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THE NEBULOUS 6-CENT FARE TAKING FORM

For many years electric railway men have talked about the 6-cent fare for city properties in somewhat the same way that mathematicians discuss the fourth dimension. It was of interest from a theoretical standpoint, problems based upon its use could be worked out mathematically, but it could not be visualized as actually in existence. We are glad to say now that the 6-cent fare is disappearing from the category of imaginary quantities. It is emerging from its nebulous form and becoming concrete. We had occasion only four weeks ago to commend the frank statement of President Brush of the Boston Elevated Railway to a legislative committee that the 6-cent fare must come as the ultimate solution of that city's transportation problem. In our issue of April 7 we published an abstract of a report on the Philadelphia situation in which the engineers of the city referred to a 6-cent fare on the proposed high-speed system as one way of reducing the deficit from its construction. Now the 6-cent fare is being talked of as a possibility in Albany as well as in Rochester.

A RETURN TO FORMER PRACTICE

A 6-cent fare for city service would simply mean a return to the fare charged by street railways for ten years or more beginning about 1864, when the rides were, of course, very much shorter than they are now. The conditions under which this fare was introduced about fifty years ago are described in a report presented at the 1911 convention of the American Electric Railway Association by Frank R. Ford. Briefly, they were permitted because of the higher cost for labor and material, and in March, 1865, Congress enacted a law giving legal status to the raising of the rates above the 5-cent fare provided in the charter of many of the companies. In many cases the fare was not reduced to 5 cents until after the roads were electrified. No serious difficulties were experienced in the collection of the 6-cent fare, and we do not believe that there would be any now, although fare collection methods have changed radically in the interval. The fact that in none of the cities where the plan has been broached has there been any serious outcry against the suggestion is at least some evidence that the public realizes that the high cost of living which has affected each individual is something from which railway companies are also not exempt. Undoubtedly there will be problems to be solved, but the 6-cent fare has at least been seriously suggested, and we hope that before long it will become an actuality in several cities.

DATA FOR ELECTRIFIED TRACK MAINTENANCE

The question of the effect of electrification upon track life and way maintenance is an important one. The factors entering the problem are many, and their comparative influences have been the subject of many disputes and much discussion. It is pretty well agreed, however, that the rail wear chargeable to the locomotive itself is considerable, and that well-designed electric locomotives with their distributed wheel loads, short rigid wheelbases, high adhesive coefficients, and absence of unbalanced reciprocating parts should cause much less damage to track structures than their competitors, the heavy modern steam locomotives. Unfortunately, there is a general lack of definite data relative to this claim. The results obtained on European roads are not conclusive, and few engineers would care to consider that the results obtained in this country in connection with interurban and rapid-transit lines and terminal electrifications are applicable to main-line conditions. Yet if it can be shown conclusively that with electric motive power even a small saving can be made in the annual cost of maintaining way and way structures, now grown extremely large, such a showing cannot help but have an important bearing on decisions relative to future electrifications. Now that several roads in this country are operating heavy main-line service over extensive electrified divisions, data on track maintenance ought to be available, and it is to be hoped that they will be obtained in the near future.

GOOD WATCHES ESSENTIAL FOR UNIFORM LOADING

In looking over a car-loading graph, it is usually taken for granted that every platform man had exact time. A recent investigation on a Southwestern city property, however, showed that a considerable part of the inequality in car loading was due to inaccurate watches. In the case of short-headway routes, it was found that an error of one minute in making time points might mean a difference of 33 per cent in loading. The trainmen were naturally astonished when told how influential such seemingly small variations could be, for they did not consider one or two minutes important. The use of car-checking instruments on this road is a further reason for seeing that the trainmen have correct time, inasmuch as the uniform making of time points is an essential factor in proper operation. While the management of this road feels keenly the need for better watches, it hesitates to put its men to the expense of buying movements which will meet the specification of less than

thirty seconds variation in a week. It realizes that the cost of uniforms, supplies, etc., is quite a burden, especially for new men. Since this situation must be common to many properties, it might be well for some progressive watch manufacturer to appoint local agents who would be authorized to make especially easy terms to railway men. The railways themselves might also help by offering to pay part as reward for high efficiency in coasting, use of energy, freedom from accidents and the like. Certainly, if exact time can mean so much in railroading, the managements should be willing to do all they can to encourage the use of real railroad watches by their employees.

WHAT IS "SELLING TRANSPORTATION"?

Mr. Frothingham's paper at the 1917 mid-year meeting brought to the front the latest and most important question in the electric railway field—that of "selling transportation." As from now on we shall hear a great deal on this topic, it is well that there should be a fairly definite understanding of what this term means.

One school has defined "selling transportation" as selling the railway's viewpoint through liberal publicity, courtesy and prompt attention to complaints. It would also endeavor to cultivate salesmanship among trainmen by having them pay more attention to the needs of passengers and even to acquiring a speaking acquaintance with riders such as exist between a store clerk and frequent customers.

To another school, "selling transportation" means largely the selling of the greatest possible number of rides. Less stress is placed upon extensive publicity than upon giving a service that the public cannot overlook. The modern one-man car is the strongest weapon of this school, and most effective use is being made of it.

To us, "selling transportation" means a blend of both views. We do not believe that the most persuasive and pervasive publicity will do a railway any permanent good if it does not back up its expressions with accomplishments; nor do we believe that a betterment of service made almost *sub rosa* is going to get enough extra business to justify the outlay.

When all is said and done, the public can be sold only on good service well advertised, and with a definite personality behind the service. The public has too many troubles of its own to harbor resentment long once the causes have been removed. Two or three years of well-advertised good service have, in more than one community, changed active hostility first to indifference and then to support—yea, even to home financing of the local utility's needs. The merchant who acquires a run-down or bankrupt store does not argue with customers as to who was responsible for past wrongs. He simply begins anew as if nothing had ever happened. Let the live electric railway man follow his example. He should quit apologizing for his predecessors and buckle down to the job of selling transportation by making his railway a credit to the town both in its service and in its publicity.

CONSERVATION IS NOT NECESSARILY RETRENCHMENT

There is great confusion in the minds of many people as to what they should do now that war is here. Like Mr. Britling, they feel they want to aid the government in some way but do not know what that way should be. As the present conditions are not greatly different from those which prevailed in England during August, 1914, it might be well to consider first the warning issued on April 19 by Howard E. Coffin, a member of the advisory committee of the Council of National Defense, as to some of the things not to do. In this interview, Mr. Coffin pleaded against a fitful and ill-advised campaign of public and private economy. Briefly, his thought was that while we want to reduce waste, especially of food and of the raw materials which will be directly useful to ourselves and to our allies in the prosecution of the war, we need quite as much to be sure that general business conditions shall remain as nearly normal as possible. In other words, in the mobilization of our military strength and industries, we must mobilize as well all of the commercial energies of the country so as to make each unit as productive and efficient as we can. To quote Mr. Coffin: "The country must keep going strongly ahead as a successful economic machine. We must have successful industries, if successful tax levies are to be received."

To this statement there will be general agreement, but what is its application to the electric railway industry? As we see it, the application is this: The electric railways of the country are a vital factor of both our military defense and our industrial activity, especially when the latter is under high pressure conditions. British experience has shown that during war a considerable additional traffic should be expected on the local railways. This will come partly as relief to the main lines, to which naturally will fall the long-distance haulage of men and supplies, and partly because of the greater need of transportation by the workers in the industrial army and others who remain at home. The first duty of the electric railways, therefore, in any scheme of national defense, is to maintain their properties in such condition of maximum efficiency that they will be able to supply all transportation of a military and civil character that may be demanded. This obligation naturally includes that of co-operating with the military authorities in the extension of their transportation facilities, where necessary, to care for more rapid movements, and in other ways already detailed in these pages.

A secondary duty, subordinate only to the first, is that of carrying on this work with the greatest efficiency and with the least waste. This means a conservation in the operation of each property of the physical equipment, the labor employed and the administrative and executive talent exercised. If this conservation can best be secured by the expenditure of money (and real conservation often means expenditure rather than retrenchment), money should be spent more liberally than ever before. It should be spent intelligently, however, so as not to interfere any more than is necessary

with the needs of other industries or of the nation as a whole. This logically suggests that the economies sought should primarily be those secured by labor-saving devices or methods, or in reducing the consumption of raw materials useful in commerce or in a military way.

We have no doubt that the electric railways will respond promptly and patriotically to the needs of the nation. This country is being drawn together as never before. Its people realize that the fundamental point at issue in the present war with Germany is not infringement of our international rights at sea, no matter how outrageous those infringements may have been. But a great moral issue is involved. Shall the weak be constantly in danger of the imperialistic ambition of their stronger neighbors? Shall all nations be subject to repetition of the present war when one country feels that it has the military power to conquer another? Shall the future government of the civilized world be autocratic or democratic? Americans with their traditions of liberty can answer these questions in only one way.

CHARGES FOR UTILITY MANAGEMENT

The decision of the Illinois commission in the Lincoln Water & Light Company case, mentioned in our last issue, and the order issued last December by the Massachusetts Gas & Electric Light Commission on the award of contracts, abstracted at the time in these columns, are important because of their bearing upon the subject of the relations between holding companies and their subsidiaries. By the Massachusetts order, which was addressed "to the several companies under the supervision of the board," it will be remembered, all utilities are forbidden to contract for supplies, construction or management with concerns in which the utility's officers or directors have a substantial interest, except where such concerns secure the contract on the basis of the most favorable offer, to be ascertained by "honestly conducted competitive bidding." Exceptions to this general rule are to be made only under unusual circumstances and with the approval of the board. Existing contracts shall not be renewed upon expiration except upon the terms prescribed.

Without doubt, instances may be found of the abuse of power by holding companies over their subsidiaries. Perhaps the order of the Massachusetts board was prompted by some case of the flagrant misuse of such authority, although none was mentioned. It is a self-evident duty of every public utility commission to protect the customers of public service corporations from such abuses. We believe, however, that in carrying out any policy looking to the divorcing of the management and the ownership of a utility, a commission should exercise the greatest care to avoid doing permanent injury to the utility and its patrons. Competitive bidding for expert management would bring into competition the successful, experienced firm and the amateur organization. The latter could well afford to assume such responsibility for little or no compensation because of the experience to be gained and the opportunity to establish a reputation. The older organization could not afford to take unprofitable work. It would have the handicap of high salaries for men of wide experience and long training. Its bid, by comparison, might seem excessive if the award were to be determined solely by the charge paid.

We have, however, no serious fear that so revolutionary a change in the management of our utilities is about to take place. The present practice of having the owners operate their own property is not only the most logical from the standpoint of the stockholder but it should be best for the patrons because it should encourage a broad policy of building up the undertaking. The cases cited are warnings, however, that commissions in future rate cases will give more attention than they have in the past to the charges made for management by holding companies and to the benefits derived under such management by the local utility involved.

ONE-MAN CARS SHOULD MEAN BETTER SERVICE

There has been some talk about the desirability of avoiding the term "one-man" car because of its effect on the public. There is equal danger, in our opinion, that some railway managers will become confused by the term and will come to look upon this valuable type of car simply as a means for cutting the labor cost in half. The one-man car in itself is not a Moses in the wilderness, loaded down with manna for starved receipts; nor is it a sure-cure physician for swollen expenses. If one were to judge by what some managers say, he would think they believe that the adoption of one-man operation simply means closing the rear platform of their present cars and discharging half of their platform men. Any company which attempted this would be undeceived in twenty-four hours; indeed, such a trial might lead to prohibitory legislation throughout an entire State.

There is just one right way to introduce the one-man car on anything but a thinly-patronized line, and that is to increase the service proportionately when the change is made. It is also desirable, when possible, to install entirely new cars.

Do people prefer five-minute to ten-minute headways. and seven-and-a-half-minute to fifteen-minute headways? They do, and they are showing it by 10 to 15 per cent greater riding. Do the platform men prefer the all-automatic car, more pay, and undivided car management? They do, judging by their unwillingness to return to the old plan on other routes. Are the railways who bought new cars earning their rewards in lower costs of operation and maintenance? They are, to the extent of seeing undreamed-of possibilities in the new method of operation in the threefold aspect of better earnings, satisfied employees, and improved relations with the public.

Therefore, let every railroad man do all he can to prevent jeopardizing the wonderful good that can come from handling the one-man car in the right way, not as a bald scheme for reducing the number of platform men but as a splendid means for regaining or actually creating traffic through the provision of better, safer, and faster service.

Instructions for Inspecting Bridges and Culverts

Thorough Inspections, Supplemented by Use of Work Sheets Outlining Annual Improvements, Reduce Emergency Repairs to Minimum

By FRANK B. WALKER
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OF the various articles and letters published during the past few years in the ELECTRIC RAILWAY JOURNAL on the subject of bridge and culvert inspection, the writer wishes especially to commend the editorial which appeared in the issue for April 19, 1913, page 706. This editorial showed clearly that safety of operation and continuity of service depend upon rigid periodical inspections. It included specific suggestions as to the methods to be used in inspections and in recording the results thereof. The present article takes up these important subjects in greater detail with a condensed set of instructions of an extremely practical character.

IMPORTANCE OF REGULAR INSPECTIONS

The proper inspection of bridges and culverts is one of the most important duties of the maintenance of way departments of both steam and electric railways. Bridges on steam lines are, with but few exceptions, owned and maintained by the operating companies, while on electric railways, particularly street railways, the major portion of the bridges are owned and maintained by the cities, towns, counties or interests other than the operating companies. However, a greater amount of inspection work falls upon the maintenance of way engineer than the total amount of the company's capital invested in bridges indicates, as all structures over which cars operate must be thoroughly inspected at stated periods whether the operating company owns them or not.

Several years ago the writer, when connected with the engineering department of a transcontinental railroad, had occasion to inspect and supervise the maintenance of all bridges and culverts on many thousands of miles of line, and also to instruct others in the best ways of making the necessary inspections. The instructions given below are a result of that experience. I have found that they apply equally well to the inspection of electric railway bridges.

These instructions were printed on the front fly leaves of all of our bridge inspection books. After the fall inspection was completed the notes were checked over by the resident engineer, and a decision was made, after consultation with higher officials, as to the permanent work or betterments that would be authorized. Work sheets, setting forth the nature of the work for each structure, were then prepared, bills of material were made, requisitions were sent to the stores and purchasing agent, and all other arrangements were completed in the late fall or early winter so that bridge work could be started promptly in the spring and carried out continuously during the working season. In normal years contracts for masonry, filling or other work can be let at lower prices if bids are requested in the fall or winter, as all materials are cheaper during the slack winter season. It is astonishing how little emergency work on bridges is necessary when the inspection is properly made and when the work of repairs is closely followed by frequently checking up the bridge work sheets.

INSTRUCTIONS TO GOVERN INSPECTIONS

1. Master carpenters should make a thorough inspection of every bridge and culvert on their divisions each spring and fall, and should be held responsible for their safe condition. Should any structure be found to require immediate repairs, the work must be done at once, and a full report made to the division superintendent and resident engineer.

2. The resident engineer should make work sheets from fall inspection notes, showing the work to be done and material required.

3. The spring inspection should show whether or not the work outlined on the work sheets is sufficient to keep the structures in safe condition until the following spring. If more work or material is required than the work sheets show, the additional work or material required should be fully specified. A copy of these inspection notes must be made and forwarded to the resident engineer and reported by him to the chief engineer for approval.

4. The fall inspection should be made jointly by an assistant engineer and a master carpenter. They should both inspect thoroughly every bridge and culvert, entering in their inspection books complete notes, including bills of material required and a statement of the work to be carried out during the ensuing year.

_____ *Division.* _____ *Line.*

Date Inspected _____

Bridge No.	DATE Erected	DATE Present Piling	DATE Present Deck	KIND Pile, Trestle or Truss	Length	Size or Height	Fire Proof Deck Kind	Condition of Bridge and Description of Work to be Done	MATERIAL REQUIRED

SPECIMEN PAGE OF BRIDGE INSPECTION BOOK USED ON BAY STATE STREET RAILWAY

5. All bridges and culverts should be inspected on main lines and sidings, at highway crossings and overhead railway and highway bridges which the company maintains or over which it operates. It should be indicated who maintains other overhead bridges. The length and height of each structure should be noted, giving those of each part separately, such as approaches, trusses, timber, steel, etc. The height of bridges should be taken from the lowest ground surface to the base of the rail. The length of timber culverts should be taken as the length of the lower timber. Masonry culverts should be measured for length between the outer faces of parapet walls. In rectangular culverts the height should be given first and the width second. The length and width of overhead bridges should be given, and also the overhead and lateral clearance of each track.

Galway Line Western Division 49 Sheets

Statement of Work to be done on Bridges & Culverts During 1914 Sheet No. 2

Bridge & Culvert Numbers	Kind	Lg'th.	Ht.	Work to be done	Approx. Cu. Yd. Exc.	Fill-ing	Mas-nry	Rip-rap	Ln. Ft. Brs. to be Fl'd	Lin. Ft. of Pipe Required Kind	12"	15"	24"	30"	36"	Number Tim. Bill	A.F.E.	Item	Date Com-pleted
25	Pile	11½	3½	Piles and deck poor. Replace with 36 in. concrete pipe 32 ft. long, fill and place one metal number plate.		30		8	12	Concrete Pipe					32			21	

SAMPLE WORK SHEET WITH AN ITEM INDICATING NEEDED REPAIRS

The kind of each structure should be given, *i.e.*, whether pile or timber, truss or girder bridge, plank, timber, stone, concrete, stone arch, brick arch, iron, sewer, reinforced concrete, corrugated-iron pipe culvert, etc., as the case may be. The names of streams spanned should be given, and stations, mile posts, and overhead bridges should be entered between the proper bridge numbers. Panels, spans or bents should be numbered, say, from east to west with No. 1 at the east end.

6. If a structure requires no repairs for one year it should be marked "O.K." in the column "Condition of Bridge." When structures require repairs or renewals within one year, a concise statement should be given of the conditions of various parts upon which work is needed, as piles, trestle bents, sills, caps, stringers, ties and guard rails, fireproof decking, etc.

7. The current year's work sheets should be checked up to see if the work specified thereon has been properly completed. If any additional work is required it should be so stated and a list of necessary material specified.

8. New bridges or culverts constructed since the last inspection should be recorded in the proper places and their exact locations given.

9. Bridges or culverts needed to provide additional waterways should be recommended and notes given on the character of the work, the approximate drainage area, why needed, etc.

10. The bridge records should be kept up to date in a separate book. They should give the number of piles in each bent, length of spans, number and size of stringers, length of trusses or girders, height of each bent, pier or abutment, etc.

11. The condition of piles or timber bents should determine the renewal of decks. For bridges with decks in fair condition and piles above ground in poor condition, it should be determined whether frame bents cannot be substituted for piles. The cheapest construction consistent with safety and future repairs or renewals should be adopted.

12. The following information should be given regarding structures which have about reached their limit of life: (a) Material required to repair. (b) Material required to renew complete with similar construction. (c) Permanent work required, and whether of steel, masonry, pipe or filling, or a combination. The approximate yardage of filling and masonry should be given and the size and length of steel or pipe. High-water marks should be observed and in so far as possible conclusions drawn as to the kind of foundations or if further investigation is necessary. If the size of the permanent opening required is doubtful, further investigation should be recommended before the permanent work is ordered. If an opening is to be filled, the inspector should note whether it is used for a roadway or a cattle pass, giving the size and location of the opening to be left in the permanent structure. When pipe culverts are recommended, the height of fill should be noted, and also whether pipe can be put through the present opening or if excavation will have to be made from the top or by tunneling through the fill.

13. Data on highway crossing culverts, giving their location, length, size, kind of material, distance from the bottom of ditch to the top of the road, and on which side of the track, should be recorded in separate books. Minor repairs can be made with second-hand timber. If the culvert is to be completely renewed, the area of the required opening should be stated.

14. The size and kind of ties on steel bridges should be noted, and also whether they are creosoted or painted, whether the rails are cutting into the ties, the number and kind of tie plates, if any, and the kind of rail joints, if other than angle-bar pattern. A small percentage of renewal ties for steel bridges should be of the same size as those in use at the time, but when the major number of all of the ties are to be renewed, they should be of standard sizes, surfaced on four sides and painted. The inspector should also note the condition of wood fillers under the ties.

15. If bridges have inside guard rails the kinds and conditions of these should be noted as well as their height with respect to the track rail. The inspector should notice if the points are in place, and whether or not repairs or renewals are required.

16. The alignment and surface of the track on bridges and approaches should be noted, whether it is tangent or curved and if properly centered on the bridge. Track on approaches should be in good surface and firmly bedded to avoid any undue shock when trains come onto the bridge at a high rate of speed. If the track is creeping on the bridge, the direction and the amount of movement should be ascertained.

17. The kind and condition of fireproof decking on all bridges should be noted.

18. Piles should be inspected below the ground surface as well as above. If they sound hollow, a hole should be bored to determine the thickness of the shell, and the kind of wood if the piles have been treated.

19. Trestle bents or towers should be properly sway-braced, and all braces, longitudinal and lateral, should

be drawn up tight and should have sufficient bolts or spikes to hold them properly. They should stand plumb and be otherwise in good condition.

20. The amount of camber in each truss should be noted. Timber truss spans with spliced tension chords should be thoroughly examined for pulling, which would indicate weakness due, perhaps, to a defective clamp.

21. Truss rods should be taut and in uniform tension, and all nuts should be screwed on just far enough to maintain a full grip on the screw ends. Howe truss rods are provided with about 6 in. of thread.

22. Broken angle blocks should be noted, and also the location of the break and the distances the pieces have spread apart. Any crushing of lugs into the timber should be observed, and also the inspectors should note whether braces bear squarely on angle blocks or whether they are working.

23. The condition of jib plates should be noted, as well as crushing of jib plates into the chord. Lateral systems should be examined for tautness and to insure all members being in place.

24. In the case of a steel bridge the date when it was last painted and the brand of paint used should be recorded and, from its condition and the percentage from which paint has scaled, it can be determined whether it should be spot or full painted.

25. The accumulation of dirt or débris on the bridge should be noted, especially on steel members or the masonry.

26. The bridge and vicinity should be cleared of all inflammable material.

27. The boxes at the bases of steel columns and other places which would hold water should be examined to see that they are filled with concrete, or other protection provided.

28. Steel bridges should be examined to see that they have sufficient room for expansion and contraction at the ends, and if they do not the reason should be ascertained. If the bridge is on rollers they should be in proper adjustment, and if pin connection is used the nuts should be secure on the pins.

29. If the paint has cracked or if rust has formed around rivet heads, the rivets should be examined, as this condition is an indication of loose rivets. Special attention should be given to stringer rivets, since it is most likely that the top rivets in these connections will be loose.

30. In truss spans, especially those of light design, the action under train loads should be noted and, in case of undue deflection on swaying, arrangements must be made to take accurate measurements. Adjustable counter-rods must not be allowed to hang loosely and must not be tightened more than just enough to secure a good bearing with no train on the bridge. When tension members are in multiple, they should be equally strained.

31. Details of machinery, including latches, rail lifts, rollers, etc., on all drawbridges should be examined, and the drawtender consulted about any defects he may have noted.

32. Piers and abutments should be examined carefully for signs of yielding, either by settling, or by cracking or bulging under earth pressure, and the location of cracks, by means of a sketch, should be given together with suggestions as to their probable causes. The condition of pointing should also be noted. Bridge seats and capstones should be examined for cracks or evidence of crushing.

33. The inspector should note whether there is evidence of scour around foundations, recommending any additional work, riprap or other materials if needed, and whether there is an accumulation of drift or other obstruction in the channel which should be removed or if the channel should be straightened.

34. It should also be noted whether any repairs are needed for timber cribs, wing dams, ice breakers, shear dams or other miscellaneous structures in connection with the bridges around river or stream channels.

35. Water barrels should be examined to insure good condition and location on all wooden bridges. All bridges should have proper bridge number boards, and Howe trusses should have ladders.

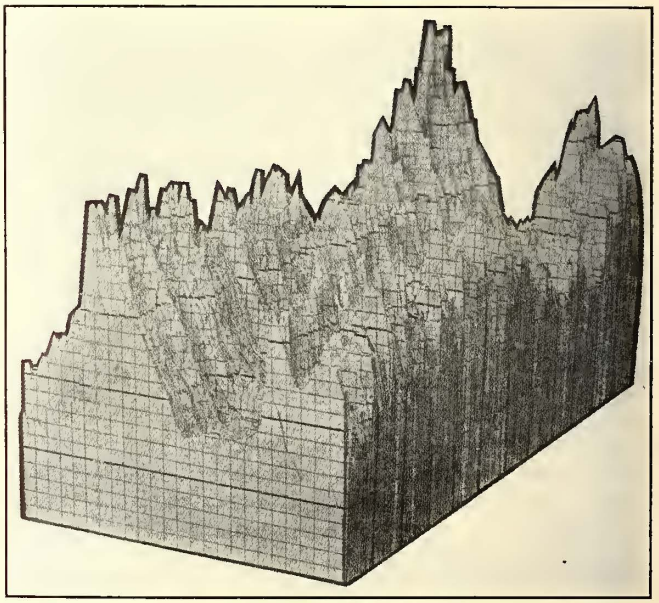
36. When tracks are on highway bridges the kind and condition of pavement should be noted.

37. Record should be made of speed-limit or other restriction signs on bridges or approaches.

38. When any portions of the structures are subject to smoke blast from locomotives, careful and thorough inspection of such portions must be made by using calipers to determine the net sections of the iron or steel and the amount of corrosion, if any. To inspect chords and floor beams, portions of timber floor must be removed when necessary.

Stereotomic Representation of Power Plant Load

The presentation of data in relief has long been found effective in many fields where it has been desirable to show the inter-relation of three variables. The application of this plan to power-plant loads is comparatively recent. There is, however, no more practical way of showing the changes in magnitude and character of load than that shown in the illustration reproduced from the March 31 *Revue Générale de l'Electricité*. It depicts the 1916 load of the Société Hydro-Électrique des Basses-Pyrénées, which has a promising power development in the extreme southwest corner of France.



REPRESENTATION IN RELIEF OF POWER PLANT LOAD

The model is made by mounting the load charts on thin sheets of cardboard or wood, sawing along the graphs and stacking the sheets as shown.

Tuesday, Oct. 9, has been selected as Fire and Accident Prevention Day. Preparations for a suitable celebration are under way by the safety and insurance interests. The National Safety Council, 208 South LaSalle Street, Chicago, Ill., will welcome suggestions as to the most effective means for eliminating accident risks.

Reducing Load vs. Raising Yield Point as Rail Corrugation Cure

Periodic Cracking and Buckling of the Stretched Skin Observed in Microscopic Study—Alternate Rolling and Abrasion Is Not Vibration

By HENRY M. SAYERS, M. I. E. E.
London, England

ON page 8 of the ELECTRIC RAILWAY JOURNAL for Jan. 6, 1917, a review of the present position of the corrugation question states: "A microscopic analysis of the mechanical properties of a corrugated rail by H. M. Sayers revealed nothing new in the way of remedy." The writer has no complaint to make of that comment; the paper was intended to be a statement of what the microscope revealed, and it was hoped that it would lead to a useful discussion and perhaps some suggestions. This hope was not fulfilled. The study* to which you referred, however, did leave on my mind some very definite views both as to the root cause of the trouble, and the direction in which cure or prevention may be found.

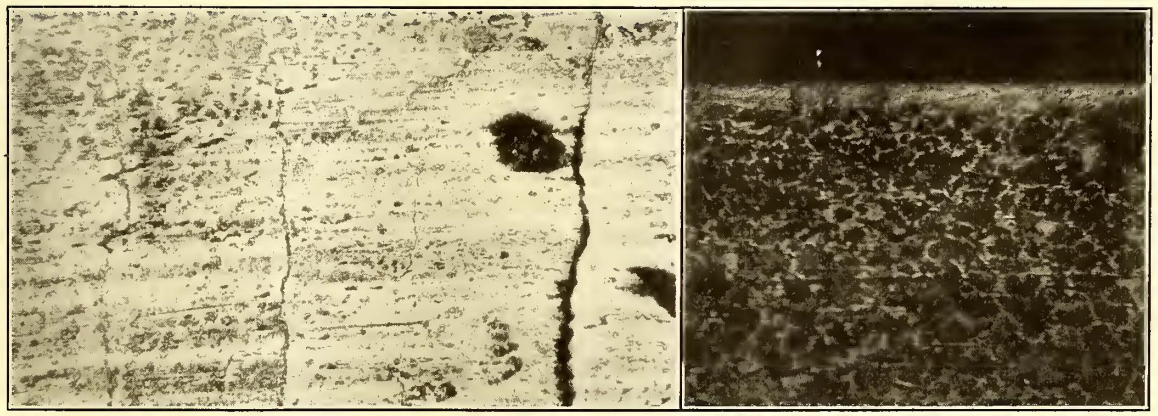
The sentence following the foregoing quotation states: "Perhaps the vibration theory is still held by the largest number of people, but the remedies based upon this theory, where they have been used, have failed to cure the disease." The writer, however, believes that the pseudo-regularity of rail corrugations, which naturally suggested the vibration theory, has been a "red herring"; it has set people to tracing and trying all kinds of ideas based upon the vibration of something, from the rail-rolling plant to torsional vibrations of axles, but nothing has resulted from these many lines of investigation, so that in the face of such an accumulation of negative results, the conclusion is that the vibration theory is not proved, and holds out no prospect of cure or prevention.

METALLOGRAPHICAL CONDITION OF CORRUGATED RAILS

The microscopic study, the results of which were set out in the article and illustrations previously referred to, does at least show what the metallographical condition of a corrugated rail is, and lends itself to our interpretation, which finds support from other sources, of the causes of that condition.

The micro-photographs of the table of a corrugated rail show that on the crests the steel has a smooth structureless appearance crossed by cracks, while in the hollows the normal structure of pearlitic steel is shown. Fig. 1, which pictures the surface of the rail table at the boundry between a crest and a hollow, shows all these features distinctly, although the low magnification of 110 diameters, essential to showing a sufficiently large field, does not bring out the detail of the pearlitic structure. Fig. 2, which is a longitudinal section at a crest, shows that the amorphous or structureless metal has a small but sensible thickness overlaying the normal ferrite-pearlite metal.

The amorphous condition must be the result of something which has happened in the course of service, producing an obvious difference of structure. What that something is ought to be the answer to the question: What is the cause of corrugation? The author would say that a great deal of light is thrown on the subject by certain facts relating to the behavior of manganese steel, which are very clearly stated by Sir Robert Hadfield in an appendix to the "Report of the Hardness Tests Research Committee" of the British Institution of Mechanical Engineers, published in November, 1916. Defining "hardness" as simply "resistance to deformation," Sir Robert says: "According to this criterion manganese steel is of a soft nature. Its yield point is low, a very small load producing permanent deformation. From this standpoint manganese steel, unless its character is altered by deformation, is really soft, yet in the ordinary acceptance of the term this material is considered very hard. Why is this? The explanation is that the ordinary term involves a loose conception of more or less (no definite



RAIL CORRUGATION—FIG. 1—MICROPHOTOGRAPH OF AMORPHOUS SURFACE CROSSED BY CRACKS; FIG. 2—MICROPHOTOGRAPH OF LONGITUDINAL SECTION OF RAIL AT CREST OF CORRUGATION, SHOWING THIN AMORPHOUS LAYER OVER NORMAL STRUCTURE OF METAL. MAGNIFICATION IN BOTH FIGURES, 110 DIAMETERS

*See ELECTRIC RAILWAY JOURNAL, April 22, 1916, page 786.

amount) of deformation, and the 'hardness' is that of the more or less deformed material. Manganese steel is an extremely hard wearing material, in spite of its natural softness, because the act of abrasion deforms the material locally, its resistance to further deformation increasing enormously thereby, and the material actually abraded off is not manganese steel in its natural state, but is the quite different material, deformed manganese steel. Manganese steel is soft, deformed manganese steel is hard."

Periodic Cracking and Buckling of the Stretched Skin

The material called manganese steel in this quotation is not exactly defined, but from the particulars given in the body of the report, it seems that it is steel containing about 13 per cent of manganese, which is, of course, very much more than is found in ordinary rail steel. Nevertheless, it may be suggested that ordinary rail steel partakes to some extent of this quality, and in the tests reported by the research committee, it is shown that ordinary steels under rolling wear suffer a surface change which is indicated by an increased surface hardness of from 4 to 15 per cent, as measured by the scleroscope, against an increase of about 100 per cent for the manganese steel. This supports the aforemade suggestion that the difference between the behavior of rail steel and manganese steel under rolling wear is one of degree only. The report of the committee describes what takes place as follows: "It may be assumed that, on first putting on the load, the yield-point of the material of the specimen on an extremely narrow strip of the surface of contact is exceeded, and that slight deformation takes place depending on the radius of the wearing and the amount of the load. After a few revolutions, therefore, there will be a thin ring of material around the specimen which has been permanently strained, and whose resistance to deformation is greater than that of the original material. Wear will then begin to take place by the gradual disintegration of this ring, both under the repeated loadings and under the extremely small but definite elastic slipping of the surfaces over each other, which is the well-known characteristic of rolling."

Now apply this to the case of a rail. With the axle weights and wheel diameters now in vogue, it is clear that the compressive stress on the rail table attains very high values amounting to approximately 50 tons per square inch in some cases where it has been measured by somewhat approximate methods, this value being considerably in excess of the yield point of the unaltered material. The result is the production of a skin of deformed metal, which has a higher hardness number, and a greater resistance to rolling wear than in its original condition. This altered or deformed skin is what is shown by the microscopic analysis of the "crests" of the corrugations. That at least is the interpretation submitted by the writer. The deformation, however, is not confined to the minute or interval structure. There is a distinct lateral flow or extension of the surface metal, as is clearly shown by protrusion on the sides of the table, both on the gage side and the outside of the rail. There must be a tendency to longitudinal stretching also, resisted by the cohesion of the metal and resulting in periodic cracking and buckling of the stretched skin. This initial cracking is clearly shown in the photograph, Fig. 1, and the writer would say that this phenomenon does not appear to have been observed, or at least published by any other investigator.

The report of the research committee states that "Another characteristic of the test is that part of the material worn away during the progress of the test appeared to be rolled into the surface again and finally came away in flakes." That the cracked and buckled deformed skin comes away from the rail is made clear by the writer's examination, the normal structured hollow being an evidence of it. Given a fairly uniform initial extension of the surface by the rolling action of the wheels, a periodic occurrence of the flaking off seems natural. The "pitch" of this flaking is probably determined by the mechanical constants of the steel and the severity of the rolling action, leading to a breaking up under a kind of shearing action, between the stretched skin and the unaffected body of metal below.

It is therefore suggested that the crests of corrugations consist of deformed, hardened and stretched steel, and the hollows of unaltered steel from which the hardened material has flaked away. Now the points at which flaking commences may very well be determined in part by such disturbance to smooth rolling of the wheel as derive from joints. The position of ties, etc., and the sometimes fairly regular sequence of joints and corrugation patterns suggests this. Another cause of the pseudo-regular pitch may be due to alternating skid and rolling of the wheels, the skid producing abrasive wear (on the hollows) and the rolling confirming the hardening of the skin. This is suggested by the frequent appearance of corrugations on track of moderate curvature, where there must be some alternating wheel action, and also by its constant appearance at places where braking is frequent. This has been especially noticed at "optional" stopping places on British tramways, where braking at short notice is frequent. There, the alternating action is no doubt that of rolling and skidding, whereas on the long radius curve it is alternately rolling and slipping. Slipping and skidding are equivalent in this respect, and it is noteworthy that against such abrasive actions the deformed steel was not found to show any superiority to the unchanged metal in the tests of the previously mentioned committee.

This alternation of rolling and abrasion is, in the writer's opinion, the only form in which the "vibration" theory comes into the matter at all, and it is not, he suggests, properly named as vibration.

Reducing Load vs. Raising Yield Point

The question remains of cure or prevention. The formation of a skin of deformed steel presenting a greater resistance to rolling wear than the unaltered metal is clearly not a defect, but a good point in rails. But the mechanical extension or detrusion which accompanies it under present conditions is just as clearly an evil, and is the root of the trouble. It occurs because the specific load put on the material is much in excess of its yield point. The cure, therefore, is to arrange either that the load shall be reduced or that the steel of the rails shall have a higher yield point, *i.e.*, that the initial hardness shall be increased.

Taking the first item, it does not seem possible to reduce the axle loads on electric railway vehicles. The tendency, both in the United States and Europe, has been for cars to become heavier. It has been noted, however, that in the United States there has been a considerable revulsion toward the use of lighter cars, chiefly motived by consideration of the traffic conditions (such as jitney competition) and partly by desire to reduce the cost of operation. But the loading of the rail surface depends not alone on the axle loads but also on the size of the wheels. Larger wheels mean a larger contact area, and therefore smaller specific load than smaller wheels, for the same axle load. It seems

therefore that the tendency to use 24-in. and 26-in. wheels which has been in evidence in the United States lately may be expected to increase corrugation, unless the axle loads are proportionately decreased. It may be mentioned that in the United Kingdom the commonest size of tramway wheel is 30 in., but many "maximum traction" trucks have driving wheels of 33 in. With such trucks it has been found that the specific load put on to the rails by the smaller (20-in. to 24-in.) pony wheels is greater than that due to the drivers, *i.e.*, the smaller diameter more than neutralizes the lower axle load.

There remains the question of rail hardness or resistance to mechanical deformation under a rolling load. The most obvious way of increasing hardness is to increase the carbon content, which has been done to a considerable extent on British tramways, 0.6 per cent of carbon being usual. A number of the most experienced tramway engineers have consistently sought an increase, without much success, however, as the makers object to such high carbon contents for technical reasons. Nevertheless this carbon increase seems the most obvious and logical road in the direction of preventing corrugation, unless a sufficiently cheap "alloy" steel can be produced.

There is also a question as to the manganese content. The high percentage manganese steels are very hard, but their ductility is also considerable. This is well shown by the way in which 50-ton to 70-ton manganese steel wire and steel can be bent and pressed to shape without distress, as clearly brought out in the manufacture of aeroplane parts.

Some experience seems to show that a high silicon content combined with high carbon is a good feature in rails. Certain lines built of such rails have remained free from corrugation during many years of service, and it is believed that high silicon facilitates manufacture in several respects.

These, however, are metallurgical questions on which the author is not competent to pronounce. What he suggests is that a rail steel is wanted which will carry rolling burdens of 50 tons per square inch or over, without deformation in dimensions, although deformation to the extent of formation of a uniform skin of rolling wear resisting properties is quite desirable.

For obvious reasons there is little opportunity of making progress in Europe in these directions, and we will have to content ourselves with studying corrugations for some years to come. But in the freer conditions of the United States experience and progress would seem to be possible, and the writer hopes that this discussion of his microscopic studies may lead to some more complete and effective threshing out of the matter than it has yet received.

Mechanical Aids in Accounting*

Voluminous Work of Milwaukee Accounting Department Necessitates the Operation of Many Labor-Saving Devices—What These Machines Are and How They Operate Is Described

By A. G. SCHWENKE

Auditor Railway Receipts Milwaukee Electric Railway & Light Company, Milwaukee, Wis.

THE work of the accounting department of The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., covers not only railway, electric, heating and gas utilities, but also the accounting procedure for the Building and Loan Association, with a membership of 2101, embracing 3266 subscriptions. To handle the accounting for all these divisions and to keep pace with the increased work due to the comparative units and detailed information required on financial reports, etc., it has been necessary to put into operation many labor-saving devices. Just how the accounting department is able to utilize various mechanical aids in its work is described in the following paragraphs.

General Accounting Work

Those who are not engaged in accounting work seldom realize how important a factor the calculating and listing machines (Fig. 1 and Fig. 2) have become. These machines multiply, divide, subtract or add, and are used in computing specific unit operating costs; extending invoices and stock manifests, utility service orders, payroll rates, and calculating statistical and financial data. They act as an important assistant in verifying and auditing all books and accounting. In fact, it only requires the services of a skilled operator to make the machines almost think. The work is greatly different from the laborious and long-drawn-out tasks of the old days, when it was necessary to make all calculations with paper and pencil.

Another interesting machine in use in the accounting department is the mailometer (Fig. 3). Prior to placing this machine in operation, it was customary for each department to seal and stamp its own letters. This system of handling mail was far from satisfactory, as the sealing and stamping of mail by hand was naturally a slow process. At the present time all mail matter from the various departments throughout the building is collected by the regular messenger service and brought to the accounting department, where the mail clerk takes charge of it. The mail is put through the mailometer, which operates by electric drive, automatically sealing, stamping and counting the envelops or postal cards at a great rate of speed. During last December 91,611 pieces of mail were handled through this machine.

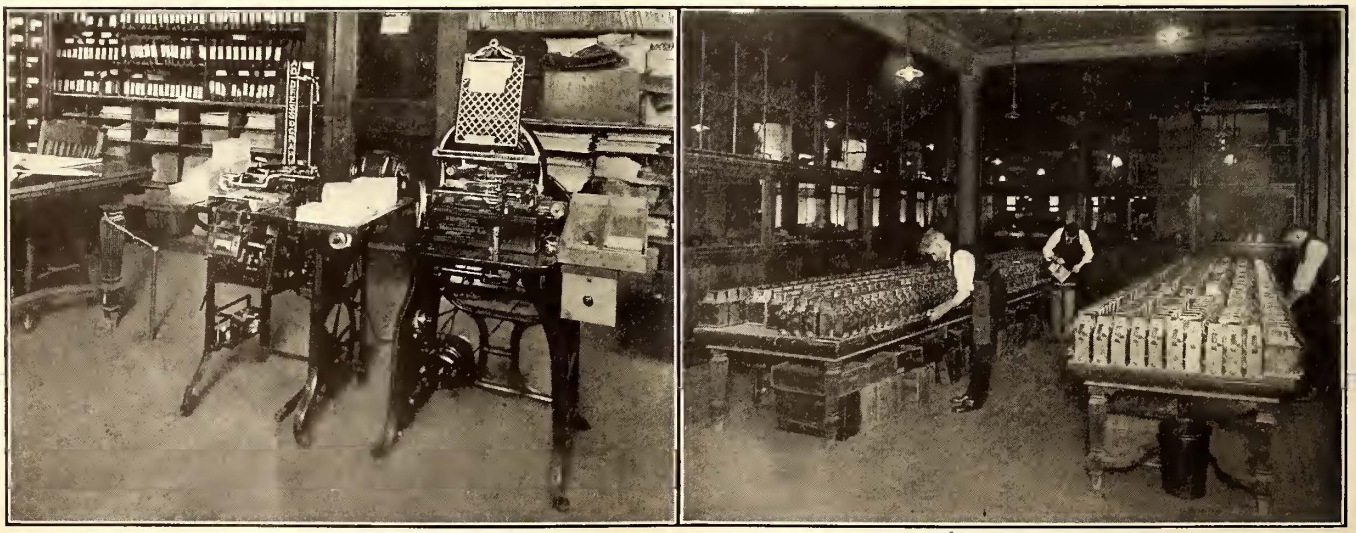
Another machine which is a great labor-saver is the Edison disk mimeograph (Fig. 4). This machine makes possible the exact reproduction of typewritten letters, drawings and forms in unlimited quantities with great rapidity and at small cost. This machine is very useful not only to the accounting department, but to the whole organization. In fact, most of the work done on it is for other departments.

Electric Service Division

The electric service division is an important factor in the accounting department. This division handles the electric and heat service customers' accounts and collections, and at the present time has about 65,000 accounts. The majority of these are for electric service,

*Abstract of paper read before the Milwaukee Company Section of the American Electric Railway Association.

MECHANICAL AIDS—FIGS. 1 AND 2—EXAMPLES OF CALCULATING MACHINES USED IN ACCOUNTING DEPARTMENT; FIG. 3—MAILOMETER USED FOR HANDLING ALL MAIL FROM VARIOUS DEPARTMENTS; FIG. 4—DISK MIMEOGRAPH FOR REPRODUCING LETTERS, DRAWINGS AND FORMS



MECHANICAL AIDS—FIG. 5 GRAPHOTYPE AND ADDRESSOGRAPH FOR SENDING MONTHLY BILLS IN ELECTRIC DIVISION; FIG. 6 TABLES FOR HOLDING FARE BOXES ASSORTED BY LINES

for which bills are rendered monthly and collections should be made monthly. The other accounts are composed of merchandise, wiring and sundry supplies and repair accounts. They also include accounts for the sale of appliances, many of which are sold under the instalment plan and require close following of monthly collections.

In issuing monthly electric-service and steam-heat bills, the addressograph (Fig. 5) is used in placing the customers' names and addresses on bills and stubs. The addresses are thus printed at the rate of approximately 3000 per hour. In connection with the addressograph a plate-making machine or graphotype (Fig. 5) is used. With this the customer's name and address are embossed on a zinc plate. The plate is then set in a suitable frame and is ready for the addressing of bills.

CASHIER'S DIVISION

The cashier's division of the accounting department has charge of all funds received from the various sources, and the banking of these. It also has charge of all tickets sold, the auditing at the various car stations and ticket agencies, and the working up of the semi-monthly payroll. A crew of about ten men is necessary to convey the daily deposits to the bank, owing to the large amount of small change received. Each man carries two satchels of coins. The supply car is used as the conveyance from the Public Service Building to the bank, and it is under the protection of a police officer when making the trip.

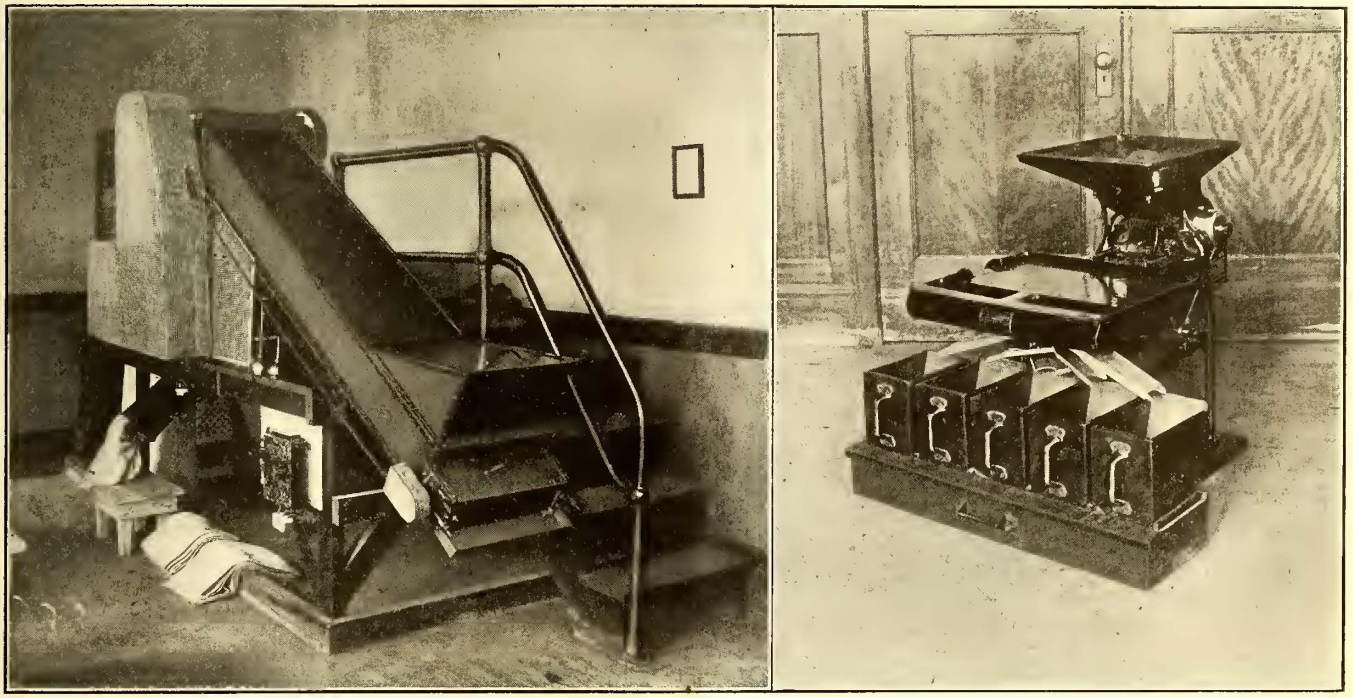
A large amount of detail work is necessary to compute the payroll of the various departments; to make the proper deductions from the various pay checks, such as cash loans, dues and fees of the Employees' Mutual Benefit Association, payments on Building and Loan Association stock, etc., and to transcribe the names and amounts to the payroll checks for more than 4000 employees semi-monthly. At the present time most of the payroll work is being taken care of with the use of calculating and adding machines, typewriters with adders attached, and check writers and protectors. In former years most of the work was done with paper and pencil, and the checks were all written out in long-hand, which made it a tedious affair.

This division handles between 7,000,000 and 8,000,000 commutation tickets each month, which are sold at the various car stations to the conductors. It also handles all tickets sold by the ticket agents to the various points along the interurban lines, there being approximately 250 different kinds of agents' tickets sold. This volume of tickets sold, it will later be seen, necessitates certain mechanical aids in the division that deals with the auditing of railway recipts.

AUDITING RAILWAY RECEIPTS DIVISION

The layman must often wonder, and not without cause, as to what becomes of the accumulated fares on an electric railway. On the Milwaukee system the first operation necessary in handling the daily fares collected is the assorting, emptying, sealing and inspecting of fare boxes. When the fare boxes are turned over to the station clerk by the conductors after a day's work, he deposits a small identification card on the trap of each fare box to show on what line it was used. All fare boxes are collected daily from the various stations and are brought to the accounting department by the supply car, which reaches the department at 7 a. m. The boxes are there turned over to the fare-box clerk, who immediately assorts them by lines and places them on two large tables (Fig. 6). Each of these is about 20 ft. long and 4 ft. wide, and holds approximately 300 fare boxes. At the present time the company has a total of 1285 fare boxes in use on the Milwaukee city and suburban system. During 1916 these were used 193,768 times, or on the average 531 fare boxes were used daily.

After the fare boxes are assorted, the contents of the boxes for the different lines are emptied into large canvas bags and are then ready to be separated—that is, the tickets from the coins. The fare boxes are then sealed, and a general inspection is made to see whether or not the box is properly locked, and the teeth, trap, etc., are in proper condition. If any fare boxes are found not to be in proper working order, they are held



MECHANICAL AIDS—FIG. 7—MACHINE USED FOR SEPARATING COINS AND TICKETS; FIG. 8—MACHINE FOR SEPARATING COINS INTO VARIOUS DENOMINATIONS

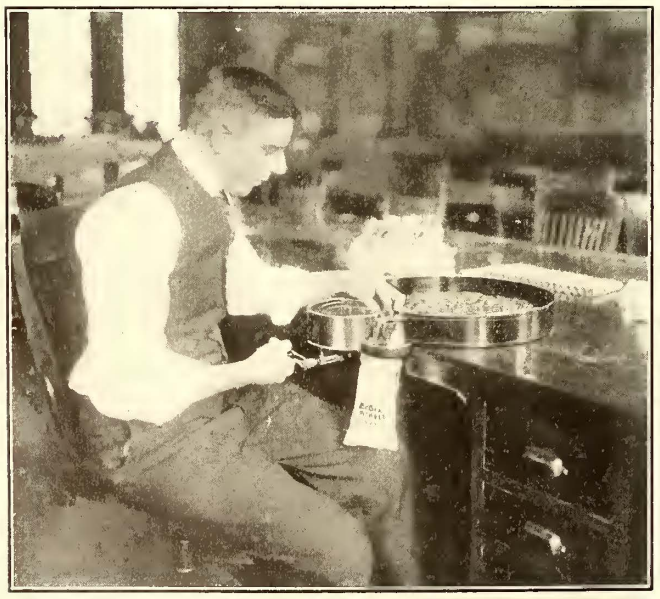
out and forwarded to the shops for repairs. After the sealing and inspection the fare boxes are ready to be returned to the various stations.

Separating Tickets and Coins:

The separation of the tickets from the coins is accomplished with the ticket and coin separator (Fig. 7). The contents of the large canvas bags which contain the receipts of an entire line are deposited into the hopper of the separator. From the hopper the tickets and coins are conveyed to the shaker or agitator by a flight conveyor, which travels about 16 ft. per minute. The flights on this conveyor are about ¼ in. high and 3 in apart. The agitator is similar to a large flour sieve and is run by eccentrics, which operate at a speed of 280 movements per minute.

This particular agitator has three square screens, each having a surface of 595 sq. in. The wire meshes of the first screen are 1¼ in. square, those of the second 1 in. square and those of the third ¾ in. square. The purpose of the different sizes of wire mesh is to allow part of the tickets and coins to drop from the first to the second and third screens so as to spread them more evenly over the three screens. The wire mesh of the lowest screen permits the passage of coins but prevents tickets from dropping down the coin chute.

To separate the tickets from the coins, the agitator is set into operation, moving the tickets and coins about. The tickets are then cleared from the screen by means of a draft furnished by a 16-in. fan, and are carried to the ticket chute at the rear of the separator, from there going directly into a large paper sack. The fan is situated in the front of the screen or under the conveyor, and is operated by a ⅛-hp. motor, running at the rate of 1900 r.p.m. The motion of the screens causes the coins to drop through to the coin chute directly



MECHANICAL AIDS—FIG. 9—COUNTING MACHINE TO PREPARE COINS FOR BANKING

beneath. Approximately 250,000 tickets and 55,000 coins are separated daily. The average speed for this work is about 3500 tickets and 700 coins per minute.

Sorting the Coins:

After the coins are separated from the tickets, there is another big job ahead—that is, to separate the different denominations of coins. This, however, is very easily performed by the use of an automatic coin sorter (Fig. 8), which separates the different denominations as desired. In order to save time and reduce the handling of the coins, the sorter is placed directly underneath the coin chute of the coin-and-ticket separator, the coins thus being fed directly into the hopper.

The hopper, which holds approximately 10,000 coins, is somewhat cone shaped. From it the coins automatically feed to the shaker, which is so fastened as to give it a slight forward slope. The shaker consists of

MECHANICAL AIDS—FIG. 10—TICKOMETER USED IN COUNTING TICKETS

five plates, with spout attachments, about 1 in. apart. The two upper or "nickel" plates are perforated with small openings a little larger than the size of a penny. The next two or "penny" plates have openings a little larger than the size of a dime, and the last or "dime" plate has openings a little smaller than a dime.

An eccentric device operated by a 1/6-hp. motor gives the shaker a short forward and backward movement, sifting the different denomiations of coins through the small openings to their respective plates. From there the coins are shaken into small compartments placed in front of the separator, each denomination in a separate compartment. The motor also operates the device which feeds the coins to the plates at regular intervals. This machine separates approximately 1500 coins per minute.

Counting the Coins:

The next operation is to count the coins and prepare them for banking. This work is accomplished with the use of a Johnson coin-counting machine (Fig. 9). This device consists of a tray and a counter head for each denomination of coins.

The operation of this machine is very simple. The assorted coins are placed in the tray and fed into the machine with the left hand, the machine being set into motion by turning the crank with the right hand. The coins are conveyed to the counting mechanism through the medium of a sprocket. Three small gates are fastened in the channel around which the coins are carried by the sprocket to facilitate the filling of the latter. At the end of the channel is a shear over the sprocket which will admit but one coin at a time to the counting mechanism. If the machine is not overfed all coins will pass into the shear; but if overfed, some may ride over

the shear and must then be run through the channel again to be counted. Should a bent or badly mutilated coin wedge into the separating shear, thereby choking the machine, a backward turn of the crank will bring it out to where it can be removed. As soon as the coins go through the shear they are passed to a smaller sprocket of the counting mechanism, which registers the coins and drops them into a sack attached to the spout of the machine.

The pennies are counted into sacks containing $1 each, the nickels into sacks containing $25 each and the dimes into paper wrappers containing $5 each. Some of the nickels are also done up in paper wrappers containing $2 each. These $2 nickel packages are used by the station clerks to supply the conductors with change.

When counting coins into paper wrappers, a metal tube is attached to the spout of the counterhead and a paper wrapper is inserted. This is held in place by a support which covers the opening at the bottom end of the tube and holds the wrapper in place. A cogwheel is attached to the cyclometer which regulates the number of coins and automatically stops the machine when the desired number has been counted into the wrapper. The operator then removes the filled wrapper and crimps the open end.

Counting the Tickets:

The next step is the counting of the tickets. This work is performed through the use of a tickometer. Four of these machines are used to count the accumulation of tickets collected daily on the Milwaukee city and suburban system. All tickets are put up in small stacks or bunches, 150 to 200 tickets in each, this operation being necessary before they can be counted on the tickometer. The tickets are then placed in the feeder of the machine. By turning the crank, which is operated with the right hand, several small rubber wheels are set into operation which convey the tickets from the feeder to the rim. There each ticket goes into a clip and at the same time is registered, the machine being so adjusted that it will not feed more than one ticket at a time.

When the rim is filled, the tickets are dropped into the ticket holder underneath by pulling down the lever held in the left hand. This lever operates a brass strip above the tickets, which pulls them from the clips. The machine is equipped with a disk which is numbered from 1 to 150. These numbers are so arranged that every clip will cover one number, and the operator is able to tell immediately the exact number of tickets counted into the clips instead of using the register, which would necessitate the recording of the beginning and the ending readings.

An efficient operator is able to count approximately 30,000 tickets per hour. The advantage in using this machine over the old system is that a more accurate count can be made and the tickets are also handled in much less time.

After the tickets are counted, they are placed into large double paper sacks, holding approximately 30,000 to 35,000 tickets each, and are sealed with strips of paper. These sacks are conveyed to one of the boiler rooms three or four times a week and are destroyed in furnace fires.

The Government Printing Office, Washington, D. C., has reduced the price on paper-bound copies of the National Electrical Safety Code to 20 cents each. Copies bound in flexible cloth are sold at 30 cents each. The code contains 323 pages.

Treated Red Cedar Poles in Demand

Western Red Cedar Association Discusses Effect on Consumption of New Method for Treating Poles

The annual meeting of the Western Red Cedar Association was held on April 3, in Spokane, Wash., with representatives of nine lumber companies in attendance. E. T. Chapin, president of the association, in an address submitted elaborate statistics of the lumber industry which indicated that the chief competitor of Western red cedar was Northern white cedar. Out of 567,000 Western red cedar poles used in 1915, 422,000 went to electric railways, light and power companies, but only 239,000 Northern white cedar poles went to this class of consumers. Northern white cedar seems to be used almost entirely by telephone and telegraph companies and steam railroads, the total consumption by such companies of white cedar in 1915 being 1,507,000 poles, or about 90 per cent of all the white cedar used in that year. The consumption of chestnut poles from 1907 to 1915 inclusive is about the same for each year. During the same period the consumption of cedar poles, including Northern white and Western red, has increased slightly. The consumption of pine in the same years has increased from 156,000 in 1907 to 546,000 in 1915, but its use is confined almost entirely to poles less than 20 ft. long. Consequently, the Western red cedar pole has little to fear from this competition.

One of the developments of the past year has been the new method adopted by cedar dealers for treating poles. By the new method, commonly known as the "B" treatment, a deep penetration of creosote is given to the butt of the pole. Statistics compiled covering the sale of poles during January, February and March of 1916, and covering the same period in 1917, show that during these three months of 1916 the treated poles sold were 16 per cent of the total sales, while during the same period of 1917 the treated poles sold were 35 per cent of the total sales. In view of this significant fact Mr. Chapin predicted that the industry is close upon the era when practically all poles sold will be treated.

The difficulty that has been encountered in the past has been in getting in a deep penetration, because poles were not sufficiently well seasoned, but the puncturing method that has now been evolved bids fair to overcome this trouble. The puncturing of the pole for 18 in. above the ground line and for 18 in. below, with knife-like blades, permits the oil to spread between the annular rings, and results in an even penetration. Hardly any of the fibers of the wood are broken, and it is not anticipated that the trade will object to the punctures, especially when they are fully advised of the benefits derived. It has been found that poles which have seasoned only six months can be given a fine penetration by this puncturing method.

Other business of the association included the appointment of a commmittee authorized to arrange, within the next ninety days, a series of comparative strength tests in Spokane of Western red cedar and various other kinds of poles, including the different kinds of steel. This committee is to secure the services of some competent engineer to outline and conduct the experiments, and is to invite a representative of the United States Forestry Department to be present, also prominent engineers from all over the country.

Election of officers for the ensuing year resulted in the selection of the following: President, F. C. Culver, Sandpoint, Idaho; vice-president, O. S. Hanson, Spokane, Wash.; and secretary-treasurer, G. A. Clark, Spokane, Wash.

The Maintenance of Way Department To-day*

The Author Submits a Discussion of Methods, Equipment and Results Obtained in the Maintenance of Modern Track

BY B. R. BROWN
Engineer Maintenance of Way Dallas Electric Company

IN the past ten years the cost of track in dirt streets has increased from $12,000 to $20,000, and in paved streets from $35,000 to $50,000 per mile, whereas, in contrast, on account of heavier cars, faster and more frequent service, the life of the track is practically the same, or less. If track costing $40,000 per mile has an average life of ten or twelve years with ordinary and delayed repairs, and we can increase the life of that track from two to five years by efficient and timely repairs, it is well worth the expense.

These conditions have brought into use many efficient and economical types of equipment for use in the maintenance and construction of track, most of which are now in general use, and have proved their merits.

Contrast the old wooden concrete board of a few years ago to the electric-driven, self-propelling concrete mixers now in general use. By the use of the mixer the labor cost of mixing concrete has been reduced from $1 per cubic yard to as low as 30 cents per cubic yard. The saving effected on 5000 cu. yd. of concrete will more than pay for the mixer, and with the mixer you get a more uniform mixture with the correct proportion of ingredients carefully calculated, thus assuring a better quality of concrete.

The electric track drill, electric spike drivers, and pneumatic tie tampers are excellent examples of the modern tools used on maintenance of way repairs, and on construction work. They effect a saving in labor, but first they perform better and more efficient work. The work can be speeded up, and more work per day accomplished, and at the same time the cost of the repairs will be less than the same work performed by crude and antiquated methods.

For the removal of cupped joints, a very efficient machine has been developed in the reciprocating track grinder. The machine is used more, perhaps, for removing corrugations from the rails, but for either use it is especially adapted.

On the Dallas Consolidated Electric Street Railway, from May 1, 1916, until Jan. 1, 1917, a total of 2410 joints were planed to a true surface at a cost of 35 cents per joint. This included labor, oil, tools, grinder blocks and repairs. Joints should be replaned every eighteen months to two years. If we start with the new track and keep the joints planed we will increase the life of the track from 15 per cent to 40 per cent and at the same time will effect a saving in the cost of making repairs, which will be necessary if the track is allowed to just "run along." This is as true of bolted joints as it is of welded joints, for if the cup is kept out of the joints the bolts will not so quickly become loose, and the joint will remain intact.

On one piece of track that has been operated for three years, 378 joints were planed at an average cost of 13½ cents per joint. Only three or four joints on this street had started working loose, but they all showed a slight cupping.

One of the more expensive jobs, per joint, was on track seven years old that served our heaviest city traffic. On account of the traffic this work was done at night. A total of 303 joints were planed at a cost per joint of 44½ cents. This work was done in July, 1916, and to date these joints show no signs of the returning of the cupping, while the track is in excellent condition.

On corrugation grinding the reciprocating grinder has been just as efficient. Our records show the cost of removing corrugations to vary from 2½ cents to 3½ cents per foot, depending upon the depth of the corrugations and traffic conditions.

Another very efficient machine in general use on track repairs is the Indianapolis electric welder. The writer is indebted to V. W. Berry, Fort Worth, Tex., for his experiences with this machine: On Front Street, in Fort Worth, the Northern Texas Traction Company had a section of double track built of 7-in. 80-lb. T-rail on wood ties and solid concrete foundation. One track was welded by the Goldschmidt butt-weld method, and on the other track continuous joints had been used. This section of track had only been built about eight years, but on account of the heavy city and interurban traffic was in very bad condition and it would have been necessary, in a very short time, to have completely rebuilt it. The bolted joints were all loose, cupped and working badly, and the welded joints nearly all were broken.

In rehabilitating this track 10-ft. sections of new rail have been cut in and with the Indianapolis welder angle bars welded to the rail. It was also necessary to build up the ball of the rail on the worn sections to conform with the new pieces of rail, and it was here that the welder proved its merit. Then with the reciprocating grinder these joints were planed to a true surface and paving replaced. The result has been entirely satisfactory, and the life of this track has apparently been prolonged for at least three years. Without the welder this track could have been repaired only by the cutting in of new pieces of rail and the applying of bonds and continuous joints; and in a manner, the same results would have been obtained, but inside of twelve months these joints would again have been loose and it would be necessary to make still further repairs. A comparison of the cost of these two methods of repairing will show that the work performed with the welder cost from $3.50 to $5 less per joint, and with the welder a more permanent work has been accomplished.

For companies that have a large amount of asphalt paving to maintain the use of the portable asphalt heater and mixer will prove economical and efficient. This machine is a combination heating plant and mixer designed for bituminous concrete road mixtures and for sheet asphalt, rock asphalt and cement concrete work. One very successful machine of this kind is sold by the Koehring Machine Company of Milwaukee. The machine is driven by a 15-hp. 550-volt motor fed from the trolley. This motor serves to operate either the mixer, the mechanical charger, the hot blast apparatus or to propel the machine.

By disconnecting the blower and asphalt tank and connecting the water line the hot-mixer may be used as an ordinary concrete mixer. With this portable plant, asphalt paving can be taken up and relaid at a cost of 40 cents to 50 cents per square yard. Instead of paying paving contractors from $1.50 to $1.80 per square yard for repairing asphalt paving we now do the work with our own plant and forces, and we not only are able to do three times the amount of repairs for the same money, but can also, by efficient handling of the mixtures, perform more satisfactory work. There is hardly enough work on the average city system to keep such a machine continuously at work on asphalt paving repairs, but this repair force need only be a gang of a foreman and fifteen men, and by training they can be used on

*Abstract of a paper presented at the thirteenth annual convention of the Southwestern Electrical and Gas Association at Dallas, Tex., April 26-28, 1917.

other classes of paving and track repairs when not actually engaged on asphalt repairs.

These are just a few of the many modern, efficient and money-saving pieces of equipment that are adaptable to track repairs on the average-size railway system. There is a tendency to hesitate in the purchase of such equipment because of the first cost, but a little figuring on the possible saving in cost of repairs will convince the most skeptical that they would do well to investigate the subject of economical and scientific track repairs.

Present-Day Operating Problems*

The Author Reviews Conditions Which Affect Electric Railway Companies in Their Endeavors to Furnish Satisfactory Service

BY V. W. BERRY
General Superintendent Northern Texas Traction Company, Fort Worth, Tex.

THE patrons of a street railway company are interested in but one thing. That one thing is service. And from their viewpoint, service is affected by arrangement of tracks, schedules, type of rolling stock and treatment accorded by employees. Therefore, it is note enough that we make excuses for low speed, infrequent service, interrupted schedules, unclean or uncomfortable cars, or discourteous treatment of our patrons by our salesmen. Steps must be taken to correct these conditions, otherwise we will have a dissatisfied public to contend with.

A few years ago the street car was the fastest vehicle on our streets. To-day, except on such lines as have had the schedules materially quickened, street cars are about the slowest vehicles on our streets. Our cars may be slow because traffic conditions are considered such that the danger of accidents would be too great to run faster. What is more likely, the speed just happens to fit the length of a particular line with a certain number of cars in service; and, furthermore, as the same speed has been maintained for years, it is thought it should be satisfactory to-day. Or, perhaps, we are using cars not adapted to higher rates of speed. It is possible that a thorough investigation might result in a material increase in speed, which would surely be greatly appreciated by the public, after which we may be in a better position to ask our patrons to "step lively."

Infrequent headways on some lines might be compared with elevator service that would be given to a tall building, where 200 people wished to ascend and descend every hour, with a car designed to carry fifty people, and operated every fifteen minutes, the management of the building taking the attitude that, as the four trips per hour would carry all of those desiring to ride, there was no necessity of giving a more frequent service. The result would probably be that some of those desiring to ride would walk, particularly those going to or from the lower floors, while those going higher would probably complain of the poor service, and perhaps "move off the line"—an expression sometimes heard.

A few years ago, fifteen and twenty-minute headways were not uncommon, and were considered frequent in many cities. To-day we must give a more frequent service if patronage is to be retained, otherwise our patrons will be picked up by vehicles which come along more frequently, and are more speedy than our cars.

Large cars operated infrequently necessarily make a great number of stops, which reduces the average rate of speed; whereas small, light-weight cars, making less stops, accelerating and decelerating rapidly, can be operated at a much higher rate of speed. On many lines the cost of operating large, heavy cars makes frequent headways impossible, whereas it may be possible to operate small, light-weight cars at a reduction in cost sufficient to enable operating a more frequent headway, with the result that the speed can be materially increased. This combination of a more frequent headway and increased speed will surely result in increased earnings, and better satisfied patrons.

Schedules are interrupted and cars are delayed from many causes, some of which are congestion of traffic, car failures, broken wires, derailments, accidents, fires, water, and "dollar" watches. The co-operation of public officials, and the enactment of additional laws regulating traffic, may be necessary to obtain relief from some of the delays caused by congestion of traffic, but surely it is not necessary to tie up the entire system of a city for an hour or so for a circus parade, on account of operating single-end cars on single-track lines, with no means of turning back, or for lack of crossovers suitably located on double-track lines where double-end cars are operated. We must provide for just such emergencies, otherwise we are in no position to solicit the co-operation of the public and public officials in a campaign to better traffic conditions, as affecting the movement of our cars.

Car equipment will sometimes fail, and wires will break, even though of modern type of construction, and most carefully maintained. Derailments and accidents will occur with the strictest discipline and most careful operation. To minimize the length of such delays, emergency vehicles with self-contained power units must be available and ready for instant use, so that they can be rushed to the scene of trouble with the least possible delay.

Another important matter, and perhaps the largest single operating problem confronting street railways to-day, is the selection and training of transportation employees. It has been said that the success or failure of a retail merchant depends upon his selling organization. The same may be true in the street railway business; for, surely, in selling transportation, a nickel's worth at a time, we are conducting a retail business, and as in the case of the large retail store, our salesmen are the ones that meet the public, and to a great extent mold public opinion.

In selling transportation, as in selling any commodity, wide-awake, clean, courteous salesmen, who realize their responsibility, must be employed, and we must know that our patrons are receiving that polite and courteous treatment to which they are entitled, before we attempt to enlist their co-operation in a campaign of courtesy.

In order to know that we are furnishing sufficient reliable service at all times, it is also necessary that a keen supervisory force of trained traffic men be maintained. With such an organization, supplemented with such improved devices as terminal clocks, headway recorders, telephone dispatching system, etc., we should be able to keep close enough in touch with the volume of traffic, and movement of cars, to be reasonably sure that our patrons do not know more about our business, from the standpoint of service, than we know ourselves.

In the matter of furnishing a satisfactory service, operators of street railway properties are to-day undoubtedly facing the most serious situation in the history of the business. Therefore, in conclusion, let us not forget that service is the one thing that the public is interested in, and service is what we must give them, by operating clean, comfortable cars, on a frequent and speedy schedule, and manned with courteous salesmen.

*Abstract of a paper presented at the Thirteenth Annual Convention of the Southwestern Electrical and Gas Association of Dallas, Tex., April 26-28, 1917.

War Conditions and the Electric Railways

This Is a Period of Preparation, and Many Electric Railway Companies and Individuals Are "Doing Their Bit"

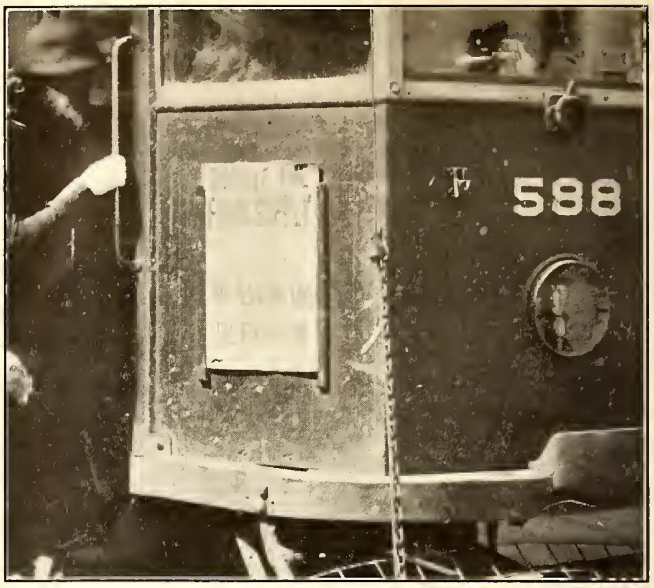
A SERIES of notes in the last issue of this paper told of some of the steps being taken by electric railways following the declaration of war with Germany. These included protection of strategic points on their systems, co-operation with the Council of National Defense and other matters. This week other war notes are published.

Boston Elevated Helps to Increase the Food Supply

The electric cars in Boston are being used to promote the important service of food conservation and production, as illustrated in the accompanying photograph of a dash sign in general use in the Boston metropolitan district. Taking the slogan "The Planting Line Supports the Firing Line" as the watchword, these signs carry the injunction "Double the Food Supply. Plant a Garden This Spring." Thus they carry a widespread appeal of a most timely character to the general public to do what it can in adding through local soil cultivation to the food resources of the country. The Boston Elevated Railway and the Middlesex & Boston Street Railway are vigorously co-operating with the Massachusetts Committee on Public Safety in this deserving publicity.

To show that it is doing its own part in this work, the Boston Elevated Railway this week threw open to employees for vegetable gardening about 300,000 sq. ft. of unused land owned by the company in the vicinity of carhouses and other property of the road. About sixty plots of land, averaging 5000 sq. ft. each, have been assigned at different locations for use by employees with families, on the basis that crops are to be raised for their own consumption and not for sale. The company has on hand a certain amount of fresh manure, which it will haul to these plots of land free of charge, until the supply is exhausted. The company is plowing this land free of charge. So far as possible the company will also plow any land situated near its lines which employees own or have obtained from others and on which they are raising crops for their own families, the company furnishing the plows, horses and driver.

Division superintendents have been requested to talk with the local sub-committee on food conservation of the public safety committee in the cities and towns of their districts and also with private individuals, to obtain other available land for crop production by employees who cannot be accommodated on land owned or controlled by the company. The company will assist by free plowing of such land as soon as its own property has been plowed. Detailed assignments of land are to be made by heads of departments and division superintendents under the direction of Major Thomas F. Sullivan of the department of maintenance of way.



UNITED STATES UNDER WAR CONDITIONS—DASH SIGN IN BOSTON URGING FOOD CULTIVATION

Application for Special Tariff

The Pennsylvania Public Service Commission has approved the application of the Pittsburgh Railways Company to put into effect a special tariff relating to the transportation of the United States soldiers.

Demonstration for Railway Recruits at Ottawa

The shopmen of the Chicago, Ottawa & Peoria Railway had a flag-raising on April 15 in honor of three of their members who have enlisted for the war, and the event was made the occasion of a general patriotic demonstration in front of the shops by other citizens of Ottawa. Some 3000 persons were present, and the accompanying illustration shows them gathered around the flagpole erected just in front of the car shops.

The exercises began with a drill by the members of the military company of which the enlisting shopmen

UNITED STATES UNDER WAR CONDITIONS—FLAG RAISING IN FRONT OF SHOPS OF CHICAGO, OTTAWA & PEORIA RAILWAY IN HONOR OF RECRUITS FROM THE RAILWAY

are members. The flag was then raised by the three railway recruits. Then followed addresses by the Mayor and others. The platform was occupied by prominent citizens, including municipal officers, Civil War veterans and representatives from the Red Cross and other patriotic societies.

School for Women Conductors in Toledo

According to a bulletin issued from the New York office of Henry L. Doherty & Company, the Toledo Railways & Light Company is considering the starting of a school to train women to act as conductors. Since the company announced that it would pay all salaries of the men who enlisted and keep their positions for them, many trainmen have joined the colors.

Recruiting Literature on Cars

The United Railroads of San Francisco has offered to the recruiting officers in that city to carry on its cars for distribution folders used to advertise the service. The marine recruiting office has accepted this offer, and "Take One" boxes are being installed on the United Railroads' cars. A similar plan is to be followed on the Municipal Railway cars.

Suggestions in Confidential Bulletin Adopted

The bulletin on preparedness recently issued by the American Electric Railway Association to its members and containing various suggestions of what they might do to help the Government during the war has received general commendation. A number of electric railway companies have put the measures in force. A copy in the natural course of events was filed with the Council of National Defense and in this way came to the attention of some of the steam railroads, and several of them have adopted the suggestions so far as they applied to steam railroad conditions.

Recruiting Stimulated by Colonel Kealy

P. J. Kealy, president Kansas City Railways, is colonel of the Third Missouri Regiment. He was in the East at a military conference when the word came to start recruiting actively and wired his instructions to subordinates. When he arrived on the scene he took personal charge to stimulate filling of the companies, and quick work resulted. It is said that the railway members of the Third Regiment now in various companies will be assembled in one company, into which others from the Railways Company may enter.

Safety Work in Pittsburgh

AT the present time the National Safety Council is very active in Pittsburgh. A comprehensive plan has been developed, under which the entire industrial district has been divided into fifteen sections. Each of these has a safety committee, with a chairman and a secretary. The fifteen chairmen constitute the local executive committee.

These fifteen subdivisions do not cover the public utilities in Pittsburgh, but it is planned that Cecil G. Rice, assistant to the president, Pittsburgh Railways, shall organize a committee for such enterprises. Mr. Rice's idea is to have a committee composed of the coroner, a member of a court, a county commissioner, a councilman, a legislator, a life insurance expert, a casualty company representative, the president of the Team Owners' Association, the president of the Automobile Owners' Association, a delegate from the Congress of Women's Clubs, an educator, a newspaper man, a local representative of the Workmen's Compensation Board, a clergyman, an attorney, a doctor and a representative of the city Department of Safety. This committee would have subdivisions as needed.

It is contemplated that after the organization of such a committee safety work will be carried on in the schools until they close in June, and that attention will be turned during the summer to traffic conditions. In Pittsburgh, it is said, there are more accidents from automobiles than from street cars. Some time during 1917 a big safety rally will probably be held in Pittsburgh.

In order to get the street railway more interested in the work, it is expected that Mr. Rice will appoint one of his men as secretary of the committee. Recently the Associated Bureaus of the Pittsburgh Railways held a meeting, which was attended by the president of the company, the general manager, department heads, members of the Associated Bureaus and others. C. W. Price, field secretary of the National Safety Council, discussed the possibilities of accident prevention. The chiefs of the welfare bureau and the medical bureau explained their work, and Mr. Rice talked about the cost of accidents. It is planned that a larger safety organization will now be formed in the local company.

Concrete Poles Made by the Centrifugal Process

Principles of Machine Used and Properties of Products Were Outlined at Meeting of Railway Telegraph Superintendents

AT a meeting of the Association of Railway Telegraph Superintendents held in Chicago on April 19 W. H. Lienesch, chief engineer Universal Concrete Products Company, Chicago, Ill., discussed the subject of the manufacture and properties of hollow concrete poles. He said that the new centrifugal process had been developed to produce a pole free from the great weight, high cost and fragile characteristics of the solid pole; a pole having more reliable qualities as to shearing value, from the ground line to the butt, and cheaper to manufacture, than the hollow pole made with a collapsible core. For this purpose a machine containing a revolving metal form is employed, the process of manufacture being briefly as follows:

The lower half of a circular metal form is placed on rollers set in line with a machine constructed to revolve the form in a horizontal position. The half form is filled with wet concrete material, a fabricated cage of reinforcing steel is laid into the concrete, the upper half of the form is placed in position, and the entire form, concrete and steel, is rolled into the machine. After suitable clamps have been applied, the form is revolved for several minutes at a high speed causing the concrete to be compressed against the sides of the inside of the form with a pressure varying from 75 to 300 lb. per square inch. This produces a dense concrete structure having a smooth hole through the center and walls tapering in thickness from end to end.

Immediately after turning the pole is removed, in the form, from the machine and allowed to set for twelve hours. After this the upper half of the form is removed and the pole is rolled out into a bed of fine sand where it is allowed to harden for ninety-six hours. It is then removed to a storage yard and, after being cured under water for ten days, is ready for shipment.

Mr. Lienesch stated that the weight of a pole constructed by this process is only one-half that of a solid concrete pole of equal strength and two and one-half times that of the best cedar poles which have but one-

half the strength of the concrete poles. To overcome the shearing action which occurs on both sides of the pole along horizontal lines, coinciding with the plane of the neutral axis, frequent spirals are wound about the longitudinal bars in the hollow centrifugal pole. Thirty-seven-foot poles made by the centrifugal process have been transported at the age of ninety-six hours by wagons over rough streets for a distance of 5 miles, indicating that the curing process is not absolutely necessary to permit them to be handled.

Organization of the West Penn Railways

THE division of duties among the officials of the West Penn System is clearly shown in the radial diagram reproduced herewith. The companies comprising this system do a diversified lighting, power and railway business in western Pennsylvania.

The president of the company is Samuel Insull who, with one of the vice-presidents, J. F. Gilchrist, and the consulting engineer, Frederick Sargent, is located in Chicago. The property is directly administered from the offices in Pittsburgh. The railway department is one of the four main divisions of the property and it is under the direction of Williston Fish, vice-president.

Reporting to Mr. Fish are ten departments as shown. For operation and maintenance the railway property is separated into three divisions, each with its operating superintendent and superintendent of track and roadway. The operating superintendents are Daniel Durie, O. P. Hess and W. B. Atwood. In charge of track and roadway are P. A. Meyer, Mr. Hess, who performs two functions in his division, and W. A. Underwood, all reporting to J. L. Fritsch, chief engineer of roadways and structures.

Kansas City Railways' Power-Saving Campaign

THE Kansas City Railways has recently conducted a coasting or power-saving campaign, using four coasting recorders, with very satisfactory results. The campaign was planned by Julien H. Harvey, superintendent of efficiency. On the lines where the recorders were used the average of coasting was increased from 8.2 to 24.6 per cent, and this result was used to stimulate the men responsible for power consumption.

The first phase of the campaign consisted of the issuance of a series of seven daily bulletins. The first was on a 4-in. x 6-in. card which was widely distributed. Succeeding bulletins were on letter-sized sheets and these were posted at carhouses and other points. Following the week's campaign there has been an effort on the part of the traveling instructor to impress upon new and old motormen the importance of coasting.

The first bulletin contained the "Five Principles of Efficiency" as follows: (1) Never use power and brakes at the same time, except when necessary to operate a track switch. (2) Notch up the controller uniformly. (3) Don't rest with the controller on the resistance point. If you want to go slow for any reason coast until time to apply brakes. (4) When braking stop the car with one application of air. (5) Coast—coast—

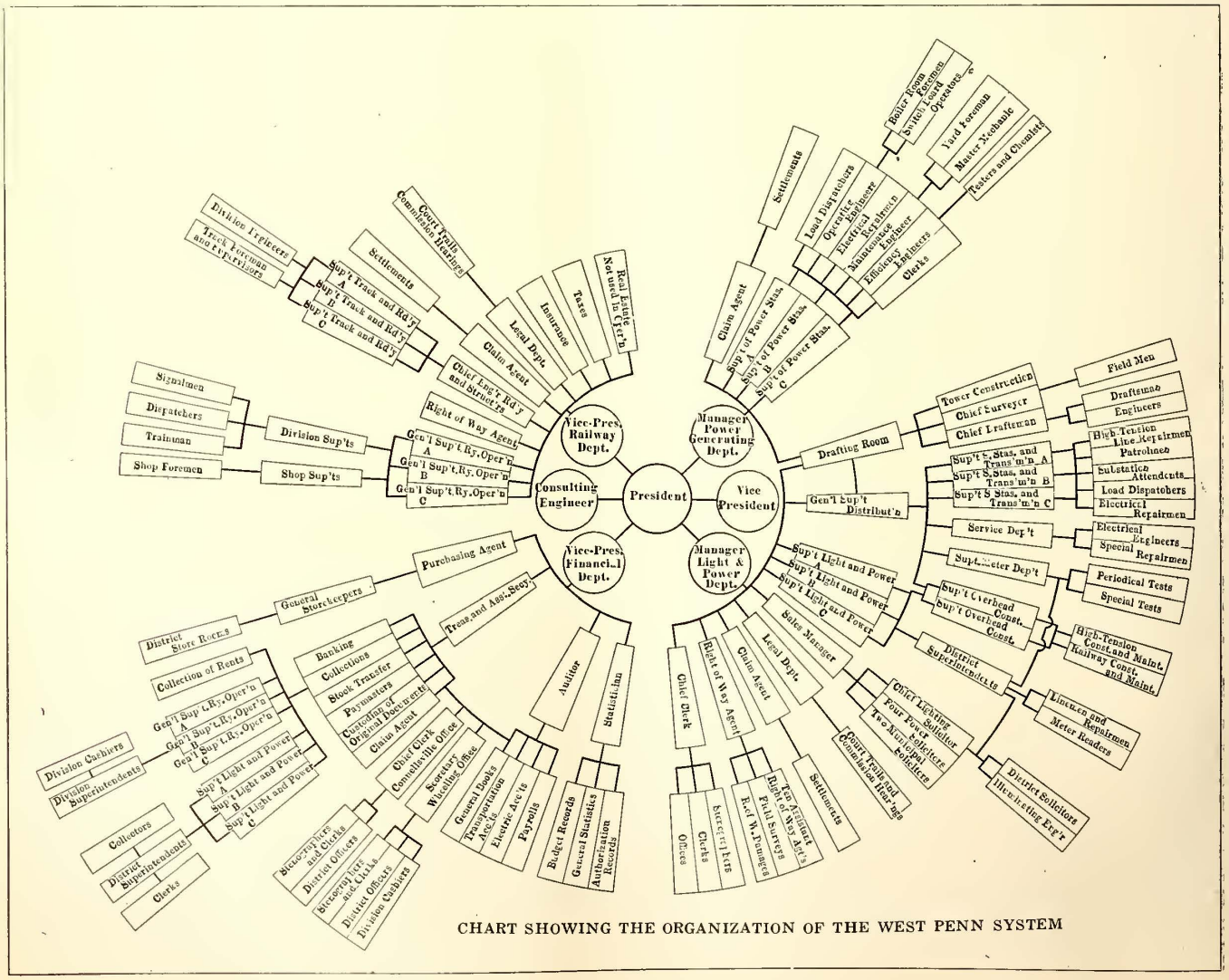


CHART SHOWING THE ORGANIZATION OF THE WEST PENN SYSTEM

coast—all you can consistently with your schedule. Coasting does not mean going downhill at high speed. It means cutting off power and drifting until it is necessary to apply the brakes for slowing down or stops.

Succeeding bulletins explained how to secure the most coasting, stating the results of coasting tests on the Prospect line, and contained elaborations of the five principles already mentioned.

American Association News

Company Section Committees Are Considering the Definition of Electric Railway Transportation Terms—Martin Schreiber Explains to the Newark Section the Essential Requirements for Advancement in the Railway Field—Other Section Activities

Electric Railway Transportation Terms

The definitions which were compiled in December for the use of company sections with a view to securing constructive comment are being considered by committees of the several sections. The suggestions for revision are to be in the hands of Secretary Burritt by June 1, so that there is now about one month remaining to complete this work. The present compilation is made up of the recommendations of several committees. When adopted it will form a useful glossary which will have a tendency to make the literature of transportation more accurate and specific.

Lecture on Electricity at Chicago

At the April 17 meeting of the Chicago Elevated Railroads' section P. B. Woodworth, professor of electrical engineering at the Lewis Institute, delivered the third of a series of experimental lectures on "Electricity." Secretary P. V. Lyon writes: "We all came away with a pretty clear idea of the meaning of a watt." The "Definition of Electric Railway Transportation Terms" report of the Transportation & Traffic Association, compiled for the use of company sections, was considered and referred back to the appropriate local committee.

President E. J. Blair made some remarks regarding national defense, and explained to those who desired to enlist that they need not go outside of the railway properties to do so. The attendance at the meeting was about one hundred.

Satisfaction and Progress in Work

At the April meeting of the Public Service company section Martin Schreiber, chief engineer Public Service Railway, read a carefully prepared paper on the subject "Find a Way—or Make One." The paper was addressed to the men who have a tendency to be dissatisfied with their progress. Some of the high points are covered in the following paragraphs.

A certain number of men are satisfied with their work, having learned that this condition is largely a matter of peace of mind. These have educated themselves to keep their daily demands within their means. There are, however, many who are dissatisfied, largely through their own fault, and, according to Mr. Schreiber, it is up to these men to make a way out of their difficulties or to find one.

After citing a number of examples of men who had reached success by overcoming difficulties, he said that common sense, enthusiasm and industry are the most important elements in success. The first-named includes character, judgment and understanding of men, including one's self. In addition to these a certain amount of knowledge is required—there must be some special training to round out the progressive man's characteristics.

Progress involves the acquirement of additional knowledge. The motorman or conductor, for example, should interest himself in the problems of the dispatcher, the shopman and the track man; in fact, in the problems of the men in all departments. As knowledge is acquired it should be imparted to others, in order that poise and resourcefulness may be developed. In time promotion will result if warranted, for as a general proposition every company believes in promotion if it is actually justified.

In addition, however, to the acquirement of knowledge there must be determination and enthusiasm. It is the latter which distinguishes a real virile man from the shiftless, indifferent sort. Enthusiasm attracts; it suggests loyalty and sincerity, and creates confidence. The electric railway man must be enthusiastic regarding the service which his company is giving. He must have an ideal before him and this, in a surprising way, will serve to lighten his daily tasks.

Manila Section Welcomes C. N. Duffy

The feature of the March 6 meeting of joint company section No. 5 was the address made by C. N. Duffy in response to a welcome extended by the section on the occasion of his return from the United States. At the business session which preceded the address E. I. Jeffery was elected a director in place of W. A. Seten, resigned, and one applicant for membership was elected. The attendance at the meeting was forty-seven.

After brief welcoming remarks by O. Keesee, superintendent of transportation M. E. R. R. & L. Co., Mr. Duffy paid a tribute to the employees of the company for their co-operation with him during the past three years, referred to the opportunities ahead of the ambitious man, and then told something of the observations made during his recent tour.

Contrasting the railway operating conditions in Manila with those in Hongkong and Shanghai, he said that in Hongkong last year the street railway traffic had increased 25 per cent to 35 per cent over the previous year due to influx of population from Canton and vicinity. In spite of the limited equipment the company is doing a rushing business, the stock sells at five times par, and a dividend of 22½ per cent is paid. In Shanghai with twenty-six miles of track 650,000 people are served as compared with forty-four miles and 275,000 people in Manila. The Shanghai Tramways gave 499,000 car-hours of service in 1915 as against 405,000 in Manila, while the respective numbers of revenue passengers carried were 59,000,000 and 12,500,000.

Mr. Duffy's conclusions, after studying working and living conditions in Japan, China, Korea and elsewhere, were that the Filipinos enjoy the best conditions found in the Orient. In Hongkong and Shanghai, for example, platform men do from two to five times as much work as those in Manila and receive less than one-half as much pay.

Practical and Economical Solutions of Problems in

EQUIPMENT AND ITS MAINTENANCE

Every live shop, track, line and power plant man is doing something that others would like to know about. Such men have a splendid opportunity to assist the industry by notifying the editors of this paper of new things that have been done. Information may be sent in the form of rough notes or short articles, and special rates will be paid for all accepted material.

Locomotive Crane Pays for Itself in One Year

Electrically-Operated Machine Used Twenty-three Hours a Day During the Rush Season

BY FRANK L. AIME
Pittsburgh (Pa.) Railways

In contrast with other methods of handling materials in storage yards and other places on an electric railway property, a locomotive crane has the advantages of economy, mobility and quick adaptability to the service required. The crane which is being operated by the Pittsburgh Railways is in service during the winter months on an average of twelve hours a day, while in the summer season while the track work is being done it is usually operated twenty-three hours a day, in two shifts of eleven and one-half hours each. No other tool could have been bought which would have met the demands put upon it by the different operations in the storage yards. For example, a car of 60-ft. rail can be quickly unloaded, the rails being piled 30 to 50 ft. from the track. The crane can then be moved under its power to another part of the yard, and with the hook replaced by a grab-bucket a workcar of ballast can be unloaded. Then the grab-bucket can be taken off, a lifting magnet attached and the crane is ready to load a car of scrap iron or unload steel wheels.

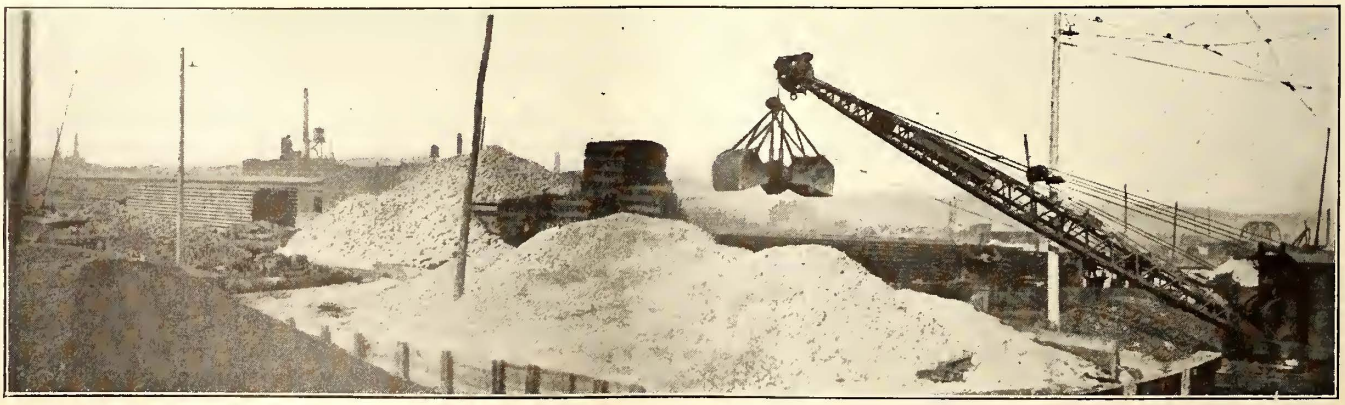
Construction Details

The crane was designed according to the specifications submitted by the Pittsburgh Railways and was built especially for them by the Browning Company, Cleveland, Ohio. It is the first one of its kind ever made. Other cranes of this type have been propelled along the track by a motor in the turret, the power being transmitted to the truck by shafts and gearings. This method could not be used in this case as it was necessary that this crane be able to "negotiate" a 35-ft. radius curve. The trucks were, therefore, designed to carry their own motors. The trucks are of the archbar type with 6-ft. 2-in. wheelbase, 34-in. wheels and each carries one 100-hp. motor. Truck centers measure 10 ft. 10 in. The compressor for the air brakes is hung on one of the trucks.

The deck frame is 22 ft. 10 in. long, 8 ft. 7 in. wide and stands 3 ft. 9 in. above the rail. All open space in the deck framework is filled with scrap iron for ballast, except that occupied by the air tank. The turret is located midway between the trucks and is designed to allow the boom to swing completely around. The cab over the turret was built as low as possible, 13 ft. 8 in. from top to rail, in order to pass under bridges, of which there are many on the system. The boom is 42-ft. long. At its maximum radius of 48 ft. from the center of the turret the crane will lift 5 tons without outriggers, and at a radius of 12 ft. can handle 15 tons. The weight of the crane ready for service is 65 tons net.

The utility of the crane would be cut down considerably if it were not possible to change over from the grab-bucket to the lifting magnet or hook in a short time, since many of the routine jobs, such as loading a car with sand and gravel, take but twenty minutes and other jobs perhaps less. With the first grab-bucket used the end of the lifting cable was attached in a laborious manner which consumed at least thirty-five minutes for each change; that is, seventy minutes for changing over and back. It did not pay to make this change to do a thirty-minute job, and a means was sought to speed up the changing operation. B. J. Yungbluth, general storekeeper, solved the problem by having a slot cut in the face of the drum of the bucket, as shown in one of the accompanying illustrations. An open socket fastened to the end of the lifting cable is slipped through the slot and when the cable is tight the socket is locked against the small end of the slot. In addition to this a hinge pin is put through the idler pulley on the bucket. It is necessary to remove this pin to attach or detach the bucket, and the rigid pin with a cotter pin at each end which was previously used required a special tool to handle it. The grab-bucket can now be changed in two minutes instead of thirty-five.

Part of the equipment used with the crane is a lifting magnet designed to operate at 220 volts with a current



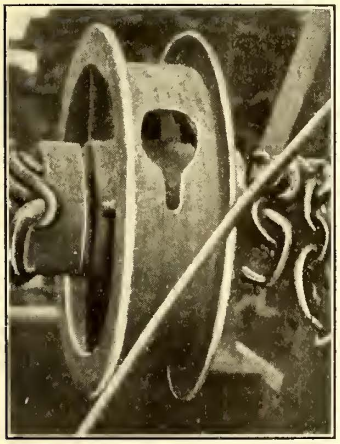
VIEW SHOWING HOW MATERIALS CAN BE STORED IN LARGE QUANTITIES BY USE OF THE LOCOMOTIVE CRANE

of 27 amp. Under most favorable conditions the magnet will lift 20,000 lb. Power from the trolley wire is used and the voltage is cut down from 600 to 220 by means of a grid resistor located on the turret. Brake shoes, tie rods and scrap iron disappear here and reappear there with almost magic swiftness when the lifting magnet is used.

Operating Methods

The limited space in the yard made it impossible to lay the trolley tracks along one of the spur railroad tracks from which rail, ballast and other heavy material is unloaded, hence the trolley track is laid to straddle the railroad track, and the crane comes up behind a car and unloads it readily because of the length of the boom. In the case of the 60-ft. rail which is shipped in on two cars, the boom cannot reach to the center of the rail, but the grab-hook is carried out to the center and the rail is dragged toward the crane and then lifted and swung out to the pile.

There is no trolley wire over this straddle track, but the power is supplied to the crane by means of a cable with a special waterproof insulation and steel armor. This drags along the ground as the crane moves. The cable is connected to the trolley feeder about in the middle of the length of a spur. To relieve the electrical connection at the crane of the mechanical strain caused by the dragging of the cable, a small chain is attached to the cable near its end and hooked into a ring on the side of the crane deck. The circuit from the cable to the turret is completed through knuckle connectors located on each side of the car. A double-throw switch in the turret is used to change from overhead trolley to cable current supply, so that when the trolley pole is used the bare knuckle connectors are dead.



SLOT CUT IN DRUM OF GRAB-BUCKET TO FACILITATE ATTACHING OF LIFTING CABLE

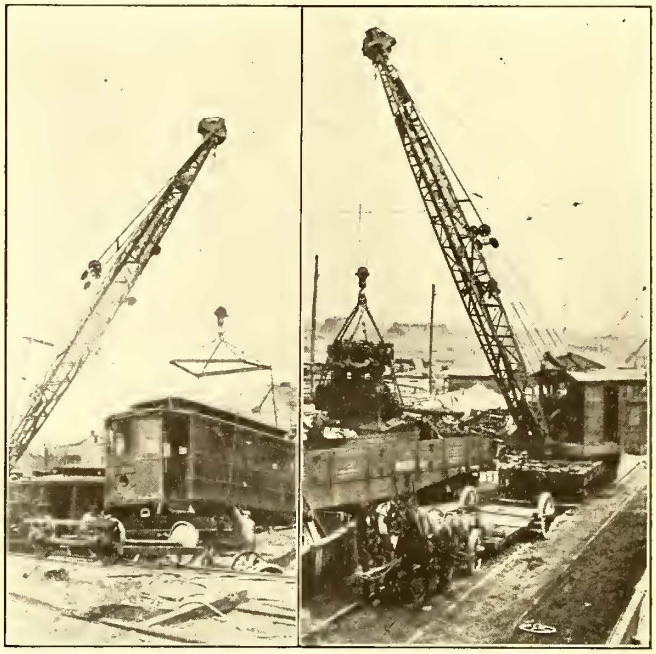
The other trolley wires in the yard are 30 ft. above the rail, and while this allows considerable freedom for the boom, the crane could probably do 50 per cent more work without a trolley wire above it. This system is, therefore, unsatisfactory in this respect but must suffice until some better means is obtained for transmitting power to the cars in the yard.

The matter of costs is very gratifying when they are compared with the other methods of handling the same work. It is conservatively estimated that with one crane operator and three crane attendants the machine will perform the work of a foreman and twenty-five laborers. An analysis of comparative cost, based on 300 ten-hour working days per year, follows:

Yearly Cost of Manual Labor	
One foreman at $3 per day, 300 days	$900
25 laborers at $2 per day, 300 days	15,000
Total	$15,900
Yearly Cost of Crane Operation	
1 crane operator at $3 per day, 300 days	$900
3 crane attendants at $2 per day, 300 days	1,800
Interest on investment 6 per cent of $10,000	600
Depreciation 8 per cent of $10,000	800
Power, estimated	300
Total	$4,400

A balance of $11,500 in favor of the crane shows that it pays for itself in one year if operated for only ten hours per day. As we operate it longer hours the saving is relatively larger. Since a power-consumption test has not been made on the crane the exact cost of power is not known; however, the amount given here is thought to be a generous estimate. Repairs on the crane so far have been practically negligible. During the past four months it has been in the shop but two days. In 1916 it was in the shop nineteen days, thirteen of which were spent in a general inspection which is made once a year.

Mixed sand and gravel or similar materials have been handled with a 1¼-cu. yd. grab-bucket at an average cost of 1¼ cents per ton, based on unloading from a railroad car and dumping in a pile whose apex is 25 ft. from the crane track. This is in contrast to 8 cents per ton, the cost before the crane was put in service. Fifty tons of coal can be unloaded with the grab-bucket in an average time of twenty-five minutes. As an example of what can be done with the lifting magnet, ten kegs of railroad spikes or eight 34-in. wheels can be taken at one lift. A carload of 3200 brake shoes can be unloaded and piled 15 ft. from the track in an average of forty-five minutes.



TWO JOBS ILLUSTRATING GENERAL UTILITY OF LOCOMOTIVE CRANE

The crane was placed in operation in August, 1914, and since that time it has been in constant use. Because of the demand for it in the East Liberty yard it is seldom used elsewhere, although it is possible to run it to other parts of the system if necessary. Appreciation is due Mr. Yungbluth for data and information which made this article possible.

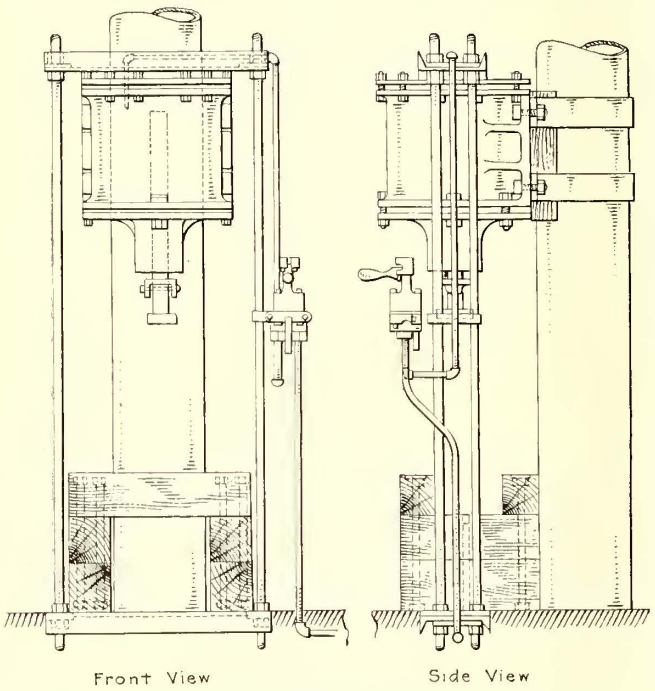
A fully equipped garage with machine shop, wagon shop and vulcanizing plant, always ready to receive emergency calls, is maintained by the United Railways of St. Louis. The first automobile trouble wagon was built in the early part of 1907 and is described in the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 4, 1908, page 22. Eleven of these tower automobiles are now in service and one is under construction. The company also operates cars for handling freight, trucks, trouble wagons, money wagons, and one ambulance car.

Press for Removing and Installing Armature Bearings

Brake Cylinder Device Costs but Forty Dollars and Takes the Place of Hydraulic Press—Bearings Are Not Distorted and Do Not Require Scraping

BY R. H. PARSONS
Electrical Foreman

Since the almost general adoption of the box-frame motor, the bearings of which are placed in the frame heads or housings under pressure, a device for installing and removing these bearings has become a necessity. The pressure necessary to install a properly fitted bearing is about 5 tons, as recommended by the electric manufacturing companies, and for this a hydraulic press is best adapted. As such a machine is frequently not procurable, a cheap but satisfactory press can be made from a brake cylinder of sufficient capacity. Brake cylinders have already been used for this purpose so that the idea is not new, but the manner of adaptation herewith illustrated is entirely satisfactory and if used heretofore has not been described.



BRAKE CYLINDER DEVICE FOR INSTALLING AND REMOVING ARMATURE BEARINGS

A cylinder, capable of exerting a force of 14,000 lb. at a pressure of 70 lb. per square inch, is suspended on a suitable post by means of clamps. Across the top of cylinder and bolted to it is placed a 6-in. channel iron properly shimmed to provide bearing to the solid parts of the cylinder. Buried in the floor, and set at the floor level, is a duplicate channel iron, connected to the other by four 1-in. tie rods. These tie rods take all of the strain of the stroke so that the cylinder suspension sustains only the cylinder's own weight. An ordinary brake valve attached to the tie rods and easily accessible to the operator provides means for controlling the action of the piston.

A bench, constructed of heavy pine timber reinforced by tie rods, is also provided. On this bench are placed the housings for pressing the bearings in or out.

By the use of the brake cylinder device, the need of a hammer is obviated, and therefore time is saved in installing and removing the bearings. Also a bearing is not distorted by this device and so does not require scraping to make it fit the shaft. The outfit can be fitted up for approximately $40, whereas a hydraulic press of suitable size and shape would cost $200.

Another Device for Encouraging Power Saving

A Clock and Counter Mechanism Records Duration of Braking Periods and Number of Stops and Slowdowns

The Connecticut Company is equipping its cars in New Haven with a new device for encouraging motormen to save energy in car operation. The device is the invention of William Arthur, until recently a member of the engineering staff of McHenry & Murray, consulting engineers of New Haven, Conn.

FACE OF POWER-SAVING RECORDER

The "power-saving recorder" is designed to record the length of time during which air pressure is on the brake cylinder, and also the number of times that pressure is applied. It achieves its object by encouraging men to coast more and to avoid unnecessary stops and slowdowns. The mechanism is contained in a circular iron case about 5 in. in diameter and 3 in. deep with dials showing in figures the accumulated braking time and number of brake applications. For convenience in subtracting totals to determine elapsed braking time and corresponding numbers of brake applications, the recording mechanism is operated backwards—that is, successive totals are increasingly smaller instead of larger, as in most recording devices. This feature lessens the clerical effort required in making records. The recorder is preferably placed on the vestibule frame directly in front of the motorman so that he can read the indications whenever he is disposed to do so.

The mechanism consists of a substantial clock movement such as has been developed for automobile service, together with a pneumatic controlling device. Air pressure from the brake cylinder acting upon a piston in a tiny cylinder at the bottom of the recorder case raises a piston stem carrying a lead weight. The latter has the function of positively returning the piston to the off position. To the upper part of the stem is attached a spring brake which bears on a grooved brake wheel

POWER-SAVING RECORDER IN POSITION ON CAR

when in the off position. During the releasing operation this brake spring serves to set the clock mechanism instantly in motion.

The clock drives the duration-of-braking dial, and at each rise of the piston the brake-application counter is moved forward by means of a simple lever system. The only aperture in the case is a small hole to permit the insertion of the clock-winding key, the hole being covered with a dust cap between windings. The clock spring is of capacity sufficient for two weeks' operation, the assumption being that it will prove most convenient to wind the clock weekly, the extra capacity being provided for reserve.

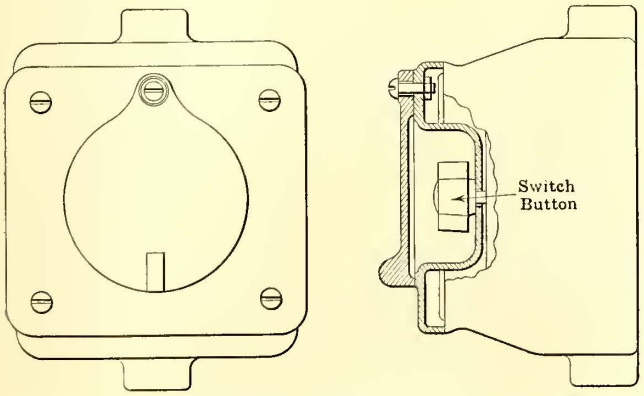
The principle upon which the new recorder is based is that in general and for the same conditions, the man who has coasted the most will have had his brakes on the least. Excepting for resistance losses practically all of the excess energy put into a car has to be finally dissipated by the brakes in grinding away the brake shoes and wheels, so that in general the less energy wasted during braking periods the less will be the total energy consumption.

Condulets with Protected Snap Switches Replace Cluster Boxes

Condulets for the control of street clusters and designed for a General Electric No. 626 combined snap switch and cut-out are being used by the Brooklyn Rapid Transit to replace the present wooden boxes containing a knife switch of the single-throw, quick-break type and a fuse mounted on the same base. The condulets are the YC-11303 type, manufactured by the Crouse-Hinds Company. The wooden boxes, being of light construction, have not lasted long and were frequently damaged by boys, necessitating the removal of the entire cabinet and switch with connections. Often a door has been broken off and the switch and interior of a box exposed. Another disadvantage has been that a person attempting to close a switch was liable to receive a shock, particularly at night, by touching the exposed metal parts between which there might be an electrical pressure of 600 volts.

CONDULET ATTACHED TO TROLLEY POLE

In the condulets a swinging cover protects the switch-button fittings. These fittings are designed to be shock-proof and will not become damaged from water, the only exposed part being the stud. Grounding is made through a ½-in. conduit which is attached to an iron trolley pole.



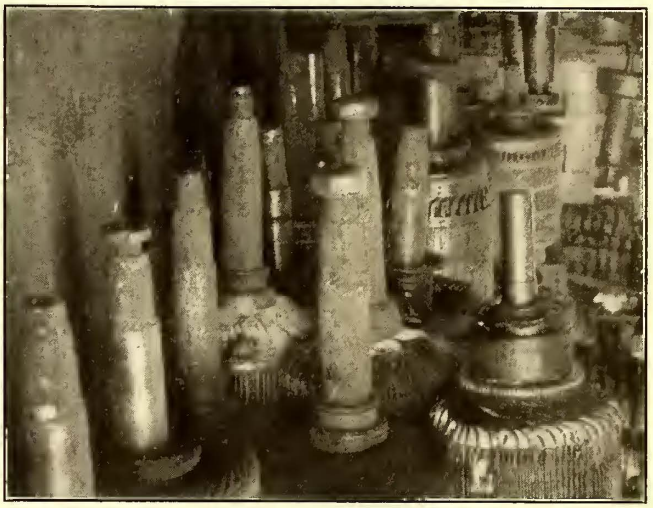
DETAILS OF CONDULET

Reclaiming Worn Armature Shafts

BY C. L. KELLER
Assistant Master Mechanic Detroit United Railway

The Detroit United Railway has been realizing a marked saving in the maintenance of old-type motors through the use of an electric welding outfit. Nine out of ten of these older type armatures which come in for repair because of worn or broken bearing shafts, keyway or pinion seat, are in good condition as far as the armature coils are concerned, but to replace the shaft with a new one requires the complete rewinding of the armature. Instead of doing this, the worn parts are built up or breaks repaired by the use of an electric welding device, and this is possible without disturbing the windings.

The accompanying photograph shows a number of armatures which have been repaired by this means and are ready to be re-turned to standard dimension. This



ARMATURE SHAFTS BUILT UP BY ARC WELDING

process has saved the winding of two or more armatures a day for the company, with a corresponding saving in material and labor. The time required to build up an entire shaft end, including bearing, keyway and pinion seat, is about two and one-half hours.

Trolley Wheel Machining Costs Reduced

Improved Methods Devised at the Shops of the Boston Elevated Cut Down Labor Costs Very Materially

Improved methods of machining trolley wheels at the Albany Street shops of the Boston Elevated Railway have lately been devised. The company manufactures its own wheels, which are now standardized at a 4¼-in. diameter, and turns out 7000 wheels a year.

In machining the wheels after they have been received from the brass foundry seven principal operations are performed: (1) chamfering inner edge of bore; (2) rough drilling bore; (3) finishing bore; (4) squaring off hub, with counterbore at each end; (5) putting wheel on mandrel and turning groove; (6) pressing in bushing; (7) reaming out bushing to take off surplus graphite. These operations can be performed in from five to six minutes. The longest part of the work as regards any individual task is the turning of the wheels, which takes less than one minute.

A time-saving feature of the chuck, which is used in holding a wheel for chamfering and drilling, is illus-

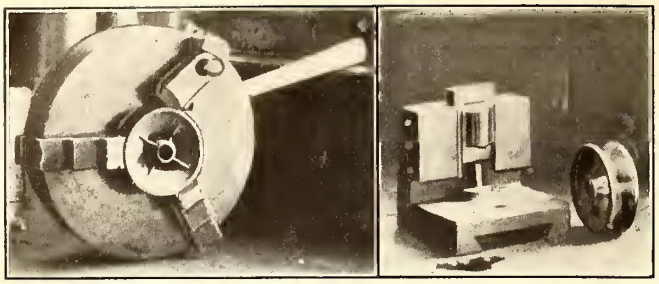


FIG. 1—CHUCK WITH ONE LOOSE JAW; FIG. 2—REVERSIBLE TURNING TOOL

trated in Fig. 1. One of the jaws of the chuck is made loose so that, by a simple turn of the jaw, a wheel can be centered in place for machining. The chuck is a 12-in., three-jaw universal equipment. Two jaws of the usual type are built up about ⅞ in. by electric welding. The loose jaw, 3½ in. long by 1⅛ in. thick, is held at one end by a ⅝-in. bolt that is tapered into the chuck body. By this device a wheel is clamped into place by properly shaped jaws and thus allows quicker and more accurate work to be done than by the old method when the wheel was caught by the edges.

Another device for saving time, shown in Fig. 3, is the special turret of cast iron which is provided with receptacles and locking arrangements for the chamfering, rough finishing, and finishing of tools. When in use, a short bar, not shown in the illustrations, is attached to the tailstock of the 18-in. engine-type lathe and adjusted to bear upon the under side of the turret so as to brace it and relieve the strain on the tailstock. In this way the change from one tool to another can be made with the least possible delay. In Fig. 4 is shown a tailstock spindle bonnet used on the lathe. This bonnet has two slots ¾ in. long placed on opposite sides, and is locked in position by two ⅜-in. steel pins, thus forming two bayonet joints. At the right hand end of the bonnet is attached a shrunk-on handle. By making a half turn the tailstock can be released and pulled out by hand to the required distance for adjusting the tool or changing the work, instead of having to crank the tailstock out of the way as in former lathe work. Cast iron was first used for the bonnet, but was replaced as it cracked at the joint.

The turning tool employed, as shown in Fig. 2, is shaped for the standard wheel groove and is designed so that the tool can be reversed when the upper edge becomes dull. By this device, a total of 100 wheels can be turned without requiring a change of the tool edges. The tool is seated in a head provided with gibs and a shim which are adjustable by set-screws to the tool wear. The head is of cast iron and fits the lathe ways.

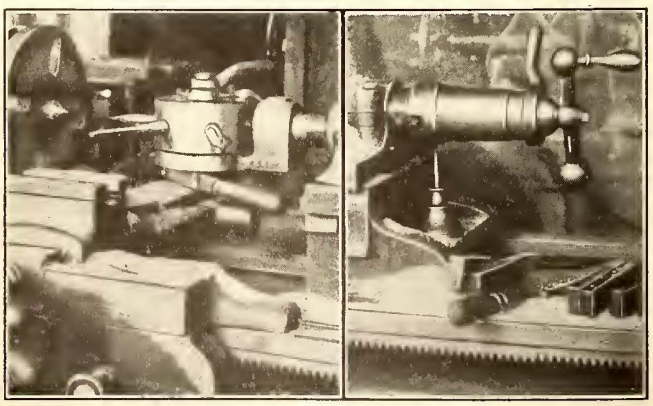
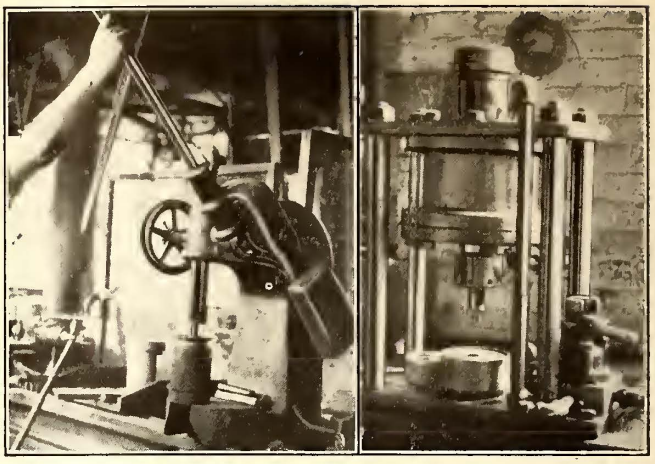


FIG. 3—TURRET; FIG. 4—SPINDLE BONNET



FIGS. 5 AND 6—OLD AND NEW BUSHING METHODS

Formerly bushings were forced into place by a hand-operated press appearing in Fig. 5. It was necessary to start a bushing into the wheel bores from the bench, and in setting them home at least two strong pulls on the 3-ft. 6-in. lever were required. Results were correspondingly unsatisfactory. Fig. 6 illustrates the present method, which employs a home-made pneumatic press having a cylinder 7¼ in. in diameter with a 4-in. stroke. The cylinder is attached by nine ⅝-in. cap screws to a headplate carried on four 1½-in. cold rolled steel columns. Above the cylinder, a chamber is provided containing a spring head against which the piston drives in its upward stroke, the motion of the piston being controlled by a three-way valve in the air piping.

Air is supplied at a pressure of 85 lb. per square inch. The bushings, of the "Bound Brook" type, are of ⅞-in. outside diameter, ½-in. inside diameter and are 1½ in. long. Graphite is used for lubrication. The trolley wheel rests in a recessed base with a spiral spring centering plug of nearly a ⅞-in. diameter which is slightly depressed as the bushing is driven home. The recess in the base is about ⅛ in. deep and holds the wheel in place during the entire operation. Five bushings per minute can easily be set home, including placing and removal. The bushing is forced home by a plunger equipped with centering plug slightly less in diameter than the inside diameter of the bushing itself. By the use of the above described equipment, the entire labor cost of trolley wheel machining is stated by the company to have been reduced to 2.77 cents per wheel.

Oxy-Acetylene Welding Makes Strong Pipe Joints

The investigation of the relative strengths of acetylene-welded and screwed pipe connections, when subjected to internal pressure, has been the subject of a series of investigations in the machine construction laboratory of the University of Kansas. The welded specimens were made by the Oxweld Acetylene Company, Chicago, Ill., while the screwed connections were made with malleable-iron couplings by expert pipefitters.

The following conclusions have been drawn from the results of the experiments:

1. The strength of a welded pipe connection is practically the same as that of unwelded pipe. By slightly building up the weld it can be made stronger than the rest of the pipe.

2. The strength of the welded pipe connection is much greater than that of the malleable-iron screwed fitting.

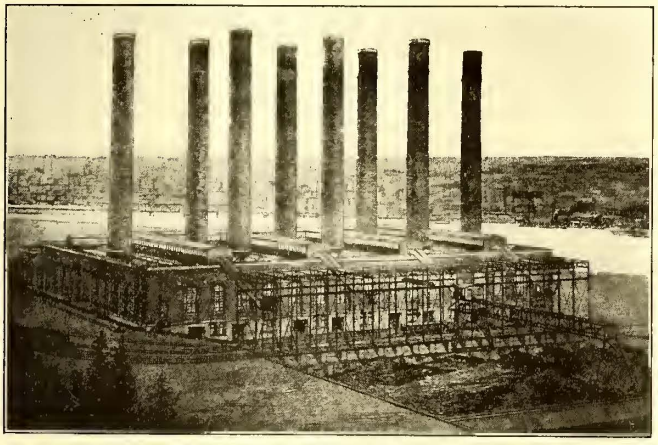
3. Although a careless or inexperienced operator may produce a leaky joint by the welding process, nevertheless, if the pipe is tested for leaks when installed, it should cause no difficulty in service.

The time required to make the screwed connections is about the same as that required to make a welded joint in the same pipe, but the cost of the welded joint is less.

A Big Power-House Project

The accompanying illustration is from a pen sketch of the new power house of the Toledo Railways & Light Company as it will appear when completed. It is expected that the first unit, taking in the space occupied by three stacks in the picture, will be completed by December of this year. Work is being rushed night and day for this purpose. By next spring three 20,000-kw. units will probably be in operation, and the plant as shown is designed for an ultimate capacity of 200,000 kw. The total cost will be about $8,000,000.

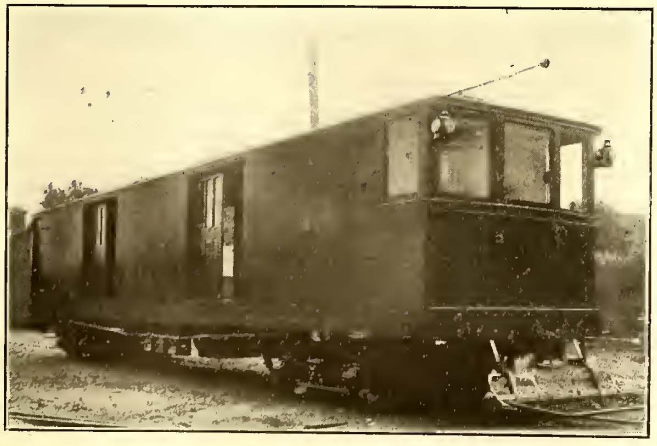
The plant is located in East Toledo, the 24-acre site including some made land which will extend to the dock



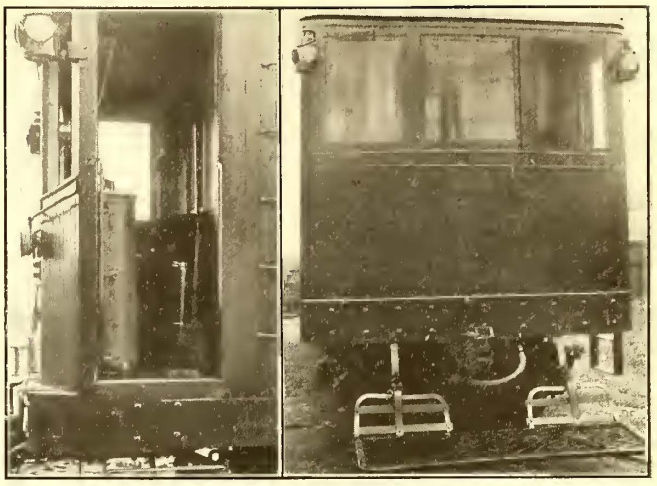
PROPOSED POWER PLANT FOR TOLEDO RAILWAYS & LIGHT COMPANY, EAST TOLEDO, OHIO

line of the river. It will ultimately be 425 ft. wide, 600 ft. long, and there will be eight radial brick stacks, 274 ft. high, with inside diameter of 18 ft.

The plan is to take coal from the cars by means of cranes, drop it into crushers and convey it into the hoppers. The ashes will be received in conveyors and delivered to freight cars, so that the same cars that bring in the coal will take out the ashes. A storage house for 200,000 tons of coal will be erected alongside the plant.



GENERAL VIEW OF NEW INTERNATIONAL RAILWAY EXPRESS CAR



SIDE AND FRONT VIEWS OF VESTIBULE OF NEW INTERNATIONAL RAILWAY EXPRESS CAR

New Express Cars for the International Railway

During the past winter the International Railway has been using in express service two cars of a type designed by the company's mechanical department. These were built at the Cold Spring shops of the company at Buffalo. The accompanying illustrations show the construction of the car clearly. Attention is, however, directed to the following salient features:

The car is arranged for double-end operation with a shallow motorman's vestibule on each end. In each vestibule is a compactly arranged control equipment for the motors, air brakes, sanders, whistle, etc., and a well-lighted desk for the keeping of records. The interior of the car is well lighted through windows at the ends and glazed panels in all of the side doors. It is neatly finished and provided with hooks attached to the car-lines for the reception of long slender packages. For night lighting fifteen lamps are provided, these being carried in sockets mounted on the under side of the roof and protected with simple strap-iron guards.

The car is equipped with four GE-210 motors geared for a free-running speed of 45 m.p.h. It weighs, completely equipped, 60,240 lb. The general dimensions are as below:

Length over bumpers	48 ft. 6 in.
Length inside express compartment	40 ft. 9 in.
Width inside express compartment	7 ft. 8½ in.
Height inside express compartment, at center	8 ft. 3 in.
Width overall	8 ft. 6¼ in.
Height from top of rail to top of trolley base	12 ft. 4½ in.
Height from top of rail to under side of side sills	3 ft. 3 in.
Wheel base of trucks	5 ft. 0 in.
Wheels, rolled steel	34 in. diam.

INTERIOR VIEW OF NEW INTERNATIONAL RAILWAY EXPRESS CAR

News of Electric Railways

Traffic and Transportation

Financial and Corporate | Personal Mention | Construction News

State Commission Control Upheld

Illinois State Supreme Court, in Case Pending Nearly a Year, Decides Public Service Commission Has Control Over Chicago Utilities

The State Supreme Court of Illinois on April 19 rendered a decision in which it upheld the power of the Public Utilities Commission of Illinois with respect to jurisdiction over the local utilities in the city of Chicago. The decision in the case was rendered as the result of an appeal to the Supreme Court from the decision of Judge Thomas Taylor, Jr., of the Circuit Court at Chicago, rendered on May 27, 1916, in which he denied the right of the Public Utilities Commission to issue orders affecting the service and equipment of the Chicago street railways. A formal injunction was entered in the Circuit Court at that time preventing the commission from enforcing its order of Sept. 29, 1915, which was intended to effect service changes. This order by the commission in regard to service was reviewed at length in the Electric Railway Journal of Oct. 9, 1915, page 775. It was considered unusually drastic.

How the Circuit Court Ruled

The opinion by Judge Taylor stated that the commission's order invaded some of the rights of the company and the city and that consequently it was in violation of their constitutional privileges. In the case before Judge Taylor the question of the constitutionality of the act creating the Public Utility Commission also was raised. On that point the Circuit Court ruled that the State of Illinois had seen fit to pass an act which provided for the regulation of public utilities and held that the act so passed was presumed to be constitutional until it was proved beyond a reasonable doubt to be otherwise. Under the ruling handed down now by the State Supreme Court the only authority reserved to the city is the right to decide what street cars or companies shall operate in its streets and to designate the streets. The opinion, however, is not yet available for publication.

The Attitude of the Railways Affected

The Chicago Surface Lines was really a third party to the proceedings. Legal action was started by the city of Chicago in October, 1915, in the form of a bill filed in the Circuit Court of Cook County attacking the constitutionality of the public utilities commission law of 1913. Later the Surface Lines intervened in the suit asking for an order which would establish its position clearly as between the jurisdiction of the State Commission and the City Council. On April 20 Leonard A. Busby, president of the Chicago Surface Lines, issued the following statement:

"The effect of the decision of the Supreme Court, as I understand it, is to best in the State Public Utilities Commission all the powers of regulation heretofore vested in the City Council and in the Board of Supervising Engineers, Chicago Traction, under the 1907 ordinances. The effect of the decision is to leave the City Council merely the power to grant the right of operation upon specified streets, the right to purchase the property on certain terms, and the right to share in a certain part of the receipts of the property; but all matters pertaining to regulation of services will be heard and determined solely by the commission. It means that questions relating to routing of cars, type of equipment and regulation of the service, which have heretofore been discussed and passed upon by the City Council, will now be controlled by the State commission."

The decision is expected to throw open again for discussion the question of home rule for Chicago. The committee on judiciary and local transportation of the City Council of Chicago has practically agreed on a bill which is on the calendar at Springfield, the purpose of which is to grant home rule over public utilities within the city limits. This measure is along the lines of the bill rejected by the Legislature last year, but is said to be less objectionable to the neighboring towns and to the steam railroad interests. At the hearing last year it was brought out that the objection to home rule for Chicago was based largely on a fear that within a few years Cook County, in which Chicago is situated, will have a majority representation in the State Legislature, and that the down-State legislators would never consent to give Chicago home rule unless Cook County's representation was greatly reduced. The question before the legislative committee at that time was whether it should recommend that Chicago have a separate commission or confer the power to regulate Chicago utilities upon the City Council.

Rehearing May Be Asked

It is expected that the city will ask for a rehearing by the State Supreme Court. If that is denied appeal may be made to the United States Supreme Court on grounds of constitutionality.

$1,100,000 Car Plant for Coast

Extensive Plant on Twenty Acres Proposed for Pacific Electric Railway in Conjunction with Southern Pacific Railroad

The directors of the Pacific Electric Railway, Los Angeles, Cal., on April 16, voted an appropriation of $1,100,000 for the construction and equipment of car shops at Torrance, 10 miles south of Los Angeles. Later in the week ground was broken on the twenty-acre site upon which will be erected the twenty or more buildings, plans for which are being completed by J. D. Isaacs, consulting engineer for the Harriman Lines, New York City. Upon completion of the preliminary excavation work and the arrival of working drawings from New York, work will be started on the buildings by the construction department of the railway company, under the supervision of M. C. Halsey, 695 Pacific Electric Building.

The larger buildings will be of reinforced concrete, steel and brick. There will be heavy machine shop and paint shop, each 180 x 450 ft., freight car shop, 180 x 400 ft., blacksmith shop, 155 x 200 ft., power house, 60 x 120 ft., dry lumber and iron storage buildings, coal bunkers, scrap bins, offices, etc.

How the Plant Will Be Used

With this plant in operation the Pacific Electric Railway will construct not only its own cars but also a part of the cars needed by the Southern Pacific Railroad, it is said. Repair work for the entire interurban system will be done at the new shops. Heretofore this work has been done chiefly at the company's shops at Seventh Street and Central Avenue, Los Angeles, which are now being dismantled to make way for the warehouses and terminal which are being constructed there by the Los Angeles Union Terminal Company.

When the abandonment of the Los Angeles shops was decided on last year the directors of the road laid plans for shops at Torrance, but at that time it was the intention to construct only a part of the buildings under a proposed appropriation of about $500,000. The recent decision to proceed immediately with the construction of the entire plant is said to have been made by the directors in anticipation of the increased demand that it is expected will be made because of the war for additional rolling stock.

Company Agrees to Investigation

Rhode Island Company Accepts Provisions of Legislative Investigation Act—Investigating Committee Prepares to Organize

The Rhode Island Company, Providence, R. I., has officially accepted the provisions of the act recently passed by the General Assembly and signed by the Governor calling for an investigation of the affairs of the company and the affording of financial relief, if such is found just. A certificate signed by Theodore Francis Green, secretary of the corporation, has been filed with the Secretary of State.

The reason for the acceptance being required dates back to the so-called transfer act, which contains a provision that "this law shall not be changed" without the consent of both parties thereto. This has been claimed to be an iron-clad provision which has placed the company outside of jurisdiction in regard to certain fare and transfer matters without its own consent.

It was felt by the lawyers in the Legislature that the company must formally announce its willingness to accept such changes as the special board may recommend, whether favorable or unfavorable to itself, and for that reason the "acceptance" clause was added. It had been suggested in committee that the Rhode Island Company might gladly accept a favorable report by the investigating committee, and abide by its decision, but might reject an unfavorable report, basing its authority to do so upon its alleged inviolable right to agree to all changes.

The members of the investigating committee, all ex officio, will be William C. Bliss, chairman of the Rhode Island Utilities Commission; Zenas W. Bliss, chairman of the Rhode Island tax commission, and George H. Newhall, bank commissioner. The members will organize, probably within a week, and elect a secretary and map out a plan of conducting the investigation.

Baltimore Men in New York

City Officials and Others Inspect Electrified Terminals at New York—Engineers Report

A number of city officials and members of the Chamber of Commerce from Baltimore, Md., spent April 12 and 13 in New York for the purpose of investigating the electric operation of railroad terminals in the latter city. The party, which was accompanied by several local municipal officials and by engineers from the office of Gibbs & Hill, New York, was shown over the Pennsylvania Station and its tunnels under the East and North rivers and then through Sunnyside yard and over the New York Connecting Railway to the electrified Harlem yards of the New York, New Haven & Hartford Railroad. A trip was made over the latter line to the end of the commuting zone at Stamford, and through the Grand Central Terminal which serves the New York end of the New Haven road, as well as the New York Central Railroad. A tugboat in the municipal service was provided to take the party along the west shore of Manhattan Island and thus give an idea of the proposed extensive improvements, including electric operation, for the New York Central's freight tracks and freight yards. The return trip over this route was made by automobile.

The object of the trip was to aid the Baltimore officials in their investigation of the feasibility of electric operation from both operating and financial standpoints, this problem having been under consideration in Baltimore for a number of years. Electrification of the section of the Pennsylvania Railroad which runs through that city has been proposed by several administrations, but in view of the decidedly thin local traffic and the delays that would be caused to through trains because of the need for changing locomotives at each end of a short electric zone, there would be no economy, and probably an increased operating expense, if the tracks through the city were electrically equipped. The expense of equipping such an electric zone would, in addition, be very great, owing to restricted tunnel and yard clearances. Consequently, the railroad company has opposed all plans that look to the establishment of a short electrified zone through Baltimore in advance of the time when it becomes commercially feasible to electrify the entire engine division on which the city is located.

Water Engineer Walter E. Lee reported on April 16 to Mayor Preston on the Pennsylvania Railroad Company's local improvement plans. He said that the real problem was the congestion in the tunnel between the North Avenue bridge and Fulton Junction. He recommended that all passenger traffic from the north and east be handled through existing tunnels; that a freight cut-off start at Bayview Junction and extend over a private right-of-way parallel with and north of Boston Street, and enter a tunnel under the bed of Franklin Street, beginning just west of Calvert Street and extending to Pulaski Street, joining the main line in that neighborhood. Mr. Lee advocated a large terminal freight yard bounded by Central Avenue, Pratt, Bond and Fleet Streets, a territory having entrances from the east, north and west without grades and close to the manufacturing and shipping interests. Reports on the company's plans were also submitted by Harbor Engineer McCay, Chairman Compton of the paving commission and Highway Engineer Cooksey. Electrification was urged by all.

Seattle Conferences Continue

Several Matters Over Which the City and the Puget Sound Company Differ Considered at Meetings

The proposal that the Puget Sound Traction, Light & Power Company, Seattle, Wash., grant universal transfers to Seattle's municipal railway lines, in exchange for a renewal of the franchise for supplying steam heat between Madison and Main Streets and Third Avenue and the waterfront, occupied most of the time in a recent conference between the City Council and the officials of the company. No agreement was reached, and further discussion along this line was postponed until other questions at issue between the city and the company have been threshed out.

The question of granting a renewal of the steam-heating franchise was brought up in a series of conferences being held between the city and the company, in an attempt to arrive at some working agreement that would be mutually satisfactory. City and company officials agreed on every point in the proposed steam franchise, with the exception of the transfer agreement insisted upon by Councilman Oliver T. Erickson.

A. W. Leonard, president of the Puget Sound Traction, Light & Power Company, asked that a money value be placed on the franchise. Councilman Erickson suggested 5 per cent of the amount invested in a steam plant. Mr. Leonard doubted the reasonableness of such a valuation, in view of the fact that the steam plant earned between 3 per cent and 4 per cent on the investment.

The demand made by Councilman Erickson that the company agree to the exchange of transfers between city and company lines, in exchange for the steam-heating franchise, developed a controversy between Mr. Erickson and Councilman R. H. Thomson. The latter pointed out that by this arrangement the city would pay 2½ cents to the company for most of the passengers using the Division "A" line, and the same fee for 300 of 500 passengers carried each day on the Division "C" line. According to Councilman Thomson this would increase the monthly deficit of the municipal line about $3,000, without in any way increasing the revenues. Councilman Erickson insisted that service was what the city wanted, and that revenue was a secondary consideration.

At the conference an extension of the East Union Street line of the company was agreed to by the company. The company has money in its budget for the extension and is awaiting the grant of a franchise to begin work. The question of Twenty-third Avenue service by the company north of Madison Street will be taken up at an early conference. Patrons of this line want the cars which serve that district routed down Madison Street, instead of the present transfer arrangement. The State Utility Commission has ordered the installation of this service, but the company has carried its objection to the order to the Supreme Court.

The question of bridges under construction and proposed, for which the company is expected to contribute, was also taken up at the city traction conference, but with no definite results. The determination of the matter of added cost

in providing for street railway traffic in the construction of bridges was referred to A. H. Dimock, city engineer; the company's engineer, and A. L. Valentine, superintendent of public utilities of the city. Representatives of the company present at the conferences were President A. W. Leonard, Vice-President W. H. M'Grath, General Manager A. L. Kempster and General Counsel James B. Howe.

Tacoma Extension Terms Fixed

Review of Principal Provisions of Agreement Under Which Tacoma Railway & Power Company Will Operate Extension to Municipal Line

Final agreement on plans for the construction, equipment and operation of an extension of the Tacoma (Wash.) municipally-owned tideflats street railway to the Todd shipyards was reached at a meeting recently of city, Pierce County, Tacoma Railway & Power Company and Todd shipyard representatives. It is now up to Pierce County to build a road fill-in extending from Eleventh Street to the shipyards, on which the city will lay the street railway tracks.

City Attorney Harmon has been instructed by the Council to draw up a formal agreement, to be signed by the City Commissioners and the Tacoma Railway & Power Company officials. The present agreement for the operation of the Eleventh Street line, now being run by the Tacoma Railway & Power Company for the city of Tacoma, will remain in effect until the completion of the extension. The Tacoma Railway & Power Company has agreed to surrender its present contract with the city in case the city wants to operate the Eleventh Street line itself. This is still a question for the commissioners themselves to answer when the line is built.

The question of transfers was also laid over until completion of the line, although the company stated expressly that if at any time the city desired to enter into a transfer agreement, the company would not accept less than 4 cents on any transfer. This will force the city to charge 5 cents without transfers. While it was tentatively decided at the meeting to charge a straight 5-cent fare each way, the Council reserved the right to raise the fare if that became necessary to guarantee a revenue sufficient to meet the interest on the $165,000 of bonds which will be issued by the city to secure the funds to build the line. The city will also reimburse the Puget Sound Traction, Light & Power Company for the $3,000 deficit which has accumulated in operating the present line. Pierce County will finance the construction of the Eleventh Street fill, where the tracks will be located. This work will cost about $74,000.

Organizing Cincinnati Forces

Rapid Transit Commission Is Arranging Preliminaries for Loop Construction

At a meeting of the Rapid Transit Commission of Cincinnati, Ohio, on April 20, Chief Engineer Frank S. Krug was authorized to submit a general plan of organization at a meeting to be called a few days later. The proposed organization will include the number of engineers, draftsmen and other technical men needed and the number of real estate experts necessary for securing and appraising property to be used as right-of-way for the loop line approved at the recent election. Supervision of the various features of the work will be assigned to committees composed of members of the commission. A secretary and assistant secretary to the commission will also be employed, but candidates for these positions have not yet been considered. Mr. Krug has stated that specifications for the eastern half of the loop will be prepared first. The lease of the Union Gas & Electric Company on a portion of the canal on the west half will not expire until the end of the year, but there is nothing to interfere with the work on the eastern half. Mr. Krug is confident that the engineering work will be completed in time to award construction contracts by Jan. 1, 1918. The headquarters of the commission will be continued in the City Hall.

W. Kesley Schoepf, president of the Cincinnati Traction Company, has suggested to the County Commissioners that the space between the tracks of the Glendale line on the Dixie highway be sodded. He has agreed to move the tracks to the center of the street, in accordance with the wish of the commissioners, and expressed the opinion that the appearance of the highway would be improved by the grass strips. Before the plan can be put into effect the officials of the village of Wyoming will have to relinquish their right to compel the company to pave between the tracks.

Progress of Oakland Resettlement

In March announcement was made of the personnel of the committee appointed by Mayor Irving of Berkeley, Cal., to negotiate with the San Francisco-Oakland Terminal Railways a resettlement of franchises in that city. Mayor Davie of Oakland has now appointed, as a committee to negotiate a resettlement of franchises held by the company in the city of Oakland, in accordance with the application filed on Feb. 27 under the provisions of the recent amendments to the Oakland charter, ex-Governor George C. Pardee, a member of the committee which drafted the resettlement provisions of the Oakland city charter; A. S. McDonald, Percy C. Black, J. W. Stetson, J. H. Boyer, Samuel Hubbard and Dr. R. M. Higgins.

It is assumed that the Oakland and Berkeley committees will meet in the near future for the purpose of organization and study of the details of franchises which would fulfill the conditions of the new charter provisions and attract private capital necessary to provide long-deferred betterments to the tracks and equipment for the transportation system of the East Bay cities

The new charter of the city of Alameda provides for a similar resettlement of franchises in that municipality, and it is expected that a representative committee will shortly be appointed to negotiate a resettlement under conditions permitting a harmony of operation throughout the entire East Bay territory.

Railways Purchase Coal Land

Four Indiana Interurban Railways Plan Active Mining in Their Own Interest

In order to secure immediate shipments of coal, the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis Traction & Terminal Company, Union Traction Company of Indiana and Fort Wayne & Northern Indiana Traction Company, four of the principal electric railway systems in Indiana, have, through the United Tractions Coal Company, purchased the Shirley Hill coal mines, including mine shafts, machinery and buildings, with about 660 acres of coal lands adjoining the 2390 acres of coal lands already owned by the United Tractions Coal Company. The companies have also leased an additional 600 acres of adjoining coal lands, making the total acreage of owned and leased coal lands 3650 acres.

It was with such an idea in mind as has now been put through that the four companies organized and incorporated the United Tractions Coal Company in the year 1903. The capital stock of that company was owned equally by the four traction companies, and through this coal company they acquired and became the owners of 2390 acres of valuable coal lands in Sullivan County, Indiana. The time was not judged propitious for sinking shafts and attempting to mine coal for the needs of the four traction companies until the present year, when the possibility of coal shortages made it desirable that the companies should protect their interests by insuring an ample coal supply for all their power plants.

The first work to be undertaken will be the electrification of the Shirley Hill No. 3 mine at an expense of approximately $30,000. While this mine will not supply the requirements of the plants of the railways until further development work has been done, it is estimated that during the first year about 200,000 tons of coal will be produced from this shaft, and after the electrification work has been completed, the production from this No. 3 mine will be increased to approximately 450,000 tons for the second year. All coal will be shipped from the mine in the usual manner via the steam lines. For the present the electric railways have no plans for the handling of the coal over their own lines.

Transit Muddle in Philadelphia

Philadelphia's transportation plot has certainly thickened. Moves and counter moves, accusations and counter accusations, arguments and refutations have come so fast lately that the trend of events is not always clear even to the active participants. To make all that has happened on the stage and behind the scenes plain would require proficiency in political reporting such as few besides the late Samuel Johnson possesses. Even the Philadelphia *Public Ledger* has deemed it necessary to preface its recent accounts of the transit proceedings with a summary so that the reader shall not be hopelessly lost. Thus on April 20 that paper said:

"Mayor Smith issued a statement defending the bills, which were attacked by A. Merritt Taylor, former director of city transit. Director Twining of the department of city transit attacked the attitude of Mr. Taylor. Mr. Taylor, in a statement, insisted that the bill before the Legislature which he had termed 'destructive' was different from that which he sponsored while director. Mr. Fluck issued a statement explaining his motives. Concerning the suit, Director Twining said: 'We shall continue our work until stopped by order of the court.'"

The summary just quoted represents one day's budget of news. Occasionally it seems as if the whole "fifteen decisive battles of the world" were in progress in Philadelphia at the same time.

A definite step at least was taken on April 24 in connection with the transit matters. On that day a decision was reached at Harrisburg to hold a hearing on the matter in that city on May 8. The measure to be considered is the Salus bill, which has been recommitted to the Senate committee on judiciary general. This decision was reached after a conference in the Senate chamber between Mayor Smith, Transit Director Twining, Senator McNichol, Joseph P. Gaffney, who is chairman of the finance committee of Philadelphia Councils, and Senator Kline, who is chairman of the Senate judiciary general committee. An effort will be made to combine all transit legislation now pending under one bill which will be satisfactory to all factions.

Franchise Act Attacked

The validity of the Voorhees franchise act is attacked in the appeal filed by the Trenton & Mercer County Traction Corporation, Trenton, N. J., with the State Board of Taxes and Assessment. On the gross receipts of all the electric railways the State collects 5 per cent and prorates this to the municipalities through which the companies operate. The figures are furnished by the roads themselves. The appeal of the Trenton line, however, declares that the assessment and apportionment are in excess of true value and not made within the time limited by law. Other technical requirements are also asserted to have been neglected. The company maintains that it is overcharged $1,000,000 on the assessment levied on it and made this statement through President Rankin Johnson at the hearing before the State board recently.

The constitution, it is alleged, has been violated under Par. 12 of Sec. 7, because the franchise is property and was not assessed for taxes by uniform rules as is the property of other utility corporations and persons. No proper relation for purposes of taxation, it is asserted, existed between the gross receipts of the company and the value of property taxed. This appeal was first made to the county board, but was set aside on the ground that jurisdiction was lacking.

In the session of the Legislature just closed, a statute was passed to increase the franchise tax on gas, electric, water and other utilities until, like that on the electric railways, it totals 5 per cent. The last distribution throughout the State from the electric railways was $797,088, and of this $63,498 went to Mercer County.

The State Board of Taxes and Assessment has dismissed the application of the Trenton & Mercer County Traction Corporation against the assessment of a franchise tax levied by the board, amounting to $31,345. The board held that it had no jurisdiction in the appeal. The company has not yet paid the taxes levied for the year 1916 and asked that they be set aside or reduced.

Women Car Cleaners.—Owing to the scarcity of workmen in Toledo, Ohio, the Toledo Railways & Light Company has advertised for women to scrub its street cars.

I. R. T. Employees to Hit the Trail.—The Interborough Rapid Transit Company, New York, N. Y., has requested 5000 seats for its employees to attend the Billy Sunday revival services in the tabernacle during the week commencing April 30.

Convention of Amalgamated.—The Amalgamated Association of Street & Electric Railway Employees of America will meet in Providence, R. I., on Sept. 10. This meeting will be the fifteenth biennial convention of the association. The meeting in 1915 was held in Rochester.

Michigan Utilities Bill Passes Senate.—The public utilities bill proposed for the State of Michigan, amended so as to make the commission four instead of three members, has passed the Senate of that State. Its companion bill, to fix the home rule law so that the telephone control can be vested in the city, has also been passed.

Assessment Method Advocated for Chicago Subway Construction.—Mayor Thompson of Chicago, Ill., has recommended to the City Council immediate construction of subways by special assessment as a "simple and reasonable solution" of Chicago's traction problem. His proposal was submitted in a special message of 2500 words.

To Make Its Own Asphalt Repairs.—The Trenton & Mercer County Traction Corporation, Trenton, N. J., has erected an asphalt repair plant at its carhouse in South Trenton and will shortly begin repairing its portion of the asphalt streets. Formerly the work was done by contractors or the city and charged to the railway. The company claims that it can do the work more cheaply.

Trials of Conductors in May or June.—The cases of the conductors in the employ of the Atlantic City & Shore Railroad, Atlantic City, N. J., who, as noted recently in the ELECTRIC RAILWAY JOURNAL, are under indictment for conspiracy to defraud the company will not come up for trial until either the May or June term of court. A conductor apprehended previously on a similar charge was sentenced to serve six months in the county jail.

Labor Differences Settled.—The London (Ont.) Street Railway's offer to recognize the recently organized union, and to grant a number of concessions, has been accepted by the employees. The men did not get all they asked, but the agreement, which is for a year, grants among other things an increase in wages of 2 cents an hour, half the cost of uniforms, one day a week off duty, and a down-town office. The company reserves the right to treat with any committee of employees.

Mayor Vetoes Experience Ordinance.—The City Council of Rockford, Ill., recently adopted by a ten to five vote an ordinance that no conductor or motorman may be employed who has not had at least fifteen days' experience at the hands of another motorman or conductor who has had at least two years' experience duly certified by a license. Mayor Bennett promptly vetoed the measure. He characterized the ordinance as "a tendency to prescribe, legislate and circumscribe public utilities."

Nine-in-Eleven-Hour Bill Fails.—After the first hearing on the so-called nine-in-eleven hour bill, which was introduced into the Maine Legislature this year, the measure was amended so that a day's work for motormen and conductors should be nine hours, to be completed within twelve consecutive hours instead of eleven consecutive hours. This amended bill also provided for drastic penalties to be paid by corporations or individuals controlling street railways for violations of the provisions of the act. The measure failed of passage.

Strike Broken.—The strike of the employees of the West Chester, Kennett & Wilmington Electric Railway, referred to briefly in the ELECTRIC RAILWAY JOURNAL of April 7, page 660, has been broken. Service was suspended for five days while the company was perfecting its new organization. The men demanded an increase in wages of 4 cents an hour over the scale of 21 and 22 cents which was in force. The company declared its willingness to grant an increase of 2 cents an hour and a number of the old men accepted these terms.

Ottawa Men Protest Labor Rulings.—The employees of the Ottawa (Ont.) Electric Railway have appealed to the officers of the company from alleged wrongful interpretations of the terms of the agreement covering conditions of service which was entered into between the company and the men and was intended clearly to define the status of each of the parties to the contract. The men contend that recent changes in the heads of departments, made necessary under the war conditions, have resulted in decisions being made unfair to the men by persons unacquainted with the spirit of the contract.

Chicago's Traction Fund $21,500,000.—The payments made on April 10 to the city of Chicago, Ill., by the Chicago City Railway, the Chicago Railways and the Southern Street Railway, under the terms of the 1907 settlement ordinances, aggregated $2,746,988. The period represented was the fiscal year ended Jan. 31, 1917. The increase over the previous year was $1,081,178. The settlement for the year ended Jan. 31, 1917, was divided as follows: Chicago Railways, $1,769,460; Chicago City Railway, $881,332; Southern Street Railway, $96,196. In the ten years since the franchise was granted the payments to the city have totaled about $21,500,000.

Utility Law Amended.—Governor Gunter of Colorado has signed the bill amending the public utility commission law which gives the commission power to refuse permits for competitive utilities in any district where proper service at reasonable rates is being rendered by an existing utility. The bill also provides that where a municipality desires to acquire any privately-owned utility it must make application to the commission, which will fix the value of the utility and submit the question of purchase at such price at a special election in the municipality. The latter provision gives the commission jurisdiction over the attempt of the city of Denver to acquire the plant of the Denver Water Company.

Bills Affecting Illinois Utilities.—House bill No. 465, introduced into the Illinois Legislature, contains provisions under which any street railway would be permitted to surrender its present franchise for an indeterminate permit. These provisions are identical with the Wisconsin indeterminate franchise act. House bill 466 is an amendment to a law under which cities are now permitted to own and operate their own utilities. As the law now stands cities may engage in the operation of such utilities without hindrance from the State Public Utilities Commission. House bill No. 466, if enacted into law, would require every city, before engaging in a public utilities business, to secure a certificate of convenience and necessity from the State Public Utilities Commission.

Illinois Traction System to Take Up Forestation.—The Illinois Traction System has arranged to set out 30,000 catalpa trees from 18 in. to 24 in. in height at points along the right-of-way where there is considerable acreage and where the trees will not obstruct the view. At a point near Lincoln, Ill., about 5 acres of ground have already been plowed and made ready for planting. A similar plat will be set out north of Benld and other smaller patches between Springfield and Champaign. These trees are of the Speciosa variety, which if cultivated and trimmed each year can be cut and made into good fence posts in eight years, and quickly grow in a few years more into size suitable for cutting ties. The trees cost about $15 per thousand.

Another Rapid Transit Link Opened.—The new Corona elevated extension, one of the rapid-transit lines of the dual system in New York City, was placed in operation on April 21. It is 4¼ miles in length and will add 12.6 track-miles to the 115 track-miles of the dual system now in operation. In all there will be 345 track-miles in the dual system. The Corona extension is a three-track elevated structure for its entire length and will connect with the other Queens lines at the New Queensboro Bridge Plaza station. Exercises in which various city officials, officials of the Interborough Rapid Transit Company, which will operate the line, and members of the Public Service Commission for the First District participated were held on the afternoon of April 21, following the operation of the first train from New York to the eastern terminus of the line at Alburtis Avenue.

Programs of Association Meetings

Iowa Electric Railway Association

The annual convention of the Iowa Electric Railway Association will be held at Des Moines, Iowa, on May 24 and 25.

New York Electric Railway Association

The annual meeting of the New York Electric Railway Association will be held at Bluff Point, N. Y., on June 26 and 27. The program of papers has not yet been arranged.

Oklahoma Gas, Electric & Street Railway Association

The sixth annual convention of the Oklahoma Gas, Electric & Street Railway Association will be held at the Lee Huckins Hotel, Oklahoma City, on May 10, 11 and 12. There are to be three papers on plant operation: (1) Small plant operating problems, (2) ice and electric plant operation, (3) street railway plants and outdoor substations. There will also be a paper on Oklahoma fuels and one on meters and services. There will also be one question box session.

The program of entertainment arranged for the evenings is as follows: May 10, luncheon and cabaret; May 11, association banquet; May 12, joviation and rejuvenation.

Several important matters of public policy will also be discussed.

Central Electric Railway Association

The boat trip of the Central Electric Railway Association will be held on June 22 to 25. The steamship *South American* will leave Toledo on June 22 at 10 a. m., stopping at Detroit for passengers, sailing to Owen Sound and through Georgian Bay, returning to Toledo at 10 a. m. on June 25. Members of the association and guests are entitled to take the trip. Guests are considered to be personal friends of members who are not employees of any electric railway; any railway official or employee who does not belong in the territory covered by the association or who does not belong to the association in any way, although located in the territory, who would be interested in attending the meeting; officials and office employees of manufacturing and jobbing firms who do not "travel" in any territory, but whose territorial representative is a member of the association; supply men who do not travel in the States of Indiana, Illinois, Ohio, Kentucky, Pennsylvania, West Virginia and Michigan.

The association is extremely anxious to have all of its personal friends meet its business friends and wants railway officials who are not members of the association to become interested and see the advantages of the organization. It also desires the officials of manufacturing and jobbing companies who of necessity cannot join the association, but who are interested in its welfare, to enjoy the trip. Any supply man who travels the territory of the association and is not a member will not, however, be sold a ticket for the trip, unless his request is accompanied by an application for membership and check for $8.

The steamship *South American* will accommodate 584 passengers. Those who apply early will receive the preference in the assignment of staterooms. Each stateroom will accommodate two people and it is desired that those who make application for reservation shall name their own roommate. Regular application forms will be furnished later.

Application must be accompanied by a check before reservation will be made. The ticket will contain the name of the holder and number of the stateroom assigned. This is required by maritime laws. Those who invite guests should make application for tickets for those guests, as tickets will only be issued to members of the association. The rate of fare will be $20 for each person for the round trip. One-half fare will be charged for children from two to twelve years of age. The fare includes stateroom, meals and entertainment. All applications for tickets should be mailed to the Central Electric Railway Association, 308 Traction Terminal Building, Indianapolis, Ind. All checks in payment for tickets should be made out to W. H. Bloss, chairman. Reservations for tickets must be made before May 26.

Financial and Corporate

Future of the Bond Market

J. H. Briggs, assistant manager of the bond department of H. M. Byllesby & Company, Chicago, Ill., has issued the following letter to salesmen:

"Since the formal declaration of war the investor has practically dropped out of the market and trading has been confined largely to the professional element. You no doubt have been discouraged by lack of ready response to your offerings and by the pessimistic attitude assumed by the public in general. Casting about for rays of hope in what might be termed a dark period of our history, we are prone to make comparisons of present conditions with those of the past. Somewhat more than fifty years ago our country passed through its most critical period—the Civil War—and it is interesting to note the action of the bond market during that crisis.

"The bulletin of Moody's Investors Service (a copy of which was inclosed) reflects market conditions of that period as relating to bonds and shows the rapid rise in bond prices during the war and reconstruction period. This rise in price, of course, was due to abnormal profits derived from war industries, which brought on a consequential demand for investments.

"We are now entering into a similar period, but with our financial strength and credit at its highest point and our sources unimpaired by the disasters which have overtaken all of the larger nations. Surely, conditions are all in our favor.

"There is no doubt but that the new war loan will be a success and it seems only necessary for the proceeds of this loan to be distributed among the industries of the United States to insure the success of the bond market. It is unquestionable that the bulk of the proceeds of this loan will be spent in the United States and all lines of industry directly affected by the war must expand, and expansion in those lines will necessarily produce expansion in hundreds of other industries directly dependent upon the first for their livelihood. It is only a question of time when the surplus profits will be employed in the bond market in the form of stable investments.

"The tax problem at the present date is an uncertainty and by reason of its uncertainty has caused the investor to delay his investments, in order to choose wisely with least loss to himself. It is inconceivable that a tax sufficient to cover the full loan can be assessed during the life of the war. Such an action no doubt would paralyze the business of the country. We believe that taxes will adjust themselves to harmonize with other prevailing conditions. Financial markets will respond to an unsurpassed industrial and agricultural production. Reassure your customers."

Annual Reports

Cities Service Company

The comparative income statement of the Cities Service Company, New York, N. Y., for the years ended Dec. 31, 1915 and 1916, follows:

	1916	1915	Increase Per Cent
Gross earnings	$10,110,342	$4,479,800	125.6
Expenses	239,389	172,856	38.4
Net earnings	$9,870,953	$4,306,944	129.1
Interest on notes and debentures	258,960	490,000	*47.1
Net to stock	$9,611,993	$3,816,944	151.8
Dividends preferred stock	2,409,691	1,570,005	53.4
Net to common stock and reserves	$7,202,302	$2,246,939	220.5

*Decrease.

The 1916 report thus shows great progress as compared with 1915, which had been the most prosperous in the history of the company. During the last six years the gross earnings grew from $965,876 in 1911 to $10,110,343 last year, and the net earnings to common stock and reserves from $400,645 to $7,202,302. The greatest amount of increase took place during the year just closed—largely due to developments in the oil properties. Gross earnings to the Cities Service Company from oil production and refining operations for 1916 were $4,537,227, as compared with $213,788 in the preceding year.

The report contains no detailed operating figures for the various electric, gas, railway and other subsidiaries. It is stated generally that the gross receipts of the railway properties increased considerably and the additional traffic necessitated the purchase of more than sixty cars during the year. The passenger total of 111,192,573 in 1916 represents, according to a memorandum to investment bankers, an increase of 6,250,133.

Southern Pacific Company—Affiliated Electric Lines

The results of the activities of the affiliated electric lines of the Southern Pacific Company for the year ended June 30, 1916, are shown in the accompanying table. The total loss reported in the preceding year was $1,444,117, but with the elimination of the Portland, Eugene & Eastern Railway, which because of being absorbed by the parent company is not included in the table this year, the 1915 loss was $1,037,102. The 1916 loss of the remaining companies, or $1,253,309, represented an increase in deficit of $216,207, or 20.8 per cent.

This loss was made up of a decrease of $33,254 in the net income of the Stockton Electric Railroad, and increases in deficits for all the other lines, as follows: Pacific Electric Railway, $138,213; Fresno Traction Company and Fresno City Railway (combined), $3,022; Visalia Electric Railroad, $11,898; San José Railroads, $16,929, and Peninsular Railway, $12,892.

For these companies the combined railway operating revenues showed a falling off of $40,028, or 0.4 per cent. This

FINANCIAL AND OPERATING STATISTICS OF AFFILIATED ELECTRIC RAILWAYS OF SOUTHERN PACIFIC COMPANY FOR YEAR ENDED JUNE 30, 1916

	Total	Pacific Electric Railway	Fresno Traction Company and Fresno City Railway (Combined)	Stockton Electric Railroad	Visalia Electric Railroad	San José Railroads	Peninsular Railway
Railway operating revenues	$10,003,715	$8,856,796	$227,394	$221,296	$83,889	$329,531	$284,807
Railway operating expenses	6,923,159	5,994,611	166,742	178,789	78,831	239,929	264,257
Net revenue—railway operations	$3,080,556	$2,862,185	$60,652	$42,507	$5,058	$89,602	$20,550
Taxes assignable to railway operations	584,001	515,556	14,130	11,399	5,094	20,619	17,202
Operating income	$2,496,554	$2,346,629	$46,522	$31,108	*$36	$68,983	$3,348
Non-operating income	101,681	†37,301	26,602	1,425	145	3,830	32,377
Gross income	$2,598,235	$2,383,930	$73,124	$32,532	$109	$72,813	$35,726
Deductions from gross income	3,851,544	3,205,664	106,612	11,361	94,304	165,455	268,147
Net income (or loss)	*$1,253,309	*$821,734	*$33,488	$21,172	*$94,195	*$92,641	*$232,421
Tons of commercial freight carried	2,532,348	2,532,348	§	§	‡	§	‡
Passengers carried—revenue	96,602,789	75,408,265	5,099,106	5,116,406	109,353	8,045,294	2,824,365
Car miles—transportation service	36,584,206	30,807,115	1,355,106	1,270,087	213,680	1,841,028	1,097,190
Total single-track mileage	1,301.66	1,058.95	45.01	25.51	49.11	42.69	80.39

*Loss. †Does not include interest amounting to $391,153 accrued during the year, on advances to the Pacific Electric Land Company. §These lines do not carry freight. ‡Figures not available.

was met by a decrease in operating expenses only to the extent of $15,564, or 0.2 per cent. Taxes assignable to railway operations rose $25,086, or 4.5 per cent, and although the non-operating income increased a few thousands, the deductions from income rose $170,134, or 4.6 per cent. Consequently the net figure for the year showed the loss before stated.

In the case of the Pacific Electric Railway, the largest affiliated company, the operating revenues lost $17,711, or about 0.2 per cent, while the operating expenses decreased $32,191, or about 0.6 per cent. Taxes, however, rose $9,079, or about 2 per cent, and income deductions $177,215, or about 5 per cent.

All of the affiliated lines showed decreases in railway operating revenues with the exception of the Stockton Electric Railroad, which gained $21,169. In this case, however, the operating expenses rose $48,825, so that the net from railway operations showed a decrease of $27,657. With the further exception of the Peninsular Railway, whose expenses increased very slightly, the other lines all had lower operating expenses. The taxes in all cases increased, and the income deductions as well.

The total number of revenue passengers carried by all the lines fell off from 97,529,788 to 96,602,789. The tons of commercial freight carried, however, rose from 2,251,342 to 2,532,348, all this gain being on the Pacific Electric Railway. The car-miles in transportation service decreased from 37,145,814 to 36,584,206.

Duluth-Superior Traction Company

The comparative income statement of the Duluth-Superior Traction Company, Duluth, Minn., for the calendar years 1915 and 1916 follows:

	1916 Amount	1916 Per Cent	1915 Amount	1915 Per Cent
Railway operating revenues:				
Revenue from transportation	$1,398,712	99.37	$1,154,906	99.18
Revenue from other railway operations	8,799	0.63	9,539	0.82
Total	$1,407,511	100.00	$1,164,445	100.00
Railway operating expenses:				
Way and structures	$166,197	11.81	$140,953	12.11
Equipment	91,571	6.50	90,586	7.79
Power	171,473	12.18	155,617	13.36
Conducting transportation	348,939	24.79	308,481	26.48
Traffic	813	0.06	254	0.02
General and miscellaneous	137,720	9.79	145,787	12.52
Transportation for investment-credit	—2,140	—0.15	—672	—0.06
Total	$914,573	64.98	$841,008	72.22
Net revenue from railway operation	$492,938	35.02	$323,437	27.78
Taxes assignable to railway operation	69,512	4.94	69,831	6.00
Operating income	$423,425	30.08	$253,606	21.78
Non-operating income	16,917	1.20	15,515	1.33
Gross income	$440,342	31.28	$269,121	23.11
Deduction from gross income	172,341	12.24	172,699	14.83
Net income	$268,001	19.04	$96,422	8.28

During the last year the 1915 losses in revenue owing to jitney competition and other causes were fully made up. The 1915 loss of $135,011, or 10.4 per cent, in revenue from transportation was turned in 1916 into a gain of $243,806, or 21.1 per cent. Operating expenses in the last year rose $73,565, owing mostly to increased expenses for maintenance of way and structures, power and conducting transportation. The net revenue from railway operation, however, gained $169,501, or 52.4 per cent.

Taxes and income deductions showed slight decreases, while non-operating income rose a little. As a result the net income was not far from tripled, the gain being from $96,422 in 1915 to $268,001 in 1916. Thus the net income for the last year more than recovered the loss from the figure of $209,680 in 1914. The company in 1916 earned 5.94 per cent on its common stock, as compared to 1.04 in 1915, but paid nothing in dividends as compared to 1 per cent in 1915.

During 1916 depreciation to the amount of $138,561 was charged off and included in operating expenses. Expenditures for additions to property, aggregating $228,116, were made. Important improvements and reconstruction of a large portion of the company's tracks were completed during the year. There was expended for renewals the sum of $77,235. During the year two voluntary increases in the rate of pay of the company's employees were made.

The cash position of the company was greatly strengthened in 1916. The current liabilities were reduced during the year from $293,571 to $143,488. The current assets on Dec. 31, 1916, were $215,159, as compared to $159,374 the year before.

Committee on Intercorporate Relations

The board of directors of the New York, New Haven & Hartford Railroad on April 24 created a committee of intercorporate relations, which is to consist of the presidents and vice-presidents of the various companies comprising the New Haven system. Howard Elliott, who resigned that day from the presidency of the company, is to be chairman of this committee, and will work with the various presidents to co-ordinate and harmonize the activities of the companies. E. J. Pearson, who has been vice-president of the company since March 9, 1916, has been elected president to succeed Mr. Elliott. Mr. Elliott will continue as a director.

Modified Reorganization Plan Adopted

Reduction in Capitalization of United Railroads, San Francisco, by $37,628,000 Approved by Reorganization Committees

The amended plan of reorganization of the United Railroads, San Francisco, Cal., has been adopted by both the New York and the San Francisco committees. Prior to the announcement of the amended plan nearly 80 per cent of the bonds had already been deposited with the two committees. The total capitalization is reduced from $84,639,100 to $47,011,100.

The plan provides: First, for the cash requirement of $5,200,000 to take care of underlying bonds overdue and to mature April 1, 1918; second, for the exchange of the present 4 per cent bonds for new securities, consisting of 66 2/3 per cent of the holdings in new 6 per cent bonds, 8 1/3 per cent in first preferred stock and 33 per cent in new common stock; third, for the retirement of $45,873,000 in outstanding notes, preferred stock and common stock, by an issue of $12,244,000 of new second preferred and common stock, and fourth, for saleable securities to take care of the company's future capital requirements.

The $5,200,000 cash requirement is provided for as follows: $2,200,000 by the use of income accumulated pending reorganization and the sale of some non-operative property and $3,000,000 by the sale of Market Street Railway 5 per cent bonds. This leaves the Market Street Railway 5 per cent bonds as the only underlying bonds and reduces the total underlying amount to $10,098,000. Under the terms of the Market Street Railway mortgage, $3,909,000 is reserved for future improvements.

For all the junior issues the plan provides $6,000,000 of second preferred stock and $6,244,000 of common stock. In addition, the junior security holders are required to purchase $3,000,000 of Market Street Railway 5 per cent bonds, to be issued to retire underlying bonds at par, for $3,000,000 cash.

The fixed interest on the new 6 per cent bonds is exactly equal to the 4 per cent interest on the par of the present bonds, and the interest return to the bondholders is left unchanged. The total interest bearing debt of the company is reduced by the plan $12,959,000. The total annual obligatory charges are reduced $343,890. The total annual interest charges under the new plan will be $1,444,860.

The time for the deposit of bonds under the amended plan has been extended until May 26. The San Francisco committee has fixed upon $5 a bond as a fair contribution toward defraying the expenses of the committee. The New York committee has announced that the expenses and compensation of the committee will be provided for under the amended plan without cost to certificate holders that assent to the plan.

Suburban Line Purchase Proposed

Orleans-Kenner Electric Railway May Be Acquired in the Interest of the New Orleans Railway & Light Company

Francis T. Horner of Bertron, Griscom & Company, New York, N. Y., who is president of the American Cities Company, which controls the New Orleans Railway & Light Company, has issued a statement which indicates a possible closer relationship between the American Cities Company and the Orleans-Kenner Electric Railway, operating 11.3 miles of line out of New Orleans. He said in part:

"Nearly one and a half years ago Harry K. Johnson advised me that he could not secure the needed financial support to complete the Orleans-Kenner Electric Railway in accordance with the requirements of his franchise and asked whether or not my firm would loan him a sum of money with a view ultimately, if it appeared wise to us, to finance his proposition. Solely by reason of my firm's interest in the New Orleans Railway & Light Company and the belief that the interurban line would attract business to New Orleans we advanced money for the requirements of the company in an amount exceeding $100,000.

"We expect to purchase the bonds of the Orleans-Kenner Electric Railway and the controlling interest in its stock. The New Orleans Railway & Light Company has agreed that at a minimum cost of supervision it will for a year or two handle the operation so as to give the property an opportunity to become self-supporting. If the people of Jefferson Parish feel that this course of procedure is detrimental to their interests we will sell to them the bonds and stock at cost to us, plus a reasonable compensation for our time and labor, and provided further they furnish assurance—first, that they will provide the money necessary to put the road in at least as good an operating condition as the present owners and my firm contemplate, and, second, protect the road against the risk of financial disaster or receivership for a reasonable period of time until its earning capacity has been developed and demonstrated. There is neither mystery nor concealment about the transaction."

Norfolk & Ocean View Line Dissolved

Without Funds and with Accumulated Deficit of $328,000—Company's Difficulties Accentuated by Jitney Competition and Increasing Costs

The Norfolk & Ocean View Railway, Norfolk, Va., has been dissolved in accordance with the laws of the State of Virginia and its corporate existence terminated. Prior to its dissolution, the company conveyed its lines in Norfolk County to Ocean View to the Virginia Railway & Power Company, which will operate cars on the lines into the city of Norfolk over the Colonial Place line and the Norfolk & Atlantic Terminal line to City Hall Avenue. The operation of the lines of the Norfolk & Ocean View Railway were discontinued at midnight on April 5 by order of the trustees in liquidation. All tickets issued by the company and now in the hands of the public will be accepted on the Norfolk & Atlantic Terminal line and on the River View line of the Virginia Railway & Power Company or will be redeemed by the trustees in liquidation.

T. Norman Jones, Jr., agent for the trustees in liquidation, who is also assistant general manager of the Virginia Railway & Power Company at Norfolk, Va., in a statement which he made to the public, said in part:

"The company regrets the necessity for the abandonment of the operation of its lines and the termination of its corporate existence. It has been operating for ten years and in that time has accumulated a deficit of $328,000. It is without funds to continue operation and as this line has failed to earn operating expenses and depreciation, to say nothing of interest on the capital invested, the board of directors of the company were unable to provide money to continue to meet its increasing expenses. Its difficulties in this regard have been greatly accentuated by the recent jitney competition and the heavy increase in the cost of materials and other operating expenses, and since it was no longer able to comply with its franchise obligations, there was nothing left for the board of directors to do but to abandon the undertaking and terminate the corporate existence of the company in the manner prescribed by law."

Bucks County Interurban Railway, Newtown, Pa.—The Pennsylvania Public Service Commission has authorized the Bucks County Interurban Railway to purchase the stock of the Trenton City Bridge Company and the Pennsylvania-New Jersey Electric Company.

Cities Service Company, New York, N. Y.—The newly-elected board of directors of the Cities Service Company met and organized on April 20. E. H. Johnston was elected a vice-president to succeed Charles T. Brown. The other officers were re-elected. An executive committee was appointed, consisting of Henry L. Doherty, Frank W. Frueauff, Warren W. Foster, Leslie M. Shaw, G. B. Tremaine, H. H. Scott and M. R. Bump. Henry L. Doherty, the president, appointed Warren W. Foster, F. S. Terry and Frank W. Frueauff a committee of three to take up and consider the matter of changing the par value of the company's stock and consider the advisability of making application for listing the company's securities on the New York Stock Exchange, with the request that the committee make its recommendations not later than the June meeting of the board of directors.

Havana Electric Railway, Light & Power Company, Havana, Cuba.—A special meeting of the stockholders of the Havana Electric Railway, Light & Power Company will be held on May 17 to take action on the resolution passed by the directors declaring that it is advisable to increase the capital stock of the company from $30,000,000, divided into 300,000 shares of the par value of $100 each, of which $15,000,000 is preferred stock and $15,000,000 is common stock, to $36,000,000, divided into 360,000 shares of the par value of $100 each, this increase of 60,000 shares to be preferred stock having the same preferences, qualifications and restrictions as the preferred stock set forth in the original certificate of incorporation, and to fix the price, terms and conditions upon which the increase of capital stock is to be offered to the stockholders for subscription.

Jefferson County Traction Company, Beaumont, Tex.—A merger is proposed of the properties of the Beaumont Traction Company, the Beaumont Electric Light & Power Company and the Jefferson County Traction Company, all controlled by the Eastern Texas Electric Company. According to the proposal the Jefferson County Traction Company will take over the properties of the other concerns. In order to put this plan into effect it is necessary that the people of the city pass upon the matter by ballot. The reason for the merger is the saving in operating cost made possible by such an arrangement.

London & Lake Erie Railway & Transportation Company, London, Ont.—The London & Lake Erie Railway & Transportation Company has offered to sell the portion of its line between St. Thomas and Port Stanley, 8 miles, together with four cars, for $168,000. The contention of the officials of the road, which is meeting with severe competition from the London & Port Stanley Railway, a municipal line, is that this portion of the road operated as a freight and passenger line in connection with the city's line would pay, even if in direct competition with the London & Port Stanley road.

New England Investment & Security Company, Springfield, Mass.—In a circular issued to the preferred shareholders of the New England Investment & Security Company, the preferred shareholders' protective committee of that company describes a plan for preserving the value of the preferred shares, while at the same time meeting the interest charges on the $13,709,000 of coupon notes due on April 1, 1924, by an exchange of the preferred shares of the New England Investment & Security Company, for the newly authorized first preferred stock of the Worcester Consolidated Street Railway, controlled by the Investment Company. To allow such a plan of readjustment the recent authorization by the Massachusetts Public Service Commission of an issue of 45,000 shares of preferred stock of the Worcester Consolidated Street Railway was sought and ob-

tained. The preferred shareholders' committee hopes to be able to offer 40,000 shares of this stock as of July 1, 1917, to the preferred shareholders of the New England Investment & Security Company, in exchange for their holdings, share for share.

New York (N. Y.) Railways.—An application has been filed with the Public Service Commission for the First District of New York by the New York Railways for permission to purchase 6842 shares of stock of the Bleecker Street & Fulton Ferry Railroad at $28.50 each. The remainder of the 9000 shares will be bought at the same price if the owners will deposit them with the Union Trust Company. The Bleecker Street & Fulton Ferry Railroad was organized about 1864 and was authorized to construct a surface road in Fourteenth Street and other streets and avenues. In January, 1876, the company was leased to the Twenty-third Street Railway for ninety-nine years. This lease was in turn assigned to the Metropolitan Street Railway, which has been succeeded by the New York Railways.

New Orleans Railway & Light Company, New Orleans, La.—Frank B. Williams has been elected a director of the New Orleans Railway & Light Company to succeed Hugh McCloskey, who resigned recently as president of the American Cities Company, which controls the New Orleans Railway & Light Company.

Reading Transit & Light Company, Reading, Pa.—The Pennsylvania Public Service Commission on April 19 approved the application of the Reading Transit & Light Company to purchase stock of a number of railway and light companies in Berks and Lebanon Counties now operated by it under lease. The plan is to simplify the intercorporate relations of the companies by consolidating them, and is a step in the direction of preparing for the further development of the street railway and electric power service in Reading and the Lebanon Valley, in accordance with the plan noted in the Electric Railway Journal of Feb. 10, page 267.

Twenty-eighth & Twenty-ninth Streets Crosstown Railroad, New York, N. Y.—A payment of $65 per $1,000 bond has been authorized by the bondholders' committee to holders of the certificates of deposit of the Central Trust Company for the first mortgage 5 per cent bonds of the Twenty-eighth & Twenty-ninth Streets Crosstown Railroad. Payment will be made on and after April 24 at the office of the Central Trust Company in New York. The Twenty-eighth & Twenty-ninth Streets Crosstown Railroad was succeeded by the Mid-Crosstown Railway, which is now included in the system of the Third Avenue Railway.

West India Electric Company, Ltd., Kingston, Jamaica.—The gross receipts of the West India Electric Company, Ltd., for the calendar year 1916 amounted to $286,321, an increase of $12,004, or 4.37 per cent over those of 1915. Of this total $195,602 came from the railway department. The receipts in this group showed a marked recovery, although $11,267 below those of 1914. With normal conditions prevailing, it is expected that the traffic receipts will again reach the maximum figure. The operating expenses in 1916 totaled $144,064, this being an increase of $696, or 0.48 per cent. On account of the greater increase in receipts, the operating ratio was only 50.31 in 1916 as compared with 52.26 in 1915. The net earnings at $142,257 represented an increase of $11,307, or 8.63 per cent. The passengers carried in 1916 totaled 4,812,754, a gain of 321,926, or 7.16 per cent.

Dividends Declared

Cape Breton Electric Company, Ltd., Sydney, N. S., Can., 3 per cent, preferred; 1½ per cent, common.

Cities Service Company, New York, N. Y., monthly, one-half of 1 per cent, common and preferred; one-half of 1 per cent, common, payable in common stock.

Columbus Railway, Power & Light Company, Columbus, Ohio, quarterly, 1¼ per cent, preferred, Series B; quarterly, 1¼ per cent, common.

East St. Louis & Suburban Company, East St. Louis, Ill., quarterly, three-quarters of 1 per cent, preferred.

Grand Rapids (Mich.) Railway, quarterly, 1¼ per cent, preferred.

Havana Electric Railway, Light & Power Company, Havana, Cuba, 3 per cent, preferred; 3 per cent, common.

Kentucky Securities Corporation, Lexington, Ky., quarterly, 1½ per cent, preferred.

Lehigh Valley Transit Company, Allentown, Pa., quarterly, 62½ cents, preferred.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Me., quarterly, 1½ per cent, preferred.

Monongahela Valley Traction Company, Fairmont, W. Va., quarterly, 1¼ per cent, preferred.

Montreal (Que.) Tramways, 2½ per cent, quarterly.

Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, 1½ per cent, preferred.

Pacific Gas & Electric Company, San Francisco, Cal., quarterly, 1¼ per cent, common.

Scioto Valley Traction Company, Columbus, Ohio, quarterly, 1¼ per cent, first preferred; quarterly, 1¼ per cent, preferred.

South Carolina Light, Power & Railways Company, Spartanburg, S. C., quarterly, 1½ per cent, preferred.

Tampa (Fla.) Electric Company, quarterly, 2½ per cent.

Electric Railway Monthly Earnings

BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.

Period			Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Feb.,		'17	$7,714	*$8,711	†$995	$1,161	†$2,156
1 "	"	'16	7,281	*7,720	†439	1,094	†1,533
12 "	"	'17	123,986	*112,804	11,182	13,379	†2,197
12 "	"	'16	116,877	*97,005	19,872	13,420	6,452

CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.

1m., Feb.,		'17	$32,010	*$19,445	$12,565	$6,552	$6,013
1 "	"	'16	28,638	*18,579	10,059	6,424	3,635
12 "	"	'17	401,499	*236,151	165,348	78,451	86,897
12 "	"	'16	367,479	*211,355	156,124	78,872	77,252

COLUMBUS (GA.) ELECTRIC COMPANY

1m., Feb.,		'17	$80,987	*$30,744	$50,243	$28,417	$21,829
1 "	"	'16	64,622	*27,428	37,194	28,679	8,515
12 "	"	'17	915,378	*356,985	558,393	343,142	215,251
12 "	"	'16	741,241	*326,371	414,870	344,329	70,541

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

1m., Feb.,		'17	$1,530,735	*$925,409	$605,326	$430,917	$174,409
1 "	"	'16	1,362,995	*709,410	653,585	408,330	245,255
12 "	"	'17	17,340,513	*9,696,593	7,643,920	5,076,403	2,567,517
12 "	"	'16	14,977,054	*7,978,108	6,998,946	4,603,102	2,395,844

EL PASO (TEX.) ELECTRIC COMPANY

1m., Feb.,		'17	$111,254	*$64,067	$47,187	$5,312	$41,875
1 "	"	'16	91,146	*45,584	45,562	4,722	40,840
12 "	"	'17	1,141,886	*693,623	448,263	60,290	387,973
12 "	"	'16	1,006,674	*528,951	477,723	51,379	426,344

GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.

1m., Feb.,		'17	$148,284	*$104,970	$43,314	$36,761	$6,553
1 "	"	'16	145,763	*99,442	46,321	36,617	9,704
12 "	"	'17	1,953,997	*1,248,750	705,247	439,456	265,791
12 "	"	'16	1,927,491	*1,215,644	711,847	434,099	277,748

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

1m., Feb.,		'17	$25,249	*$17,635	$7,614	$5,183	$2,431
1 "	"	'16	24,165	*16,077	8,088	5,523	2,565
12 "	"	'17	331,399	*189,658	141,741	63,279	78,462
12 "	"	'16	286,881	*160,712	126,169	66,358	59,811

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO

1m., Feb.,		'17	$477,004	$297,208	$179,796	$82,680	$97,116
1 "	"	'16	359,403	167,676	191,727	98,740	92,986
2 "	"	'17	967,385	580,051	387,334	166,688	220,646
2 "	"	'16	726,545	344,428	382,117	187,175	194,942

PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.

1m., Feb.,		'17	$25,550	*$18,830	$6,720	$7,180	†$460
1 "	"	'16	25,618	*14,829	10,789	7,378	3,411
12 "	"	'17	312,229	*222,382	89,847	86,314	3,533
12 "	"	'16	292,168	*177,877	114,291	90,666	23,625

PENSACOLA (FLA.) ELECTRIC COMPANY

1m., Feb.,		'17	$26,909	*$15,083	$11,826	$7,800	$4,026
1 "	"	'16	21,832	*11,686	10,146	8,066	2,080
12 "	"	'17	288,287	*162,614	125,673	92,462	33,211
12 "	"	'16	263,590	*147,430	116,160	86,891	29,269

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

1m., Feb.,		'17	$720,177	*$440,390	$279,787	$189,142	$90,645
1 "	"	'16	597,214	*432,928	164,286	183,795	†19,509
12 "	"	'17	8,348,610	*5,168,424	3,180,186	2,227,602	952,584
12 "	"	'16	7,563,813	*4,811,870	2,751,943	2,186,819	565,124

SAVANNAH (GA.) ELECTRIC COMPANY

1m., Feb.,		'17	$69,295	*$42,645	$26,650	$23,655	$3,085
1 "	"	'16	60,396	*44,167	16,229	21,355	†6,792
12 "	"	'17	843,910	*559,154	284,756	284,061	695
12 "	"	'16	785,159	*518,011	267,148	278,465	†11,317

*Includes taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

Seeking Relief from Traffic Delays

Head of New York Railways Appeals by Letter to Truck Owners for Clear Tracks—Responses Very Gratifying

The streets of New York are the scenes of the worst traffic congestion in their history, due to the enormous amount of building operations and other obstructions which figure in the subway construction. The number of automobiles has increased almost 200 per cent annually during the last three years, making the total number in use in the metropolitan district alone more than 314,000. To these are added many more which enter from New Jersey. The resulting use of the street car tracks by vehicles has so impaired the trolley service that officials of the New York Railways are endeavoring to secure some measure of relief. During one stormy day last winter the company suffered a loss of 22,000 car-miles, or nearly 25 per cent of its usual mileage, due largely to automobiles and trucks using the tracks, which were cleared of snow.

Delays Offset Car Improvements

As noted in the Electric Railway Journal for March 10, page 459, the modern improvements in car service intended to promote speedy operation are more than offset in New York by delays to which the cars are subjected, and in some cases the scheduled speed in the congested districts has been reduced from 6½ m.p.h. to 5½ m.p.h. It is evident that until street conditions are more nearly normal all street users must pledge greater co-operation. As a step toward this end Theodore P. Shonts, president of the New York Railways, has sent about 6000 letters to all truck owners and firms using auto trucks or horse-drawn vehicles for delivery purposes, inviting their help in keeping the tracks clear. Many replies have been received which without exception voiced favorable attitude, and some firms asked for further suggestions from the company for methods by which their drivers could be made more responsible. The appeal by Mr. Shonts was substantially in full as follows:

President Shonts Urges Co-operation

"The cars, of course, must stay on the tracks; they cannot ride around automobiles or trucks. When a car is delayed the number of people inconvenienced is very greatly in excess of the number who can possibly benefit, even temporarily, by the use of the tracks. A great deal of this use of the tracks is doubtlessly due to thoughtlessness, but no matter what the cause, the result is the same. Drivers frequently drive in the middle of the street when there is ample room to proceed at the side.

"An ordinance of the city of New York provides that vehicles using the tracks must turn out immediately upon signal from the motorman of an approaching car. It is a well-known fact that this ordinance is violated by drivers and the violation ignored by the police. You can aid in securing an observance of the law and facilitating the movement of traffic by requiring your drivers to keep off the tracks.

"Efficient street car service is of vital concern to every merchant in New York City. Most customers make part of the journey by subway and 'L' and complete it to the store on the street car. The firm of James A. Hearn & Son has instructed its drivers to keep off the car tracks. It recognizes that for its wagons to block street cars is to delay its own customers. Others will, I am sure, want to do the same thing, as this is a matter which should be of interest to the whole community.

"May I not ask, therefore, that you instruct your drivers to avoid the use of the car tracks, or the middle of the street on which there are tracks, unless it is impossible to get along in the space to the side? This, I take it, would not interfere with your work or comfort, and it would aid us tremendously in our efforts to serve the public under exceedingly difficult street conditions."

Bay State Files New Rates

The Bay State Street Railway, Boston, Mass., has filed a new schedule with the Public Service Commission of Massachusetts which slightly increases the price of its reduced-rate tickets. At present the company sells forty-nine reduced-rate tickets at 3.5 cents each, good during certain morning and evening hours in either a 5 or a 6-cent zone. The majority of the tickets are used between points embracing two zones and are purchased at 7 cents each. It is proposed to increase most of these rates to 8.5 cents. In most instances the regular fare between two such points is 11 cents. About twenty reduced-rate tickets, good for all hours of the day and in some cases in three or four zones, are also used. The company maintains that this is a discrimination against other patrons who pay the regular fare, and these tickets will be discontinued except in some cases where a reduced-rate ticket for certain hours will be substituted on account of heavy riding.

The company has also filed with the commission a tariff which eliminates half fares for school children. It contends that the Massachusetts statute requiring such fares is unconstitutional, in view of the fact that the company is thereby obliged to carry this class of passengers at a loss. Although the Supreme Court has passed favorably on the general interpretation of the law, it was held in the case of Commonwealth vs. The Interstate Consolidated Street Railway that if the requirement causes an actual loss to the company, it may be deemed unconstitutional. The commission will probably hear this case early in May.

Hearing on Discontinuance of Service

The Public Service Commission of Massachusetts recently heard the case of remonstrators opposing the discontinuance of service on the Wilmington Center-Billerica Center line of the Bay State Street Railway, Boston, Mass. The company proposed to abandon the line because the traffic is insufficient to meet operating expense. S. H. Pillsbury, counsel for the company, maintained that the commission has no authority to order a continuance of service provided the company abandons the location, unless the road is restrained by an agreement to the contrary.

The line in question is about 6½ miles long and was formerly a part of the through route from Lowell to Boston. Howard F. Fritch, of the company's statistical department, said that during the year ended June 30, 1916, the total receipts per car-mile were 6.12 cents. The receipts per car-hour were 50 cents, while the wages of motormen and conductors averaged 61 cents per car-hour, and the average operating expense per car-hour for the entire company, including interest, rentals and taxes was $2.50. The total revenue was $1,852.84 during that period. Last winter the company spent $900 for snow removal. R. S. Goff, vice-president and general manager of the company, said that about $64,000 would be necessary to put the track in fair condition.

The patrons opposing the abandonment of the line expressed their willingness to pay higher fare to have the service retained. The hearing was closed, the company and remonstrators agreeing to endeavor to reach a settlement.

Higher-Fare Movement in Rochester

James F. Hamilton, general manager of the Rochester Lines of the New York State Railways, announces that the company is considering an application to the Public Service Commission of the Second District for permission to increase its fare from 5 cents to 6 cents. Within the last five years the company has increased the wages of its employees about 18 per cent. It is spending one-third of its gross revenue of $4,107,442 for capital improvements and, with the steady increase in operating expenses, a 5-cent fare with free transfers is an insufficient unit. No definite plan has yet been adopted. Among the methods considered, besides the general fare increase of from 5 cents to 6 cents in the city limits with free transfers, are the adoption of a straight 5-cent fare with a charge of 1 cent for each transfer and the establishment of a zone system.

Proposed Freight Advance

I. C. C. Statement in Regard to Proposed 15 Per Cent Increase in Freight Rates

Following requests by the carriers throughout the country to be permitted to file supplements to existing rate schedules, proposing general increases in rates of 15 per cent, except as to a few specified commodities, the Interstate Commerce Commission has recently heard in conference large numbers of representatives of the carriers and shippers respecting the matter. The purpose of these requests is to avoid the expense and delay incident to the full and detailed preparation and re-publication of all of the existing tariff schedules, substituting in detail the proposed increased rates for those now in effect.

The commission announces that it has issued permissive orders as an emergency measure authorizing the filing of rate supplements, but has reached no determination, and has expressed no views or opinion upon the question of the reasonableness or propriety of the proposed increases, which will be subject to protest, suspension, complaint, investigation and correction if they are found to be in conflict with any provision of the interstate commerce act. Reasonable opportunity will be afforded for the presentation and consideration of protests.

Better Service for Providence

As a result of a special report made to the City Council of Providence, R. I., by Public Service Engineer Brunet, the Rhode Island Company has been ordered to reroute ten of its principal car lines so as to provide quicker service. The lines will loop just outside the center of the city instead of running through Exchange Place. Mr. Brunet found that last year the company carried 16,690,948 transfer passengers in addition to fare passengers, and that for each increase of 1000 in the population of the city it has to transport 702,000 revenue-paying passengers. The problem before the company is realized from the fact that the normal growth in population is from 4000 to 5000 a year.

Steamer Supplements Railway Service.—The Northwestern Ohio Railway & Power Company, Toledo, Ohio, put the steamer *Presque Isle* into service on April 22 between the eastern terminus of its road and Sandusky, across the Sandusky Bay. The road is operated between Toledo and Bay Point, just west of Sandusky.

Louisville Employees Discuss Rules.—The rule book was the subject for consideration at the last of the regular get-together meetings of the trainmen of the Louisville (Ky.) Railway. Samuel Riddle, superintendent of transportation, presided. The men handled the rules constructively and in a number of cases touched upon the incidents which led to their adoption.

Tool Boxes Removed.—The Kansas City (Mo.) Railways has removed the tool boxes from all cars. The order is a result of a careful investigation to discover whether a tool box had ever been used. The men have recently been instructed to report all defects promptly, and have been in the habit of bringing the cars in for repairs, however trivial the damage might be.

Supervisors Direct Buffalo Traffic.—The International Railway, Buffalo, N. Y., has adopted a policy of increasing the number of uniformed traffic supervisors. Within the last few months several experienced motormen and conductors have been promoted to the position of supervisor, and officials of the company say this new policy has done much to keep cars on schedule and facilitate the handling of passengers.

New Orleans Survey Financed.—An appropriation of $12,000 has been made by the City Council of New Orleans for the work of the special commission about to make a transportation survey in that city, as reported in the issue of this paper for April 14, page 712. Of this sum $10,000 will go to J. E. Allison, who is conducting the investigation, and the remainder will be used for incidental expenses. The money will be taken from the city treasury balance of the year 1916.

Bus Company Gets Franchise.—The City Council of Portland, Ore., has granted to the Portland Trackless Car Company a franchise authorizing it to operate jitneys between Portland and Linnton. The franchise, like the others which have been granted to this company, will be submitted to the voters at the municipal election on June 4. The Council granted the franchise, pending the outcome of the franchise election, with the same regulations as those of other "for hire" cars which are now operating in the city of Portland.

Finding on L. A. & W. Service.—An investigation made by the Public Utilities Commission of Maine, following a petition against the Lewiston, Augusta & Waterville Street Railway, Lewiston, Me., alleging inadequate service in the Augusta, Gardiner and Waterville districts, has revealed that the chief difficulty is a lack of power. In the finding it is noted that $200,000 is to be expended immediately for additional power facilities and the purchase of more cars. The evidence taken did not indicate that there had been excessive over-crowding of cars except where the regular quota of cars was not furnished.

Fare Increases Proposed for Utica.—The New York State Railways, Utica Lines, has filed with the Public Service Commission for the Second District of New York a new tariff showing increased fares as follows: Local round-trip fares advanced 5 cents between Rome and Utica, Frankfort, Ilion, Mohawk and Herkimer; between Utica and Utica Park and Frankfort, Ilion, Herkimer and Little Falls; and between Little Falls and Frankfort, Ilion, Mohawk and Herkimer; also advanced 10 cents between Little Falls and Rome. The sale of interchangeable coupon ticket books at $10 per book containing 1200 coupons of the face value of 1 cent each will also be discontinued. The changes are to be effective on May 15.

Restraining Order Protects Bus Company.—A temporary order forbidding Secretary of State I. M. Howell or the prosecuting attorney of King County, Seattle, Wash., from interfering with the operation of the Ferry Line Auto Bus Company at West Seattle was issued recently by Judge Everett Smith in the Superior Court. The company asserts that agents of the Secretary of State threaten prosecution unless it pays a license fee for one year. By action of the last Legislature, bus companies, operating within city limits, will no longer be required to pay the license fee. The company has offered to pay a pro rata portion from March 1 to June 12. The line is operated in conjunction with the Port of Seattle Commission's ferry.

Plans for Use of One-Man Cars Abandoned.—The Corning & Painted Post Street Railway, Corning, N. Y., has decided against the use of one-man cars. Early in March the company equipped a number of cars so they could be operated by one man, but before the plan went into effect notice was served upon the company by the Mayor of Corning that he would not allow the operation of cars over the city lines with one man. Employees of the company voted to strike unless the company rescinded its one-man crew order. After a conference at which the officers of the company endeavored to secure the consent of the municipal authorities for a trial of the one-man system they agreed to continue the operation of cars with a motorman and conductor. The Mayor contended it would be unsafe to operate one-man cars over certain crossings.

I. T. S. Prosecutes Annoying Passengers.—The Illinois Traction System, Peoria, Ill., is resorting to severe measures in a campaign against rowdyism on its interurban cars. Several cases against riotous passengers, where over-indulgence in liquor was the cause, have been prosecuted. A prominent resident of the eastern part of Sangamon County was recently fined $25 and costs, amounting to $49.50 in the County Court. It is the endeavor of the company to keep passengers who are under the influence of liquor off its cars, and conductors have strict instructions to this effect. Occasionally, however, such passengers succeed in boarding the cars and postpone their boisterous conduct until after the car has left the terminal. These conditions have been especially annoying where there are isolated "wet" towns, and the company hopes through its operating and legal departments to censor the conduct of these undesirables for the benefit of regular patrons.

Committee Reports on Niagara Service.—The public service committee of the Greater Niagara Falls Commercial Association, Niagara Falls, N. Y., which was appointed several months ago to investigate local service of the International Railway, has made its report. Much of the blame for delays has been placed upon steam railroads for blocking grade crossings. As a result of the co-operation between International officials and the special traffic committee additional cars have been placed on the lines during the morning and evening rush hours, and schedules have been so arranged that better connections are made at transfer points. Through car service has also been inaugurated between the north and the upriver electric districts. Favorable comment has been made in the local press upon the co-operation given the municipal authorities and the commercial association, and the improved service is credited largely to E. H. Henning, superintendent of the Niagara Falls local lines of the International.

Bus and Railway Vie for Billy Sunday Traffic.—The Public Service Commission for the First District of New York has issued to the Fifth Avenue Coach Company, operating buses, a certificate of convenience and necessity to permit the operation of several of its stage routes north to 169th Street and Broadway during the term of the Billy Sunday evangelistic services. A somewhat unusual situation occurred at the hearing before the commission preceding the issuance of the necessary certificate, owing to the fact that an officer of another public utility corporation, namely, the Third Avenue Railway, appeared in opposition to the grant as requested. The opposition of the Third Avenue Railway was based on the fact that the proposed bus line extensions created "an element of unfair competition" with the cars of several of the railway lines. The commission, however, in issuing the certificate accepted an agreement from the coach company to change its hours of operation if deemed necessary so as to overcome any just cause for complaint that the railway company might have against the alleged competition.

Company Y. M. C. A. Proves Popular.—An article entitled "Blazing the Trail," in the March-April number of *Railroad Association Magazine*, by T. Norman Jones, Jr., assistant general manager of the Virginia Railway & Power Company at Norfolk, Va., relates the success of that company's Young Men's Christian Association, which was established for its employees in 1904. The membership of the association last year averaged 680, about seventy of whom were in a branch established in South Richmond. Its home affords reception rooms, a reading room, a bath room, barber shop, pool tables, games, etc., a library of more than 2000 volumes and an assembly hall which seats about 300 people. Weekly noon-hour services in the shops were conducted last year with an average attendance of about forty-five, and other weekly meetings are held, addressed by ministers and other speakers. Between 450 and 500 members use the building daily and it is estimated that 36,000 letters were written last year in the writing room. The monthly dues in the association are 25 cents, the major portion of the expense being borne by the company.

Reduction in N. Y. C. Fares Refused.—An opinion by Commissioner Travis H. Whitney has been approved by the Public Service Commission for the First District of New York in the case brought by the Taxpayers' Alliance of the Bronx, a borough of New York, to compel the New York Central Railroad to reduce its fares for local service on the Harlem Division within the city limits, and to increase its service. The opinion states that the commission cannot comply with the request of the alliance. No order, however, has yet been adopted by the commission, but a copy of the opinion has been submitted to the company and the attention of its officials was called to the concluding paragraph in which Commissioner Whitney points out that the company should find some method of access to the Grand Central station in addition to its Park Avenue tracks in Manhattan. Reports have been in circulation that the company might at some future time connect the west side tracks with the Grand Central station by means of a tunnel. This would make it possible to increase materially the number of trains for local service operated upon the Park Avenue tracks.

Personal Mention

E. H. Johnston has been elected a vice-president of the Cities Service Company, New York, N. Y., to succeed Charles T. Brown.

Newton M. Hudson, auditor of the Second Avenue Railroad, New York, N. Y., has been appointed receiver of the company to succeed John Beaver, deceased.

C. I. Kephart of California is valuation engineer for the Interstate Commerce Commission handling the valuation of the Butte, Anaconda & Pacific Railway, Anaconda, Mont.

H. E. Vordermark, secretary and auditor of the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., has been elected vice-president and treasurer of the company.

John A. Britton, vice-president and general manager of the Pacific Gas & Electric Company, Sacramento, Cal., has been appointed by the Governor of California to membership on the California State Defense Board.

E. J. Davis, formerly assistant superintendent of transportation of the El Paso (Tex.) Electric Railway, has been transferred to Beaumont as purchasing and claim agent for the Stone & Webster properties in that city.

F. H. Schmidt, for eleven years assistant auditor of the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., has been appointed auditor to succeed H. E. Vordermark, who becomes vice-president and treasurer.

Thomas E. Dempsey has been named chairman of the Public Utilities Commission of Illinois by Governor Lowden. Mr. Dempsey has been Assistant Attorney General during the terms of the last three Attorney Generals of that State.

M. C. Whiting, until recently assistant superintendent and electrical engineer of the Cairo Railway & Light System, Cairo, Ill., a subsidiary of the Illinois Traction System, has entered private business in that city as superintendent of the International Silica Company.

Henry L. Doherty of the Cities Service Company, and George Williams, who first suggested flood-lighting the Statue of Liberty, have been appointed by Mayor Mitchel of New York to the illumination committee to help design a fitting welcome for the Allied Commission.

Byron C. Fowles, secretary-treasurer, general superintendent and purchasing agent of the Pine Bluff (Ark.) Company, has resigned, effective May 1, to become general manager of the public utilities in Kingsport, Tenn., which are owned by the Equitable Securities Company, New York, N. Y.

H. W. Dyson, comptroller of the British Columbia Electric Railway, Ltd., Vancouver, B. C., has resigned to become general manager of the Yorkshire & Canadian, Ltd., at Vancouver. Mr. Dyson went to Vancouver from England in 1910 as assistant to George Kidd, then comptroller, and was promoted in 1914 when Mr. Kidd was made general manager of the company.

A. R. Piper, general freight agent of the Brooklyn (N. Y.) Rapid Transit Company, who is on the retired list of the United States Army with the rank of captain, has been ordered back to duty by the government. Captain Piper, just prior to his call to the country's service, organized a department on the Brooklyn Rapid Transit System for the protection of the company's physical property against attack by alien enemies.

Howard Elliott has resigned as president of the New York, New Haven & Hartford Railroad, effective on May 1. Mr. Elliott will become chairman of the newly organized committee on intercorporate relations, which is to consist of the presidents and vice-presidents of the companies in the New Haven system. In this position he will act in an advisory capacity with the purpose of co-ordinating the activities of the several subsidiary concerns.

E. J. Pearson has been elected president of the New York, New Haven & Hartford Railroad succeeding Howard Elliott.

Mr. Pearson was a vice-president of the company in charge of construction, operation and maintenance. He has had a wide experience, especially in the construction of terminals with which he was connected in Chicago, St. Louis, Kansas City and New Orleans. He has also acquired an invaluable training in operating problems and railway economics from his varied services in this field.

W. Saville, formerly chief clerk of the British Columbia Electric Railway, Ltd., Vancouver, B. C., has been appointed comptroller of that company, succeeding H. W. Dyson. Mr. Saville entered the employ of this company in 1911. Prior to that time he was associated with the Aire & Calder Navigation Company at Leeds, Yorkshire, England, as chief assistant to the secretary. He had also been with the Underground Electric Railways of London, England, under Sir Robert Perkins and the late Charles T. Yerkes.

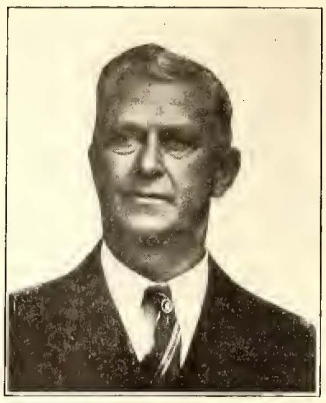
Benjamin F. Cresson and **William D. Ray** were tendered a farewell banquet recently at the Pomfret Club, Easton, Pa. Their many friends took this means to show their appreciation of the services of their guests, who have resigned their positions with the Pennsylvania Utilities Company. Mr. Cresson had been with the company and its predecessors more than fifteen years as president of the Easton Gas Company. Mr. Ray was vice-president and general manager of the present organization for two years. Wesley M. Heiberger presided.

C. R. Richards, head of the mechanical engineering department of the University of Illinois since 1911, has been appointed dean of the College of Engineering and director of the Engineering Experiment Station to succeed Dr. W. F. M. Goss, who resigned recently to become president of the Railway Car Manufacturers' Association of New York. Dean Richards was graduated from Purdue University in 1890 and has been successively instructor in mechanical engineering in Colorado Agricultural College, and professor of practical mechanics, professor of mechanical engineering and dean of the College of Engineering of the University of Nebraska. Since entering the University of Illinois he served two years as acting dean of the College of Engineering during an absence of Dean Goss. He is a member of the American Society of Mechanical Engineers, the Western Society of Engineers and the Society for the Promotion of Engineering Education.

E. F. Kelley, chief clerk to James P. Barnes, general manager of the Schenectady (N. Y.) Railway, entered the railway field with the New York Central Railroad as chief clerk to S. J. Kearns, who was assistant superintendent of the western division with headquarters at Syracuse, N. Y. Mr. Kelley has been connected with the New York State Railways since 1909, when he entered the mechanical and engineering departments of the Utica and Syracuse lines. In 1914 when the Buffalo, Lockport & Rochester Railway, Rochester, N. Y., passed into the control of Allen & Peck, Inc., James P. Barnes, then general manager, made Mr. Kelley chief clerk and later he was appointed, in addition, purchasing agent of the company. He resigned this position to accompany Mr. Barnes, who recently became general manager of the Schenectady property. Mr. Kelley was secretary-treasurer of the Railway Club of Rochester and upon leaving Rochester he was elected to honorary membership.

James E. Allison will soon begin the work of conducting the extensive survey of transportation conditions in New Orleans, La. Mr. Allison has done much work along the lines of public service investigation and is the author of several reports and articles on valuation and regulation subjects. Following a year of service on the Board of Engineers of St. Louis and as consulting engineer in a department of the St. Louis World's Fair, he was made commissioner and chief engineer of the St. Louis Public Service Commission in 1909 and was reappointed in 1911. In his capacity as chief engineer he made valuations of public service property for several companies in St. Louis representing a capitalization of about $170,000,000. In 1913 he resigned to engage in consulting practice and made a specialty of public service valuation work. He was later appointed to lecture in Washington University, St. Louis, Mo., on the economic principles relating to the regulation of public utilities. Mr. Allison has established a fund for promoting the study of public utility economics.

George A. Murch has been appointed general manager of the St. Albans & Swanton Traction Company, St. Albans, Vt., and the Public Electric Light Company, that city, succeeding F. C. Wilkinson, resigned. Mr. Murch is a pioneer in the construction and operation of electric railways, having started with the Thomson-Houston Company, for which company he built and managed the first electric railway in Toledo, Ohio, and later was manager of the Attleboro (Mass.) Street Railway System. He was then employed by the firm of Shaw & Ferguson as superintendent of construction of the Worcester, Leicester & Spencer Electric Railway, at that time the longest street railway in New England, and upon its completion was elected manager. After two years the Worcester Construction Company was organized with Mr. Murch as one of the original five members, and during its life he was connected with the construction and management of street railways throughout the United States. Other work contributing to Mr. Murch's wide experience has been his services during the last few years in responsible positions with the Bradford & Olean Street Railway, the Maynard, Acton & South Acton Street Railway and the Atlantic Shore Line Railway. During the last six months he has been engaged in constructing a three-phase high-tension line for one of the companies of which he has just been made manager.



G. A. MURCH

Obituary

John F. Milnor, who has been connected with the law department of the Brooklyn (N. Y.) Rapid Transit Company for a quarter of a century, died at his home in that city on April 24.

William J. Hurn of the Louisville (Ky.) Railway is dead. Mr. Hurn entered the service of that company in 1883 as a driver on one of the old mule cars, and was gradually promoted to the position of superintendent of the change and transfer department.

W. J. O'Neill, assistant treasurer of the Brooklyn (N. Y.) Rapid Transit Company, died on April 21. Mr. O'Neill began his services with that company in 1894 as bookkeeper and after receiving other promotions in the auditing department he was appointed to his last position in 1904.

Richard W. Meirs, vice-president of the Hudson & Manhattan Railroad, New York, N. Y., died at his home in Philadelphia, Pa., on April 20 at the age of fifty-one. Mr. Meirs was graduated from Princeton University with the class of 1888. At the time of his death he was a director of the Commercial Trust Company of America and of several railway and power companies, principally in Pennsylvania. Mr. Meirs was a member of the Pennsylvania Historical Society and manager of the Franklin Institute. He also claimed membership in the Metropolitan, Princeton and Grolier Clubs of New York City and several local clubs in Philadelphia.

John Beaver, receiver of the Second Avenue Railroad, New York, N. Y., died on April 19 in his seventy-fourth year at his home in that city. He was born in Esopus, N. Y., and after attending the public schools he took a course at the New York Free College. He served in the civil war and afterward became cashier of the Third Avenue Railway. In March, 1900, he was elected president of the Forty-second Street, Manhattanville & St. Nicholas Avenue Railway, a position which he held until 1908, when he was made secretary and treasurer of the Central Park, North & East River Railway. Later he became president of the Second Avenue line. In 1900 he became also vice-president of the Empire City Savings Bank, and in 1913 was elected president, a position he held at the time of his death.

Construction News

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

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

FRANCHISES

San Diego, Cal.—The San Diego Electric Railway has asked the City Council for a franchise to construct a line on Fifth Street from University Avenue to Washington Street, thence along Washington Street to First Street. Sealed bids will be received by the Council for this franchise until May 14.

Savannah, Ga.—The Savannah Electric Company will ask the City Council for a franchise to construct an extension south on Abercorn Street to Fifty-first Street and west on Fifty-first Street to Barnard Street.

Brooklyn, N. Y.—The bureau of franchises has recommended to the Board of Estimate that May 18 be fixed as a date for a hearing on the petition of the Nassau Electric Railroad, controlled by the Brooklyn Rapid Transit Company, for a franchise to construct an extension on Eighty-sixth Street from Fifth to Third Avenue, Brooklyn. Application for this franchise was made by the company several months ago. This company is also petitioning for a renewal of its franchise to operate a single-track line along Georgia Avenue, and from Liberty Avenue to Atlantic Avenue, and for a renewal of its contract with the city under which it is operating a single-track line along Flatbush Avenue. If the recommendations of the Bureau of Franchises are adopted hearings will be held on these matters, respectively, on April 30 and May 18.

Johnstown, Pa.—The Johnstown Traction Company has received a new franchise from the City Council of Johnstown.

Wapate, Wash.—The Pacific Power & Light Company has received a fifty-year franchise from the City Council to furnish light and power in Wapate.

Moundsville, W. Va.—The Wheeling Traction Company has received a franchise from the City Council to make changes in its line in Moundsville.

TRACK AND ROADWAY

Globe-Miami Railway, Globe, Ariz.—Surveys will be begun at once of this company's proposed line from Globe to Miami, and it is expected that construction work will be begun shortly. Arrangements are being made to construct a large amusement park midway between Globe and Miami, where a dance pavilion, bath house and pool will be built. Edgar Sultan, Globe, secretary. [April 7, '17.]

Municipal Railways of San Francisco, San Francisco, Cal.—A contract has been awarded by the Board of Works to John Spargo, San Francisco, for concrete trolley poles on Upper Market Street for the Church Street line of the Municipal Railways.

Connecticut Company, New Haven, Conn.—This company plans to extend its tracks easterly along State Street to Water Street and through Water Street to Congress Street, Bridgeport, where connection can be had with the main line across the bridge.

Atlanta & Anderson Electric Railway, Atlanta, Ga.—This company was organized at a recent meeting of the stockholders in Atlanta. A bill was passed by the last regular session of the Georgia Legislature amending the general railway law so as to provide for the incorporation of interurban railroads, and under the new law the Atlanta & Anderson Railway received from the Secretary of State a charter as an interurban railroad. The entire capital stock has already been subscribed, and it was announced by the officers of the company that as soon as the issue of securities is authorized by the Railroad Commission of Georgia the work of construction will be commenced. The following board of directors was elected: J. G. Craft, G. W. Westbrook, H. P. De laPerrie, I. H. Phillips, William D. Bowers, W. B. Hardman, C. J. Hood, W. H. Smith, R. L. J. Smith, W. E. Simmons, J. L. Murphy, Albert Howell, Jr., Mark Bolding, L. G. Greer and Hugh Howell. J. L. Murphy was elected president and Mark Bolding secretary of the company. The present plan contemplates that the new line will be completed and in operation within two years, connecting Atlanta with Anderson, S. C., where it will connect with the Piedmont & Northern Electric Railway. [Feb. 3, '17.]

Georgia Railway & Power Company, Atlanta, Ga.—This company plans to spend $160,000 in reconstructing its tracks during this year.

South Georgia Power Company, Valdosta, Ga.—A communication from B. Parks Rucker, Schenectady, N. Y., states that the South Georgia Power Company has been organized to develop a hydroelectric plant on Willacoochee River, 4 miles west of Valdosta, Ga. It will supply power to Valdosta, Quitman, Boston, Thomasville, Pelham, Moultrie, and other neighboring towns and cities. Power will also be supplied to the Valdosta Street Railway. [March 24, '17.]

***Du Quoin, Christopher & Eastern Traction Company, Du Quoin, Ill.**—This company contemplates the construction of a line from Du Quoin easterly to West Frankfort and from Du Quoin southerly to Carbondale.

Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.—This company will be delayed two months in the extension to its city lines in Waukegan, and in the reconstruction of its present lines, the delay being on account of the inability to secure materials. Work will be begun on the extension of the line on North Avenue and Glen Flora Avenue to the tannery and on other proposed improvements as soon as materials can be assembled.

Peoria & Chillicothe Electric Railway, Peoria, Ill.—A formal order increasing the capital stock of the Peoria & Chillicothe Electric Railway from $5,000 to $165,000 was approved by the stockholders of the company at a recent annual meeting in Chillicothe. A. S. Black, secretary, explained that the increase in capital stock was made in order to begin operations, the smaller sum being subscribed at first for the purpose of lessening the expenses of the company until it was time to actually start operations. [March 10, '17.]

Springfield & Carbondale Railway, Springfield, Ill.—Work has been begun at Harvel on this company's proposed line from Springfield to Carbondale. C. H. Forrester, Chicago, president. [April 14, '17.]

Union Traction Company, Anderson, Ind.—Extensive improvements have been made by the Union Traction Company at Mounds Park, near Anderson.

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—This company will build a single-track line in West Tenth Street from Bismarck Avenue to Tibbs Avenue. The work will be begun not later than Aug. 15 and will be completed by Oct. 18.

Arkansas Valley Interurban Railway, Wichita, Kan.—Preparations are being made by the Arkansas Valley Interurban Railway for its proposed extension north from Newton or Halstead to Salina.

Paducah (Ky.) Traction Company.—This company is double-tracking some of its lines in Paducah, the work to continue for three months.

Bay State Street Railway, Boston, Mass.—Plans have been submitted by the Bay State Street Railway to the commissioner of streets and highways for the relocation of its tracks on the Pawtucket Falls bridge and into Mammoth Road and Varnum Avenue. The plan provides for two sets of tracks on the bridge.

United Railways, St. Louis, Mo.—Work will soon be begun by the United Railways on track reconstruction and the building of extensions. The most important extension contemplated for this season is one along the city limits southwardly from Wydown Boulevard to Manchester Avenue. The company expects to operate this track as a southern extension of the present Hamilton Avenue line. This work may not be entirely completed this season, but it is anticipated that the portion as far as the Market Street line will be in operation by fall. The company will also rebuild the bridge over the Rock Island tracks in Clayton.

Panama Traction Company, Jamestown, N. Y.—The Public Service Commission for the Second District of New York has granted the Panama Traction Company permission to use gasoline as the motive power for its proposed line between Panama and Asheville. D. L. Davis, Jamestown, general manager. [March 31, '17.]

Interborough Rapid Transit Company, New York, N. Y.—Operation was begun on April 21 of the Corona extension of the dual transit system from the Bridge Plaza station in Long Island City to Alburtis Avenue, Corona.

Interstate Electric Corporation, New York, N. Y.—Plans are being prepared and surveys made by the Interstate Electric Corporation for its proposed railway in San Angelo, Tex. Construction work on the line will be begun at once, it is announced, but officials of the company say that through the inability to get steel from the mills the work will go forward slowly. R. W. Davidson, New York, secretary. [Dec. 9, '16.]

Halifax Electric Tramway Company, Ltd., Halifax, N. S.—Surveys are being made by the Halifax Electric Tramway Company, Ltd., for an extension of its line. The company is in the market for additional rolling stock, rails, ties and general construction material. J. W. Crosby, general manager.

Cincinnati (Ohio) Traction Company.—Walter A. Draper, vice-president of the Cincinnati Traction Company, appeared before the Council committee on street railways on April 23 in opposition to the full program for the construction of fifteen extensions, as mapped out by the committee. He said the funds are not available and that consent for the issue of new capital must be obtained from the Public Utilities Commission and the city authorities. He objected to the plan of building an additional track on Central Avenue, as the street is too narrow. Mr. Draper advised the committee to select a few streets on which extensions are considered absolutely necessary, but at the same time advised that great difficulty may be encountered in securing steel rails enough for this purpose. The committee named four streets and agreed to refer the matter to the city solicitor and the city engineer for consideration.

Oklahoma (Okla.) Railway.—This company will construct a ½-mile extension from Broadway and Thirteenth Street northward.

Toronto Suburban Street Railway, Toronto, Ont.—Operation will be begun on May 1 on this company's line from Toronto to Guelph, 46 miles.

Johnstown-Somerset Traction Company, Johnstown, Pa.—The directors of the Johnstown-Somerset Traction Company have decided to complete that part of the company's proposed line from Johnstown to Jerome and to place it in operation as soon as possible. The company proposes to construct a line from Johnstown to Rockwood. Kent Miller, Somerset, secretary. [Dec. 10, '16.]

Philadelphia, Pa.—Sealed proposals will be received by the Department of City Transit, Philadelphia, until May 1 for 168 column foundations in Frankford Avenue from Unity Street to Dyre Street, Frankford Elevated Railway, contract No. 503. Copies of plans and specifications may be obtained upon deposit of $10, to be refunded upon return of plans.

***Texas Electric & Power Company, San Angelo, Tex.**—This company has been organized at San Angelo with a capital stock of $200,000 for the purpose of constructing an electric railway system in San Angelo, and electric interurban lines radiating in several directions. Officers: Charles W. Hobbs, San Angelo, president; R. J. Irvine, San Angelo, vice-president, and M. F. Treadwell, Ballinger, secretary.

Salt Lake & Utah Railroad, Salt Lake City, Utah.—Work has been begun by this company on the construction of an extension from Granger to Magna.

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—An appropriation of $1,100,000 has been voted by the Pacific Electric Railway for the construction and equipment of car shops at Torrance, 10 miles south of Los Angeles. This is an increase of $600,000 over the amount previously appropriated for this purpose, as stated in the Electric Railway Journal for Jan. 6. The larger buildings will be of reinforced concrete, steel and brick. There will be a heavy machine shop and paint shop, each 180 x 450 ft.; freight car shop, 180 x 400 ft.; blacksmith shop, 155 x 200 ft.; power house, 60 x 120 ft.; dry lumber and iron storage buildings, coal bunkers, scrap bins, offices, etc. Heretofore this work has been done chiefly at the company's shops at Seventh Street and Central Avenue, Los Angeles, which are now being dismantled.

Worcester (Mass.) Consolidated Street Railway.—This company will expend about $75,000 this year on the construction of two trolley freight terminals. One is for the Boston & Worcester Street Railway and the other for the Worcester Consolidated Street Railway.

Interborough Rapid Transit Company, New York, N. Y.—The Public Service Commission for the First District of New York recently received bids for the construction of station finish for the three stations to be located on the Manhattan portion of the Park Place, William and Clark Street subway. These stations are at Wall and William Streets, Fulton and William Streets and Park Place and Broadway. The low bidder was John B. Roberts, New York, whose proffer was $139,919.

Philadelphia, Pa.—Sealed proposals will be received by the Department of City Transit, Philadelphia, until May 1 for additional steel superstructure and appurtenant work to provide station platforms on the Frankford Elevated Railway at Huntingdon Street, contract No. 520. Copies of plans and specifications may be obtained upon deposit of $10, to be refunded upon return of plans.

Reading Transit & Light Company, Reading, Pa.—A new building will be erected by the Reading Transit & Light Company at its North Tenth Street terminus for cleaning and washing cars. The building will be large enough to accommodate three cars at one time.

POWER HOUSES AND SUBSTATIONS

Arkansas Valley Railway, Light & Power Company, Pueblo, Col.—This company is installing a new 2500 kw. motor generator set in its Pueblo power station to facilitate the interchange of current between the Canon City and Cripple Creek divisions and the Pueblo station.

United Railways, St. Louis, Mo.—This company will construct a new substation in the western portion of the city.

Interstate Electric Corporation, New York, N. Y.—This company, which was granted a franchise some time ago to construct an electric railway system in San Angelo, Tex., will erect a power plant as soon as the necessary machinery and equipment can be obtained. R. W. Davidson, New York, secretary.

Richmond Light & Railroad Company, New York, N. Y.—This company has received permission from the War Department to install submarine cables in the Fresh Kills Creek from Rossville to Linoleumville.

Durham (N. C.) Traction Company.—A new turbine has been ordered by the Durham Traction Company which will more than double the present capacity of its power station.

Pacific Power & Light Company, Astoria, Ore.—This company is constructing a substation at Touchet, Wash., and will supply electricity from the Priest Rapids plant.

Reading Transit & Light Company, Reading, Pa.—The Metropolitan Electric Company, controlled by the Reading Transit & Light Company, has ordered an additional turbo-generator to cost $500,000, which will increase the plant's capacity from 30,000 to 62,000 hp. The company recently installed a 15,000-hp. generator in its West Reading plant.

Corpus Christi Railway & Light Company, Corpus Christi, Tex.—This company contemplates additional equipment in its plant and making other improvements to the property.

Washington Water Power Company, Spokane, Wash.—This company contemplates the erection of a high-tension transmission line from its power plant at Long Lake to Northport, about 90 miles.

Monongahela Valley Traction Company, Fairmont, W. Va.—It is reported that this company contemplates the construction of another generating plant to develop 50,000 kw.

Manufactures and Markets

Discussions of Market and Trade Conditions for the Manufacturer, Salesman and Purchasing Agent

Rolling Stock Purchases Market Quotations Business Announcements

Department for Buyers and Sellers

The purchasing agent of a large Western property writes that he has "found much pleasure in reading the 'Manufactures and Markets' columns. There is always considerable information which at times may be particularly valuable to the purchasing departments." This man then mentions several topics and suggests that a discussion of one or more of them might be taken up in this department to the advantage of both railway official and manufacturer.

The general manager of a railway and electric company writes: "We are particularly interested in the topics. 'Rising Prices and Their Effects,' 'Who Should Carry the Repair Parts Stock?' and 'Forehandedness in Buying.'"

The purchasing agent of a large Eastern interurban syndicate writes: "You are getting the right sort of information to your readers, and I want to compliment you on the way the subjects are handled." Then he asks for help in solving a problem in motor maintenance. Thus he has shown his confidence in the JOURNAL as a source not only of news, but also of technical information.

As a class, the purchasing agent is not prone to scatter praises, and so the good things that have been quoted and those that others have expressed are accepted as confirmation of the idea that through the institution of this department the railways would be served.

The manufacturers also have shown active interest in this department. Some of the topics here presented in which the manufacturers have shown special interest have been "Who Should Keep the Repair Parts Stock, the Railway or the Manufacturer?" "Forehandedness in Buying," "Standardization" and "The Raw Material Situation." Manufacturers not only have shown a willingness to discuss topics of general interest, but through constructive suggestions made, have shown that the class of material presented has been of assistance in cementing closer relations between the buyer and seller.

Purchase Standardized Products

Co-operation Between Buyers and Sellers Will Benefit Both—Reasons Given for Acceptance Now of Manufacturers' Standard Products

Standardization, if full co-operation between purchasers and manufacturers could be effected, would greatly relieve the tense situation which now embarrasses both buyers and sellers. It is difficult to understand why association standards and the standardized products of manufacturers are not more generally acceptable to electric railways.

"Arguments for the purchase of standard products are not pleas on the part of the manufacturer for his personal benefit," says the manager of a large industrial concern. "A sale no doubt would be made in any event, and the purchase of a standardized product rewards the purchaser as well as the manufacturer, because standardization means lower prices. The manufacturer in arguing for the purchase of standardized products is endeavoring to smooth out his factory load curve, and to provide against interruption of his manufacturing schedules."

LOOKING ASKANCE AT SPECIAL DESIGNS

Factories that are now overburdened with work look askance at orders for special articles which require new production programs. Regardless of the good intentions of the shop department, such orders are subject to constant sidetracking and are made to fit in with the general scheme of production as best they may. This is just the working out of human nature on the part of the individuals in the factory who must be relied upon to produce the articles.

Non-standardization and the manufacturing of small lots increases the shop cost, notably in the tool, jig and machine set-up costs. For example, figures are available on the cost of machining an armature thrust collar. This is an automatic machine job. The direct labor cost is about 18 cents per piece, but the cost to set up the machine preparatory to doing the work automatically is about $4.75. Thus the quantity put through has a great influence on the unit price. The same argument holds for the manufacture of practically all parts of a railway or industrial motor. Shop practice in this country is now at a stage where almost every part of a motor can be made in an automatic way cheaper than it can be made by any other method. Thus large lots are essential to low prices.

CO-OPERATION WILL REDUCE PRICES

The standardization of products is the result of co-operation between the manufacturer and the user, and the aim of the manufacturer should always be to develop the product which will be best suited to the service to be rendered and therefore most widely accepted. Because of the large sales of a standard product the manufacturer is enabled to distribute his engineering and development cost over a great number of units and thus keep the cost per unit low. Take, for example, the development cost of one of the most popular types of electric railway motors. This cost to the manufacturer was about $20,000, but since approximately 30,000 motors of this type were sold the development cost per motor was only about 66 cents. On some equally good motors the sales were smaller, due to restricted buying of equipment at the time the motors were introduced to the field. Thus the development cost per motor has been nearer $20 than 66 cents. This seems to be another illustration confirming the statement of motor manufacturers that the field has asked for a larger number of types of railway motors than operating conditions need. A restriction of this number will result in better motors at less cost to the producer and the purchaser.

According to one manufacturer, competition can be relied upon as the force which will urge the manufacturers to keep their products up to date. Thus standardization of a manufactured product will not delay progress. It can therefore be stated as a rule that not only for the present conditions but generally the purchaser will be benefited by limiting his purchases to articles standard with the manufacturers. These advantages are so great that railway buyers would do well not to allow prejudice and personal opinion to offset the advantages to be derived, unless the standard articles which are offered for sale are actually unsuited for the service for which they are intended.

Export Business Must Be Cultivated

"Many American manufacturers are enjoying an export business of considerable magnitude now. As long as the war lasts, the foreign purchaser, in many cases and to a great extent, will be forced to deal with the American producer. He has to accept the arbitrary terms and conditions imposed by the manufacturer here in order to get any goods at all. After the war, however, when the foreign purchaser again has several sources of supply available and the American producer is threatened with over-production and lack of demand, the circumstances will have to be different." These were the words expressed to a representative of this paper recently by the buyer in this country for a considerable amount of supplies for electric lighting and railway systems abroad. Continuing, the buyer said:

"An immense amount of educational work is required in this country in order to fit the great majority of American

manufacturers for entering the foreign and export trade under circumstances that will give them even a 'look in' after the war, in competition with European concerns manufacturing the same goods. This is not due, by the way, to inferiority or want of merit in the products. Indeed, in these respects, the American manufacturer is not, as a rule, handicapped. He is handicapped, however, and quite seriously, by his very low coefficient of adaptability and his apparent indisposition, or lack of ability, to see things from the purchaser's point of view. The American manufacturer will have to become more tolerant, more accommodating and more adaptable if he wishes to retain any considerable portion of foreign trade. He must learn to extend credits when credits are warranted, and supply the apparatus ordered and not other apparatus which he considers just as good. He must also learn to pack and box his goods for foreign export. I realize the difficulties in the way of getting raw material under which manufacturers of electrical apparatus in this country are now struggling. I know that they are unable in many cases to make good deliveries even to domestic customers. But the point I wish to make is this: The foreign customer should be treated as well as the domestic customer, and the manufacturer should make an effort with export orders to take care of those minor points which cost the manufacturer little or nothing but make a great difference in the satisfaction which his products give when they reach the foreign field."

Standardizing Catalog Sizes

Bulletins, Photographs, Connection Diagrams, Specifications, Factory Forms and Correspondence Paper Included—Decreasing Width of Margin Effects Big Saving

By Martin P. Rice
Manager Publication Bureau, General Electric Company

The General Electric Company took up the subject of standardizing the size of catalogs many years ago, and the plan has been carried further than in any other organization that I know of.

In the first place a size was selected solely because of inherent advantages, and not merely because it would cut conveniently from a size ordinarily furnished by paper mills. Our standard size is 8 in. x 10½ in., and we aim to publish everything except loose-leaf agents' handbooks in this size. We have also adopted it for correspondence paper, blueprints, photographs, diagrams of connections, specifications and factory forms. There is a great advantage in such uniformity; it facilitates filing and handling, and it is particularly advantageous when we write to customers inclosing our bulletins, connection diagrams, specifications or photographs—all these forms being uniform in size with the correspondence paper.

In recent years, there has been a great deal of discussion on standardization of size in catalogs. Opinions are gradually crystallizing and the size selected usually approximates ours. Some, however, specify 8½ in. x 11 in.

When it comes to a choice between 8 in. x 10½ in. and 8½ in. x 11 in., I think there are some good arguments for the smaller size; in fact, I can see no real good reason for making a sheet exactly 8½ in. x 11 in. Nearly all of the so-called 8½ in. x 11 in. sheets measure 8⅜ in. x 10⅞ in., because the 8½ in. x 11 in. size is merely an attempt to cut a certain number of sheets out of a paper maker's standard size. In other words, instead of considering the question of size solely on its merits and requiring paper manufacturers to meet the demands as we have done, some propose to adopt a size originated primarily for the paper maker's convenience. Let us see how it would work out for the General Electric Company.

An 8½ in. x 11 in. sheet contains 10 per cent more paper stock than an 8 in. x 10½ in. sheet. This additional stock is seldom utilized in either printed catalogs or in correspondence; it merely furnishes increased width of margin. During a normal year, this company uses about $120,000 worth of paper, so that the increased cost of the larger size would be about $12,000, for which we get nothing. There would also be a corresponding increase in postage, expressage and freight. It would probably cost the company not less than $25,000 a year to make such a slight change as an increase from the 8 in. x 10½ in. sheet to the 8½ in. x 11 in. sheet.

With the present scarcity of paper and consequent increase in prices, it is difficult to say how anyone can consistently advocate a standard size larger than necessary. It would be a violation of fundamental economic principles which just now would be particularly inexcusable.

Steel Corporation Sales Policies

Recent remarks of Elbert H. Gary, chairman of the board of the United States Steel Corporation, throw a light on the steel production situation as it has existed during the last twelve months. In commenting on the earnings Mr. Gary is quoted as having said that it was never the intent or purpose of the management to secure the highest prices possible. When prices were advancing the management has always endeavored to steady them and keep them within fair limits. The policy has been to exert a steady influence, no matter what the condition of the market might be. He further stated, "At the present time we are selling standard plates from $3.50 to $4 per 100 lb. to the general trade and at about $2.90 to the Government. We could sell the same product to the trade at from $8 to $10, the latter price having been recently bid.

When questioned about the trade outlook Mr. Gary said that there was no let-up in general business conditions and that the tendency is to advance prices. "Personally," he added, "I don't want to see them advanced."

"Our books are well filled with orders. We have more unfilled orders than ever before, and enough to keep us busy throughout 1917, and in addition we have sold considerable product for 1918. We could sell still more if we had it. At the present time we have about 270,000 employees of many different nationalities. Between 50,000 and 60,000 of them are stockholders."

Copper Market Quiet

Dullness has again developed in the copper metal market and inquiries which had been received earlier in the week have not resulted in actual orders.

In speaking of the most discussed feature of the copper market for the past month, which was the purchase by the government of 45,510,000 lb. of ingot copper at 16.67 cents per pound, the *Wire Message*, published by the Habirshaw Cable Company, Inc., and the Electric Cable Company, says:

"We have read several opinions to the effect that this concession would probably cause a general weakening of the market. We can see no logical reason why it should have this affect. The concession was an arbitrary measure, and will not change the law of supply and demand, which fixes the prices to the general public. The price quoted is for the quantity named to be delivered within twelve months. The concession in price does not apply to the demand for copper from our European Allies.

"Several factors have contributed to the softening of the market during the past month. Many consumers who ordered for future delivery have been unable to get the metal when expected, and have been obliged to buy spot copper to cover urgent needs. When the delayed copper arrived, some of it was offered for resale. High prices have stimulated preparations for unprecedented production. The result of these preparations was checked by bad weather, labor troubles, and inadequate transportation. With the return of more normal conditions an easier market was to be expected. How far it will recede from previous high levels, it is difficult to say.

"We believe the future price of copper must depend largely upon the demands of our government and its Allies during the next few months. Until this demand and the terms of sale are more definitely determined, we see no reason for a sudden decline in price such as took place some ten years ago. At that time high levels were due largely to speculation, to-day's prices are due to a legitimate demand for the metal and so long as the war continues we see no reason to anticipate a lessening in demand."

Second-Hand Market Strong

Although deliveries on most manufactured products have been set back a month or two months, because of the government's demands on the industries of the nation, no appreciable effect has been felt by the merchants in second-hand electrical goods except for very large apparatus, the demand for which has been enhanced to an appreciable extent. Second-hand dealers continue to experience a large demand for practically all classes of equipment. There is no shortage at the present time of second-hand electrical apparatus except for large equipment, such as large induction motors, rotary converters, transformers and turbines.

Steam engines, it is understood, are a drug on the market, there being no demand for this class of equipment.

The available machinery is for the most part in excellent shape. There is, of course, some poor stuff coming out, but owing to the price of copper it has been found to be more profitable to scrap the machines for old metal than to attempt to rewind or otherwise repair them to good operating condition.

The second-hand market in the future, in all probability, will depend largely on the copper market. If the price of copper continues high it is the belief of those engaged in the trade that second-hand dealers should experience an excellent business. On the other hand, should a readjustment of the copper market bring prices down nearer their level in normal times, the indications point to a poor second-hand market.

NEW YORK METAL MARKET PRICES

	March 31	April 28
Prime Lake, cents per lb.	35	30
Electrolytic, cents per lb.	35½	30
Copper wire base, cents per lb.	42	39
Lead, cents per lb.	9½	9⅝
Nickel, cents per lb.	50	50
Spelter, cents per lb.	10¾	9¼
Tin, straits, cents per lb.	55⅞	57½
Aluminum, 98 to 99 per cent, cents per lb.	55	57

OLD METAL PRICES

	March 31	April 28
Heavy copper, cents per lb.	29	26¾
Light copper, cents per lb.	24¾	23
Red brass, cents per lb.	20	19½
Yellow brass, cents per lb.	19	18½
Lead, heavy, cents per lb.	8	7¾
Zinc, cents per lb.	8	7
Steel car axles, Chicago, per net ton	$38	$41.50
Iron car wheels, Chicago, per gross ton	$22	$24
Steel rail (scrap), Chicago, per gross ton	$27.50	$31.50
Steel rail (relaying), Chicago, per gross ton	$34	$39
Machine shop turnings, Chicago, per net ton	$9.50	$10.50

CURRENT PRICES FOR MATERIALS

	March 31	April 28
Rubber-covered wire base, New York, cents per lb.	42	39
No. 0000 feeder cable bare, New York, cents per lb.	42	39
No. 0000 feeder cable stranded, New York, cents per lb.	39¾	39½
No. 6 copper wire (insulated), New York, cents per lb.	39½	36½
No. 6 copper wire (bare), New York, cents per lb.	42	39
Rails, heavy O. H., Pittsburgh, per gross ton	$40	$40
Rails, heavy Bessemer, Pittsburgh, per gross ton	$38	$38
Wire nails, Pittsburgh, per 100 lb.	$3.20	$3.50
Railroad spikes, 9/16 in., Pittsburgh, per 100 lb.	$3.65	$3.85
Steel bars, Pittsburgh, per 100 lb.	$3.75	$3.75
Sheet iron, black (24 gage), Pittsburgh, per 100 lb.	$4.85	$5.85
Sheet iron, galvanized (24 gage), Pittsburgh, per 100 lb.	$6.55	$7.05
I-beams over 15 in., Pittsburgh, cents per lb.	10	10
Galvanized barbed wire, Pittsburgh, cents per lb.	4.05	4.35
Galvanized wire, ordinary, Pittsburgh, cents per lb.	3.85	4.15
Cement (carload lots), New York, per bbl.	$2.02	$2.12
Cement (carload lots), Chicago, per bbl.	$2.06	$2.16
Cement (carload lots), Seattle, per bbl.	$2.60	$2.60
Linseed oil (raw, 5 bbl. lots), New York, per gal.	$1.11	$1.21
Linseed oil (boiled, 5 bbl. lots), New York, per gal.	$1.02	$1.22
White lead (100 lb. keg), New York, cents per lb.	10¼	10¾
Turpentine (bbl. lots), New York, cents per gal.	45	51

ROLLING STOCK

Lewiston, Augusta & Waterville Street Railway, Lewiston, Me., is reported to be considering the purchase of cars.

Conestoga Traction Company, Lancaster, Pa., has purchased eight city cars from The J. G. Brill Company.

Gary & Interurban Railroad, Gary, Ind., through its receiver, has been authorized to issue $192,000 of receiver's certificates of which $114,000 will be used in improving Gary's street car service. The improvements include the purchase of additional cars and equipment.

Illinois Traction System, Peoria, Ill., noted in the March 31 issue as having ordered fifteen double-end city motor cars from the St. Louis Car Company, has specified the following details for these cars:

Number of cars ordered....15
Road.....Peoria Railway Co.
Builder .....St. Louis Car
Type.....Double-end city motor
Seating capacity 40
Weight (total).....36,500 lb.
Bolster centers, length.17 ft. 0 in.
Length over bumpers..41 ft. 0 in.
Length over vestibule..40 ft. 0 in.
Width over all.....8 ft. 2 in.
Rail to trolley base,
11 ft. 4⅝ in.
Body .....Semi-steel
Interior trim....Polished bronze
Headlining,
Painted three-ply veneer
Roof .....Plain arch
Air brakes .....Westinghouse
Car trimmings....St. Louis Car
Conduits and junction boxes,
St. Louis Car
Control .....Type GE
Curtain fixtures..Curtain Supply
Curtain material .....Pantasote
Designation signs,
St. Louis Car standard
Door mechanism,
St. Louis Car standard
Fenders .....Berg fenders
Hand Brakes.Patt. vertical wheel
Heaters ...Consolidated electric
Headlights,
Incandescent-Crouse-Hinds
Journal boxes.A.E.R.A. standard
Motors,
Four GE 258-A, inside hung
Paint.....Paint and varnish
Registers .....International R-5
Sanders,
St. Louis Car air sanders
Sash fixtures,
St. Louis Car standard drop sash
Seats, style .....Longitudinal
Seating material .....Rattan
Step treads.....Empire safety
Trolley catchers or retrievers,
Ideal
Trucks .....Double, archbar
Ventilators.....St. Louis Car
Wheels (type and size),
24-in. chilled iron

Public Service Railway, Newark, N. J., noted in the ELECTRIC RAILWAY JOURNAL of Jan. 27 as ordering fifty open and 100 closed cars from the Cincinnati Car Company, has specified the following details for this equipment.

Number of cars ordered.....100 closed	50 open
Delivery .....Summer and Fall, 1917	May and June, 1917
Builder .....Cincinnati Car	Cincinnati Car
Type .....Passenger, not convertible	Open
Capacity 50	96
Weight (total) .....42,276 lb.	37,890 lb.
Bolster centers, length.....24 ft. 6 in.	24 ft. 0 in.
Length over bumpers.....50 ft. 10 in.	48 ft. 0 in.
Length over vestibule.....50 ft. 2 in.	47 ft. 4 in.
Width over all.....8 ft. 7 in.	8 ft. 5 in.
Height, rail to trolley base....11 ft. 2¼ in.	11 ft. 9 in.
Body .....Semi-steel	Steel underframe
Interior trim .....Cherry	
Roof, arch or monitor .....Arch	Arch
Air brakes .....GE straight air	GE straight air
Control, type .....25—HL	
75—HLD	P.C.
Designation signs .....Hunter	Hunter
Fare boxes .....Johnson	
Wheelguards .....HB life guards	HB life guards
Heaters .....Electric	
Headlights .....Incandescent	Incandescent
Motors, type and number.25—West. 307 CV	
75—West. 514	GE 200
Motors .....Outside hung	Outside hung
Seats, style .....Longitudinal	
Seating material .....Rattan	Wood
Trucks, type.....25—Standard 0-45	
75—Standard 0-50	Standard 0-50
Wheels .....Chilled iron 30 in.	Chilled iron 33 in.

Tacoma Railway & Power Company, Tacoma, Wash., noted in the March 31 issue as having had twenty-eight single-end one-man cars purchased for it by the Stone & Webster Management Association, Boston, Mass., has specified the following details for this equipment. In addition to the twenty-eight single-end cars ordered, four double-end cars, identically the same as the above with the exception of the double end, have also been ordered from the American Car Company.

Number of cars ordered.....28
Builder .....American Car
Type .....Single-end one-man
Seating capacity 36
Length over bumpers,
27 ft. 9½ in.
Length over vestibule,
26 ft. 9½ in.
Width over all.....8 ft. 0 in.
Rail to trolley base..12 ft. 6 in.
Body .....Semi-steel
Interior trim....Statuary bronze
Headlining...None, rafter finish
Roof .....Arch
Air brakes .....Westinghouse
Axles .....Brill
Bumpers .....American Car
Car trimmings .....Brill
Control .....Type K-10
Couplers..American Car pull bar
Curtain fixtures..Curtain Supply
Curtain material .....Pantasote
Designation signs .....Hunter
Door-operating mechanism,
American Car
Fare boxes .....Johnson
Gears and pinions.....GE
Hand brakes,
American Car, with Pittsburgh drop handle
Heaters .....Consolidated
Headlights .....Golden Glow
Journal boxes .....Brill
Lightning arresters .....GE
Motors,
Two GE 258-C, inside hung
Sanders .....Keystone
Sash fixtures....O. M. Edwards
Seats,
Heywood Bros. & Wakefield 6-P stationary
Seating material,
Steel mahogany, wood and canvas lined
Springs .....Brill
Step treads .....Feralun
Trolley base .....GE
Trolley catchers .....Keystone
Trolley wheels .....GE
Trucks.....Brill, type 78-M-1
Ventilators,
Utility automatic, small size
Wheels,
24 in., 2½-in. tread, ⅝-in. flange

Wichita Railroad & Light Company, Wichita, Kan., noted in the Feb. 7 issue as having ordered fifteen light-weight, single-truck, single-end cars from the St. Louis Car Company, has specified the following details for this equipment:

Number of cars ordered.....15
Builder .....St. Louis Car
Type.....Light-safety city car
Seating capacity 41
Weight (total).....16,000 lb.
Over bumpers.....29 ft. 7½ in.
Over vestibule.....29 ft. 0 in.
Width over all.....7 ft. 11 in.
Rail to trolley base,
11 ft. 5 5/16 in.
Body .....Semi-steel
Interior trim,
Malleable iron, painted
Headlining,
Painted, three-ply veneer
Roof .....Plain arch
Air brakes .....Westinghouse
Bumpers..St. Louis Car pressed
Car trimmings....St. Louis Car
Conduits and junction boxes,
St. Louis Car
Control.....Type GE K-10
Couplers,
Bar type, with draw heads
Curtain fixtures..Curtain Supply
Curtain material .....Pantasote
Designation signs,
St. Louis Car standard
Door mechanism...Air operated
Fare boxes,
Woods' non-recording
Fenders or wheelguards,
St. Louis Car lightweight
Hand brakes,
Drop handle, St. Louis Car
Heaters.....Peter Smith hot air
Headlights .....Golden Glow
Journal boxes.A.E.R.A. standard
Motors .....Two GE 258-A
Motors .....Inside hung
Paint.....Paint and varnish
Registers .....International R-5
Sanders,
St. Louis Car air operated
Sash fixtures.....St. Louis Car
Seats, style,
Hale & Kilburn, stationary cross-seat
Seating material .....Rattan
Step treads.....Empire safety
Trolley catchers .....Keystone
Trucks,
St. Louis Car single cantilever
Ventilators,
St. Louis Car Peerless
Wheels (type and size),
24-in. chilled iron

TRADE NOTES

St. Louis (Mo.) Electrical Works has changed its address to 4060 Forrest Park Building.

Railway Car Manufacturers' Association, New York, N. Y., has established an office at 61 Broadway, room 2216.

Acme Supply Company, Chicago, Ill., announces that Thomas Dunbar, Sr., has been made president of the company, H. H. Schroyer having retired.

Philadelphia (Pa.) Holding Company has received an order from the East St. Louis & Suburban Railway for one radial truck.

Safety-Armorite Conduit Company, New York, N. Y., has removed its New York offices to 511 West Twenty-seventh Street, where it will be in connection with the company's new warehouse.

National Conduit & Cable Company, New York, N. Y., announces that new financing, which has been made necessary by increased business, will provide $1,500,000 additional working capital. The company's business, which consists of supplying telegraph and telephone appurtenances, has netted an average profit of $2,500,000 yearly. The Underwriting Syndicate includes Millett, Roe & Hagan and Pritchett & Company, the National City Company, and Montgomery, Clover & Tyler.

Dr. Robert Grimshaw, special agent of the Department of Foreign and Domestic Commerce, whose early trip to South America to report on opportunities for American manufacturers in that country was mentioned in these columns last week, expects to sail about May 28. Prior to this time he will visit a number of the manufacturing cities in New England, as well as Syracuse, Buffalo, Cleveland, Toledo, Chicago, Cincinnati and Pittsburgh to discuss matters relating to export trade with interested manufacturers. The field in South America which he will especially investigate is that of metal and wood-working machinery, prime movers and electrical apparatus, also the methods adopted in the different countries for getting bids and awarding contracts for government and municipal supplies, as mentioned last week. Dr. Grimshaw has written extensively on mechanical engineering subjects for American periodicals, and for twenty years prior to the war resided in Germany, where he was consulting and mechanical engineer for the Bavarian and Bohemian governments. At present he may be addressed in Room 409, Custom House, New York.

ADVERTISING LITERATURE

W. N. Matthews & Brother, St. Louis, Mo., have issued a bulletin describing and illustrating their type F Matthews Woodpecker Telefault.

National X-ray Reflector Company, Chicago, Ill., is distributing a bulletin entitled "How to Know and Have Good Lighting." Illustrations of well-known places which use X-ray reflectors are given.

Electric Storage Battery Company, Philadelphia, Pa., has issued catalog KXS, describing its latest type of portable battery for railway signal service. This battery has been especially designed to give sixty-day service on one charge with very little increase in weight, as compared with types heretofore used for thirty-day service. The plates, separators, jars, covers and carrying cases are of especially rugged construction. This company's double-flange cover and automatic filling and vent plug are important features, eliminating the escape of acid spray during charge and preventing slopping of acid over the tops of the cells while filling.

International Steel Tie Company, Cleveland, Ohio, has issued an instructive catalog of its products, showing the manner of installation and construction details of the steel crossing foundations and steel twin ties by photographs and drawings. Various applications of these two products are pictured in the catalog, as used on a number of properties. The actual saving which results from the use of steel twin ties in permanent track construction in paved streets, as compared with the use of wooden ties in similar construction, by virtue of the greater bearing area with less quantity of concrete, is explained in detail, as are also the advantages due to prolonging the joint life and to cutting the labor cost. Certain recommendations as to the depth and quality of concrete to be used, based upon the experience of a number of companies, are also included in the booklet, thus rounding out the information desired by any maintenance-of-way engineer when considering the use of twin steel ties for high-grade track work.

New Publications

The "Mechanical World" Electrical Pocket Book for 1917. The Norman, Remington Company, Baltimore, Md. 240 pages. Price 45 cents, postpaid.

In this year's handbook a lengthy section on electrical measurements and testing has been added. Other new sections include those on transmission line calculations and on wiring systems. The handbook is written in a concise, practical manner, with illustrations only where needed to make the subject matter readily understood. It is of a size convenient for constant pocket use and its utility is increased by a forty-six-page diary in the back.

Railway Strikes and Lockouts.—United States Board of Mediation and Conciliation. Superintendent of Documents, Government Printing Office, Washington, D. C. 367 pages. Paper, 30 cents.

This work is an impartial comparative analysis of world legislation relative to the adjustment of public-utility labor disputes. While it is not a critical study of the efficacy of the laws in different countries, it presents valuable operating details and official data from which the reader can draw his own conclusions. The work is a useful compendium of information on a subject of increasing importance in the United States.

Resistance of an Oil to Emulsification. Bureau of Standards Technologic Paper No. 86, by W. H. Herschel. Government Printing Office, Washington, D. C. Thirty-seven pages. Ten cents per copy.

This paper gives the theory of the subject, and also tests of the emulsifying properties of oil. The statement is made that the subject is of greatest importance in connection with high-speed engines and steam turbines, because emulsification interferes with the filtering of the oil in the circulatory system, and may thus prevent proper bearing lubrication.

Interior Wiring. By Arthur L. Cook, head of department of applied electricity, Pratt Institute, Brooklyn, N. Y. John Wiley & Sons, Inc., New York, 416 pages. Semi-flexible leather. Price, $2 net.

This book is intended as a guide to modern practice in electric lighting and power applications and in the design and installation of the wiring for such purposes. Numerous halftones and diagramatic illustrations help so to present the matter as to make it readily understandable by superintendents and operators of electrical installations and wiremen, who may be called upon to make extensions to or changes in existing installations, and who need definite information as to the best method of procedure. It is also adapted for use in schools to supplement shop instruction.