the conductor's position, to assist in guiding passengers as they passed in paying fare. This experiment was closely watched by the management to see if it gave an answer as to the economical use of these single-truck cars. There was no doubt that the P.A.Y.E. feature greatly assisted in speeding up the schedule and in making operation more attractive. In fact many trainmen soon made application for the run on which this remodeled car was used.

The experiment proved so successful that the management has started on a program of changing over all

the rest of the 163 cars. By July 1 some 35 were remodeled and in operation and others were being closed up at the rate of one per day.

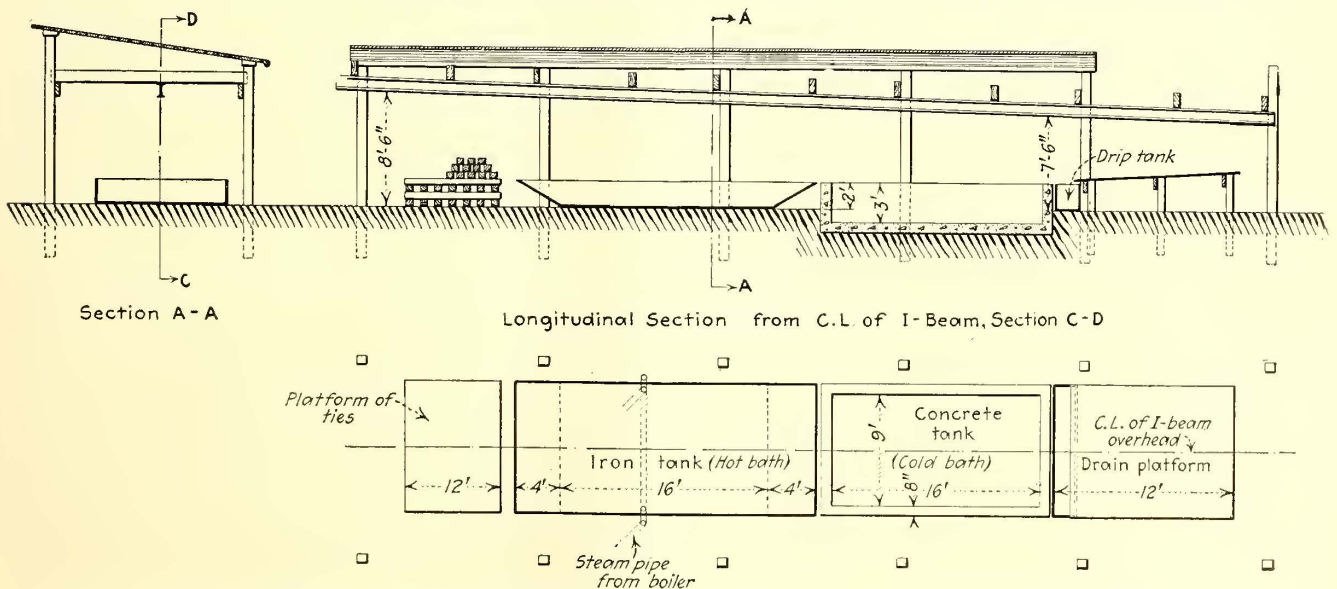
The only new equipments necessary are the door and step mechanisms which are furnished by the McGuire-Cummings Manufacturing Company, Chicago. The total cost of changing these cars as described is about \$225 per car.

Chattanooga's Successful Creosote Plant

Hot and Cold Tank Application of Creosote Gives 1½ Gal. Penetration per Tie—Ties Handled by Angle-Iron Swing Basket

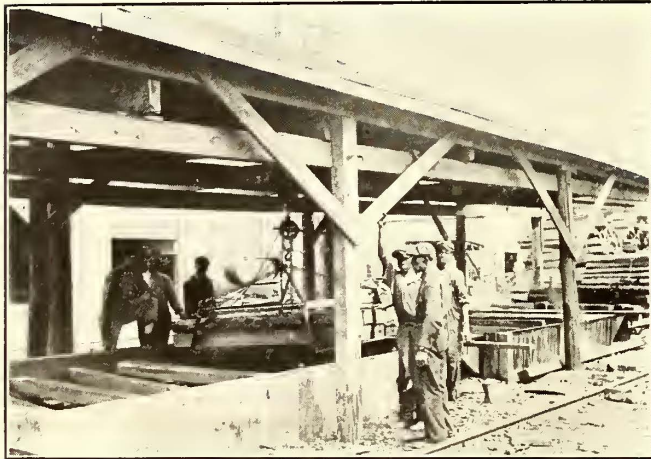
THE way engineering department of the Chattanooga Railway & Light Company has been having very satisfactory results from its creosote plant, which has been running for about a year. It is a plant operated on the hot and cold immersion principle, and the average results on a 6-in. x 8-in. x 8-ft. red oak tie show a penetration of 1½ gal. as against a desideratum or possible maximum of 1½ gal.

The arrangement of the plant is shown in an accompanying plan and is seen to consist of two tanks, the first a steel tank in which the hot creosote is placed and the second a concrete tank in which is the cold creosote. It is probable, however, that the steel tank will be replaced soon with a concrete tank, the steel tank being



PLAN AND ELEVATION SKETCHES OF CHATTANOOGA RAILWAY & LIGHT COMPANY'S CREOSOTE PLANT

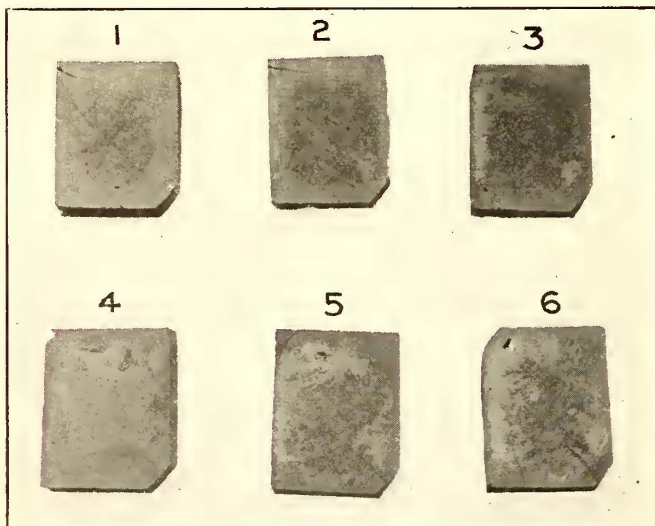
one which was left from a previous installation and was used before the present arrangement was started. One of the interesting features of this installation is the I-beam and crane and basket for the handling of the ties. As indicated on the elevation, in the accompanying sketch, there is an I-beam installed which has a 2 per cent slope in the direction in which the ties are



THE CREOSOTE PLANT IN ACTION

always carried. On this I-beam is a traveling hoisting machine of 1-ton capacity made by the Brown Hoisting Machine Company of Cleveland. This is a screw-gear block and falls, from which is suspended the basket made of angle iron, shown in the accompanying view.

Seasoned red oak ties are used and are delivered at the end of the hot tank, where they are stacked. About eight ties at once can be handled in the present basket. These are then carried on the I-beam crane, which is on rollers, to the hot tank, where they are left in 150 deg. creosote for one hour. This tank is heated by means of steam coils supplied from a 5-hp. boiler, which is located at a sufficient distance to minimize the risk. The ties are then removed from the hot bath to the



CROSS-SECTION OF ONE OF THE TIES TREATED IN CHATTANOOGA, SHOWING PENETRATION AT THE FOLLOWING DISTANCES FROM END OF TIE: No. 1, 2 IN.; No. 2, 4 IN.; No. 3, 6 IN.; No. 4, 8 IN.; No. 5, 10 IN.; No. 6, 12 IN.

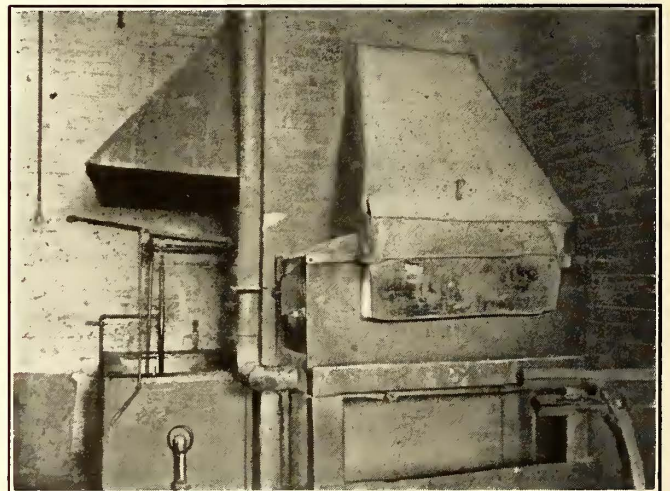
cold bath, where they are left for an additional hour. After coming out of this bath they are laid on the drain table, after which they are stacked and are allowed to season for at least one week before being used.

In commenting on this plant, R. C. Morrison, engineer of maintenance of way, said that if he were rebuilding the plant he would place the I-beam 3 ft. higher than it is in the present installation in order to give more room to work with ties in the basket; that is, in order to give better leverage in handling the basket up and down by means of the screw-gear block and falls, which in this case should be more rapid than the present one.

The original cost of the plant was about \$600. As to operating costs, labor, the records show, figures at from 4 to 5 cents per tie, and material—carbosota—at a little more than 37½ cents per tie. Figuring interest, maintenance and material and labor, the total cost is from 45 to 50 cents per tie.

Hardening Elliptic Springs

IN ITS shops at Rochester the New York State Railways has a convenient outfit in the corner of the blacksmith shop for heating and chilling complete halves of elliptic springs. The set of leaves forming a half spring are bunched together and heated in an oil-fired furnace, as shown in the accompanying illustration. This is built in an angle between the chimney and the shop



SPRING HARDENING CORNER IN RAILWAY SHOP AT ROCHESTER

wall, with a hood and flue connection to the chimney. Doors are provided on one end and one side.

In the angle between the second side of the chimney and the second wall is the water-cooled oil quenching tank, also provided with a hood connected to the chimney to remove fumes. A simple lever mechanism facilitates the lowering of the hot spring into the oil from a distance sufficient to prevent scalding of the operator by oil or fumes.

The Municipal Tramways at Bradford, England, have recently added to their equipment a one-man trackless trolley bus with seats for thirty passengers. The car is equipped with one motor only. Another type of trackless car recently added is a six-wheel bus with double deck. One-half of the weight is carried on the rear axle, the other being divided equally between the two front axles, which turn together for steering purposes. The principal data of this car are: Seating capacity top deck, thirty-three; lower deck, twenty-four; over-all height, 14 ft. 7 in.; outside width, 6 ft. 10 in.; total length, 23 ft. 10 in. This gives an occupancy per seat of 2.85 sq.ft. of street surface.

Meeting of American Society for Testing Materials

Sulphur and Phosphorus Limits Raised on Structural Steel and Steel Castings—New Specifications for Cast-Iron Wheels Presented—Tests for Insulating Varnishes Agreed Upon

THE annual meeting of the A. S. T. M. was held June 20-24 at Asbury Park, N. J. At this meeting several matters were discussed which are of interest to electric railway engineers and the following is an abstract of some of the reports and papers presented:

STEEL SPECIFICATIONS

Action was taken regarding the extra point of phosphorus and sulphur which had been permitted in various standard specifications as a war measure. The note concerning this is now to be removed from all specifications. Recommendation, however, has been made to raise the sulphur content 0.01 per cent in the following specifications: Structural steel for locomotives, cars and ships and steel castings. In the car steel specification this applies to the structural grade only. The phosphorus content in acid steel castings is raised .01 per cent. This is for the reason that it is felt the extension in sulphur from 0.05 to 0.06 per cent in the three classes of structural steel must be retained due to the heavy tonnage involved and to the continued difficulty in obtaining low-sulphur fuels and melting stock. It will be noted that the sulphur extension will be removed on the materials which are to be worked hot and allowed on structural materials which are to be fabricated cold.

Report was made that the survey which was started last year of the effects of phosphorus and sulphur in steel is now well under way in the hands of a joint committee working under the chairmanship of the United States Bureau of Standards.

The specifications for carbon steel rails have been extensively revised as to form, at the same time clarifying the sections covering the nick and break test. Slight changes have also been made in specifications for quenched high carbon steel splice bars, quenched carbon-steel track bolts, steel track spikes, steel screw spikes, low carbon steel splice bars and quenched alloy steel track bolts. These changes relate chiefly to the manner of taking test specimens and making tests.

Similar changes were made in the specifications for structural steel for cars, carbon steel bars for railway springs, special silicon spring bars, silicon manganese bars for railway springs, chrome-vanadium spring bars, carbon steel and alloy steel forgings, quenched and tempered carbon steel axles, quenched and tempered alloy steel axles, cold rolled steel axles and steel castings.

The tentative specifications for welded and seamless steel pipe has been extensively revised and a new tentative specification was presented for carbon-

steel rails with special quality requirements. These specifications are based entirely on the specifications recently adopted by the American Railway Engineering Association. This added specification is proposed for the reason that it is felt that the requirements of rail buyers are by no means uniform, and where the amount of traffic and general service conditions are more severe, a buyer might want to purchase rails subject to more rigid requirements than would be the case if the service conditions were less severe. Among other things the new specifications require that there shall be sheared from the end of the bloom formed from the top of the ingot sufficient metal to secure sound rails. Addition of aluminum to the molds is not permitted. Definite limits for carbon, manganese, phosphorus and silicon are set, and tests are required to determine ductility or toughness as opposed to brittleness and soundness. Physical qualities are determined by drop test in the standard A. R. E. A. drop testing machine, record being taken of the elongation of the rail under the blow. Test pieces which do not break under the drop test are marked and broken to determine whether the interior metal is sound. Rails are classified as No. 1 and No. 2; No. 1 being those that are free from injurious defects and flaws of all kinds. No. 2 rails are those which by reason of surface imperfections, or for other specified causes, vary from the specifications in a manner which does not impair their soundness and strength. It is permitted that No. 2 rails shall form 5 per cent of the order.

CAST-IRON CAR WHEELS

A new proposed tentative specification for cast-iron car wheels was presented to replace the standard specifications for cast-iron car wheels. This differs somewhat from the American Railway Association (M. C. B.) standard specification and is drawn so as to cover wheels other than M. C. B. standard wheels as well as the standard wheels themselves. The new specifications are drawn up along lines which represent present-day practice in wheel foundries.

IRON AND STEEL CHAIN

While the present specification is substantially correct with respect to test requirements, gradual changes in raw material and trade practices have made necessary a thorough revision of the section on classification and manufacture. In consequence a new proposed tentative specification was presented, in which especial attention was directed to the term "Crane Chain," which no longer represents the highest grade, the term "Dredge Chain" having super-

seded it. Five classes of chain are given:

Class AA for slings, cranes, hoists, steam shovels and marine uses, and where an all-iron chain is desired.

Class A for slings, cranes, hoists, steam shovels and marine use where a high quality chain is desired and sold under the trade designation "Dredge Chain."

Class B for ordinary slings and hoists and sold under the trade designation "B.B.B."

Class C for railroad cars, construction and forestry work and sold under the trade designation "B.B." or Railroad Chain.

Class D for general service and sold under the trade designation "Proof Coil" or "Common Coil Chain."

MERCHANT BAR IRON

A new proposed tentative specification for merchant bar iron is included in the report on wrought iron, it being stated that a considerable change has taken place in the process of manufacture of some of the ordinary grades of bar iron. Small sizes of mixed scrap, thoroughly reworked, are now a prominent factor and it has been thought desirable to recognize this condition in a new specification, rather than to include the material in the present standard specification for refined wrought iron bars. The new specification presents the same tensile and bend test requirements as for the refined bars, but the section on manufacture is particularly adapted to this product.

INSULATED WIRE AND CABLE

The committee states that this specification has been materially improved. While no extensive revision has been made some new material has been added. The more important changes are as follows:

1. Thickness of Insulation.—A table of recommended thicknesses of insulation for various working pressures has been added together with details of procedure for measuring the thickness, including the variation limits, rejection conditions, etc.

2. A new sub-division covering tape has been added.

3. A new sub-division covering braid has been added.

An interesting feature of the work of the committee on rubber products for the coming year is that the committee contemplates taking up the subject of specifications for weather stripping for cars.

ELECTRICAL INSULATING MATERIALS

In explanation of its work, the committee states that since its inception it has confined its work entirely to the testing of insulating materials, as the

state of the art does not as yet warrant the establishing of specifications for the various materials themselves. This year a standard has been agreed upon for a method of testing insulating varnishes.

The society's tentative standard methods of testing molded insulating materials has now been in use for four years without important criticism, and it is understood that they are in more or less general use by the manufacturers of this class of insulating material. They have also been adopted to standard by the Associated Manufacturers of Electrical Supplies. They are therefore now to be advanced to standard of the A. S. T. M. with some minor changes.

TWO TESTS FOR SHEET INSULATION

With regard to sheet insulation, the dielectric strength is the most important property. The apparent dielectric strength is greatly affected by the time of application of the testing potential due to the generation of heat, so that two types of test are desirable; one, to give the dielectric strength under a rapidly applied potential or so-called apparent "momentary" dielectric strength, and the other to give the strength under continuous application of potential. No agreement has been reached yet on the test.

In the testing of liquid insulations a great need has been the standardization of the electrodes and length of gap used in testing oils for high-tension transformers and switches. The committee has completed an investigation on this subject and presented its report thereon to the convention and a proposed standard method for testing transformer and switch oils. A proposed standard method was also presented for testing electrical porcelain.

Subjects to which the committee expects to give attention are:

1. Procedure for dielectric strength tests of sheet-insulating materials.
2. Procedure for a sludging test of transformer and switch oils.
3. Preparation of tests of molded insulation for high-frequency applications.
4. Pothead and splicing compounds for underground cables.
5. Dielectric losses in insulating materials.

CORROSION OF IRON AND STEEL

The five-year test of uncoated sheets exposed in the Pittsburgh district is nearing completion and the committee states that it may definitely be concluded that copper bearing metal shows marked superiority as compared to non-copper bearing material. Iron or steel containing less than 0.15 per cent copper are classed as "non-copper bearing." It is interesting to note that no 16 gage sheet containing 0.06 per cent copper or more has failed after five months' exposure, while 65 per cent have failed of those having 0.03 or less.

In the immersion tests made the presence of copper apparently has little influence on the life of the specimen.

The Mechanical Man as a Salesman*

BY E. B. GUNN

Superintendent of Transportation and Equipment Western Ohio Railway Company, Wapakoneta, Ohio.

WE HAVE found that by keeping in close contact with our employees, not only our salesmen (the conductors and motormen) but all other members of the organization as well, we are able to keep the force running much smoother and so gain better results.

It is necessary for the mechanical equipment to be kept in good condition so that passengers can get over the line smoothly and quickly; also to prevent frequent pull-offs, as the changing of cars is very objectionable to the traveling public. A failure of the mechanical equipment causes delays which often result in the passenger's missing his connection, which, of course, discourages traffic; and at this time the electric lines need all the friends they can get.

The roadway department's co-operation is just as necessary as that of any other, for a bad track causes derailments and rough riding, which makes the work of the salesmen much harder. It also causes delays and failures of the equipment which are expensive.

It is also just as necessary for the employees to work for the success of the freight department as it is for that of the passenger, with the exception, of course, of the element of personal feeling which does not enter into the freight department. It is from the freight hauling that the electric line must look for its gain, and that is the branch of service, I think, that has been overlooked more than the passenger business. Of course, the motor truck under the present conditions is a great rival of the electric line, but by having a quick, reliable service and safe handling of goods and courteous treatment from all employees the electric line, I believe, will be able to hold a great part of the freight haulage. The time is not far off when the motor trucks must be brought under the supervision of the public utilities commissions, and must file their schedules of rates the same as the electric lines are required to do. When this is done and they are required to pay their proportion for the upkeep of the roads they use, they will then be on the same basis as the electric lines; and, I believe, the selling of the products will be just as easy and the outlook for the electric roads as bright as it was a few years ago. The electric lines have a place in the traffic world and the public will not stand for them to be sidetracked.

It is a problem for us to work out, and the only way that this can be accomplished is, as Mr. Barnes has so ably shown, for all departments to co-operate and all work together. Each

and every head of department must get away from the idea that his department is more important than any other, for the man who greases the track is just as necessary along his line as the executive. When the spirit of co-operation permeates the entire organization from the president to the track man, and everyone is pulling for the one and only purpose, *success*, then we will have the success that is sure to come. Let us all get over the dumps and put into the proposition the pep and enthusiasm that the proposition deserves, and that enthusiasm will be communicated to the men under our supervision and they, in turn, will do their best for the success of the electric line, and the business will just have to be successful.

Valuation and Rate of Return

IN HIS paper on "Valuation and Rate of Return," presented before the joint meeting of the Iowa Electric Railway Association and the Iowa Section of the National Electric Light Association, on June 23, at Lake Okobogi, Iowa, L. B. King, appraisal engineer United Light & Railways Company, Davenport, Iowa, paid particular attention to electric lighting companies, but a few of his remarks are pertinent to railroads.

After outlining the purposes of valuation he discusses inventory of property, from which discussion the following extracts are taken:

It is quite essential that every utility should have a valuation of its property, entirely distinct from the "plant and investment" account carried on its balance sheet, because without this knowledge it is impossible for the operators of the plant to know what results are being obtained in the way of net revenues applicable to paying interest charges and dividends from that particular plant.

Unless operating under a uniform classification of accounts, where two valuations have been made of the same property, one by or for the company and the other by or for the city or state, it becomes hard to compare or reconcile these valuations, and this leads to more or less confusion whether the report is presented in court or to a city council. No matter what system is adopted, after one is adopted and the property accounts are classified, later expenditures for new construction should certainly be classified under the account adopted.

The distribution system of either an electric utility or electric railway utility is the most difficult part of the property to inventory and to obtain prices on. It will very seldom be possible to obtain the exact original cost of building the pole lines, stringing the wire, etc., for many reasons, one of which is that the work is done piecemeal and not all expenditures find their way to the proper charges. It is therefore necessary to estimate the cost of poles, wire and erection to a large extent.

*Abstract of Discussion on Merchandising Transportation, at meeting of Central Electric Railway Association on board S. S. South American, Thursday, June 30, 1921.

Mr. King then takes up the question of intangible fixed capital, in which he argues for capitalization of superseded property, of the cost of consolidation of smaller, older companies, development expense, early losses, cost of establishing business, etc.

CAPITALIZE UNFINISHED CONSTRUCTION

Mr. King also urges the capitalization of unfinished construction. Of this he says: "In the determination of the rate base there should also be included the estimated cost of completing any construction which is under way, and any construction which has been authorized and is certain to be started very soon. Inasmuch as the study of rates is for the purpose of fixing rates for the future, it is only proper that these rates should pay the proper return on additional investments which must be made." The usual account is taken of the subject of working capital.

In his discussion on rate of return, Mr. King points out that many utility commissions have excluded from the valuation the cost of financing, whether this includes the cost of interesting capital, issuing and marketing securities and brokerage fees, or also the dis-

count at which the securities have been sold in order to market them. He then says: "The cost of selling the securities will usually amount to from 2 per cent to 3 per cent of their par value, and the discount frequently runs as high as 25 per cent of the par value. These items, if excluded from the valuation, must be considered in fixing the rate of return which should be insisted upon." With reference to rate of return and the dependent rate schedule, he said: "Certain rates of return have been approved or fixed in many rate cases, and then service rates have been established which were entirely insufficient to earn anywhere near the rate of return which had been approved. When this happens, it is a moral obligation of the regulatory body to make up the deficiency so created by further adjustment in the rate. The mere fixing of a rate of return in an ordinance or decision does not guarantee this rate to the utility, and if the theory of rate-fixing legislation is to be fair, then the deficit created must be made up by future higher rates, and this future must not be so long deferred that the patient dies during the process."

Provision for regular monthly meetings of the executive committee.

A classification and amplification of the definition of duties of officers, which make ample provision for the safeguarding of the funds of the association and the issuance of checks.

Provision for a nominating committee, to be appointed early in each summer, which will make public its nominations thirty days before the annual convention. Other nominations may be made by any member at any time before the actual election.

Definite by-law provision for the mid-year conference.

Definite provision for certain standing committees of the association, such as finance, policy, subjects and meetings, publicity, publications and national relations, with the requirement that these committees make monthly reports to the executive committee. All the members of the first two committees are to be members of the executive committee, and the chairmen of the other four are ex officio members of the executive committee, without vote, unless they are already elected members.

Provision for certain other committees having to do with membership and with co-operation with sectional railway associations.

Definition of the duties of the various committees.

Provision that the dues now in the by-laws shall be maximum dues, which the executive committee may lower, but once lowered may not raise without consent of the association.

Provision that privileges of the association shall be withdrawn from members who are a year or more in arrears in dues.

Other suggestions which the committee has considered and regarding which it makes recommendations are:

That the executive committee consider in its own meeting the question of arranging for admission of municipally owned railways to membership. The executive committee has a subcommittee of its own on this subject which will present data to it.

That the executive committee make a study of the present system of dues.

That the association do not sponsor certain experts in labor, legal, technical or other special lines.

That the executive committee give closer supervision to committee work, arranging that committee reports may be made public at any time during the year whenever finished, rather than holding them to flood the annual convention.

That the executive committee create a special committee for co-operation with educational institutions of the country, to encourage the study of railway and public utility problems, and to assist in placing young engineers with railways.

That the committee codify its own regulations as a sort of executive committee by-laws.

That the executive committee consider the advisability of incorporating the association.

American Association News

Special Reorganization Committee Reports

Recommends J. W. Welsh as Permanent Executive Secretary—Suggests Useful Changes in Constitution and in Procedure

THE special reorganization committee appointed by President Gadsden in response to a resolution of the executive committee to make recommendations regarding reorganization of the headquarters office of the association and any other recommendations regarding the organization or operation of the entire association which it saw fit or thought advisable has now formulated its report and placed it in the hands of the members of the executive committee. The executive committee will hold a meeting which has been tentatively arranged for Aug. 5, at which this report will be considered; but meanwhile the committee decided that it would be advisable to publish an abstract of this report so that the association members might have opportunity to transmit their ideas to the executive committee, and that the executive committee, having the advantage of hearing from the industry, could formulate its program in more nearly complete form, ready for action by the association at Atlantic City in October.

Criticisms of, and suggestions with reference to, these recommendations of the reorganization committee to the executive committee will therefore be welcomed. They should reach the secretary's office not later than Aug. 3, in order to be ready for consideration by the executive committee at its meeting on Aug. 5.

The following is an abstract of the report of this committee. Many of the suggestions, in order to be incorporated in useful form, have necessitated changes in the constitution and by-laws and the committee has therefore drawn up an amended constitution and by-laws in which the following things have been accomplished:

Recognition of the interest in and necessity for study of other transportation systems, and permission under special act of the executive committee for trackless transportation companies to enter the association.

Provision for separate classification of members such as consulting engineers, management companies, investment bankers, etc.

Redefinition of the officers and membership of the executive committee as follows:

A president, to hold office for one year, eligible to re-election.

Four vice-presidents, two elected each year for two-year terms, not eligible to re-election to the executive committee, except as president.

Twelve members at large, six representing manufacturing companies, six representing operating companies; two of each to be elected each year for three-year terms and not eligible to re-election to the same office.

A treasurer, to hold office for one year, subject to re-election.

The two junior living past-presidents, with power to vote.

The four presidents of the affiliated associations.

An executive secretary, who is not a member of the executive committee, but who attends its meetings. He may not be the same person as the treasurer.

That due consideration be given to the geographical distribution of the executive and other committee meetings, to the selection of executive and other committee members, and that the association co-operate with various sectional associations and arrange for representation of the American Association at their meetings.

That the executive committee outline some policy to promote continuous work by committees to avoid a halt in activities for a month or two after annual association meetings, which frequently occurs. Suggestion was made of appointing committee members for a term of years, a portion of the committee retiring each year.

That the executive committee consider giving publicity through the Advertising Section to the sense of responsibility which the electric railway industry today feels in trying to provide complete transportation service to a community.

The question of *Aera* being continued as a magazine or changed to a bulletin was brought before the committee. The *Aera* advisory board was requested to make a report on this subject to the committee. This was presented by Chairman C. L. Henry of the advisory board in person. There was considerable discussion on the benefits of *Aera* as the association's official mouthpiece and as an agent to promote company section work and to reach the rank and file of the industry. There was a discussion as to how best *Aera* could co-operate and avoid unnecessary duplication with existing technical magazines in the railway field. The committee in accepting the report decided to recommend the continuation of *Aera* as a magazine in its present general form.

Finally, in response to a special request of the executive committee to suggest a name or names for the position of secretary, to fill the vacancy created by Mr. Burritt's resignation, the committee recommends that J. W. Welsh be appointed secretary, to date from July 1, 1921.

Progress on Heavy Traction Report

AT A meeting of the heavy electric traction committee, held in the association office on June 23, a draft of the committee's report was read and discussed, after which various suggestions offered by members present and by letter were considered. It was decided to include in the report news of a 60-ton Westinghouse switching locomotive of standard design and of a Butte, Anaconda & Pacific tractor truck, used for switching, as well as views of the Westinghouse and General Electric Paulista locomotives. The tabulated data on multiple-unit equipment, which are being prepared by the General Electric and Westinghouse companies, will be consolidated for presentation in the report as soon as received by the chairman.

Those who were present and participated in the discussions were Sidney

Withington, chairman; C. M. Quereau, John C. Davidson, A. H. Armstrong, J. V. B. Duer, Mr. Masson, representing H. W. Cope, and Mr. Sloan.

Association Announces 1921 Convention Program

THE plans for the 1921 convention at Atlantic City of the American Electric Railway Association have advanced far enough so that the association is able now to announce the tentative program. The duration of the meeting will be as usual from Monday to Thursday inclusive, or from Oct. 3 to Oct. 6. The general subjects to be considered in formal papers, topical discussions or addresses are: (1) a paper on the influence of the electric railways in improving industrial efficiency; (2) a paper on the contrasted advantages of service-at-cost contract franchise and state regulation; (3) a paper on the comparative condition of the industry today and four years ago; (4) a topical discussion on electric railway finance; (5) an address by some public official on a subject relating to the industry.

The first subject will bring out the fact that electric railways are essential to the maintenance of community and commercial life, and that this fact should be kept before the investors and general public. The existence of a street railway has often been taken as a matter of fact, and at present there is much discussion as to whether or not surface railways will be extended. Some hold that as yet the electric lines have not had a full opportunity to demonstrate their maximum utility because of restrictions placed by state laws and franchises prohibiting the transportation of commodities, and it is possible that this view may be presented by one of the papers on this subject.

The paper on service-at-cost will take up the two methods of rate adjustments and present the advantages appertaining thereto so as to permit careful study. Some operators prefer the service-at-cost while others believe state regulation of rates and service to be more desirable.

The subject of comparative conditions divides into four parts, namely, community relationships, plant and facilities, net earnings and finances, and it is hoped that each of these will be covered.

The discussion on electric railway financing will continue that begun at the last mid-year meeting, and a basis of discussion is found in present requirements for mortgage securities, home town financing, financing by sale of capital shares and municipal aid.

The names of those who will present papers on the different topics mentioned will be made public by the secretary of the association as soon as definite arrangements along this line have been made.

The association is not yet ready to announce the name of the public official who it is expected will address the members of the association at the convention.

Committee Plans Increased Activity Organizing Company Sections

THE committee on company sections and individual membership of the association is planning a campaign to organize additional company sections among member companies.

A meeting of the committee is to be held in the immediate future, to discuss the details of the plan to place before electric railways the benefits to be derived from company section organization. The original company section committee, which consisted of Martin Schreiber, chief engineer and manager, southern division, Public Service Railway, Camden, N. J., as chairman; Charles C. Peirce, manager railway department General Electric Company, Boston, Mass., and H. H. Norris, managing editor *ELECTRIC RAILWAY JOURNAL*, New York, N. Y., was recently enlarged by the appointment of the following members: F. G. Buffe, general manager Kansas City (Mo.) Railways; E. F. Wickwire, sales manager Ohio Brass Company, Mansfield, Ohio; J. P. Barnes, president Louisville (Ky.) Railway; F. S. Arkwright, president Georgia Railway & Power Company, Atlanta, Ga.; and B. J. Mallon, assistant general manager Metropolitan West Side Elevated Railway, Chicago, Ill.

The idea which the committee has in mind is the revival of the interest taken in company sections. Prior to the war there were twelve organizations of this kind located at points throughout the country, each of which was maintaining considerable enthusiasm among its members and educational work pertaining to the industry.

During the war many members entered military service and company section activities were suspended. Since the close of the war two new company sections have been organized and many companies are now considering the organization of sections. The committee will be glad to co-operate in every way possible to the furtherance of such plans.

Merchandising Transportation

THE final meeting of the committee on merchandising transportation of the T. & T. Association was held at the association's headquarters on July 14. Those present were J. H. Alexander, Cleveland; H. C. Clark, Newark; G. T. Seeley, Youngstown; K. A. Simmon, for M. B. Lambert, East Pittsburgh.

Since the previous meeting the chairman had prepared in tentative form the full report and had forwarded it to all members for comment. Letters either of approval or criticism from those of the committee unable to be present and others were read, and their comments as they referred to the report were noted. The chairman will present the completed report to the executive committee next week. The report this year will detail actual means of merchandising transportation as practiced by the industry and is a supplement to the report of last year.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Suspension Contemplated

Receivers at Des Moines Appeal to Court for Permission to Shut Down All Service

The receivers for the Des Moines (Ia.) City Railway filed a petition during the week ended July 9 with Judge Martin J. Wade of the federal court asking that they be allowed completely to suspend operation of the railway system in Des Moines.

Judge Wade set July 13 as the date for hearing arguments on the motion and F. C. Chambers, operating receiver, is authority for the statement that in the event the petition is allowed service will be suspended one week from the date of Judge Wade's order.

RECEIVERS LOSE HOPE

This seemingly drastic step was taken by the receivers only after all hope had apparently disappeared of securing relief through the City Council.

M. H. McClean, representing the Harris Trust & Savings Bank, Chicago, acting for security holders of the railway, appeared before the City Council recently with a program for the solution of the railway problem. He proposed to the Council that the owners of the local plant would undertake to secure the funds necessary to secure electrical equipment to restore full service in Des Moines if the City Council would take the following action:

1. Declare the present franchise forfeited.
2. Eliminate the present destructive bus competition.
3. Initiate proceedings looking to the negotiation of a new service-at-cost franchise.
4. Declare its intent to refrain from demanding extensions or extensive reconstruction and from the levying of burdensome special assessments for paving while the company is financially unable to undertake such things.

This program apparently made little impression upon members of the Council and ultimately all four measures were killed by being received and filed. The bus measure appeared to have some chance of passage, but in a stormy session of the Council, in which bus owners and members of improvement leagues were present the ordinance was defeated on its second reading.

MAYOR REGARDS BUSES AS INSUFFICIENT

The program had the indorsement of the Corporation Counsel and received partial support from Mayor Barton. Mr. Barton's attitude with regard to ruling the buses off the street was that this measure should be taken only in the event that the railway agreed to make a substantial reduction in fares. Mayor Barton, however, addressed a letter to the Council in which he stated that the city could not hope to depend upon the buses for transportation.

As the situation now stands, appar-

ently no real action toward a settlement is to be taken until Judge Wade rules on the petition filed with the court by the receivers.

Judge Wade on July 13 took under advisement the petition of the receivers of the Des Moines City Railway for a complete suspension of service. His ruling is expected within twenty-four hours. Just previous to the hearing the city of Des Moines filed a belated resistance to the petition and city attorneys argued for a delay in suspension.

Wage Cuts Being Negotiated in New York

Frank Hedley, president and general manager of the Interborough Rapid Transit Company, New York, N. Y., announced officially on July 12 that he had asked the employees to accept a 10 per cent cut in wages beginning July 24. The present agreement between the company and the Interborough Brotherhood expires on Dec. 31.

Mr. Hedley said that some time ago when the cost of living was rapidly rising, the company at the request of the men voluntarily increased wages, although it had a contract with the men for a fixed wage. Now that conditions are the reverse, the company has requested the men to treat it the same as the company has treated them.

The cut, if accepted, will affect some 14,500 men. Under the present scale of wages motormen are getting 86 cents an hour, guards 58 cents, laborers from 48 cents to 58 cents, and the mechanical forces from 65 to 80 cents an hour.

It is understood that the company has guaranteed that if the men accept the proposed cut, no further lowering of wages will be made until July, 1922, six months after the present agreement with the Brotherhood expires.

Negotiations are in progress between Receiver Hedges of the New York Railways and the employees of that company looking to a similar decrease in wages. The number of men affected by these negotiations is reported to be about 5,000.

As has been stated previously in the ELECTRIC RAILWAY JOURNAL negotiations are also in progress in Brooklyn looking to a cut in the pay of the men employed on the Brooklyn Rapid Transit System. The cut in wages there is expected to be made on Aug. 6 when the agreement between the men and the company expires. It is said that it will be at least 10 per cent. Receiver Garrison is understood to favor a reduction of from 12 to 15 per cent. The employees are conferring among themselves, and their representatives will in turn meet the officials of the company during the week ended July 23 to agree on the size of the decrease.

Another Brawl Started

Chicago's "City Hall" Will Endeavor to Get Five-Cent Fare—Mayor Before New Commission

Mayor Thompson on July 8 started his long promised fight for restoration of the 5-cent fare on the Chicago surface lines. This was in the shape of five petitions filed before the new Illinois Commerce Commission against the Chicago Surface Lines and its four component companies. The petitioners were the city of Chicago, Mayor Thompson and four other "citizens and taxpayers." The preliminary hearing was set for July 12.

The petitions reiterate many of the Mayor's arguments against the surface line companies, arguments which failed to stand the test before the old utilities commission or the courts. He evidently expects to get a more favorable ruling from a friendly commission, the members of which were reappointed recently by his political ally, Governor Small. The petitioners ask that the "final order" entered by the former commission on Nov. 5, 1920, be rescinded, altered or amended and that the rate of fare be reduced from 8 to 5 cents.

Contending that the contract ordinances under which the companies are operating have been abrogated by the "acceptance of a rate of fare higher than 5 cents, the petitioners ask the commission to restore the old rate regardless of the ordinance provision." This is said to be warranted by a change in conditions due to decreased cost of operation. They also ask that the \$7,000,000 now in the renewal fund be applied to the reduction of fares, and that the city's share of the net receipts for the past two years be used for the same purpose or turned over to the municipality for use and occupation of the streets. This latter sum of about \$3,500,000 was tendered to the city by the companies but was refused because the Mayor has insisted that an acceptance would be a recognition that the ordinances of 1907 are still in effect.

The petitioners also attack the Board of Supervising Engineers, claiming that it has no legal right to exist and that the members should not be paid out of the operating expenses of the companies. The commission also is asked to inquire into the salaries paid certain officers and lawyers employed by the companies. The unusual suggestion is made that the companies are not entitled to any return on their investment until they "comply with the law and furnish adequate service." In any event it is alleged that they should not be allowed a return greater than the 5 per cent fixed by the ordinances.

New Orleans No Nearer Settlement

The Commission Council of New Orleans, La., at the conference on July 7 wound up the discussion bearing upon a solution of the city's traction troubles without reaching a definite conclusion. The hearing was confined largely to the matter of the valuation of the railway.

Representatives of the association of commerce and the advisory committee of forty appeared and urged the members of the Commission Council to take immediate action in the matter. They insisted that the commissioners had already had enough advice.

W. S. Penick, one of the committee of forty, said he was impressed with the work of the sub-committee that fixed the valuation and that the amount named (\$44,700,000) was less than some of the members present thought the property was worth.

The conference adjourned with the promise that when "the thing is whipped into shape" those interested would hear from the city.

The delay of the city has entangled it in a web of litigation which will hardly permit the commissioners to extricate themselves before winter. Up to the present time the litigation pending is as follows:

The railway has enjoined the city, in the federal court, from interfering with the receiver in the collection of an 8-cent fare.

The railway has instituted injunction proceedings against the State of Louisiana, in the Civil District Court, restraining it from interfering in the pending controversy between the city and the railway, looking to an adjustment of the city's traction troubles.

The State of Louisiana, through the Attorney-General's office, seeks to restrain the city by injunction from reaching a settlement with the railway upon any terms not in keeping with the company's franchise alleged to have been obtained from the State and not from the municipality.

Seattle Case to Be Determined on Its Merits

In a decision handed by Judge Jeremiah Neterer in the United States District Court recently, the application was granted that has been made by S. B. Asia and thirteen taxpayers of Seattle, Wash., for dismissal of the amended complaint filed by the Puget Sound Power & Light Company for a restraining order to prevent the fourteen taxpayers from interfering with the city in the payment of the interest and principal on the \$15,000,000 of bonds issued by the city in payment of the railway lines now included in the system of the Seattle Municipal Railway.

The court said:

For the reasons given in the decisions filed on April 1, and on March 12, the motion of the defendant is granted. The issue should be determined at the earliest date. The Circuit Court of Appeals convenes in this city in September and it is possible to have the action of this court reviewed at that time if the parties are so

disposed, and all parties may then rest secure in the proceeding which must be adopted.

Judge Neterer handed down a decision on March 12 denying the application of the Stone & Webster interests for a temporary injunction against the fourteen taxpayers. The amended complaint upon which the appeal was handed down recently was in the nature of an appeal from that decision. At that time, the court held that the Superior Court had full jurisdiction in the case. The court held that the payment of the interest when due removed the "contingency which no doubt caused the plaintiff to move in this case and this was done without order or suggestion from this court."

Public Hearing on Question of Rehabilitation

The City Council of Portland, Ore., has adopted a resolution requesting the Public Service Commission to call a public hearing to discuss the question of whether the Portland Railway, Light & Power Company has made the expenditures for maintenance and reconstruction which it promised to make prior to the granting of the 8-cent fare. F. I. Fuller, vice-president of the company, states that his company has no objection to the investigation. He said that in the last seventeen months the company has spent \$431,000 for maintenance, reconstruction and general track and roadway work. The total maintenance for this period was \$1,033,493.

Highway Legislation Before Congress

There is a growing feeling in Congress that federal aid highways should not be "free from tolls of all kinds" as is provided in both the Dowell and Townsend bills now before Congress and in the existing law. This is due to the increasing tendency on the part of motor common carriers to use the public highways without making returns for the use of this facility.

It is recognized that it is frequently very difficult to require a common carrier or a contract carrier performing his service on a highway without penalizing the farmer or other producer in his efforts to get his products to market. Some are of the opinion that the federal law should contain no inhibition against tolls and that the matter better could be left to the states, since the question involved is almost always a local one.

Highway legislation marked time during the week ended July 9. Senator Townsend found it impossible to be in Washington during the week. Both the highway bills are at present under his immediate jurisdiction. The Dowell bill, which recently passed the House as a rider on the Phipps bill, was referred to Senator Townsend's committee. The Townsend bill itself is on the Senate calendar. Senator Townsend is in a position to call the bill up at nearly any time that he desires.

City Still Opposing Indianapolis Street Railway

At a conference of officials of the city and Indianapolis Street Railway recently, the traction men refused to enter negotiations for a contract which would give the city all regulatory rights over the company excepting that relating to rates.

Mayor Jewett said that Dr. Henry Jameson, chairman of the board of the utility, promised him that if the city would not use its influence against the bill to permit public utilities to surrender their franchises all the company would desire to do would be to get relief from the fare provisions of its contract with the city and would submit to city regulation in all other matters.

Dr. Jameson denied having made such a promise. He insisted that he was standing by his word.

Upon refusal of the company to enter into negotiations for the contract Corporation Counsel Samuel Ashby announced that the city will seek to have its common council pass an ordinance or ordinances granting it such regulatory powers as it desires, under authority of section 10 of the public service commission law which provides for such procedure in the case of a utility operating under an indeterminate permit.

It seems certain that the city will insist upon its right to collect \$30,000 a year for the next five years and \$50,000 for the seven years thereafter as a franchise tax payment to the board of park commissioners, as was guaranteed under the surrendered franchise. It also appeared probable that the city will insist that the company continue to pay both for original cost and maintenance of pavement between its tracks.

The traction men insisted that for the city to continue to require these things would constitute burdens which would either break the company's back or necessitate appeal to the Public Service Commission for higher fares. They were pessimistic about the relief to be obtained from a rate greater than 5 cents, because the recent 6-cent charge brought in less revenue than did the nickel when coupled with a charge for transfers.

Arbitrators Reduce Wages in Des Moines

Wages of the employees of the Des Moines City Railway have been reduced from a maximum of 70 cents an hour, the old scale, to a maximum of 59 cents by the findings of the board of arbiters chosen by the company and the men. The employees had sought an increase to a maximum of 80 cents, while the company asked a reduction to 57 cents. The high rate goes to men of more than nine months' service. Those serving their first three months will receive 53 cents and the men over three months and less than nine months 56 cents. The agreement fixed by the arbitrators became effective on July 1.

Jersey Value \$82,000,000— Increased Charge for Transfers

The Board of Public Utility Commissioners of New Jersey at noon on July 14 filed its decision in the investigation of the rates of the Public Service Railway. The board continued the 7-cent fare, but increased the charge for transfers from 1 to 2 cents. It finds a valuation of \$82,000,000 for the property, and estimates the income to be produced by the additional transfer charge, together with the company's other revenue, will afford a return of slightly more than 7 per cent on the value found.

The board's decision is voluminous, comprising more than seventy typewritten pages. It discusses in detail the different estimates of value submitted to the board, the capitalization of the company, its revenues and operating expenses. The board states that it had before it data regarding the value of the company as included in the Cooley appraisal, which was made by the company; the appraisal made by Ford, Bacon & Davis, under contract with the State Appraisal Commission; testimony of the board's own experts and that of the experts for the municipalities and historical costs of the property as developed by witnesses of the municipalities.

The principles of the valuation as declared by the New Jersey courts are referred to and applied by the board. In addition to the decision of the New Jersey courts numerous decisions of the United States Supreme Court and courts and commissions of other States are cited and the principles therein set forth are discussed.

The board found itself unable in view of the testimony presented to accept the valuation figures as presented by Ford, Bacon & Davis to the special state valuation board.

The valuation as found by Ford, Bacon & Davis for the State was \$125,000,000. The valuation as found by Dean Cooley for the company was \$200,000,000. The value claimed by the municipalities was \$60,000,000. Other phases of the rate case are referred to elsewhere in this issue.

Interurban Will Electrify Track to Union Station

The Denver & Interurban Railroad will take steps immediately to electrify the Burlington Railway right-of-way from Utah Junction to Union Station in Denver, according to announcement made in Denver on July 9. The work will occupy about six months' time, the cars being routed over the present line via Globeville and over the Denver Tramway tracks until the project is completed.

Provision for electrification of the railway line into Denver and shortening of the route was contained in a rate increase which was given the company last fall by the state Public Utilities Commission. The estimated cut in the running time under the new system is

20 minutes with the elimination of all the attendant congestion of traffic in Denver streets over which the cars run.

Under the new plan, the electric cars will not run into the Union station proper but will have their terminus on the Colorado and Southern coach tracks to the north of the main lines. With the new system in effect no additional charge, it is understood, will be made for city fares in Denver which are now collected by the tramway company there as franchise rights. This will, under prevailing street car rates in Denver, lower the round trip fare 16 cents.

City to Make Offer for Woodward and Fort Lines

At a conference of the members of the Street Railway Commission with three representatives of the Detroit (Mich.) United Railway on July 8 it was announced that the city would soon tender an offer to the company for the lines on Fort Street and on Woodward Avenue, where the franchises have expired. It is from these streets that the courts have held that the city has the right to order the company to remove its tracks.

According to a statement by Alex Dow, speaking for the company, the company will give its answer as to whether or not it is willing to accept the figures named by the city within forty-eight hours after receiving the commission's offer. No decision was reached by the commission at the recent meeting as to what figures the city will name for the two lines.

The question of ratifying the purchase of these two lines, which will link up the new municipal system with the down-town district, will be decided at the November election. Final decision will be left to the voters and they will be asked to authorize the purchase of the lines at that time.

Some time ago the Detroit United Railway signified its willingness to sell the two lines at such time as the people desired to take them over. Although no announcement was made by company officials following the last meeting, Allan F. Edwards, vice-president of the railway, stated that the company's attitude had not changed. Both Mr. Edwards and Mr. Dow declined to make any statement at the present time except to say that the company was ready to sell these lines to the city.

Denver Plans Wage Readjustment

Negotiations will be entered into in the near future between a committee of employees' representatives and E. Stenger, receiver for the Denver Tramway, looking toward a general wage readjustment. In the meantime, the employees' representatives have notified the trainmen that Receiver Stenger will not restore the top wage of 58 cents an hour which was in effect at the time of the August, 1920, strike—a rate approximately 90 per cent of the present trainmen would have automatically received next month or soon thereafter.

Fares May Go Up in Cincinnati

There will be no reduction in fares on the lines of the Cincinnati (Ohio) Traction Company on Aug. 1. This is a direct result of activity of the citizens' committee, of which William J. Schultz is chairman. Instead there is a likelihood of fares going up on the strength of petitions filed by the committee with the city auditor. The petitions ask for a referendum on the ordinance recently passed by the City Council providing for the lowering of fares.

The filing of the petitions has the effect of suspending the operation of the new ordinance. It means, therefore, that the 1918 franchise ordinance still is in force and under its terms when the traction company suffers a deficit for two months in succession it may give notice of an increase in fares on the fifteenth of the following month, to take effect on the first day of the month thereafter.

The committee submitted 178 petitions which contain a total of 16,644 names. Less than 10,000 signatures were required. The petition seeks to submit the ordinance to the voters at the November election, thus holding up the issue until after that time. Mr. Schultz declared that if the ordinance is voted down by the citizens he will introduce an ordinance by initiative petition providing for a reduction of fares at the rate of one-half cent each month until a level of 5 cents is reached.

City officials pointed out that under the law the formal acceptance by a public utility of any franchise ordinance or an amendment is necessary before the ordinance can become effective. Such an ordinance will take care of the deficits, it was pointed out, and the traction company is not likely to accept it because of these conditions. Mr. Schultz's idea is to abolish the annual franchise tax of \$350,000 paid to the city by the traction company.

Mayor John Galvin, when informed that the petitions had been filed, said it is too bad that a condition of this kind should arise.

Duluth Absconder Captured

Berger T. Jager, former confidential secretary to Vice-President A. M. Robertson of the Twin City Rapid Transit Company, is in the Hennepin County jail under indictment for grand larceny. After confessing to a Cincinnati clergyman he wrote to Mr. Robertson offering to give himself up, and arrived July 9 in Minneapolis in charge of a Pinkerton man. On Jan. 29 it was discovered Jager had converted to his own use a Duluth-Superior Traction Company check for \$4,825. On Jan 31 it was discovered he had taken from a safety deposit vault \$127,000 in securities belonging to the Duluth company. Of these securities \$116,000 were recovered on July 2. Jager had been employed fifteen years by the company before his resignation and disappearance.

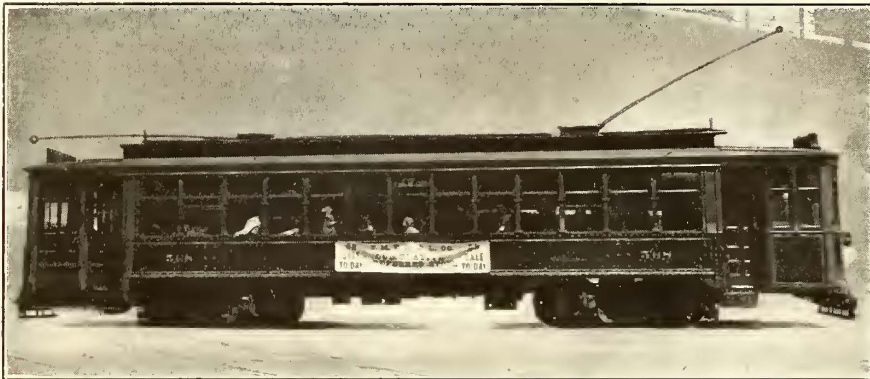
Financial and Corporate

Milwaukee Sells Stock

\$3,000,000 of New Issue being Placed Locally in Campaign with Several Novel Features

A novel advertising scheme has just been made use of by the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., in selling its securities direct to the public. The company is one of the pioneers in direct sales

The methods employed by the Milwaukee Electric Railway & Light Company and its affiliated companies in Wisconsin in selling their securities to the public were described in some detail in the paper, "Home-Town Financing," read by S. B. Way, vice-president and general manager of the company, before the 1921 mid-year meeting of the American Electric Railway Association. This paper was printed in the ELECTRIC



BANNER DISPLAYED ON MILWAUKEE CARS

of securities. As reported in the ELECTRIC RAILWAY JOURNAL of June 11, 1921, page 1160, it recently increased its capital stock. It was decided to offer for sale in 1921 a part of the new issue of preferred stock, largely for the purpose of transforming floating debt incurred during recent years for additions to plant and property to a permanent investment basis. In order to attract attention to the sale which was to begin on June 30, 1921, all the 700 city and interurban cars of the company appeared on the morning of June 30 carrying large banners on their sides calling attention to the sale of securities. As is shown in the accompanying illustration, the banners read: "T. M. E. R. & L. Co. 8 Per Cent Cumulative Preferred Stock. On sale today. Public Service Building."

BANNERS PRODUCE SENSATION

The banners produced something akin to a sensation since they resembled banners announcing picnics. This caused everybody to endeavor to get a good look at them. The banners were supplemented on June 30 by half-page advertisements in the principal Milwaukee daily newspapers, giving further details of the stock issue and of the sale in general. The advertising campaign is being continued, a quarter-page advertisement being used in the large dailies since July 1. Advertising will also be carried in the various Wisconsin dailies and weeklies. In addition, the company has asked the co-operation of its employees to help sell the securities. A small commission will be paid for each share of stock sold by them.

RAILWAY JOURNAL of Feb. 12, 1921, page 304.

The stock being sold is a \$3,000,000 issue of 8 per cent cumulative non-voting preferred. It is being sold at par (\$100). The issue has been approved by the Wisconsin Railroad Commission. The advertisements announcing the sale of this stock call attention to the fact that the increase in preferred stock is the first in twenty years. During the

past twenty-one years, according to these advertisements, the company paid a total of \$5,661,879 to holders of the \$4,500,000 of 6 per cent preferred stock in regular quarterly cash dividends. The holders of the common stock have received during the past nineteen years a total of \$12,315,550, or at an average yearly rate of 6 1/2 per cent.

Adequate Junior Financing

Practical Application of Doctrine of Bankers' Association to Be Made by Holding Company

A committee of the stockholders of the North American Company, New York, N. Y., has recommended to the stockholders a plan and agreement for the reclassification and readjustment of the capital stock of the company. The subsidiaries serve rapidly growing districts constantly demanding increased facilities with the attendant large requirements for new capital. It is explained that continued employment by subsidiaries of bonds and notes as the sole means of financing the cost of such added facilities tends in time to produce a financial set-up top-heavy in debt and to impair the credit of the parent company and its subsidiaries.

In other words, the rapid growth of the properties has required a larger amount of capital than the subsidiaries could provide and it has been necessary to make up the balance from surplus earnings, with the result that the quoted market discount on the stock of the holding company as now organized has made it impossible to meet these capital requirements from the sale of additional amounts of such stock. It thus becomes imperative that a readjustment of capitalization be effected which will make it practicable to raise new capital and permit distribution of a

FIRST TIME IN 20 YEARS

T. M. E. R. & L. Co. Increases Capital Stock \$3,000,000 and Gives Wisconsin Investors an Opportunity to Buy 8% Cumulative Preferred Shares at \$100 a Share.

20-Year Dividend Record

A total of \$5,661,879 has been paid the holders of \$4,500,000 of 6% preferred stock in regular quarterly cash dividends, without a break, during the past twenty-one years. A total of \$12,315,550 has, at an average yearly rate of 6 1/2%, been paid the holders of the common stock in regular yearly dividends during the past nineteen years.

Growth of the Business

Year	Electric Customers	Electric Railway Passengers	Total Operating Revenue
1916	51,243	166,904,402	\$ 8,913,222.15
1917	59,169	178,947,295	10,206,979.82
1918	62,948	160,369,803	12,010,271.27
1919	73,292	158,137,542	14,588,446.05
1920	83,361	213,243,993	18,867,753.61

Today T. M. E. R. & L. Co. is in a better position to render satisfactory and profitable service than ever before. Its continued steady and healthy growth and prosperity are as certain as that of the milk and cream which it produces. It is not only a source of pride to the city of Milwaukee, but also a source of pride to the State of Wisconsin. The company's growth and prosperity are a result of the excellent management of the company and the excellent service rendered to the public. The company's growth and prosperity are a result of the excellent management of the company and the excellent service rendered to the public.

Where You Can Buy the Shares

Residents of Milwaukee city and suburbs will find it most convenient to buy their shares at the Public Service Building, 200 Milwaukee Ave., Milwaukee, Wis. Residents of other Wisconsin cities and towns can order the shares through their local banks or by mail direct from the Company. Mail orders should be addressed to: Securities Department, Public Service Bldg., Milwaukee, Wis. and certified checks, bank drafts or other remittance in payment for shares should be made payable to T. M. E. R. & L. Co.

The Milwaukee Electric Railway & Light Company

Property Value Exceeds Capitalization

Value of T. M. E. R. & L. Co. physical property and plant, state appraised 1916, with addition from May 31, 1921, estimate of working capital, materials and supplies and other items \$52,329,313

Value of working capital, materials and supplies, excess of bills and accounts receivable over bills and accounts payable, etc. 2,976,870

Total value of physical property, cash and accounts May 31, 1921. \$55,306,183

Securities outstanding and on sale, June 30, 1921:

Bonds	\$20,000,000
Notes	2,450,000
Equipment	1,500,000
8% Cumulative Voting Preferred Stock	4,500,000
6% Cumulative, non-voting preferred stock, same issue	2,000,000
Common Stock	8,850,000
Total	\$44,850,000

Total bond discounts and expense, as distributed out of earnings 2,274,118

Total present value of bond, note and stock liabilities \$42,575,882

Excess of actual value (excluding going concern value), over total capitalization, \$3,000,754

larger proportion of these earnings to stockholders.

The present authorized capital of the company is \$30,000,000, all common, of which \$29,793,300 is outstanding. It is proposed to provide an authorized capital of \$60,000,000 to consist of \$30,000,000 of 6 per cent cumulative preferred stock to be redeemable at 105 per cent of par and \$30,000,000 of common stock. Under this plan there will be issued to each stockholder for each \$100 share held at present \$50 par value of 6 per cent cumulative preferred stock and \$50 par value of common stock.

This will require the issuance of the same amount of stock as is now outstanding, so that upon completion of the plan recommended, the relative position of each stockholder will be maintained, unaltered as far as his proportionate interest in the assets of the company are concerned. On the other hand, however, the new plan has the advantage that the preferred stock with its fixed dividends of 6 per cent and the small proportion of the total earnings required therefor should rank as a high-grade investment stock.

Since the return on one-half the capitalization will be limited to 6 per cent, all remaining earnings will be applicable to the common stock. The larger sum thus left available for this issue, it is hoped, will warrant this stock enjoying a market from time to time at par or above. In this way it is expected provision can be made for financing the capital requirements of the subsidiaries, thus permitting the release for dividends of a larger percentage of the subsidiaries' earnings.

The matter of a readjustment of the capitalization of the company was first considered in 1917. Prior to the annual meeting of the stockholders in 1920 a plan was submitted and received the approval of a majority of the stockholders. It was later withdrawn, however, for further consideration. The directors believe that the plan now offered obviates the only objection which was offered to the plan of 1920.

Future Encouraging

Increased Traffic on London Railways Fails to Offset Increase in Operating Expenses

In the 1920 comparative statement of the operations of the five companies, which became parties to the agreement made under the London Electric Railway Facilities Act of 1915, there is shown an increase in traffic receipts of £1,924,388, or 20 per cent over 1919. At the same time the operating expenses increased £2,199,249, or 26.9 per cent over the preceding year.

Allowing for an increase in the miscellaneous receipts of more than £130,000, the net income for 1920 was £141,895 less than in 1919. The statement of the London General Omnibus Company is more encouraging than in

ground Electric Railways may be obtained by the fact that 98,309,320 more passengers were carried than in 1919, an increase of 5.7 per cent. During the same period the total car miles increased 17,751,663, or 11.9 per cent.

During the year the London General Omnibus Company placed an order for 500 "K" type motor omnibuses, making together with those ordered the previous year 1,000 in all, of which 547 had been put into service up to Dec. 31, 1920. Another order has been placed for an improved bus known as the "S" type. The company will then have omnibuses of the "B" type seating thirty-four passengers, the "K" type seating forty-six passengers, and the "S" type seating fifty-four passengers.

A bill which was promoted by the four railway companies for an increase

STATISTICAL INFORMATION OF ROADS IN LONDON FOR YEAR 1920

	Metropolitan District Railway	London Electric Railway	City and South London Railway	Central London Railway	London General Omnibus Company	Total
Mileage—first track.....	27.825	24.137	7.325	6.825		
second track.....	26.887	23.775	7.325	6.764		
Total single track.....	70.800	57.613	15.680	21.375	() 577	
Train-miles—active.....	5,109,101	6,717,301				
idle.....	142.620	119.053				
Total train-miles operated....	5,251,721	6,836,354				
Total car-miles operated.....	19,562,491	27,862,463	7,391,809	8,069,045	85,843,092	148,728,900
Revenue passengers carried:						
Ordinary (cash).....	(a) 95,320,179	112,703,726	26,443,739	39,328,973	767,953,649	1,041,750,266
Workmen.....	(a) 24,338,296	32,946,156	12,011,225	4,536,672		73,832,349
Season.....	(a) 28,040,865	18,940,220	2,683,928	6,454,240		56,119,253
Total passengers.....	(a) 147,699,340	164,590,102	41,138,892	50,319,885	767,953,649	1,171,701,868
Gross passenger revenue.....	£1,533,000	£1,716,476	£353,104	£525,083	£6,533,951	£10,661,614
Average fare per passenger (pence).....	2.49	2.49	2.06	2.46	2.04	2.18
Statistics per car-mile:	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Traffic receipts.....	1 9.67	1 2.78	0 11.47	1 3.63	1 6.27	1 6.72
Operating expenses.....	1 6.53	0 11.94	0 10.45	1 2.43	1 6.64	1 4.74
Net income.....	0 10.30	0 1.53	0 0.45	0 1.76	() 0.005	0 1.76
Passenger traffic.....	7.55	5.91	5.57	6.23	8.94	7.88
(a) Estimated. () Deficit. (c) Miles of street on which buses operate, of which 222 miles are over tramway tracks.						

1919, the net income being a deficit of only £1,942 or a gain of £137,062. The reason, therefore, for the total decrease in net income over 1919 was due to the large decreases of the London Electric Railway of £167,607, the City & South London Company £41,275, and the Central London Railway £84,668.

Some idea of the rapid growth of the service rendered by the London under-

in rates received the Royal assent on August 16, 1920. The new fare was put into operation on Sept. 26, by which ordinary fares were increased about 30 per cent, and workmen's fares and season tickets were also increased. On the same date a new schedule of rates was introduced by the London General Omnibus Company. The results of the increase thus far are up to expectations.

INCOME STATEMENT OF ROADS IN LONDON FOR YEAR 1920

	Metropolitan District Railway	London Electric Railway	City and South London Railway	Central London Railway	London General Omnibus Company	Total
Traffic receipts.....	(a) £2,472,614	£1,716,476	£353,104	£525,083	£6,533,951	£11,601,228
Operating expenses.....	1,509,272	1,387,294	321,911	485,132	6,675,238	10,378,847
Net receipts.....	£963,342	£329,182	£31,193	£39,951	* £141,287	£1,222,381
Miscellaneous receipts (net).....	205,508	134,936	32,309	73,317	247,928	693,998
Gross income.....	£1,168,850	£464,118	£63,502	£113,268	£106,641	£1,916,379
Interest, rentals and other fixed charges.....	327,371	286,266	49,619	54,071	108,583	825,910
Net income.....	£841,479	£177,852	£13,883	£59,197	£1,942	£1,090,469
Reserve for contingencies and renewals.....	45,000	45,000	25,000	20,000	285,000	420,000
Dividend on guaranteed and preference stocks.....	() 124,930	126,947	42,500	21,600		315,977
Total deductions.....	£169,930	£171,947	£67,500	£41,600	£285,000	£735,977
Surplus paid into or drawn from common fund.....	£841,549	£5,905	(c) £53,617	£17,597	(c) £286,942	£354,492
Amount received from common fund.....	42,539	106,348	21,270	70,898	113,437	354,492
Per cent of total.....	12	30	6	20	32	100
Add balance from last year's accounts.....	22,098	20,942	19,750	11,762	59,726	134,278
Total amount available for dividends and further reserves.....	£64,637	£127,290	£41,020	£82,660	£173,163	£488,770
Dividends.....	44,100	104,940	22,200	67,500	114,320	353,060
Balance carried to next year's account.....	£20,537	£22,350	£18,820	£15,160	£58,843	£135,710

(a) Including \$705,347 from Government compensation after providing for adjustments.
 () Exclusive of dividend on second preference stock.
 (c) Deficit net out of common fund.

* Deficit.

Hartford & Springfield Road Doing Better

The committee representing the holders of bonds of the Hartford & Springfield Street Railway, Hartford, Conn., has expressed great satisfaction over the much-improved physical condition of the property and its present financial status, and has urged the continuation of the receivership. The members further suggested that bondholders refrain from sending in for payment the \$600,000 of first mortgage 5s due on July 1.

The bondholders received a statement of operation from Receiver Harrison B. Freeman under date of June 10, 1921. In this report Mr. Freeman expressed the belief that the railway "can be made to earn its operating expenses, taxes and something to apply on bond interest as soon as the industrial depression has passed and there has been a readjustment so that operating expenses can be reduced."

The Hartford & Springfield Division went into receiver's hands in October, 1918. At that time it owed more than \$50,000 in open accounts and had failed

Hartford & Springfield Division			Hartford Division		
	Gross Receipts	Operating Expense		Gross Receipts	Operating Expense
Oct., 1918-1919.....	\$245,675	\$235,942	July 1, 1920-May 1, 1921..	\$152,450	\$130,422
Oct., 1919-1920.....	255,140	265,131	Total system 31 mos.....	804,566	789,479
Seven months to May, 1921	151,301	157,984			

to pay interest on its bonds. Money had to be borrowed to keep the road going, but the company, despite the severe conditions imposed by the influenza epidemic and the coal shortage, weathered the gale so that now all notes have been paid and all bills up to June 1 have been met. Considerable money has been spent in replacement and more than \$20,000 has been expended within the last two years in rolling stock. These various expenditures, together with a 50 per cent wage advance, have eaten pretty well into the company's finances, even though a flat 10-cent rate for each zone went into effect on April 1, 1920, instead of the 7-cent fare. The advance in rates helped materially at first to swell the gross receipts, but this favorable development was only temporary due to the present industrial depression. State taxes and assessments for highway improvements to the amount of \$29,653 accrued from Oct. 1, 1918, to Jan. 1, 1921.

The accompanying statement shows the operating results of the receivership from Oct. 1, 1918, to May 1, 1921.

Deficit of \$150,000 Accumulated Since 1913

The New Jersey & Pennsylvania Traction Company, Trenton, N. J., announces a deficit of more than \$150,000 in operating its line from Trenton to Princeton since 1913, according to figures submitted by the company in the hearing of the application for a 10-cent fare before the Board of Public Utility Commissioners. It was shown that

the company's property was valued by the commission in 1913 at \$500,000 and again in 1916 at \$575,000. Both sides agreed that the 1916 valuation would hold for the proceedings in the present case. The 6 per cent net return on this valuation, which the commission authorized, would amount to \$34,000 a year. A deficit amounting to from \$11,000 to \$50,000 a year has accumulated since 1913. Last December the commission rejected the application to raise the fare from 7 to 8 cents and advised the company that an increased rate would be unlikely to solve its financial problems.

Toledo Going Behind Steadily

With the stabilizing fund of the Community Traction Company, Toledo, Ohio, down to \$183,333 after five months of operation it has been necessary to raise fares to 7 cents with tickets at eight for 50 cents or possibly six for 40 cents.

The report for the month of June made by Commissioner Wilfred E. Cann indicates a deficit of \$32,963 after providing for operating expenses and allowances for various funds. This is a de-

crease of \$1,406 from the previous month. The total accrued deficits so far amount to \$313,634.

This sum will have to be made up by fare increases and savings in operations. The fare raise will not take effect before Aug. 1 because of a special provision in the ordinance which allows six months operation without a fare change.

A decrease in gross revenue from all sources of \$13,663 is accounted for by the fact that riding has fallen off about 18 per cent and that June had one day less of operation than the previous month.

OPERATING RATIO 85.47 PER CENT

There was a greatly increased expenditure on ways and structures during the month of June. A total of \$49,811 was paid out for that work during the month. The ratio of operating expense to income fell to 85.47 per cent during the month, a decline of 2.01 per cent.

The commissioners are not pessimistic over the status of the operation of the lines. They believe that the restriction of buses which will soon be effective will divert about \$16,000 revenue to the railway and that the decrease in power rate will net a saving of between \$10,000 and \$20,000 a month.

The bus ordinance is now in litigation. The Common Pleas Court was upheld during the week ended July 9 by the Court of Appeals and further action was expected on July 13 to bring the matter before the Supreme Court of the State for the final effort to set the measure aside.

Financial News Notes

Wants to Issue Bonds.—The Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., has petitioned the State Public Utilities Commission for permission to issue \$500,000 of 7 per cent secured sinking fund gold bonds and \$98,400 of first mortgage bonds.

\$525,000 Sought to Be Recovered.—Two suits seeking a total of \$525,000 from the Ohio Traction Company and the Cincinnati Street Railway for franchise tax have been filed in the Hamilton County Common Pleas Court by Attorney Robert S. Alcorn as a taxpayer.

Haytian-American Corporation in Difficulties.—A petition in bankruptcy has been filed against the Haytian-American Corporation. The corporation has concessions from the Haytian government for the operation of railway and electric lines, electric light and power companies and a large sugar plantation in Hayti. James N. Rosenberg was appointed receiver in equity for the corporation last April.

Overtures Made to Continue Line.—The Lake Shore Electric Railway has been asked by citizens to abandon its plan of removing service on the Soldiers' Home and West Monroe Street lines in Sandusky. The service will be continued according to company officials provided a 10-cent fare is permitted to be charged on the Soldiers' Home line and a 7-cent fare on the West Monroe Street line. The present fare on other lines is 6 cents with five-for-a-quarter tickets.

\$1,000,000 of Transit Bonds Sold.—The city of Cincinnati, Ohio, has sold to a syndicate composed of Halsey, Stuart & Company, the Guarantee Trust Company, the Bankers Trust Company, Stacy & Braun, the Fifth-Third National Bank and Ames, Emerich & Company, \$1,000,000 of Cincinnati Rapid Transit Railway Construction 5½ per cent bonds. They are a direct obligation of the city, mature Jan. 2, 1967 (optional 1942), and are being offered at 103.50 and interest, yielding 5½ per cent.

"Let Your Service Pay You Dividends."—The Public Service Corporation of New Jersey, Newark, N. J., reported on July 5 that its "Customer Ownership" campaign or its offering of 8 per cent cumulative preferred stock had aggregated subscriptions in the first four weeks of more than \$1,000,000. The campaign was started on May 23. In the first four days 612 new partners were secured, and in the first four weeks this number was increased to more than 4,000. A detailed account of this offering was given in the ELECTRIC RAILWAY JOURNAL for June 4.

Traffic and Transportation

Jersey Case Carried Up

Public Service Commission Appeals From Court Ruling Holding Present Fare Inadequate

The Board of Public Utility Commissioners of New Jersey has appealed from the decision of the Supreme Court of New Jersey in the 10-cent fare petition of the Public Service Railway. It will be recalled that the opinion of Justice Bergen in this case declared that the course followed by the commission was not warranted by the evidence. The commission now replies to the strictures by the Supreme Court upon its action in the 10-cent case.

ORDER NOT WARRANTED

The commission says that the order of the Supreme Court was not warranted by law. Furthermore, the commission holds that the order of the court was in effect the legalizing of "all the bond issues of the Public Service Railway and all the rentals paid to subsidiary companies under lease," the valuations of which have never been determined by commission or court.

The third point made by the commission in its comment upon the Supreme Court decision is that the appeal to the Court of Errors will determine whether the fixing of a just and reasonable rate is a judicial or legislative function. It was expected that the board would announce by July 14 what it considered a just and reasonable permanent fare for the railway.

The commission sought immediate action on its appeal, but Chancellor Edwin Robert Walker declined to convene the Court of Errors and Appeals in special session to stay the judgment of the Supreme Court directing the commission to grant a higher rate of fare than 7 cents to the railway. L. Edward Herrmann appeared before the chancellor at the direction of the Utility Board. The chancellor stated that it would not be possible at this time, upon such short notice, to secure a quorum of the sixteen Errors Court members, as many of the judges are away.

VALUATION BRIEF FILED

In a brief filed with the Public Utilities Commission on July 11 in the Public Service Railway valuation case, George L. Record, representing Jersey City, repeats his stand for the continuance of the 7-cent fare and asks that the Public Service be warned that if it wants greater return on its investment it must rely upon greater efficiency and economy in management. Mr. Record contended:

The evidence shows that the Public Service is not entitled to any increase of fare, and that on the contrary the rapid fall in the price of labor and material will soon put the company where a reduction in the present 7-cent rate should be ordered.

It is not fair that this company should be able to exact from the people who ride in the cars a tribute of \$1,500,000 annually

to pay interest upon securities that represent no invested value. The injustice of taxing forever people who are mostly poor in order to provide an unearned income to security holders who are mostly rich, is intolerable and in the long run can not in the nature of things continue.

The Cooley appraisal of the Public Service property is called "fanciful" and "absurd" by Mr. Record and the one made for the state by Ford, Bason & Davis fails also, he declares, because it is built up upon the same fanciful theory and because the value found depends entirely upon what rate the board should allow. Mr. Record contends for the \$60,000,000 value offered by the municipalities.

Six Cents Upheld

State Supreme Court Reverses Lower Court Decision and Dismisses Attorney's Suit

The State Supreme Court of Louisiana in a recent decision ruled that Shreveport citizens must continue to pay a 6-cent fare until Dec. 31, 1923. This finding by Justice Provosty reversed the Caddo District Court and dismissed the suit of Huey P. Long, Jr., against the Shreveport Traction Company, asking that the 6-cent fare ordinance be declared illegal.

The Shreveport fare controversy dates back to May 18, 1920, when an election was held and a majority of votes cast favored the increase in fare from 5 to 6 cents.

The increase was contested by H. P. Long, an attorney at Shreveport and a member of the Louisiana State Railroad Commission. Having failed in his efforts to defeat the proposition on the day of the election, Mr. Long filed suit to annul the election, alleging certain irregularities in the proceedings of the Mayor and Council in calling the vote. The case was tried in February, 1921, and the District Judge sustained the contention that the irregularities were sufficient for an annulment. Mr. Long came out in public print advising people to pay only 5 cents. The railway advised the people that an appeal would be taken to the Supreme Court and that the fare would be 6 cents until such time as the Supreme Court should pass upon the matter.

In the course of a few weeks the number of patrons who insisted on paying only 5 cents grew to such proportions that the railway instructed its conductors to eject any passenger who failed to pay the full fare. As a result there was considerable confusion and the company compromised the matter by agreeing to issue coupons for 1 cent in case the higher court should sustain the lower court.

The case was argued before the Supreme Court on April 11 and decision was rendered on June 30 in favor of the railway.

More Jitney Decisions

Connecticut Commission in New Findings Reiterates Stand Taken in Hartford-Manchester Case

The jitneys heretofore operating in New Haven, Conn., have been denied certificates of convenience and necessity by the Connecticut Public Utilities Commission with the exception of three buses operating on a route that serves territory intervening between two car lines. This decision also largely prohibits jitney operation to surrounding towns either on account of adequate rail service or because permits have already been granted to other jitney operators.

In denying the applications between Branford and New Haven the commission suggests that the Connecticut Company establish a motor bus service in connection with its trolley lines to serve territory between East Haven and Branford, formerly fed by jitneys and now without other means of transportation.

With regard to the applications for permits to run to Bridgeport and Hartford the commission denied the petitions, holding that in each case there was adequate steam road service and that the routes were intended principally for through traffic and would only serve intermediate territory to a limited extent. However, on the New Haven-Bridgeport route the commission suggested that the Connecticut Company might operate a motor bus from New Haven via Milford to Devon and Allingtown over the main trunk highway, there being no other existing means of transportation, nor any application for this territory. In connection with the route to Hartford, over which large touring cars were run, the commission held the train service was adequate and further that inasmuch as the automobiles with reasonable safe speed took at least thirty minutes longer than the train, the duplicate service was not warranted.

The commission allowed the application for a bus route from New Haven to Waterbury via Bethany on the grounds of inadequate train service, but denied the through route to Waterbury via Ansonia and Derby. This last-named route is co-extensive with or parallels street railway service supplying intermediate points over its entire length. The route to Waterbury via Bethany, it was held, was the quickest, most direct and uncongested for through travel and for that reason the commission denied the applications for another through route via Derby.

Business Men Ask for Cheaper Fares.

—At the monthly meeting of the Allied Boards of Trade of Pittsburgh, Pa., on June 15 constituent organizations through their delegates reported that they had approved resolutions adopted last month by the Allied Boards, calling for a lowering of railway fares in Pittsburgh. The committee on better service was instructed to bring this matter before City Council and the Public Service Commission.

More Municipal Buses

Hylan Administration in New York Establishes Routes Over Grand Concourse

The Emergency Bus System, so-called, of the Department of Plant and Structures, New York, started operation on Sunday, July 3, over an 8-mile line for a 5-cent fare along the Grand Concourse in the Harlem and Bronx districts of upper New York City. Nine two-man doubledeck buses, seating fifty passengers each and mounted on Diamond-T chassis, comprised the original fleet put into service. Eleven more buses are soon to be added. Five of these will be of the same design while the other six will be mounted on a Packard chassis with body patterned after that of the London bus.

ORIGINAL ROUTE EXTENDED

The original bus route extends from 110th Street and Fifth Avenue north via Fifth Avenue, Morris Parkway, Madison Avenue, Mott Avenue, and the

those waiting in the queue a chance to get aboard in their turn according to the number of seats operated. Stops per mile will vary from six to eight. This gives an average speed of 9.75 m.p.h.

The streets over which the buses operate could not be better so far as the paving is concerned. There is less than a mile of granite block paving, some of which is grouted, while the balance is either asphalt or bitulithic macadam. The amount of vehicular traffic which the buses have to contend with is heavy inasmuch as the major portion of the route passes over one of the main arteries for automobile traffic out of New York City for points north and east. This, however, is not as slow moving as the buses themselves for the Concourse has two one-way traffic lanes each wide enough to accommodate three traffic streams without difficulty and the speed limit is not strictly enforced.

The traffic handled during the first few days of operation averaged from

Birmingham Case Closed

Commission Expected to Rule Within Thirty Days on Eight-Cent Fare Plea

Hearings on the application of Lee C. Bradley, receiver for the Birmingham Railway, Light & Power Company, Birmingham, Ala., for an 8-cent fare with a 2-cent transfer charge and an application to keep the present electric light schedules in effect, eliminating an automatic reduction in rates, were held before the Alabama Public Service Commission on July 7 and 8.

Testimony before the commission was completed on the night of July 8 and the case was taken under advisement pending the filing of a budget for the last half of the year by J. S. Pevear, president of the company, and general manager of the property under the receiver. Mr. Pevear is also to file estimates of the receipts of the property for the last half of the year based on the present rate and on the advanced rate. Similar estimates are to be



FLEET OF BUSES SERVING TERRITORY NOW WITHOUT RAILWAY FACILITIES

Grand Concourse to Mosholu Parkway at 207th Street, a distance of 8.3 miles. The buses are run on a ten-minute headway so far as possible. As soon as additional equipment is received, it is planned to open up another route from Fort Lee Ferry thence via 126th Street to Fifth Avenue and to sandwich in with the first-named route so as to give a five-minute schedule over the Concourse. These routes do not operate except for about a half mile on streets occupied by trolley car tracks and then only to cross the Madison Avenue Bridge.

This bus system is the result of action taken by the Board of Estimate on July 1, 1921, granting to Emil Leindorf, owner of the Concourse Bus Line, Inc., permits to use the above streets for motor bus traffic. Operation is under the direction of the City Department of Plant and Structures, and that department furnishes starters and police to man the queue loading areas established at the bus terminals.

The actual running time for a one-way trip took fifty-one minutes, without including any loading time at the terminals. Under the plan of operation all buses must unload before starting on the return trip so as to give

15,000 to 20,000 a day of nineteen hours. Buses for the most part were filled to capacity and it was with difficulty that the no-standing rule was enforced.

Three-Cent Fare Advocated

Councilman Oliver T. Erickson of Seattle, Wash., is sponsor for a 3-cent fare initiative ordinance to be introduced at the spring election next year. Mr. Erickson's proposal is to charge a fare on the Seattle Municipal Railway sufficient to pay interest and redemption charges on the \$15,000,000 of bonds issued to Stone & Webster in payment for the lines bought by the city two years ago, and then meet the cost of maintenance and operation of the lines out of taxation.

City officials have joined with business men in condemning the measure. Mayor Hugh M. Caldwell stated:

I have never thought favorably of the 3-cent fare plan. I think it would hurt the city.

Councilmen John E. Carroll and A. Lou Cohen have gone on record as flatly opposing it, and other members of the Council have similarly expressed themselves. Others hold it would ruin the credit of the city.

furnished by I. W. Ross, consulting engineer for the city of Birmingham. Efforts of the receiver to secure the advance in fares were strongly contested by the city.

Mr. Pevear for the company stated that the increase was necessary in order that the company continue to operate and render proper service. I. W. Ross, witness for the city, maintained that the present 7-cent fare is adequate and that by making a traffic survey, rerouting and effecting certain economies the condition of the property can be improved. In the arguments Mr. Bradley, the receiver, declared that the raise must be granted or the property will have definitely turned back toward the conditions of 1918 when there was an almost total break down in the service. Mr. Johnston maintained that the company should be re-organized and that the additional money needed should be supplied by the stockholders. He contended that about \$2,000,000 in new money should be put into the property and stated that a large part of the heavy expenditures of the receiver represent deferred maintenance and capital investments which should not be gotten from the people in increased fares.

Mr. Pevear outlined the improvements made by the receiver. Twenty-five new one-man cars were bought, 144 motors were installed in old cars which were rebuilt. Trailers were bought and the work of rehabilitating the track was begun. During the receivership, he testified, only the preferred creditors have been paid and all other money has been put back into the property. He stated that the receiver has spent approximately \$2,297,000 in rehabilitation.

Testimony was given to the effect that the number of revenue passengers now using the railway is about the same as in 1913. An exhibit was filed showing that for 1920 there was an increase in comparison with 1913 of 287 per cent in current sold, 115 per cent in gas, and 32 per cent in the number of revenue passengers handled. In May, 1921, the comparison with May, 1913, shows a 253 per cent increase in current, 150 per cent increase in gas, and a 5 per cent increase in the number of revenue passengers handled. Mr. Pevear testified that railway mileage is the same as in 1915, more cars are in operation and better service is being given, but no more people are riding.

An exhibit was filed showing that in May, 1921, a total of 110,500 revenue passengers were handled as against 140,500 in May, 1920. Exhibits were also filed showing that since 1913 the average wage of the company has increased from \$64 a month to \$120. Operating costs of the street railway were shown by another exhibit to have been reduced from 23 cents per car mile in January to 20.1 cents per car mile in May, 1921. This compares with 21.4 cents per car mile in May, 1920. Other exhibits filed showed economies effected and savings made in the shops and a general financial statement.

Cross examination of Mr. Pevear by Mr. Johnston lasted for practically a whole day. Mr. Pevear testified that the property was in fair condition in 1913 and 1914 and that it went down to a point of practical collapse during the war. The property he testified has now been put in good condition. The common stock had not paid a dividend in years and the preferred has paid only 9 or 10 per cent where 42 per cent is due.

Mr. Ross was put on the stand for the city. The most salient features of his testimony were strong recommendation for a traffic survey and rerouting of lines in the business district. He stated that the introduction of an express service to suburbs with local cars for the nearer in traffic would effect a saving. He also recommended the abandonment of a portion of the Tide-water tracks and a rerouting of a portion of that line. He expressed the opinion that a 7-cent fare is adequate in Birmingham. He filed a lengthy statement in the form of an exhibit showing the results of his study of the property which has covered several months.

Following the close of the testimony the commission indicated that it would probably rule within thirty days.

Wants Five-Cent Fare Restored

It was recently stated by Corporation Counsel Lewis that the City of Syracuse would take steps immediately after Nov. 1 for a return of the 5-cent fare on the lines of the New York State Railways in that city. On that date the time will expire in which the city was prevented by the former Public Service Commission from filing a demand for a 5-cent fare.

The reduction will be asked on the ground that the company has installed changes which have greatly reduced the cost of operation and also that the 8-cent fare was not justifiable from the evidence submitted. Mr. Lewis will also petition the Public Service Commission to act on the one-man car issue. He wants a survey by a state expert as many complaints have been made about this method of operation in Syracuse.

Commission Grants Fare Increase

In a decision handed down June 25, 1921, the Wisconsin Railroad Commission granted permission to the Wisconsin Traction, Light, Heat & Power Company operating an interurban electric railway between Neenah and Kaukauna and a street railway in Appleton, to increase its city and interurban electric railway fares. The application for an increase was filed in October, 1920, on the ground that the increases in operating costs has been so large that a fair return on the property was not being earned. The case was heard by the commission in November, 1920, but action on the application was withheld by the commission, until the company made substantial progress towards bettering its gas service.

On Jan. 7, 1921, satisfactory evidence as to progress towards better gas service having been shown, the commission proceeded with the consideration of the case with the result that an increase in railway fares was granted. The cash fare within the city fare limits of Appleton, Neenah-Menasha and Kaukauna was increased from 5 cents to 7 cents; children 3 to 10 years who used to pay half-fare or 2½ cents will now pay 4 cents. The following ticket rates were established: eight tickets for 50 cents good for any 7-cent fare on system; twelve tickets for \$1, good for any 10-cent fare on system; books of twenty-five tickets for \$4, each ticket good for any 20-cent fare on the system and in addition good for transportation between Neenah and Appleton or between Kaukauna and Appleton with transfer privilege to and from city cars in Appleton. The company was also granted increases in interurban cash rates of fare.

Wants Interstate Rate Raised.—The Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., has petitioned the Public Service Commission of Indiana for an increase in its Indiana rates to the Illinois-Indiana interstate rate level.

Transportation News Notes

Print Transfers for Car Changes.—Rerouting the street car lines at Memphis made necessary an initial order for 16,240,000 transfer tickets, requiring twelve tons of paper, according to E. W. Ford, general superintendent of the Memphis Street Railway. For each of the twenty-three lines on which the routing has been changed a new transfer ticket must be provided. Mr. Ford said that the date for starting the new routing awaits the completion of track work.

Nashville Survey Expected Soon.—The traffic survey of the city of Nashville which is being made by Ross Harris, traffic engineer for the city and the Nashville Railway & Light Company, is expected to be completed within the next month. A preliminary report has been published showing statistics of the city but no recommendations will be made until the survey is complete. At present the main thoroughfares of the city are very much congested during the rush hours. One-way traffic is in force on a great many of the principal streets.

Supreme Court to Decide Jitney Issue.—Jitney operators of Atlantic City, barred from driving machines unless they are owners of the cars, will carry the new ordinance which went into effect on June 13 into the New Jersey Supreme Court on a writ of certiorari in an effort to prove it unconstitutional. Under the provisions of the act before the present amendment, the city issued 125 licenses to operators, giving ex-service men first call. It has been charged by the city that scores of drivers were reckless in operating cars. Repeated warnings failed to break up this condition and the law was amended to permit only owners to drive. Many jitney men were thrown out of employment by the new ordinance.

Discrimination Charged in Utah.—The Salt Lake & Utah Railroad, Salt Lake City, Utah, complainant against the Utah Railroad, has filed its brief with the Public Utilities Commission of Utah, in which it is alleged that the acts of the defendant violate sections of the compiled laws of Utah of 1917 and sections of the public utilities act. These acts, it is alleged, constitute a discrimination against the Salt Lake & Utah Railroad and shippers in that a greater amount is charged by defendant's tariffs for carriage of coal via the Salt Lake & Utah road than is charged for identical service via the Salt Lake route. The Utah Railroad has ten days in which to file its brief with the commission, the case having been presented on May 4, and taken under advisement by the commission, both parties to submit briefs in the matter.

Personal Mention

Newspaper Man in Charge of Utility Information Service

Linton K. Starr, assistant city editor of the *Atlanta Journal*, announced his resignation recently to become executive secretary of the newly formed Georgia Committee on Public Utility Information. He will have direction of the committee's activities, which, it was announced, will be to develop friendlier relationship between the public and corporations serving it by acquainting the one with the problems and purposes of the other.

Mr. Starr undertakes the work of the committee with the advantage of a wide experience, not only in the newspaper profession, but in publicity and public relations work of all kinds. A native Georgian, a graduate of Emory University and a former student of Johns Hopkins University, he has lived practically all his life in Georgia and has been familiar from boyhood with the state and its people.

Mr. Starr has been a close student of public relations for many years. During the war he conducted an extensive campaign for the government to arouse interest in and encourage the support of the selective service law in Georgia. His other work has included publicity for Emory University, various conventions and a number of business enterprises. He is an experienced advertising writer.

In its initial statement the committee expressed its views and intentions by saying that "We believe that the utilities have reached a period demanding, first, the highest possible standard of service to the public; and, second, the full understanding by the public of the problems of utilities, which, after all, are the problems of the public."

A. LeRoy Hodges Promoted on the Brooklyn City Railroad

A. LeRoy Hodges was recently appointed assistant secretary and assistant treasurer of the Brooklyn (N. Y.) City Railroad, where, until this promotion, he had been in charge of the statistical work in connection with the operation of the surface lines.

Mr. Hodges' first railway connection was with the Westchester, Kennett & Wilmington Railway, Kennett Square, Pa., as secretary to the general manager, a position he took after a business education in Albany, N. Y. Leaving this property in 1908, he was employed by the General Electric Company as secretary to the assistant manager of the switchboard department. In 1911 Mr. Hodges left Schenectady to accept an appointment as secretary to A. W. McLimont, then vice-president and general manager of the Michigan United Railways, Jackson, Mich.

Upon the leasing of this property to the Commonwealth Power, Railway & Light Company he was appointed chief clerk to C. E. Morgan, general superintendent of the Michigan Railway, and continued in this capacity until Nov. 1, 1919.

J. W. Welsh Secretary

Special Reorganization Committee Recommends that A. E. R. A. Engineer Be Made Secretary

As is indicated elsewhere in this issue, J. W. Welsh, special engineer of the American Electric Railway Association, and acting secretary since the resignation of E. B. Burritt in March of this year, has been recommended by



J. W. WELSH

the special reorganization committee as the permanent secretary. For the past two years as special engineer of the association, Mr. Welsh has conducted studies and investigations of special subjects and has had charge of the information service of the association. Under his direction the Bureau of Information and Service has rendered valuable aid to the industry.

It is the function of this bureau to compile information concerning all phases of electric railway operation. By means of it members of the association are kept informed of the latest developments in the fare situation throughout the country, wages and working conditions, trend of regulation; valuation, franchise requirements, operating methods, operating economies, effect of increased rating of fare, developments in the operation of safety cars, etc. In addition to this direct service to the member companies, the bureau has also prepared statistical data for and otherwise has assisted the various standing committees of the association, *Aera*, and the publicity department.

During each of the past two years Mr. Welsh, as a special lecturer of Yale University, has given a series of

lectures on electric railway problems to Yale graduate engineering students.

Until his appointment as engineer of the association, Mr. Welsh was in Washington, D. C., associated with A. Merritt Taylor, manager of the passenger transportation of the Emergency Fleet Corporation of the United States Shipping Board. Mr. Welsh, who served on Mr. Taylor's staff, assisted in providing transportation facilities to the various shipyards on the Atlantic and the Pacific Coast as well as correcting existing shortcomings where they were present. Previously Mr. Welsh was electrical engineer and traffic agent of the Pittsburgh (Pa.) Railways, with which he became associated in 1906 as assistant electrician. In 1910 he was made electrical engineer and in 1913 took charge of the traffic department. Some of his earlier electrical engineering experience was gained in the employ of the National Tube Company, Wheeling, W. Va., and also in the Westinghouse Electric & Manufacturing Company at East Pittsburgh.

Mr. Welsh was graduated from Wittenberg College in 1900, Harvard University in 1901, and Massachusetts Institute of Technology in 1903.

J. V. Granger has been elected vice-president of the Tidewater Power Company, Wilmington, Del., in which office he succeeds H. C. McQueen.

R. Knecht has recently become master mechanic of the Indiana (Pa.) County Street Railways, succeeding William Kinter.

S. G. Shaw, supervisor of safety on the Denver & Intermountain Railroad, Denver, Col., was recently appointed claim agent. W. C. Simonds has joined the staff of the property with the title of purchasing agent. This position was formerly held by W. S. Brackett. The two first-mentioned men hold like positions respectively with the Denver Tramways Company.

Obituary

Francis B. Crocker, founder of the Crocker-Wheeler Company, died on July 9 at the age of sixty-one. His most important contribution to the electrical industry was work done in making the electric motor a commercial success. His teaching as founder and head of the school of electrical engineering of Columbia University contributed much to the growth and importance of the electrical development of this country. It was his aim to bring about standardization in the electrical industry and as the first chairman of the standardization committee of the American Institute of Electrical Engineers, his painstaking work earned for him much commendation. He was a past-president of the American Institute of Electrical Engineers, the Electric Power Club and the New York Electrical Society.

Manufactures and the Markets

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

ROLLING STOCK PURCHASES

BUSINESS ANNOUNCEMENTS

Improvement Expected in Track Material

Market for First Half Year Has Been
Very Quiet—Deliveries Are
Immediate

The market for track material such as spikes, bolts and nuts should show improvement in the fall months, according to the opinion of producers. It is generally conceded that present buying is no better than the poor demand existent all the first half of this year. There are some inquiries out from steam roads as though they were feeling out the market, but actual orders are scarce.

Electric railway business is flat, but some of the lines in the Middle West have inquiries on the market for creosoting ties, which may be the first step in track construction work. Both steam and electric roads have been out of the market for so long that it seems conditions of demand cannot help but improve. The chief retarding factor, it is felt, has been high labor costs, and this now seems to be on the road to being remedied. Export sales are dead, and prospects there are uncertain as this market is largely contingent upon large world affairs.

Jobbers of this class of material are buying from hand to mouth and generally have low stocks. Manufacturers, however, still have considerable supplies of cancelled material on their hands and are able to make immediate shipments, though manufacturing operation is at a very low point. Some producers who make only bolts and nuts are closed down entirely, though as recently as late last summer production was two to three months behind on spikes and as long as six months on bolts and nuts.

The current base price on standard railroad spikes and track bolts has receded about $\frac{1}{4}$ cent in view of the recent drop in steel. In car lots spikes are now quoted at 2.90 cents to 3 cents per pound and track bolts at 3.80 to 4 cents. These price reductions are generally expected to improve buying.

Brill Has Built 2,961 Safety Cars to Date

The J. G. Brill Company and its subsidiary companies, the American Car Company and Wason Manufacturing Company, have received orders to date for a total of 2,961 Birney safety cars, according to the June, 1921, issue of the *Brill Magazine*. With the exception of those still in the course of construction, shipments of these cars have been made to 168 street railways in the United States, Canada, Mexico, South America, New Zealand and Hol-

land. Indications are, it is stated, that light-weight, one-man-operated safety cars will very rapidly be installed in service in practically every country in the world. Up to the first of this year a total of 4,193 safety cars had been ordered by companies in this country and Canada, statistics compiled by the *ELECTRIC RAILWAY JOURNAL* show. This total covers the five-year period previous to the present year as this type of car was practically unknown before 1916, when 187 safety cars were purchased.

Steel Cut Brings Price Drop in Electrical Items

Conduit, Outlet and Switch Boxes and
Locknuts and Bushings Are Re-
duced This Month

Following general reductions in the price of steel products that were made recently, lower quotations have resulted on a number of electrical steel products. Effective July 7 the U. S. Steel Corporation reduced the price of standard steel pipe from the discounts shown on its April 13 card as follows: $\frac{1}{4}$ -in. and $\frac{3}{8}$ -in., 1 point or \$2 per ton; $\frac{1}{2}$ -in. to 6-in., 2 points or \$4 per ton; and 7-in. to 12-in., 3 points amounting to \$6 per ton.

Effective July 11 a number of leading manufacturers of electrical conduit also reduced prices by increasing the discount allowed distributors, at the same time advancing the number of their base card by one. The decrease amounted to 9 points on black and galvanized conduit in some instances and 5 points in others. The difference of 4 points is accounted for by earlier price reductions on the part of those who at this time dropped the least, so that base prices are said to be approximately on the same level. Sizeable stocks are reported by manufacturers, with keen competition for orders and generally quiet conditions of demand.

In line with the drop in the price of base sheets, outlet box quotations have been generally reduced 11 per cent on black and 10 per cent on galvanized. The drop became effective on various dates ranging from June 27 to July 11, and was made by increasing the discount 5 points in each case.

Locknuts and bushings were reduced approximately 29 per cent by manufacturers during the same period as the price decrease noted above. The discount to jobbers in standard packages was increased 10 points.

Switch box prices are also down, the drop in several instances there becoming effective around the first of the month. The amount of the decrease varied with different manufacturers, ranging from 11 to 35 per cent.

Secretary Hoover Optimistic on Trade Situation

Although Exports Are Lower in Value,
He Foresees Slow Increase Under
Better Economic Operation

In an address in Boston on July 12 Herbert Hoover, Secretary of Commerce, in discussing the foreign and domestic business situation, said that although our exports and imports had dropped nearly 50 per cent in value from the high water mark of a year ago, more of this decrease was due to the fall in prices than to a decrease in volume, and that with Russia not exporting food he saw no reason why we should not continue to export approximately the same volume of foodstuffs that we have shipped abroad during the past six months. This item alone, he said, even at present prices would be triple our pre-war food exports and would represent the equal of more than 60 per cent of our whole pre-war export trade. He thought also that the demand for our raw materials would slowly increase toward pre-war amounts and that our manufacturers should be able to hold special fields for repetitive production and ingenuity. He expected we would have to make an effort to hold the market for manufactured goods wherever we come more directly into competition with the European manufacturer, but that we can do it if we will work and apply our brains to it.

On the financial side of our situation he expressed the belief that our world credit situation is not so serious as to require extraordinary solution. The real cure for this depression as all other depressions is courage and applied intelligence, and the return to primary virtues of hard, conscientious toil and economy in living. On every side there is evidence that the vast majority of our nation is making a gain in effort in those directions equaled only by that of 1918, and the day some months ago when we entered this effort we fundamentally turned the corner of this depression. While our recovery may be slower than some may expect nothing can prevent the prosperity of a country where the people have enlightenment, wish to work, wish to produce and wish to do right by their neighbors.

New York Retail Cement Price Down to \$3

Producers Hold Sufficient Stock to Make
Prompt Shipments, Though Pro-
duction Is Low

Activity in the market for cement continues on the same quiet level as heretofore. Electric railways are buying very little and demand from other sources, such as steam railroads or the building trade, has not picked up appreciably. Early this year, in view of the low production of cement, it seemed possible that deliveries might become pushed if building work started up as was expected. At present there seems little chance of a shortage developing, however, despite the fact that produc-

tion is still down very low. Dealers are existing from hand to mouth but producers have a fair surplus quantity, which insures immediate deliveries. Manufacturers apparently believe that the situation will drift along on its present quiet plane for a few months, with some activity in the field of residential construction work but very little in other classes of building.

Producers' prices have held steady since last April, when a cut of 60 cents per barrel was made, but meanwhile retail quotations have continued to drop. At the time producers lowered prices last April New York dealers were quoting \$3.50 per barrel. This has since dropped to a nominal price of \$3.20 per barrel, but at the same time prices are being cut to \$3, though some interests refuse to sell as low as that. The peak price of cement was \$5.20 per barrel, New York, in effect last November.

Rolling Stock

Tampa Electric Company, Tampa, Fla., has placed an order for twelve more Birney safety cars for the Tampa service to be delivered in time for the next tourist season. General Manager Thomas J. Hanlon, Jr., announces. The company placed a previous order for eight safety cars with J. G. Brill Company in February, 1920.

Pacific Electric Railway Company, Los Angeles, Cal., received ten new all-steel, multiple-unit, interurban motor cars in Los Angeles on July 5. These cars, which were described on page 393 of the August 21, 1920, issue, are the first installment of thirty ordered in July, 1920, from the Pullman Company. Delivery was delayed by two fires in the Pullman works, which destroyed a large amount of construction material. Twenty of the cars are equipped with four motors of 150 hp. each, the cost of the motor cars being \$46,000 each. The remaining ten cars are trailers, costing \$25,000. The ten motor cars yet undelivered are expected to arrive within a few weeks, followed by the trailers. The new cars, which weigh 57 tons each, will be distributed on the Long Beach San Bernardino and other lines of the company where traffic is heavy, the intention being to transfer the cars now in use to other divisions of the system.

Detroit (Mich.) Municipal Railway, mentioned in the June 18 issue as asking for bids on 100 safety cars and fifty Peter Witt cars, has this week placed orders for these. Information just issued on the Peter Witt cars is given below. Specifications on the safety cars are as shown below:

Number of cars ordered	50
Date of order	July 12, 1921
Delivery	November
Builder	G. C. Kuhlman Car Company
Type of car	Peter-Witt, Detroit Safety Type
Seating capacity	56
Weight, total	36,000 lb.
Length over all	48 ft. 1 in.
Truck wheelbase	5 ft. 2 in.
Width over all	8 ft. 2 in.
Height, rail to trolley base	11 ft.
Body	Steel
Interior trim	Cherry
Headlining	Agasote
Roof	Arch
Air brakes	G. E. C. P. 27
Axles	4½-in. A. F. R. A. Standard
Bumpers	Hedley Anti-climber
Car signal system	Faraday Buzzers
Car trimmings	Statuary Bronze
Center and side bearings	Perry-Hartman
Control	K-3562, with door contacts and line switch
Couplers	Metropolitan
Curtain fixture	Curtain Supply No. 88
Curtain material	O'Bannon D. C. No. 076
Designation signs	Keystone
Door operating mechanism	National Pneumatic at center doors
Fare boxes	Johnson
Fenders or wheelguards	H. B.
Gears and pinions	G. E. Long Adendum tooth, solid
Hand brakes	Peacock
Heater equipment	Cutler-Hammer

Headlights	Golden Glow, No. 96
Journal boxes	M. C. B.
Lightning arresters	G. E.
Motors	G. E. 265—35-hp., 4 per car, inside hung
Paint	Sherwin-Williams, Old Dutch, enamel
Registers	International R-7, air-operated
Sanders	Osgood-Bradley sand traps
Sash fixtures	O. M. Edwards Company, 13½ D1
Seats	Brill
Seating material	Rattan
Step treads	Feralun
Trolley catchers or retrievers	Ohio Brass Company
Trolley base	Ohio Brass Company
Trolley wheels or shoes	Ideal, 4½ in.
Trucks	Brill, 77 E1
Ventilators	Garland
Wheels	Steel, 26 in.
Special devices, etc.	Nichols-Lintern Tail Light, Duplex
Safety Car Devices	Equipment like that used on safety cars, controlling front door and interlocking center doors.

Track and Roadway

Southern Pacific Company, San Francisco, Cal., received bids in the office of the purchasing agent up to July 14 for track bolts and spikes.

Tampa (Fla.) Electric Company is planning to double-track about 2 miles of its line.

East St. Louis & Suburban Railway, East St. Louis, Ill., will not be able to make the improvement as requested by the city of Belleville, O. W. H. Sawyer, president, stated that \$30,000 had been appropriated for maintenance in the city during the year and that this amount would not cover extended enlargements demanded. Members of the Belleville Council will consider paving West Main Street by assessment and will compel the railway to install double tracks between the Public Square and the Southern Railway crossing.

Indiana Service Corporation, Fort Wayne, Ind.—Owing to poor business conditions the proposed big truck plant which is to be erected just east of Fort Wayne, Ind., by the International Harvester Company has been postponed for about a year. But the Greater Fort Wayne Development Company—a million dollar concern—which was formed among Fort Wayne business men to build homes, etc., is going ahead with plans already formed for putting in streets for the plant. One of the things which the development company is pushing right along is the extension of the car lines of the Indiana Service Corporation to the plant. Recently a remonstrance was filed by residents of Pontiac Street against the double tracking of that street, so another route to the plant east of the city is being considered.

The Public Service Railway, Newark, N. J., will shortly begin to lay Belgian blocks along the tracks from Bordentown, N. J., to Black's Creek.

Cincinnati (Ohio) Street Railway, has submitted proposals to the Cincinnati Traction Company for a loan of \$650,000 to finance improvements which will include the proposed extension of the Warsaw Avenue line. Director of Street Railways, William Jerome Kuertz, disclosed this fact recently to a delegation of citizens who called on him for information in regard to the above mentioned extension.

Power Houses, Shops and Buildings

Boston (Mass.) Elevated Railway has signed a lease with the Boston Transit Commission for the construction and operation of an underground tunnel station at Maverick Square, East Boston, the end of the East Boston tunnel. At present the cars run up an incline and radiate to the various surface lines. When the new station is constructed train service will be operated through the tunnel and passengers will change to surface cars at this point. The estimated cost of this station will be \$1,650,000.

Hudson & Manhattan Railroad is purchasing all its energy from the New York Edison Company. This company took over the power plant located at Washington and Bay Streets, Jersey City, New Jersey. It contains four turbo-generators with a total capacity of 8,000 kw. The plant was built in 1910.

Professional Note

Ford, Bacon & Davis, consulting engineers, New York, have opened an office at 1421 Chestnut Street, Philadelphia. At this office the firm is prepared to render services in the way of making valuations, engineering reports, superintending construction, conducting management of public utilities and industrial properties and preparing financial programs. The office in Philadelphia is in addition to the offices at 115 Broadway, New York, and at 58 Sutter Street, San Francisco.

Trade Notes

The Esterline-Angus Company, Indianapolis, Ind., has developed a portable concentration meter for showing the degree of concentration of chemical salts in water.

W. H. Bloss of the executive sales department of the Ohio Brass Company at its main office, Mansfield, Ohio, died at his home in that city on June 22. Mr. Bloss had been with the company continuously since 1906 and for the past year had been in charge of steam railroad electrification for the company. Previous to that he was in charge of sales for the central district.

The Mica Insulator Company, 68 Church Street, New York City, has developed a flexible oiled cotton tube for withstanding high temperature in electrical machine and instrument winding.

J. R. Crawford, general sales manager of the Union Carbide Sales Company, has succeeded N. C. Catabish as general sales manager of the National Carbon Company, Inc., Cleveland, Ohio.

P. L. Laughlin, assistant district sales manager of the Verona Tool Works, Chicago, has been made district sales manager, succeeding John B. Seymour, who assumed the office of sales manager Superior Supply Company, Chicago, last month.

Jeffrey Manufacturing Company, Columbus, Ohio, manufacturer of conveying, elevating, crushing machinery, etc., has moved its New York office from 50 Dey Street to 30 Church Street. Harold B. Wood has been made district sales manager, succeeding F. C. Ayers, who has left the company.

The International Register Company, Chicago, Ill., through its sales agent the Electric Service Supplies Company, has leased 112 International portable hand registers to the Third Avenue Railway Company, New York City. These registers are attached to the fare box and used as an additional check on fares. About 250 of them were also placed with the Public Service Railway Company, Newark, N. J., earlier this year, for use on its safety cars.

The Worcester Electric Tool Corporation, Worcester, Mass., has recently been organized to take over the business of the Stenman Electric Valve Grinder Company, Inc., the Stenman Electric Tool Company and the Consolidated Machine Tool Company, all of Worcester. The principal products of the company for the present will be the "HusKee" three-in-one combination service tool and the "HusKee" service drills. These tools have been on the market in a small way for the past six months and are the result of over two years' development work. The officers of the company are: H. P. Gleason, president; A. G. Sandberg, treasurer; J. J. Kelleher, sales manager, and Harold Raine, advertising and service manager.

New Advertising Literature

Pneumatic Tool Accessories.—Ingersoll-Rand Company, 11 Broadway, New York City, has issued a twenty-four-page booklet illustrating and describing its line of "Little David" pneumatic tool accessories.

Fire Fighting Equipment.—The Oil Conservation Engineering Company, Cleveland, Ohio, has issued a pamphlet on "Electric Light and Power Plant Fire Protection," which describes the "Oceco" 10-gal., non-freezing fire extinguisher.

Track Equipment.—A. C. Callon, Portland, Ore., dealer in cars, rails and other railway equipment, has issued No. 117 of "Callons Bulletin," dated June 1921, which lists various quantities of new and relaying rails, frogs, switch points, track bolts, spikes and other equipment.