Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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Shop Procedure in Multiple-Unit Car Maintenance

THIS monthly issue of the JOURNAL is read by a large circle of men who do not see the weekly issues, hence the importance of directing attention once more to the comprehensive group of articles on heavy car maintenance which we printed in the preceding two issues. These contained "hand-picked" information regarding maintenance practice with multiple-unit cars in the electrified zones of steam railroads, but the information will be valuable to electric railways as well. One point stands out very clearly, namely, that this practice is automatically tending toward standardization; apparently much more so than with street and the lighter interurban cars. There is no reason why methods of inspection, of making running repairs, etc., should not be similar on different properties, whether the motors are direct current or alternating current. Costs, of course, will differ with the service demanded of the equipment. On some roads the rolling-stock has an easy time of it, on others it is frequently overloaded. And also there is track and track. But the fundamental plan for keeping after the cars can be substantially uniform, to the benefit of all concerned.

The intensive study which the editors of this paper have given to the heavy multiple-unit car during the past few weeks has inspired in us a greater respect for it. As was suggested in a recent editorial, the steam roads which will sooner or later electrify their passenger terminals have here an efficient tool ready to their hand.

Don't Overlook the Value of Prevention

WE HAVE heard complaints recently of a lack of care given to certain details of design and construction of cars by car builders. These defects may appear like minor matters when viewed by themselves, but if they prevent a car from functioning properly when it is received by the operating company, and so requires its removal to the shops for a week or even several days, it is a serious matter to the railway. A prominent railway official who has recently put a number of safety cars in service estimates that his cars earn approximately $40 a day, and if the car is not in operation the greater part of that sum of money is definitely lost. Hence, any repair which requires the car to go to the shop for a month means a possible loss of $1,200 to the company, and it would not take many delays of this kind to equal the value of a car.

What kinds of defects have occurred? Well, there was one case where on several cars the fuse boxes were knocked off as the cars rounded a curve. Undoubtedly the curve was of a shorter radius than that for which the equipment had been designed, but such circumstances should not be overlooked. In another case the brakes worked all right when there were no passengers on the car, but with a load of passengers the brake rod became pinched between the body and the truck, preventing the brake from functioning. Another cause for a good deal of trouble is loose scale and dirt or else fins and burrs in the air piping, their effect being to restrict the openings leading to the air equipment. Some suggestions on air piping are contained in an article in this issue by Joseph C. McCune, who gives much valuable information which should be helpful to maintenance men in preventing defects of this nature which are liable to occur.

A Good Omen for the Fall Convention

THE wonderful convention, just closed, of the A. R. A., mechanical section, at Atlantic City warrants the belief that the electric railway operators and supply men will be out in full force at our own convention in October. The steam railroad men and guests in attendance at Atlantic City numbered well up toward 6,000, which number, as one attendant remarked to the writer, will be the standard henceforward rather than the 5,000 which a few years ago seemed a reasonable number to hope for. We compliment our fellow transportationists on the spirit and proportions of their convention. It is now up to us to follow the admonition: "Go thou and do likewise."

Railway Electrical Engineers to Get Closer to Managers

ONE move of the railroad men which impressed us as important and significant was that which will presumably lead to the amalgamation of the railway electrical engineers with the mechanical section of the parent railroad association, the American Railroad (formerly Railway) Association. The electrical engineers of the steam roads have had their separate society. It has done good work, but needs the stimulus which can only come from association with the big men in the business. The meeting of the electrical engineers on June 14 was rather perfunctory, although several valuable reports were presented.

With the electrical engineers forming a section of the A. R. A. there would, we think, be an entirely different tone to the meetings. On the other hand, if the electrical engineers rise to their opportunity they can do increasingly important work as electric motive power comes into larger and larger use. So far, of course, they have exerted little if any influence in this direction, but the lack of discussion of the excellent report of the committee on design, maintenance and operation of electric rolling stock, presented to the mechanical section last week, shows that much needs to be done to arouse interest in the future of transportation engineering. Obviously it is natural that the railroad men should be most interested in the problems that affect their present everyday work, but as they all presumably assent to the

proposition that electrification is coming it ought to be possible to interest them in talking about it. While the electrical engineers on steam roads are not primarily concerned with motive power, they ought to be studying this subject as far as it is an application of electric current.

We Are in Our Own Pit; We Must Dig Ourselves Out

"WE ourselves are to blame if we don't have now the time and labor saving devices we need," said one man charged with maintenance. As he went on, he argued that at former labor costs we thought it cheaper to have a man pry a car corner up or two men saw a rail in two by hand than to bother to buy the jack or the power hacksaw necessary. Now we reap what we sowed, for we have substituted man power for machinery so much in the past that managements don't understand the present call for tools and shop equipment. And, too, habits are hard to change.

But with wages today two to four times their former figures, labor and time saving equipment is the answer many times to the rising maintenance costs.

And it is up to us to dig ourselves out, in line with the thoughts of the speaker quoted. Have you analyzed your own situation to see if you are taking advantage of the many devices now available? An exhibit such as was shown at Atlantic City at the recent A. R. A. meetings shows the huge number of these labor-saving equipments and tools recently developed. Your managements will appreciate the facts, if you will show them and if you will emphasize the inverted conditions which now exist.

Of course, the answer most generally received, we suppose, is lack of funds, but when devices save their cost in one or two years by decreased expenditures they should be purchasable.

And, Mr. Manufacturer, have you done all you can to try to sell on the basis of getting your pay from the savings effected by the use of your device?

Now Is the Time to Get That Freight Business

IF EVER there existed an opportunity and at the same time an obligation to perform a much needed service it appears to us to exist now in this matter of transportation of materials by electric rails. Never have our industrial activities been so hampered by clogged transportation as today.

Now is the time to get in and prove the usefulness of the electric railway in freight movement. This proposition must be put across, this side of the business developed.

We hear the answer that times are hard and the extra equipment difficult to secure. To be sure, this is true in a measure, but if we wait till the electric railways are all in better shape the rest of the country will be in a similar condition and the great opportunity gone by.

The motor truck, which has a legitimate place in the transportation game, is making the most of its opportunities these days. And for the ultimate good of the whole community the electric railway should exert every effort to take its own legitimate place in this work. Nobody is going to shove our part of this business at us. We have to get it, and *we can get it* because it belongs to us, and in the long run the electric railway can do it better and more economically than any other agency.

Each company should pick out the business in its community that it can handle and go after it. This may in some cases mean permits for hauling freight over present tracks, as well as small extensions, spurs, some interconnection with trunk lines and other traction lines and probably a joining of interests occasionally with motor trucks as feeders. But the electric railway is a link in this transportation of materials, and it owes it to itself and society to perform its duty. And, we repeat, there is no time like the present to show usefulness in this direction. Business established now can be retained. But business not established now will not be easy to obtain when other lines of transportation open up more freely.

Clearness Desirable in Writing, Especially in Legal Decisions

WE LABOR to be lucid. In consequence a lot of scholastic verbiage and engineering jargon is made over by our hands. Engineers, however, are not the worst offenders against the English language. Commission documents especially are drab, dull and discouraging. A sentence from one springs to mind: "If it be contended that if a rate when fixed is fair and reasonable, that such rate is fair for all the time does not follow."

Only twenty-six words. Yet these words are so put together in a sentence that Sam Lloyd of puzzle fame would envy the ingenuity of the author. We think we know what the writer means. Still, we had to pass the thing on unsolved to the reader. In the case of a correspondent who sinned against the language, we could send back the item or sentence for interpretation. This we found occasion to do recently and lost a correspondent. But it is better to lose a correspondent than to lose a reader. This case also revolved around the interpretation of a commission statement. One of the sentences contained 124 words. Parse that we could not.

We, ourselves, are not a paragon of all the writing virtues. But we are more of a paragon of some of these virtues than a few other people that we know. We are even conscious of not always saying things in the way that carries the greatest conviction. Indignant readers have forced this unwilling confession from us by letters even less clear than the very statement they were seeking to correct.

The airy persiflage of James Huneker is all right in its way, but the linguistic trickster is out of place as the author of a technical paper or an official document. Still, such writings don't have to be ponderous to be profound. The words are all there in the dictionary for anybody to use. Play with words, if you must. But if you do, be careful that words do not play with you.

> True ease in writing comes from art, not chance;
> As those move easiest, who have learned to dance.

"Side-Line Johnny"—or the Need for Concentration

A POPULAR magazine has in its current issue an article which shows how salesmen hamper their progress by carrying side lines, when they ought to be giving all their attention to their main and only lines. The consequence is that often the side lines become the absorbing ones to the detriment of the others. A certain salesman carried this so far that he became known in the trade by the pseudonym used above. Each reader

of the article mentioned no doubt asked himself the question, "Am I carrying any 'side lines' in my business?" Such a question is appropriate to every electric railway employee as well as to everybody else. The chap who is getting ahead is the one who carries no side lines. Don't mistake our meaning, however, for concentration can be carried too far—"all work and no play makes Jack a dull boy." Injudicious concentration also makes cranks. And every ambitious fellow is studying on the side so that he may progress. But the principle is correct, just the same, and the coming master mechanic, for example, is the present apprentice who is carrying no side lines.

Senator Harding Receives the Republican Nomination

IN THE Republican candidate for President the country has a man who understands the needs of the public utilities of the country and the vital influence which they exert on community and business life. This is proved by the address which Senator Harding gave at the midyear meeting of the American Electric Railway Association in Cleveland last January.

Loyally, the electric railways, Senator Harding said, sustained the heavy burden of the war period, and not only have they had no reward, as was given generously in many instances to big and little business, but they were penalized worse than aliens suspected of aiding the enemy. Their destroyed credits, he said, must be restored and flexible scales of charges must be provided so that a public may pay justly for that which it demands.

The field of this paper is not politics, but we are intensely interested in the adoption of a wise and broad-minded policy toward the public utilities, not only as a matter of justice but because we realize that only by such a plan can business prosper and the wheels of industry be kept going. We, therefore, welcome the nomination to high office of candidates who have shown a breadth of vision in their consideration of utility questions.

Trouble Travels to the Antipodes, Too!

IF NOT consolation, there is at least justification for American electric railways in the fact that the disease of *deficitis* has hit the transportation fraternity all over the world in the lands of victor, vanquished and neutral alike. Glasgow, scudding dangerously along under bare poles despite the absence of fixed charges; Berlin, doubling and tripling its fares or worse in desperate efforts to overtake the drop in purchasing power, and Buenos Aires, going to 12-cent fares from 10 cents, are typical examples from every classification.

And now comes Australasia, where the lack of shipping and the depredation of marine raiders had led to the storing of such vast quantities of food, hides and wool that this part of the world was at least spared those terrific increases in the prices of "eats" and dress that have afflicted all other civilized peoples. Yet even here the tramway has been hit almost as hard as on the larger continents. Coal has gone up because of the diversion of so much magnificent man power to the destructive effort of war, railway supplies coming from the other side of the globe have arrived slowly and at prohibitive expense, while most generous sums were set aside for the dependents of the unforgettable Anzacs. In the face of these handicaps most of the electric railways of Australia and New Zealand refrained from increases in fare almost to the very end of their long war. Today, however, they are obliged to follow their brethren throughout the world because they have been struck almost simultaneously by a rise in the cost of living and by the corresponding necessity to increase platform wages.

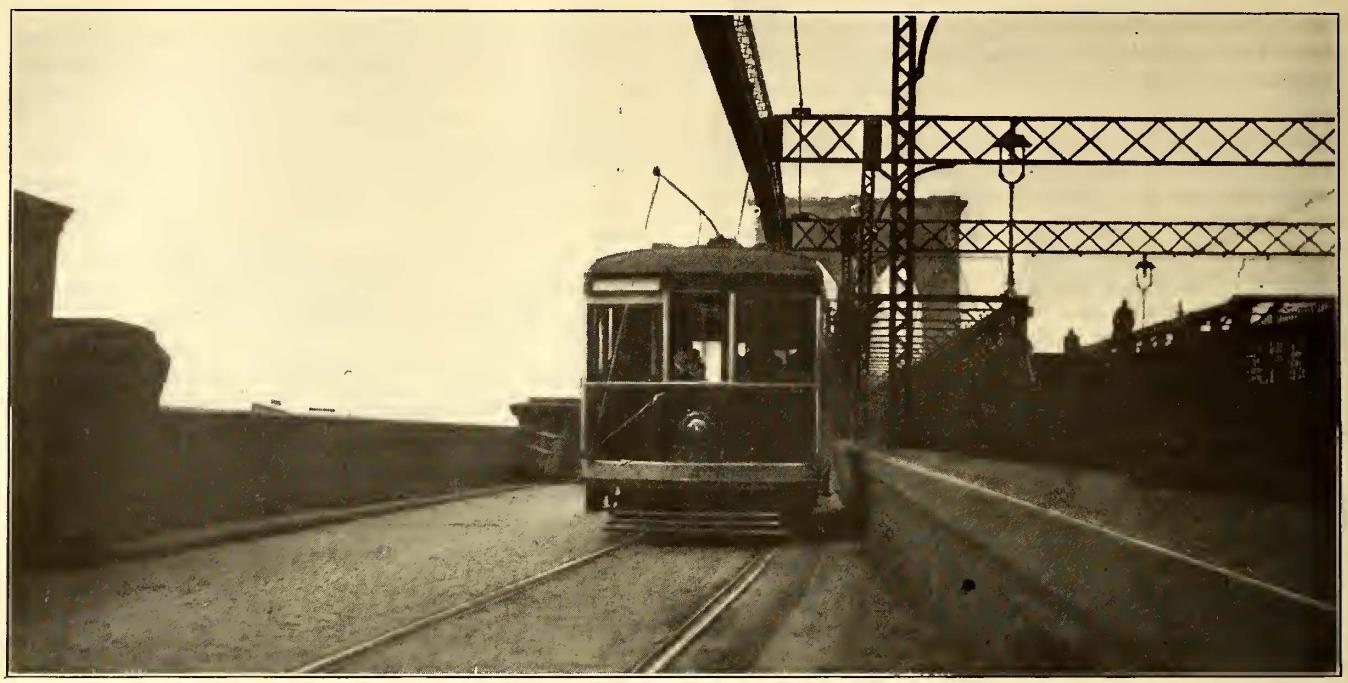
Judging from private correspondence with Australasian managers they are keen students of American technical methods. Their equipment and operation show quite a blend of British and American practices, except that in the matter of fares they have adopted the British zone fare even where they started with the American style flat fare. What they are most interested in today is how to secure more revenue without a prohibitive increase in fares. For that reason it is gratifying to have inquiries from them on the work of the safety car in giving more service at less cost and to learn that they are seriously thinking of adapting this car to "section" fare operation, as they call pay-for-what-you-get service in the Antipodes.

The Tendency Toward Greater Use of Welded Joints for Tracks in Streets

THERE is no longer any doubt that the welded joint of some form is the one toward which modern construction practice, for tracks in paved streets, is tending. Current practice includes the use of four principal forms of welds, which are the cast weld, electric bar weld, the unit weld and electric arc weld. The cast weld is included in the list as a weld by courtesy, as it were, although it is quite well known that a real union of the cast iron and the rail steel is seldom obtained. The reasons for this tendency toward welded joints are not far to seek, as they are based upon the need for the elimination of continual pavement disturbance, the noise from battered loose joints, the untimely destruction and removal of rails and the simplification of the bonding problem.

In recent years remarkable results have been obtained with the first three types of welded joint above mentioned, and each of them has become standard on many systems. Since time in plenty is required to develop defects, we may expect several more years to elapse before the industry will settle down to any single type of weld as the prevailing one. Meanwhile, the arc-weld type, though a comparative newcomer in the field, is proving a rather formidable contender for the honors, and several important companies have practically standardized them after years of experiment with the older types. One reason for this is the cheapness of the arc weld as compared with the other types of weld. Another is the simplicity of application, although at least one of the older types has this particular advantage also.

The increasing use of the newer type of weld seems to call for careful consideration at the hands of the maintenance engineers because of the dearth of information concerning the action of the heat from the electric arc upon the rail steel. Opinions vary radically as to this, and we feel certain that the industry will benefit greatly if the whole subject of welded joints could be made the object of a careful investigation at the hands of an unbiased authority such as the United States Bureau of Standards. Such an investigation would be somewhat costly, but the industry could well afford partly or wholly to finance it.



SAFETY CAR OPERATION ON BROOKLYN BRIDGE

Installing Safety Car Control and Air Brake Equipment*

Proper Installation of Equipment Has an Important Bearing on Safety Car Maintenance and the Prevention of Annoying Delays and Withdrawals of Cars from Service

BY JOSEPH C. McCUNE,
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THE cost of maintaining car equipment is affected to a considerable extent by both the design of the apparatus and the manner in which it is installed. Consequently in discussing the maintenance of air brake and safety car control equipment somewhat extended consideration will be given to the subject of proper installation. This, if it does not concern the operating man initially, does concern him when heavy repairs have to be made.

To an equipment maintenance man the paramount consideration in railroad operation is the reduction of maintenance cost to the minimum. While the maintenance expenses are usually directly charged against the equipment or the equipment department, still there are other items which might also be directly charged against equipment. These include charges due to the withdrawal of equipment from service on account of mechanical defects and the delays incident to the same causes. These latter two items constitute a heavy charge against operation.

A careful and proper installation of equipment will produce economies in operation as well as in maintenance. In one large Mid-West city in 1919 the charge against the equipment department was 13 per cent of the total operating expenses. In another city in the same section this charge was 14 per cent. In these two cities a 10 per cent increase in maintenance expense would increase the total operating expense but slightly over 1 per cent. If this increased maintenance expense reduced the total operating expense by 2 per cent it would obviously be justified. It is thus apparent that the maintenance cost should not be the determining factor in deciding what equipment is the best for a particular situation, but all interested should strive toward the limitation of that expense in so far as consistent with high-grade upkeep. The following considerations should be of assistance in such an endeavor.

CAREFUL INSTALLATION OF PIPE PREVENTS TROUBLE

All maintenance men are familiar with the difficulties experienced with new air-actuated equipment on account of scale and dirt from the new piping collecting at undesirable points. Many of these difficulties can be avoided by a careful installation of the pipe. Before pipe is assembled it should be thoroughly hammered to loosen all scale or dirt, all fins and burrs tending to restrict the opening should be cut away and the pipe should then be blown out to remove all such matter. This treatment should be given before the pipe is in place, for otherwise it is apt to result in the deposit of this matter in some part of the pipe system or in the appliances connected thereto. Moreover, the purpose of the treatment should not be defeated, as is too fre-

*This is the second of a series of articles on safety car equipment. The first was published in the ELECTRIC RAILWAY JOURNAL for April 17, 1920.

quently the case, by throwing the pipe after treatment upon the shop floor, and thus allowing dirt or cinders to enter. After the piping is complete and finally blown out, with valves removed from brackets, the system should be tested under air pressure and all leaking joints, as indicated by soapsuds, made tight. Brass-to-iron seat unions should be used, since these not only give tight joints but obviate the necessity of providing the ordinary gasket. It is good economy also to use extra quality pipe fittings on account of their freedom from leakage and their superior threads. When the pipe is assembled care should be taken that the pipe compound is applied to the entering threads so that the excess will be forced from the pipe and not into it. Disregard of this simple precaution is widespread, as are likewise the operating troubles thereby caused.

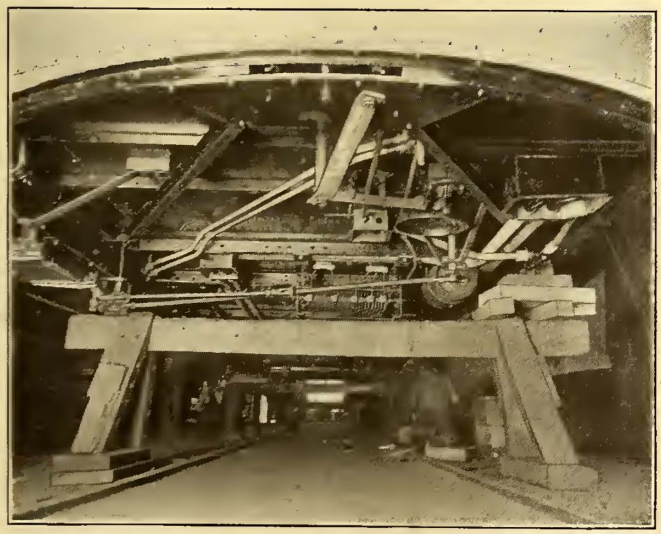
Cooling Pipes Trap Water

The location of the piping and the various safety devices is largely influenced by the necessity of avoiding the accumulation of water at any point other than in the reservoirs, and the desirability of entrapping in the reservoirs all the water precipitated by the cooling of the air after it leaves the compressor. Water in the brake system is extremely undesirable, not only on account of the freezing troubles which necessarily ensue when water is present but also on account of its deleterious effect on the apparatus itself and its proper lubrication. A consideration of what measures must be observed in overcoming the effects of moisture in the brake system will assist in an understanding of what has been found beneficial in the arrangement of piping and equipment.

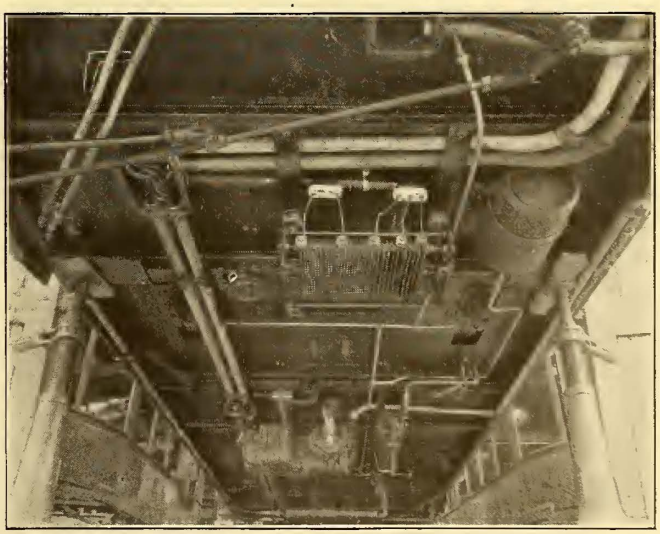
Air is a mixture of oxygen, hydrogen, nitrogen and a few other constituents, one of which is water vapor. Since oxygen, hydrogen, etc., are invisible gases there is nothing to indicate their presence in the ordinary air. Neither is the presence of water vapor indicated, since it is for all practical purposes an invisible gas, but a gas that under certain conditions will condense to form water. The ability of a given quantity of air to contain water vapor is limited. When this given quantity of air contains all the water vapor possible it is said to be saturated. The degree to which the air is saturated or the amount of water vapor it contains is indicated by its "relative humidity." Relative humidity may be defined as the percentage of water vapor which the air contains at any particular pressure and temperature as compared with the maximum amount which it can hold under the same conditions. The humidity is said to be 100 per cent when the air contains this maximum amount. As showing what this maximum amount may be, 300 cu.ft. of air at atmospheric pressure, 62 deg. F. temperature and 100 per cent humidity contains 1 gill of water. It will be noted that this volume equals the displacement of a 16-cu.ft. compressor for about twenty minutes, pumping against 100 lb. delivery pressure.

The amount of water vapor which a given quantity of air can contain is affected by two factors, its pressure and its temperature. The higher the pressure the less water vapor the air can contain. That is, if the air be saturated and be then compressed some of the water vapor will be immediately precipitated as water, since the ability of the air to contain water vapor has been exceeded. The higher the temperature the more water vapor the air can contain. That is, if the air be saturated and the temperature be increased the humidity will be decreased to something less than 100 per cent. In air brake systems the effect of temperature is greater than the effect of pressure.

Considering the action in the compressor, the air discharged on account of its compression is less able to hold water vapor than before it entered the compressor. On the other hand, the temperature of the air has been greatly increased by the work of compression done upon it. The increase in temperature more than balances the increase in pressure and the air leaving the compressor has a lower humidity than the air entering it. But as this air cools toward atmospheric temperature its humidity rapidly increases. It soon reaches 100 per cent when moisture commences to be precipitated. Moisture continues to be precipitated until the temperature of the air becomes atmospheric, since the pressure is sufficient to cause air, except in the very driest climates, to be saturated at atmospheric temperature. That is, before the relative humidity became less than 100 per cent the air would have to be cooled considerably below the ordinary atmospheric temperature. In other words, the air is in such condition that further cooling will cause further precipitation of moisture. So long as the temperature of the air remains constant, however, moisture will not be deposited. To sum up, if



PIPING TO PLATFORM (RESISTOR END)



COOLING COILS AND RESERVOIR PIPING

the temperature of the air at its exit from the second main reservoir be atmospheric and if this temperature be maintained throughout the brake system difficulties arising from the deposit of moisture will not be experienced.

From the above, the function of the cooling pipe and reservoirs (apart from their use as storage reservoirs) is apparent. This function is, first, to cool the air before it leaves the second main reservoir to atmospheric temperature; second, to entrap the water deposited during this cooling. If the water is collected in the main reservoirs it can be drained away at the necessary intervals. With this explanation of the purpose of the cooling system, the installation of cooling pipes and main reservoirs, as found desirable for cold climates, will be described. The piping installation to be described has been found desirable where climatic conditions during the winter demand especial protection against freezing. Where such protection is not required, the usual piping installation in which the pipes are located beneath the car floor has given very satisfactory service.

What Is the Most Desirable Location for Air Equipment?

The compressor is located approximately midway of the car, with its armature parallel generally to the car axles. The suction strainer is installed beneath the car floor as near the compressor as practicable, but should not be subject to wheel wash. From the compressor a 1-in. discharge pipe is led parallel to the axles to the right hand side of the car, looking toward the No. 1 end. Reaching the side sill, the pipe is led toward the No. 2 end and then, by means of a return bend, back toward the No. 1 end. The pipe is located at the edge of the car body to obtain the maximum cooling effect. If the pipe is located in the interior of the underbody structure, on account of the heat generated in the resistance and motors the cooling effect is considerably reduced. The main reservoirs are located at the No. 1 end, directly ahead of the wheels. The cooling pipe just mentioned is led into the first main reservoir. From the side of the car, into the main reservoir, the size of the pipe is increased from 1 in. to 2 in. This increase is to prevent stoppage of the pipes by freezing, which is generally a progressive action. That is, the moisture deposited on the pipe walls is first frozen, then additional moisture deposited upon this ice is frozen; this action continues until the pipe is eventually frozen completely over. It has been found by experience that freezing very frequently occurs just at the entrance to the first reservoir. By increasing the size of the pipe at this point, stoppage of the pipe is made more unlikely. The cooling pipe should drain toward the main reservoir so that deposited water can be drained away. The length of this pipe measured from compressor to reservoir should be not less than 25 ft.

From the first main reservoir a 1-in. cooling pipe leads out to the left-hand side of the car and then to the rear and back again as described for the right hand side of the car. This pipe connects into the second main reservoir and should be not less than 25 ft. long.

Location of Equipment Details

The governor is on the inside of the car body in line with but to the left of the main reservoir. It is connected to the intermediate cooling pipe just before this pipe enters the second main reservoir. The governor pipe rises vertically from the cooling pipe and then horizontally below the car floor until a short vertical riser connects to the governor. The governor cutout cock when supplied is located in the vertical section of this pipe beneath the car floor.

The emergency valve, the double check valve and the main reservoir cutoff valve are all located inside the car body to prevent freezing. They are grouped under the third seat from the end on the right hand side of the car. It is particularly necessary that the main reservoir cutoff valve be located inside the car. When the purpose of the cooling system was explained it was pointed out that cooling of the air below atmospheric temperature would cause additional moisture to be deposited. In the passage of air through the cutoff valve an expansion occurs on account of the restrictions introduced by the valve itself. During this expansion the temperature of the air decreases and moisture is deposited. If the cutoff valve is at or near the freezing point this moisture will be frozen. It is obviously necessary to install the cutoff valve within the car so that the temperature will be sufficiently high to prevent such freezing occurring.

The door engines are also located within the car, one at each end under the motorman's seat. With a former type of engine frames attached to the car floor were necessary as supports. With the present type, which has cast feet, the engine can be installed directly upon the floor. The door engine can, of course, be located under the car floor, and frequently is where climatic conditions permit, but the installation described contemplates the encountering of low temperatures during the winter.

The combined foot and cutoff valve is located above the car floor by means of a circular wooden block sufficiently thick to allow the installation of the by-pass around the valve without requiring that this by-pass piping pass through the car flooring. The combined foot and cutoff valve completes the devices, the location of which demands especial explanation. Cab fixtures, such as brake valves, air gage, etc., are located in the usual manner. The arrangement of the pipe connecting these various devices will, therefore, be next taken up.

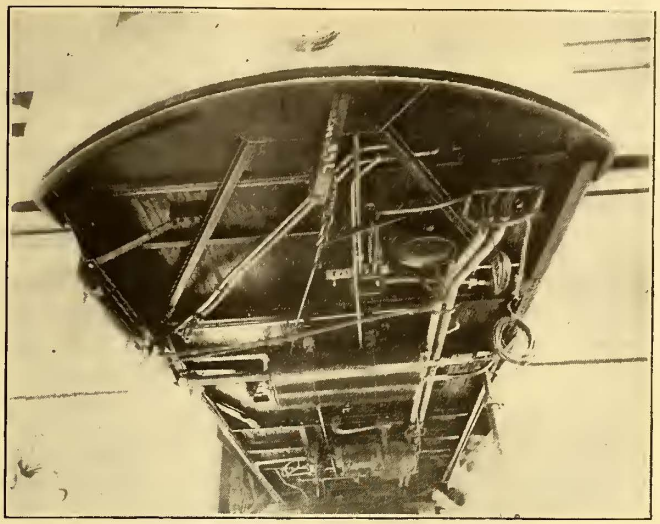
Piping Is Located Inside Car Wherever Possible

There are five main air lines running from platform to platform; namely, (1) main reservoir pipe, (2) safety control pipe, (3) emergency pipe, (4) straight air pipe, (5) sanding pipe. In addition, there is the circuit breaker cylinder pipe, which connects the two circuit breaker cylinders with the emergency valve. All of these pipes, except the sanding pipe, in so far as possible, are located within the car and for the same reason that the emergency valve, etc., were so located, that is, to prevent their freezing.

The main reservoir and safety control pipes are laid on the car floor close against the side wall on the right hand side of the car. The emergency and straight air pipes are similarly laid on the left hand side. Since the brake valves are at diagonal corners of the car body and since these four pipes must all be connected to each brake valve it is necessary for each set of pipes to make a "cross over" at one end of the car. Since the cross-over pipes cannot be laid across the platform flooring it is necessary to drop them beneath this flooring. This is done just before the platform is reached. The vertical pipe from within the car is connected to the horizontal cross-over pipe by means of a tee, one run

of which is plugged. This arrangement is employed so that in case there is freezing at this point the pipe may be thawed out and the water drained away. It is not intended that these plugs should be used as ordinary drain plugs.

The sanding pipe is completely beneath the car floor. The ball type non-return check valves are so located in this pipe that air from either brake valve is admitted only to the sand traps of the adjacent pair of wheels. The connection from the emergency valve is made between these check valves so that in emergency air is admitted to all four traps. The circuit breaker cylinder pipe is on the right hand side of the car and is laid beside the main reservoir and safety control pipes. It crosses over at the No. 1 end of the car, just before the platform is reached. On this same side of the car and next to the three pipes just mentioned is the pipe connecting the second main reservoir to the emergency valve. It runs, of course, for only half the length of the car. The brake cylinder is connected to the emergency valve by a pipe which drops below the floor at the emergency valve. In it is included a plugged tee for thawing purposes.



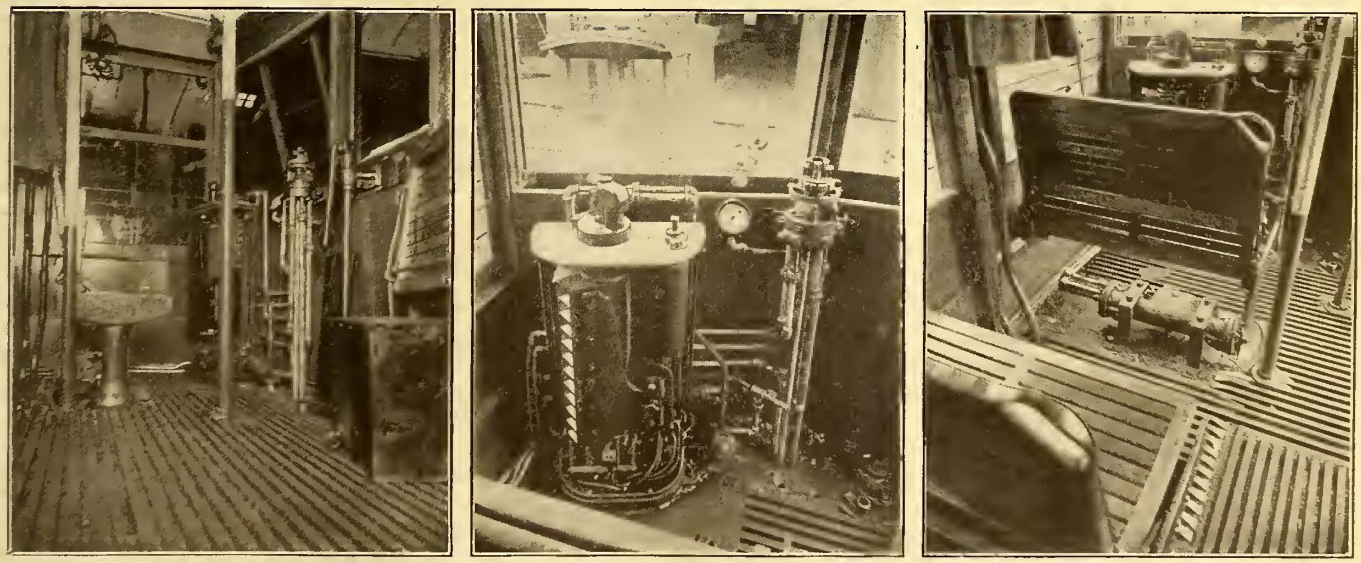
CENTER PIPING AT COMPRESSOR

The cab piping requires no particular comment. The ⅜-in. cutout cock with side outlet, by which the operator independently of the brake valve may make the door hand operated and thus may close it after his exit, should be located in such a position as to be accessible to him. The gage pipe should be taken off at such a point that the operator cannot break it off by using the horizontal section of it as a foot rest.

Proper Lubrication Is Most Important

The piping of the safety car has been described because a knowledge of the proper installation assists in the reduction of maintenance cost and delays due to mechanical defects. But poor results may be obtained even with a well-designed installation of the equipment, if the equipment be not properly maintained. An important feature of maintenance work is satisfactory lubrication. Rules to cover lubrication in all locations cannot be given, since local conditions vary greatly. What is here given should, therefore, be considered as constituting a general guide from which departures must be made as required by special conditions.

For the lubrication of two surfaces which rub together oil is ordinarily first considered. But oil has not been found to be the best lubricant for all rubbing surfaces in air brake apparatus. It is not generally the best lubricant where one surface is held against the other by air pressure and where a portion of one surface is exposed to a lower air pressure; for example, where a slide valve is held to its seat by reservoir pressure and where an exhaust opening exists in the slide valve seat. In such a case if oil be used it will form an airtight joint about the edges of the slide valve, and since there is usually some leakage under the slide valve the pressure under the slide valve will eventually become atmospheric. As a result, since the slide valve is held to its seat with a pressure equal to its area, multiplied by the difference in pressure per square inch acting on its upper and lower faces, the slide valve may be held against its seat with a greater force than if oil were not used. For if oil is not used leakage will cause the pressure under the slide valve to be at some points that of the reservoir, at others atmospheric and at still others something between the two. The average pressure is, however, lower than in the case where oil is used. The force holding the slide valve to its seat is consequently less and the friction that must be overcome before movement likewise less. Oil may therefore be a



AT LEFT, PIPING TO BRAKE VALVE AND FOOT VALVE. IN CENTER, BRINGING PIPING BACK OF CONTROLLER. AT RIGHT, DOOR AND STEP CONTROLLER INSTALLATION

REPAIR PARTS TO BE CARRIED FOR AIR BRAKE AND SAFETY CAR CONTROL EQUIPMENT ON TWENTY-FOUR CARS

Brake valves:
1 Brake valve, M-28, less pipe bracket and handle,
2 Brake valve handles,
6 Upper brake valve gaskets,
6 Lower brake valve gaskets,
4 Brake valve handle latches,
No. 15 double check valves:
6 Gaskets
Controller attachments:
2 Controller handles,
2 Controller pilot valves,
2 Controller handle base portions,
Circuit breaker cylinder:
2 Piston rod knob covers,
Brake cylinder:
6 Brake cylinder packing leathers.
Door and step controllers:
1 Door and step controller,
8 Leather cups,
8 Cylinder end gaskets,
Foot valves:
2 Combined foot and cutoff valves,
Graphite grease:
10 lb. graphite grease.
Compressors and parts:
1 Compressor, complete,
12 Inlet valves,
1 Cylinder head, complete,
4 Cylinder head gaskets.
1 Pinion,
Compressor motor parts:
1 Armature, complete,
1 Commutator
1 Commutator M. band ring,
1 Commutator M. V. ring (front),
1 Commutator M. V. ring (rear),
2 Sets armature coils.
1 Field coil,
2 R. H. brush holders, complete,
2 L. H. brush holders, complete,
12 Carbon brushes,
Governor:
1 Governor, complete,
12 Compressor fuses.

disadvantage rather than an advantage. Since graphite does not, like oil, form an airtight joint it has been found desirable for some air-actuated devices to use graphite as a lubricant for flat rubbing surfaces.

The emergency valve is one of these devices. No attempt should be made to lubricate the valve on the car, since there is great likelihood that dirt will be admitted to the rubbing surfaces in so doing. All lubricant should be applied at the bench. The valve should be taken apart and all gum and other foreign substances removed by the use of gasoline or benzine. The parts of the valve should then be thoroughly dried, using cheesecloth, not waste, since lint from the waste is apt to adhere to the surfaces. A very high grade graphite should then be employed to lubricate the slide valve, slide valve seat and that part of the bushing against which the spring bears. Occasionally a coarse flake graphite is used through error. The only graphite suitable is one in which the flakes are extremely small. To apply the graphite a paddle about 8 in. long with a piece of chamois glued to one end should be made. By dipping the chamois into the graphite a deposit of graphite is obtained which can be rubbed into the surfaces indicated until the pores of the brass are filled.

Oil is used on the bushings in which the pistons work. A drop or two of oil should be applied to the bushings and distributed around the circumference with the finger. It is the general practice to use entirely too much oil. Only a very small quantity is required. This should be spread throughout the length of the bushings by working the piston back and forth.

Graphite grease should be used to lubricate the rotary valve of the brake valve, but very little is required. The key should be lubricated with oil, poured down the opening uncovered by the removal of the oil screw. The pan in the controller base should also be lubricated with graphite grease. Graphite grease is used in the brake cylinder, being applied to the cylinder walls, the inside of the leather and the expander ring groove. It is also used in the same way in the door engines.

The oil used in the crank case of the compressor should be of fairly heavy body with high flash and fire points, high viscosity and low freezing point. Oil should be used to lubricate the circuit breaker cylinder. The remaining devices require no particular mention in so far as lubrication is concerned. How they should be maintained will be discussed in another article.

It is of course very necessary in maintenance work that a sufficient stock of spare parts be kept on hand. What constitutes a sufficient stock is largely a matter of opinion and local conditions. The tabulation given is intended to indicate in a general way what is considered necessary under average conditions.

Using Calcium Chloride to Remove Sleet from Third Rail

THE Long Island Railroad uses a protected third rail. The protection consists of a wooden cover which extends $\frac{7}{8}$ in. past the third rail toward the center of the track and $3\frac{3}{8}$ in. past the third rail away from the track. In driving sleet storms the sleet gets on top of the third rail from the track side and during extreme conditions this interferes considerably with train operation. In order to loosen this sleet from the third rail a solution of $2\frac{3}{4}$ lb. of calcium chloride to a gallon of water is used. For carrying the solution over the line and applying it to the third rail two tank cars have been constructed. These consist of steel-underframe gondola cars, 37 ft. 9 in. long by 9 ft. 4 in. wide and of 100,000 lb. capacity. The cars are fitted with automatic M.C.B. couplers and automatic air couplers with bus and train lines, so that these cars can be run between the regular electric motor cars or can be pulled by steam locomotives should occasion make this necessary. Two cylindrical steel tanks of 2,300-gal. capacity each were placed on the floor of each car, one on each side. One end of each was elevated 12 in., so that all the solution is readily drained from the tanks. Wooden houses were constructed over the cars, and each end has a door.

The calcium chloride solution is mixed in the tanks, In order to assist in this mixing a coil of pipe is placed in the bottom of each tank. These coils are perforated and have a connection outside the tank where air from the main reservoir of this or other cars can be connected to a valve. When air is admitted to this coil it passes up through the solution and assists materially in its mixing. The tops of the tanks are provided with manholes, which can be closed to make the tanks airtight. When necessary air pressure can be built up in the tanks to force the solution out.

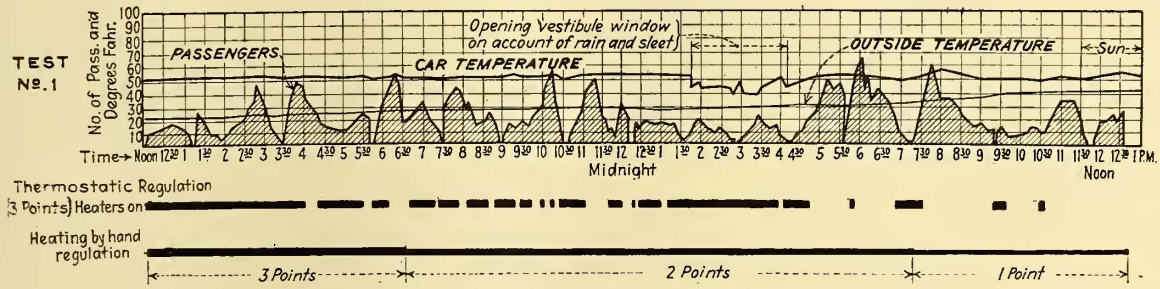
For controlling the solution as it is taken out of the tanks four valves are used. Each valve has an elbow screwed in the end and from this elbow the solution drops into a funnel. By observation of the solution as it enters this funnel the amount used can be seen and the valves adjusted to suit the conditions. From the funnel the solution is carried in a $\frac{1}{2}$-in. hose to the contact shoes. The shoes used on these tank cars are of a special type which are cored out so as to carry the solution from the hose connection on the back of the shoes and deposit it on top of the third rail. When the cars are in operation the speed is adjusted to meet the conditions, which depend upon the quantity of sleet that it is necessary to remove. This method has worked out very satisfactorily on the electrified section of the Long Island Railroad.

The first automatic substation to be put in operation in the Northwest and the third on the Pacific Coast, according to the Puget Sound *Journal*, will soon be installed on the Seattle-Everett interurban line near Martha Lake. The equipment will be furnished by the Westinghouse Electric & Manufacturing Company.

Thermostatic Control Saves Energy

A Comparison of Results Obtained with Thermometer and Hand Control of Car Temperatures Shows the Advantages of the Former — Interlocking of Heater and Control Circuits a Factor in Preventing Waste of Heat

THE accompanying graphs show some very interesting results that were obtained in car heating tests using thermostatic control and regulation. These tests were made under the supervision of J. S. McWhirter, superintendent of equipment Third Avenue Railway, New York, and give data for some reliable comparisons with hand-controlled heating. The comparisons are based on theoretically correct hand operation, a condition much to be desired but never attained in regular operation. Consequently, the actual saving in normal operation is much greater than indicated by the results of these tests.



TEMPERATURE TEST NO. 1, USING THERMOSTATIC CONTROL

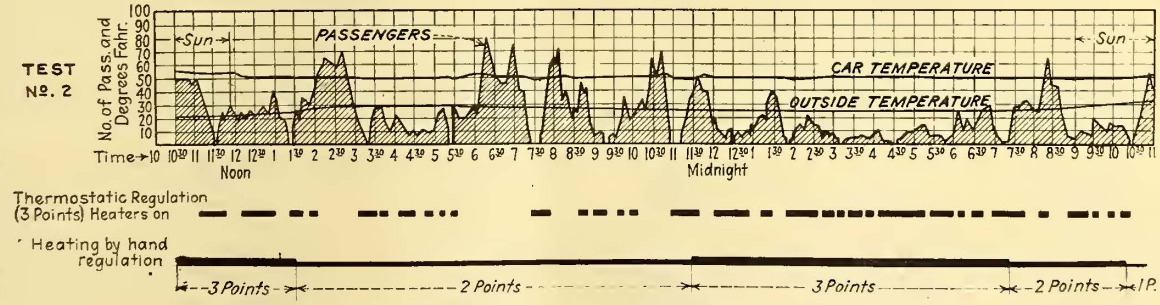
These tests were made on the Third Avenue Railway's standard convertible car, 43 ft. long over all with 30-ft. bodies and 6-ft. enclosed platforms. The car weighs 39,000 lb. light and has a seating capacity of fifty-two passengers. There are twenty cross-seats with a heater underneath each seat. Railway Utility Company's electric thermometer control, set to cut in at 46 deg. F., was used on the test cars. The Third Avenue company has 804 of its cars equipped with heat regulators, and fifty of them have the heat control circuit interlocked in the reverser in such a manner as to make the heat control apparatus inoperative when the car is not in operation. By removing the reverser handle when cars are taken out of service heat is automatically shut off.

The first three graphs show results of tests made on car No. 886 while operating in regular passenger service. A Bristol recording thermometer was used inside the car and the outside temperature was taken at frequent intervals by means of mercury thermometers. An indicating lamp was installed in the heater circuit and the time that heat was cut on or off was taken and recorded by an observer with a stop-watch. The numbers of passengers boarding and alighting at each stop were also recorded. With this information at hand graphs have been plotted for car temperature, outside temperature and number of passengers on the car. At the bottom of these graphs shaded areas indicate the times that heat was applied and cut off with thermostatic regulation and also the degree of heat that would have been applied had hand regulation been used.

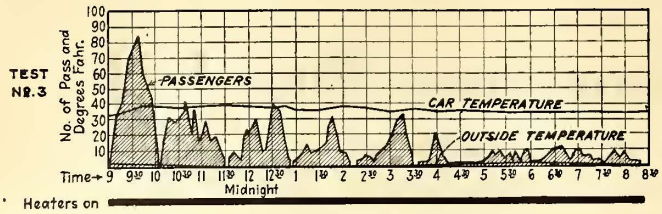
Cars equipped with hand regulation are arranged for three intensities of heat, taking 4, 8 and 12 amp., respectively, designated as one, two or three "points of heat." The instructions followed for hand regulation are to use one point for temperatures between 32 and 40 deg., two points between 25 and 32 deg. and three points below 25 deg.

The first test shows a run from noon Jan. 26, 1920, to noon Jan. 27. There was a continuous sleet storm during this period and the outside temperature was from 22 to 28 deg. on Jan. 26 and from 25 to 43 deg. on Jan. 27. During this twenty-four-hour test heat was applied with thermometer control for 870 minutes. All heaters were connected in the circuit so that they were all on while heat was being applied and were all off at other times. The product of the current taken, 12 amp., and the time, fourteen and one-half hours, gives 174 amp.-hr. used. As the average voltage was 575 the energy consumed for heat with thermostatic control was 100 kw.-hr.

If hand control had been used three points of heat would have been used for 390 minutes, two points for 760 minutes and one point for 320 minutes. At the current rating previously given the energy used with hand



TEMPERATURE TEST NO. 2, USING THERMOSTATIC CONTROL



TEMPERATURE TEST NO. 3 IN VERY COLD WEATHER, USING THERMOSTATIC CONTROL

control would have amounted to 115.4 kw.-hr. This test therefore shows a saving in favor of thermostatic control of 15.4 kw.-hr., or 15.4 per cent. The inside car temperature was kept uniform at approximately 50 deg. except during a period from 1:30 a.m. to 4 a.m. on Jan. 27, when a coating of sleet became so thick on the front vestibule windows that it was necessary for the motorman to open one of these to see ahead. The car temperature then dropped to 40 deg. in spite of the fact that the heaters were cut in continuously during this period. A further comparison of the results of the two types of regulation is given in Table I.

The second set of graphs shows a similar test made with the same car on Jan. 29 and 30. The outside temperature range during this test was from 22 to 30 deg. on Jan. 29 and from 25 to 32 deg. on Jan. 30. During this test current was applied for heating for 764 minutes and 87.84 kw.-hr. of energy was used. If hand control had been used, three points of heat would have been used for 660 minutes and two points for 780 minutes. The energy consumption with hand control would thus have been 135.7 kw.-hr. The saving in favor of thermostatic control would have been 47.86 kw.-hr. during this test, or 35 per cent. The inside temperature of the car was kept uniform at 50 deg.

In Table II a comparison is made of the ampere-hours used during the various periods of one and two point operation with hand regulation.

TABLE I—COMPARISON OF AMPERE-HOURS USED DURING PERIODS OF ONE, TWO AND THREE POINTS OF HEAT. FIRST TEST.

Outside Temp., Deg. F.	Time	Length of Period, Hours	Points of Heat for Hand Regulation	Amp.-Hrs. Used with Hand Regulation	Hours Heat on with Thermostatic Control	Amp.-Hrs. Used with Thermostatic Control	Per Cent Saving with Thermostatic Control
22 to 25	12 noon to 6:30 p.m.....	6.5	3	78	5.5	66	15
25 to 32	6:30 p.m. to 7:10 a.m....	12.67	2	101.36	8.1	97.2	4
32 to 42	7:10 a.m. to 1 p.m.....	5.33	1	21.32	0.9	10.8	49

TABLE II—COMPARISON OF AMPERE-HOURS USED DURING PERIODS OF ONE, TWO AND THREE POINTS OF HEAT. SECOND TEST.

Outside Temp. Deg. F.	Time	Length of Period, Hours	Points of Heat for Hand Regulation	Amp.-Hrs. Used with Hand Regulation	Hours Heat on with Thermostatic Control	Amp.-Hours Used with Thermostatic Control	Per Cent Saving with Thermostatic Control
22 to 25	10:30 a.m. to 1:30 p.m....	3	3	36	2	24	33
25 to 30	1:30 p.m. to 11:30 p.m...	10	2	80	2.6	31.2	61
25	11:30 p.m. to 7:30 a.m....	8	3	96	6.33	75.96	21
25 to 32	7:30 a.m. to 10:30 a.m...	3	2	24	1.8	21.6	10

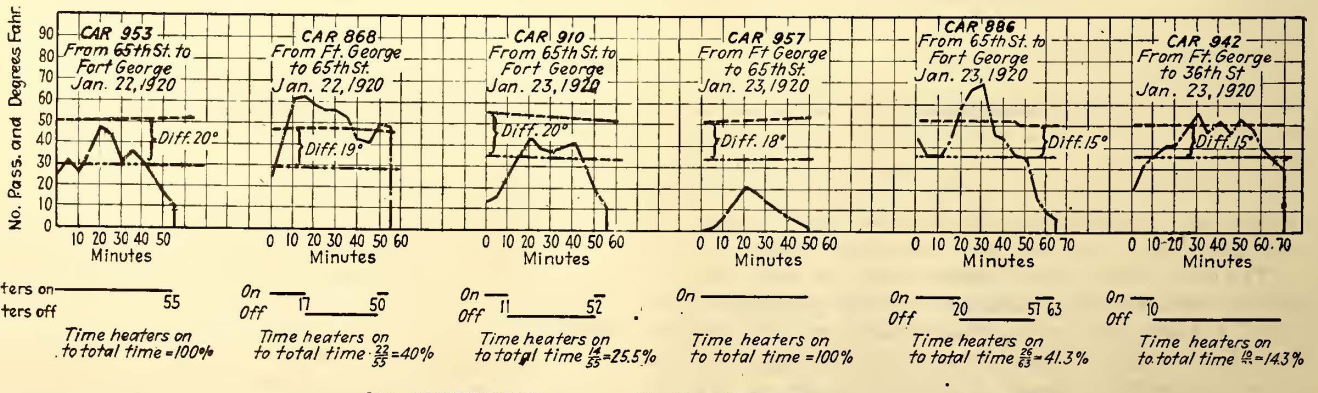
The third set of graphs shows results of a twelve-hour temperature test on the same car with the average outside temperature around zero. With all heaters cut in continuously the inside car temperature did not rise above 40 deg., but kept between 35 and 40 deg. Of course, the power consumed under such conditions is the same for both automatic and hand regulation. Such low temperature conditions seldom occur in New York City, however.

The fourth set of graphs shows a series of tests made with six different cars all equipped with thermostatic control and operating between Sixty-fifth Street and Fort George. The percentage of time that the heaters were used with thermometer control ranged from 14.3 to 100.

By comparing the results given in Tables I and II it is evident that the greatest saving from the use of thermostatic control occurs during mild weather, when the cars would be heated to a greater degree with hand control than is necessary.

New Coal Conservation Film

ELECTRIC railways desiring to encourage coal conservation among employees can have the use, without cost other than certain carrying charges, of a film which deals with good and bad methods of coal mining in transportation, firing, combustion losses, etc. The film is entitled "Coal Is King," and it was prepared from a scenario by Robert June. The pictures were taken under his direction by the Ford Motor Company. The film was originally prepared as part of the coal conservation campaign used during the war, but has just been completely revised and brought up to date, all war material being eliminated. It is in four reels, requiring approximately fifty minutes in showing. Arrangements for the use of the film can be made with the Diamond Power Specialty Company, Detroit, Mich.



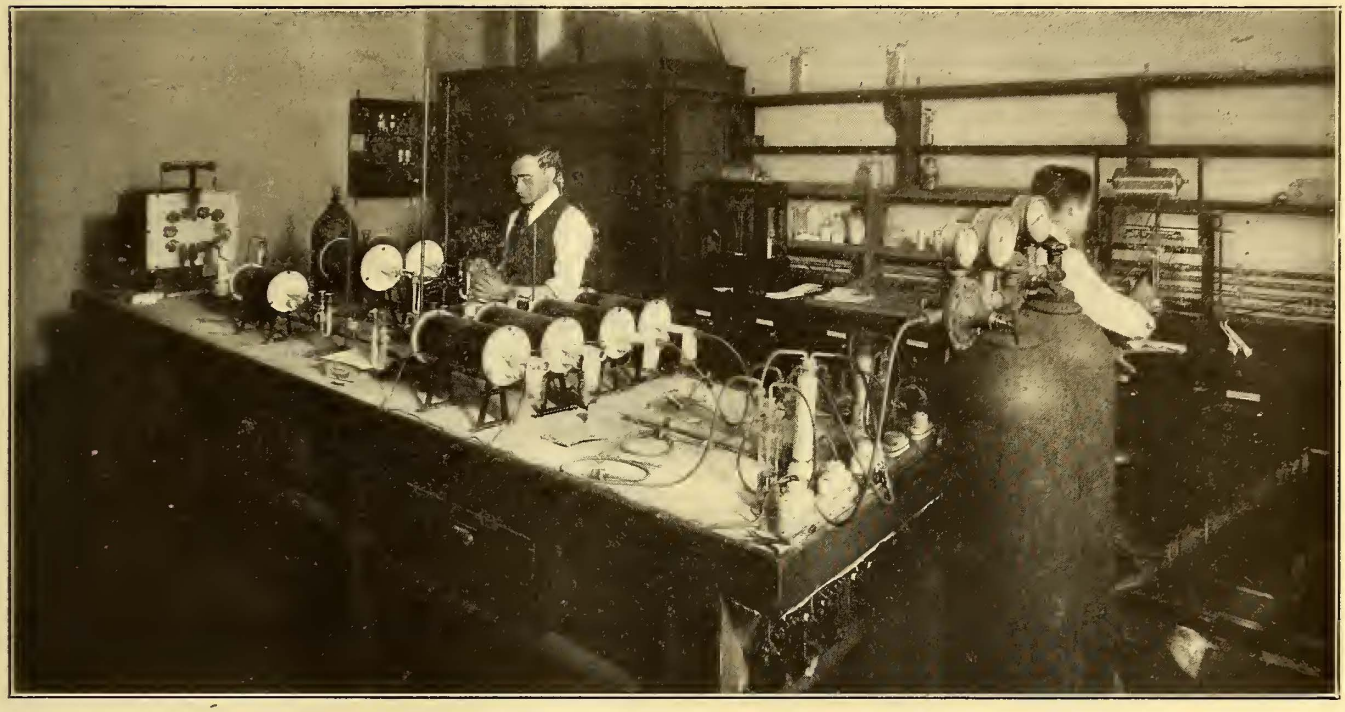
----- CAR TEMPERATURE ·—·—· OUTSIDE TEMPERATURE ·—·—· PASSENGERS

GRAPHS FOR CAR TEMPERATURE, PASSENGERS ON CAR AND OUTSIDE TEMPERATURE FOR SEVERAL RUNS

Railway Car Materials—Steel II

A Discussion of the Physical and Chemical Properties Necessary and Their Relation to Strength and Durability

BY NORMAN LITCHFIELD



CHEMICAL LABORATORY TESTS OF METALS REQUIRE SOME ELABORATE APPARATUS

Securing Desired Qualities in Steel

IN A preceding article, published in the ELECTRIC RAILWAY JOURNAL of April 17, the processes used in the manufacture of iron and steel and the elements entering into their composition were discussed. In the present article the chemical composition and some of the physical properties of steels are taken up, with the particular idea of pointing out the relation of these matters to the practical use of steel materials in car construction.

As has already been pointed out, the fundamental matter is chemical composition, and in this the preponderating influence is that of the carbon content. A rough idea of the relation between the carbon content and the ultimate tensile strength of steel of usual commercial composition, otherwise, and in its normal state as coming from the rolls, is given in the accompanying graphs. These are, however, only approximations, as considerable variation will occur due to the varying percentage of manganese and to the handling of the rolls and subsequent heat treatment, but the diagrams will be found useful nevertheless in giving a ready reference between a given ultimate strength and probable carbon content, and *vice versa*.

Before considering further the effects of varying composition, alloys and heat treatment, it will be well to study the various tests to which it is customary to put steel in order to determine whether it is suitable for any given purpose and to ascertain what these various tests mean.

In the first place, therefore, what is it that a user desires to know about a piece of steel? Primarily it is that he can fashion it successfully into a given article, subjecting it to one or more of the following or similar operations: Shearing, machining, threading, punching, welding, pressing and drilling.

Second, he may wish to subject the finished article to some form of heat treatment so as to change the physical properties of the steel to meet some special requirement.

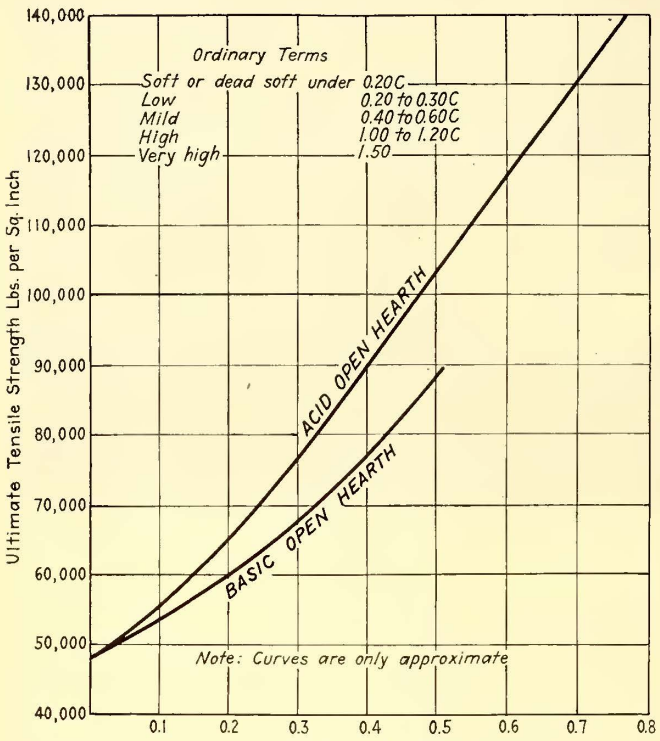
Third, he will wish to know what load the piece may be expected to carry, so that he can design the various parts of his machine or structure of proper dimensions.

Fourth, he will desire assurance that the piece will carry its load, not only for a short time, but also that it will continue to do so over a prolonged period without failure.

As a general thing, these points are very well covered by pulling apart a small piece of the steel in a tensile test machine, bending another piece cold through an angle of from 90 to 180 deg. and analyzing the steel to ascertain the percentage of phosphorus and sulphur.

At the risk of covering matters with which the reader is entirely familiar, it may be well to consider for a moment just what the tensile tests show us. Stripped

of technical terms, the action of a piece of steel in a tension test machine is about as follows: One end is fastened in a stationary grip and a pull is applied to the other, which can be varied in amount at will. As the load is increased the piece stretches, just as a rubber band does when pulled, and it has been found that the rate of stretching is quite gradual and regular up to a certain load, at which point the structure of the metal seems to break down suddenly and the piece stretches rapidly without any increase in load. The point at which this action takes place is known as the yield point. It is sometimes confused with the elastic limit, which in reality is quite different, being more or less a laboratory value, as it were, in which the user is not particularly interested. Much confusion has existed in the past in these terms, and the American Society for Testing



APPROXIMATE RELATION BETWEEN ULTIMATE STRENGTH AND CARBON CONTENT

Materials has formulated definitions of them which are clear and explicit, and are as follows:

"*Elastic limit* is the greatest load per unit of original cross-section which does not produce a permanent set. This determination is rarely made in the commercial testing of materials.

"*Yield point* is the load per unit of original cross-section at which a marked increase in the deformation of the specimen occurs without increase of load. It is usually determined by the drop of the beam of the testing machine or by the use of dividers."

If the load is continued and increased past the yield point the piece continues to stretch and finally pulls apart. The load at which this occurs is called the "ultimate tensile strength" or, more briefly, either the "ultimate strength" or the "tensile strength."

To determine the amount the piece has stretched up to the point of rupture two prick-punch marks are made on the specimen before testing, these being usually 8 in. apart or, in the case of small specimens, 2 in. apart. After the piece is broken the two halves are fitted together and the distance between punch marks is again measured. The difference between this dimension and the original length (8 in. or 2 in.) is then divided by the original length, giving the "percentage of elongation."

In addition to elongating the piece, pulling apart has the effect of reducing its cross-section at the line of rupture. This "necking down" may be gradual or it may be abrupt, as shown in two of the accompanying illustrations, this depending upon the nature of the material. The area of the cross-section of the pieces is measured at the break after pulling apart. This area is subtracted from the original area before pulling, and the remainder divided by the original gives the percentage reduction of area (also sometimes known as the "contraction").

Now as to the meanings and worth of these values to the user. In the first place, the man who is designing any part of a machine or structure determines as closely as he can what load is going to be carried by the structure. He must then make the piece large enough so that there will be a reasonable margin of strength over his calculations to insure freedom from failure. What the margin is or should be depends largely on the nature of the service to which the piece is put. This margin must be maintained at every point in the piece, for the resistance to rupture is the same for any unit of cross-section for a given character of material. Hence it is necessary to obtain all the facts possible bearing on the resistance to rupture. Experience has shown that it is surprisingly difficult to determine accurately the stress at every point in a structure. Tests made recently show a wide range of stress at various points in steel castings of not particularly intricate design, which it would be impossible to have ascertained by "figuring." Other factors enter in, such as unforeseen increases in load, etc., so that the working stress has for safety to be made considerably less than the strength of the material. The safety factor was formerly based on the ultimate tensile strength of the material, but in more recent years it has become the feeling that the yield point is the true measure of the useful strength of the material, as if this figure is exceeded the structure is likely to fail, or at least to distort.

Chemical Tests Give Additional Data

Quite apart and distinct from the question of the stability of the part to withstand the working load without immediate rupture or distortion is the resistance of the part, first, to sudden heavy shocks and, further, to a large number of repetitions of shocks of lesser character. Extended laboratory experiments and long practical experience have shown that there are certain of the chemical and physical properties discoverable by analysis and laboratory tests which throw light on the probable resistance of the metal to shock.

Closely connected with the matter of shock is that of the effect of repeated reversals of stress. A familiar case is a revolving car axle, in which at one moment one point on the circumference is at the bottom of the cross-section and so is subjected to a tensional stress, and when the axle has rotated through 180 deg. the same point on the circumference is at the top of the cross-section and so is subjected to a compressive stress. In between these two extremes this point is undergoing a decreasing tensional stress, first, down to zero, and then a gradually increasing compressive stress up to

the maximum value. Reversals of stress constitute one of the severest actions to which metal may be put.

In considering these subjects of shock and reversals of stress we begin to enter a field which is more or less controversial and from which have sprung many a theory and remedy which were destined to cure all evils, and some of which have been helpful. Within the limits of this article only the more generally accepted and simpler features can be discussed.

The first point in resistance to shock is that the impurities, especially phosphorus, shall be kept low, the exact figure being somewhat uncertain, as we have already pointed out in the discussion on the joint activities of the American Society for Testing Materials and the United States Bureau of Standards. The second is that of the ratio between the extreme working stress and the yield point of the material, the historic tests of Wohler and Bauschinger having shown that as the stress approaches the yield point the life decreases rapidly. The third is that of the granular structure, to which more particular attention will be given further on.

The other features throwing light on the working qualities and the durability of the material are the percentage elongation, already described, and the cold bend test, the severity of which is varied by altering the radius around which the piece is bent in accordance with the thickness of the piece. Thus, the thicker the piece the larger the radius around which the metal may fairly be expected to bend without failure.

The final quality is that of the reduction of area already described. The value of this is not so clearly defined as that of the elongation and is generally omitted from ordinary structural specifications. It is to be noted, however, that high grade material generally shows a high percentage of reduction in area, and the better the material the more abrupt is the "necking down."

Practical Features of Specifications

Having touched thus briefly on the general chemical and physical characteristics as determined by test specimens, it may be of interest to review a sample specification so as to point out and explain the practical application of these features. For this purpose we have selected the American Society for Testing Materials standard specifications for structural steel for cars, A-11-16, which has come into quite general use.

The first paragraph provides for applying the specification to material over $\frac{3}{8}$ in. in thickness. This is entirely reasonable, as pieces thinner than this amount are not as a usual thing depended upon for physical strength, and if they were a special specification would apply on account of the thinness of the metal.

It is required that the steel shall be made by the open-hearth process. This is in line with what we have already pointed out, namely, that bessemer stock is used only in places where failure is unlikely or unattended with danger.

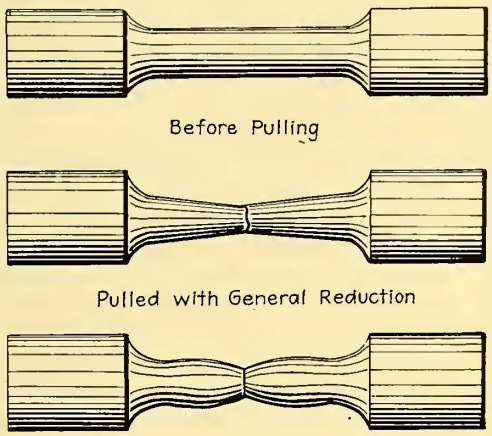
The chemical composition prescribed is as follows:

	Structural steel and Plates for cold pressing	Rivet steel
Phosphorus	Not over 0.06 per cent	Not over 0.04 per cent
Acid, basic	Not over 0.04 per cent	Not over 0.04 per cent
Sulphur	Not over 0.05 per cent	Not over 0.045 per cent

The percentages given are the normal ones and do not include the "war" tolerance of an additional 0.01 per cent in the sulphur in both acid and basic steels and 0.01 per cent in phosphorus in acid steel.

As before pointed out, it should be noticed that the percentages given in this paragraph are those found by analysis made from a small test ingot taken during the pouring of the melt of steel. In the finished article, be it plate, shape or bar, there is always the possibility that in some portions of it the sulphur and phophorus will collect together in greater amounts than in others, the action being known as "segregation," and it is felt that a reasonable amount of such action in structural steel is permissible. Paragraph 5 of the specifications provides, therefore, that the percentages of phosphorus and sulphur found by analysis of the finished piece may exceed the limits given for the ladle analysis by not more than 25 per cent. This would mean, therefore, that if the top limit given for the ladle analysis was 0.05 per cent, the permissible amount in the finished piece would be 0.063 per cent.

It will be seen that in paragraph 3 the material is divided into two groups as to chemical impurities, one for structural steel and plates for cold pressing and the other for rivets. For the rivets the percentage of phosphorus and sulphur is made less than for the other



ACTION OF TEST PIECE UNDER TENSION
Top, specimen before test. Center, gradual reduction under test. Bottom, abrupt "necking down" under test.

material on account of the excessive distortion the piece has to undergo in forming the head; a high phosphorus and sulphur content often causing the heads to fall off either during the riveting process or even after the part is riveted up.

Under "physical properties" the materials are divided into three classes, *viz.*, structural steel, rivet steel and places for cold pressing, the difference lying in the range of ultimate strength required. Thus the structural steel is made of as high strength as is consistent with ordinary manufacturing methods and the necessity for having proper machining, punching and forging properties.

This covers shapes, such as I-beams, channels, angles, etc., and all plates except those that are to be pressed cold, in which a softer and more uniform quality is necessary to resist the strains induced by the cold working. For rivets a still softer metal is desired with the low phosphorus and sulphur content already mentioned.

The yield point, it will be noted, is given in each instance as 50 per cent of the ultimate tensile strength. Many of the older specifications specified a minimum figure for the yield point in pounds per square inch, but, as tests and experience have shown, there is a

fairly constant ratio between the ultimate strength and the yield point, and it seems to express the latter in per cent of the former.

Experience has also shown that for the same class of steel there is a definite ratio between the ultimate tensile strength in pounds per square inch and the percentage of elongation, this being represented for the class of steel by the ratio

$$\frac{1{,}500{,}000}{\text{Tensile strength in pounds per square inch}}$$

This is known as the "inverse ratio," the numerator varying from 1,400,000 for some untreated high carbon steels to over 2,000,000 in the cast of alloy steels which have been subjected to a heat treatment.

For those who have much occasion to check test values of elongation against a specification based on the inverse ratio a very convenient table has been worked out which will be found on page 118 of the American Society for Testing Materials, proceedings for 1914, Vol. XIV, Part I.

The percentage of elongation given above is for standard test specimens 8 in. long between marks and does not hold for pieces of different length, as the nature of the elongation action is such that the percentage of elongation is greater for short pieces than for long pieces. This must be borne in mind in checking up the material in a finished article against the specification, for it sometimes happens that only a short specimen can be cut from the article and due allowance must therefore be made accordingly.

In addition to the effect of the length of the specimen on the elongation, there is that of the thickness of specimen, whose other dimensions conform to the standard, it having been found that on comparatively thin or thick pieces the elongation is less than on one of average thickness, and hence in paragraphs 7a and 7b allowances are made from the specified elongation to cover these cases.

These tolerances should not be considered as concessions, as they mean simply that lessened value of test qualities for different dimensions indicate the same original quality of the metal.

In paragraph 6b provision is made that "the yield point shall be determined by the drop of the beam of the testing machine." As the load is gradually applied to the test piece the latter stretches gradually up to where the load reaches the "yield point," when the stretch becomes abruptly greater. There are several ways of determining the point, the simplest of which is the sudden drop of the weighting beam of the testing machine. This method, however, is not a strictly accurate one, and for materials where an exact determination of this point is desired a delicate measuring instrument known as an extensometer is used. But for practical purposes, where a large number of specimens have to be tested, the drop of the beam is quite satisfactory, and this method is distinctly specified so that there may be no doubt either in the minds of the mill or in that of the purchaser's inspector as to exactly what is desired.

This brings us now to the questions of bend tests. The cold bend test is one of the easiest made, and, considering its simplicity, it throws a remarkable amount of light on the characteristics of the metal. And it is an important test even if full chemical and physical tests are made, for as one steel worker has said, "It is possible for us to produce a steel that will show excellent tensile properties as to ultimate strength, yield point and elongation and yet it will not bend properly." It is quite important in judging of the material by the bend test to know the radius around which the specimen was bent and the angle at which failure started.

Allowance Necessary in Tests

In the bend tests, as in those of elongation, certain allowances are made for the thickness of the material under test.

For this class of steel only one tension or one bend test is required to be made from each melt and the acceptance or rejection of the whole melt is based on this one test. It is, of course, possible that if this one test shows properties close to the lower limits of the specification, some other parts from the same melt would show properties below the lower limit, but in the interests of economy and practical production this possibility is discounted by allowing a sufficient factor of safety in the design of the finished structure. For other classes of steel to be used in exacting service, such as locomotive boilers, a tension and test piece is required from each plate, but this is not commercial practice for the ordinary run of steel and if applied generally would increase the cost to the purchaser unnecessarily and would greatly reduce production.

With the wear of the rolls the thickness of the plate or shape increases, and a practical limit has been set in paragraph 11 that the cross section or weight of each piece of steel shall not vary more than 2.5 per cent from that specified. In making any estimate of the weight or cost of any steel this allowance must be taken into consideration, as all steel is paid for by the pound, and the actual weight as delivered and paid for may considerably exceed that as figured from the nominal dimensions. This percentage figure does not apply in the case of sheared plates, these being covered in one of two ways, depending on the method of ordering the steel. If ordered to weight per square foot the variations must be in accordance with a table given in the specifications. If ordered to thickness "the thickness of each plate shall not vary more than 0.01 in. under that ordered."

It should be noted that in the latter statement no mention is made of any limit for overthickness. This naturally has quite an effect on the cost of any given number of plates and the purchaser should therefore be entirely clear in his own mind whether he needs an actual thickness or whether he can afford having plates slightly thinner than the nominal, so saving quite a lot of weight and cost.

The questions of finish, defects, etc., are ones in which the judgment of the inspector must govern, and he should if possible know the general purpose for which the material is to be used, so that he may act accordingly. Such judgment should, of course, be tempered with common sense, as a too "finicky" attitude seldom accomplishes any good to the purchaser and destroys the feeling of good will between the purchaser and the local shop people, without which it is safe to say the purchaser does not obtain as good a job as he would with it.

Having covered in a general way the main points in regard to structural steel in which the user is particularly interested it is planned in a future article to discuss in somewhat simple fashion matters relating to alloy steels and heat treatment and the field for them in railway materials.

Merchandising Transportation*

Present Conditions Have Emphasized the Necessity of Study Along These Lines—Various Methods Are Discussed, Including Means for Improving the Service, Publicity of Improvements and Securing Co-operation of Trainmen

BY F. G. BUFFE
General Manager the Kansas City Railways Company

ONE of the subjects assigned by the American Electric Railway Transportation and Traffic Association for committee investigation and discussion at the October convention is "Merchandising Transportation." No doubt if some of the operators who have passed to a region where transportation is unnecessary could return to this convention they would be surprised that the association was seriously discussing this subject. In the old days street railway transportation was provided and the public could take it or walk. Such an idea as attempting to dispose of street car rides by merchandising methods never occurred. As a matter of fact, the necessity for department store methods in transportation business had not arisen. However, "necessity is the mother of invention," and under conditions today in the street railway business even stronger than necessity it is a case of self-preservation.

Those of us who in the past three or four years have gone through one nightmare after another, including every trouble to which an industry can be subjected, who have seen surpluses turned into deficits, who have watched receipts vanish in the smoke of gasoline, look back with envy and amazement at the halcyon days when labor was plentiful and wages low; when there were no coal strikes or "flu" epidemics; when our nearest competitor was the "one-horse shay" and when 5 cents could be divided into operating costs, taxes, interest and still leave something for dividends.

The war hastened the industry's arrival at the point where it had to be up early in the morning and stay up late at night to sell what it had to offer. Regardless of the war, however, we had already reached the place where salesmanship methods were necessary. The business is in some respects no longer a monopoly, and while "competition may be the life of trade," it has come mighty close to being the undertaker in the street railway field. As an example, in 1915 and 1916 Kansas City pointed with pride to its ownership of 10,000 or 12,000 automobiles. Today approximately 35,000 of them are in use. Figured at the conservative estimate of two passengers per automobile operated, this means some 70,000 people who are no longer buying their transportation at the old stand. In some cities to a greater or less extent the jitneys have hung out their shingle, and where they have done so are hurting legitimate transportation.

In addition, increased street railway fares have developed another very likely competitor, which is no more or less than the sidewalk. Not that there has been any tightness in money matters evidenced by the people, nor has it appeared that any one desired to economize on street railway rides, or on anything else, yet we have had to face the antagonism and mental stubbornness brought about in many localities by fare increases. Our riders, who very willingly pay double for food, clothing, rent, doctor bills and entertainment, have for so long coupled 5 cents and street car rides together in their minds that our raising the ante called forth a stormy protest which in many cases turned short-haul riders into pedestrians. It is some relief to know that this condition has changed. The 5-cent fetich seems to have passed. The public now is beginning to think of rides in terms of service and cost. As a result practically every city in the country with increased fares reports increased riding. Even Boston, where antagonism to a 10-cent fare almost amounted to a boycott, has overcome this feeling. There the riding habit has returned.

The above are some of the very pressing reasons why transportation will have to be merchandised if we are going to sell. The subject offers rather unlimited scope for discussion and ideas. It covers too much territory to do more than suggest some outstanding features in an article of this nature.

The subject naturally divided itself as follows: First, direct methods of selling, which include service, advertising, education of employees, methods of handling and collecting ticket fares, methods of meeting jitney competition and the safety car. Second, indirect methods, such as those dealing with opportunities of awakening public service commissions, chambers of commerce, councils and other civic bodies to the necessity of lending their aid to increase business for the traction property.

ADEQUATE SERVICE THE BASIS FOR SUCCESS

In the very nature of things, service, in a selling campaign, must come first. The service we give is not only the display of our goods in the show windows, but it is the measure of the quality of the article we sell. We cannot rightfully go to the public for adequate support unless by the same token we give the public adequate service in every sense of the word. The absolute necessity of this is too obvious to require explanation to any operating man. It is true there was a time when some operators thought increasing operating costs must be met by decreased service. That this is a fallacy that will inevitably lead to disaster has been proven time and again. Decreased service spells decreased business in more than a direct ratio. It not only loses business but it loses, too, public confidence. It results in fattening the purses of our competitors at the expense of our own. Our business is such in its very nature that expense cannot be reduced as prices increase. Our whole structure is built upon an adequate, necessary public service, and relief from increased costs must come from increased fares, which principle is of course economically sound and morally right.

*Abstract of paper presented at annual meeting of Missouri Association of Public Utilities, Jefferson City, Mo., June 3.

There is a tendency for operation to fall into a rut. There is such a thing as obsolete methods establishing themselves by prescription. Examples of this can be seen in the tenacity with which certain routes are maintained and obsolete stop systems continued. Many of us have gone on the theory that because a certain route has become established by usage it must be continued indefinitely regardless of changed conditions. The old theory of a stop at every city block irrespective of the interval between stops is based upon custom and usage. On some lines stops are so spaced that when the time for acceleration and braking has been taken out the car runs at full speed for a few seconds only. Any one driving an automobile knows what this condition means to gears and engine, to say nothing of the loss in time. Therefore, our wares must in many cases be better displayed and better adapted to the needs of the public by revision in routes and stops. Especially are changes necessary in congested districts.

For example, in Kansas City we have for some months enjoyed the services of John A. Beeler, consulting engineer, of New York City. Mr. Beeler has acquired a most enviable reputation in the United States in straightening out traffic tangles. His work in Washington during the war, in Boston and in Philadelphia speaks for itself. Very recently Mr. Beeler has been retained by the Public Service Corporation of New Jersey and by the Chicago Surface Lines. Through a rearrangement of stops in the downtown district, by the use of the double berthing system and loading platforms, Mr. Beeler has been able to secure on many lines an increase in speed of more than 100 per cent. On one important street, in a block where formerly sixty cars an hour passed in one direction, we are now able to put through ninety-three. The effect of this is of course most significant. It means that those cars scheduled to hit the downtown district at the beginning of the rush hour are there on time when they will do the most good. Due to Mr. Beeler's rearrangement, we now find it possible to maintain our system speed at more than 9 m.p.h., and of course increased schedule speed and regular headways mean just as large an increase in service as the addition of more cars. In fact, it is more, because additional cars, if not at the right place when needed, serve no useful purpose.

I think therefore every one will admit that in merchandising transportation the first essential is to see that service is all modern operating methods can make it. Service, after all, starts in the carhouses. Clean, well maintained, well painted cars are our biggest advertisement. Very often an entire system is judged by the appearance of its cars on the street, and too much attention cannot be paid to this phase of operation. A policy of retrenchment that starts with the equipment will end in disaster if continued.

Let the People Know

Service being the first step in selling car rides, it very naturally follows that keeping the public informed of this service should be the next. There is no more practical reason for a street railway company "hiding its light under a bushel" than there is for a department store. The public is very appreciative of the printed word. The repeated suggestion that your city has the best street railway service in the country, if in any way at all backed up by facts, will very shortly meet a receptive mood in the public mind. Local pride in one's city will help bring about this mental condition. People can be educated to point proudly to their street railway service the same as to their public buildings and parks.

Advertising from the standpoint of selling transportation is a different problem than that presented by the good will and public policy advertising campaigns which have been carried on so extensively in the past five years by public service companies. A most excellent medium is the space provided by the car itself. Perhaps there is no more effective advertising than dash cards. A hanging frame on the inside from the car roof is also most desirable space. A notable example of this is furnished in Philadelphia, and each week sees a different message on Philadelphia's service in the frames. The New York Interborough uses the space on the two front windows of each car, and under the title of the "Subway Sun" communicates new data to the car riding public each week.

This direct advertising should enlarge on service changes, and copy for it should be worked out with the sole purpose of directing the attention of the rider to facilities offered by the street railway system and service given. One good feature which can be emphasized is the cost of operating an automobile. It has been demonstrated that no type of car, not even the smallest, can be operated for less than 10 cents a mile. In the larger cities to drive an automobile downtown to business and back costs from 75 cents to $1.50 a day. Another strong feature which can be utilized is the fact that the street railway system in any community is essential, that upon it the community's growth has been predicated and that system and service have both been outlined on the basis of handling all the people in the community all the time. This being the case, it is to the interest of every citizen to see that the local car line is supported, that jitney competition is not allowed and that a full measure of co-operation be given by the public. Under our present service-at-cost franchises (and in those states which have utility commissions practically all franchises resolve themselves into this type) the rate of fare depends very directly upon the amount of riding. There can be no hope for decreased fares unless the volume of riding increases and service is utilized to the fullest extent.

The moving picture theater offers a very productive field for the advertising man. Few people who ride the cars have any conception of the machinery back of their daily ride. They have but a limited knowledge of shops, power plant, carhouses, regular inspection force, track department and other branches of the organization that produces city transportation. These things can be filmed and will serve to educate the public in the rudimentary elements of its transportation.

Another essential point in selling transportation is proper education of the salesman himself. Trainmen are the company's representatives, and too often their training involves only operation of cars and not stimulation of business. I believe the greatest field ahead of street railway operators today lies in the training of transportation forces, and at the wages today being paid there is no good reason why we cannot secure the service of men's heads as well as their hands.

Such training involves courtesy, politeness, careful operation, and goes even deeper. We must first make

trainmen realize that in a sense they are salesmen, that they are responsible for much more than the ordinary operation of cars. We must bring them to a realization of the importance of their own position. We must awaken in them a higher sense of their responsibility. This means education, and, like most things worth having, will take time and unceasing patience to secure. It starts at the employment office, where greater endeavor must be made to secure a higher type of employee. It means more intensive schooling and instruction. Frequent meetings of employees and talks by officials of the company help. A company publication is another good method. In Kansas City, through published articles and talks to the men, we have endeavored to get them all interested in the company's financial statement, which shows the result of their own operation. These statements, in easily understood terms, are published in the employees' magazine every month. Every wage increase we have made in the past sixteen months has been based upon such financial statements. We have succeeded in a large measure in this policy, and I believe today employees of the Kansas City Railways are better informed as to the company's financial position and its policies than is general throughout the country in traction systems.

Just last week more than 3,100 employees signed petitions addressed to the City Council demanding that jitneys be driven off the streets. In several divisions there were not to exceed a dozen employees who refused to sign the petitions. The employees themselves requested that these men be discharged.

The active interest and co-operation of the employees of any company is a most vital factor in the sale of street car rides. Although there are many other reasons why Philadelphia has been able to succeed without fare increases, the biggest factor in the success of that company has been the co-operation of its 10,000 men. This co-operation has not been the result of a month's work or a year's work, but has been secured by constant hammering along the same lines for the past seven or eight years.

Other Means of Merchandising Transportation

For many companies a new element has been introduced from the merchandising standpoint in the necessity for ticket fares, brought about by fractional rates, which have been put into effect in many cities. It has meant in some cases the organization of a complete ticket distribution and handling system. St. Louis, according to the latest reports, has some 700 ticket agencies. There are about 450 in Kansas City. These agencies must be supplied, their interest in the work stimulated and the people induced to save money by the purchase of tickets.

There are two good merchandising reasons why ticket sales should be pushed: One arises from the fact that we have to meet daily the competition of the automobile. A purchaser of a book of tickets, having paid his fare for some days in advance, will be much less inclined to forsake the street car for its competitor. Another feature of the ticket business comes from the psychological fact that the same respect is not ordinarily paid tickets or tokens that is commanded by money itself. In other words, a stack of white chips never means as much, seemingly, as a stack of silver dollars. The tickets have been purchased and the money for them paid out. After they have passed into the pocket of the owner they become street car rides and their possession undoubtedly induces short haul business.

The rapid evolution of the safety car has brought about other possibilities from the merchandising standpoint. The principle upon which safety car operation depends is that of more frequent service. Its use allows reduced headways, and the less time prospective patrons are forced to waste at street corners the better chance we have of securing their business. Especially is this true where we have jitney competition to fight. Practically all companies who have adopted safety cars and who have followed this principle in their use report increased patronage. As one customer expressed himself some time ago in reference to safety car operation on the line on which he lives: "While the little fellows are not as comfortable in many ways as the double-truck cars, yet it seems to us that there is a car in sight on our line all the time." While not literally true, there was some merit to his statement, inasmuch as a double-truck five-minute headway had been replaced by a safety car every three minutes.

Some safety car operating figures taken from our experience in Kansas City may be of interest to street railway men elsewhere. In round numbers these figures show that on the more important lines service in car-miles has been increased from 26 to 31 per cent, headways have decreased from 30 to 37 per cent, and sixty-six safety cars have worked out an actual saving of $425 expenses per day. In other words, through the introduction of safety cars service has been very materially increased, headways reduced and the cars have saved in power and platform costs alone approximately $2,000 per year per car.

The above ideas are merely scattered attempts to present some of the more outstanding features of the subject to your attention. The details very naturally will be different on every property. The main fact, however, it seems to me, is very plain. Our business can be increased by direct selling methods. We have competition to meet, and we must meet it upon a new basis. The new order of things very naturally involves some radical changes, and in this connection what could have been more radical than the introduction of the safety car? All of us know the opposition brought to bear against the little unit five years ago, which was if anything stronger within the ranks of the industry than from the public. The car was finally taken up and adopted because it offered one of few possibilities of meeting the situation which arose with the beginning of the war. Some of us actually had to be clubbed into its adoption. We are daily seeing other innovations. The work Mr. Beeler is at present engaged in is in many respects a radical departure from old methods. It is not uncommon now to read of the appointment on many systems of traffic agents, whose duties are to stimulate and encourage travel. Without question the field covered by this subject offers many opportunities as yet hardly touched. The business has been going through a fight for its very existence, and it has existed against reverses which would have overthrown and swamped any other industry, merely because it was essential and had to "carry on." The growth and well being of every community in the United States are predicated more or less directly upon its means of urban transportation. The withdrawal of street railway service is a catastrophe which could not be contemplated in any city. For this reason therefore the industry has survived and

every indication points to a more optimistic future. As operators we have had to do things we never contemplated before and we have all had to go through a mental shakeup that has been good for us individually. Ideas which formerly were regarded as fantastic have had to be taken up in dead seriousness, on the principle of a drowning man grasping at the first straw that offered itself. Many of us were surprised to find these so-called "straws" were in reality good, substantial logs upon which to swim out of some of our troubles. The struggle has sharpened the wits of the entire industry, and without doubt we have learned and are learning to sell the product which our manufacturing plant produces.

Arc Welding of Rail Joints Without Planing the Plates

Recent Experiment in Welding Old Rails Shows That a Good Joint Can Be Obtained by This Method

BY HOWARD H. GEORGE
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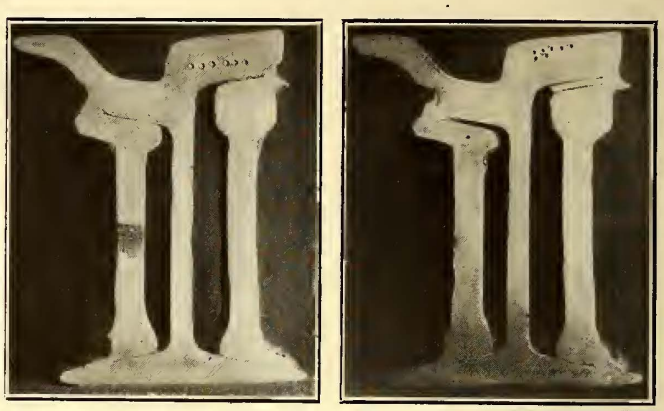
ON THE lines of the Public Service Railway considerable experience has been had with numerous types of welded rail joints. The important requirement is to provide continuity of rails and to maintain the continuity of the return circuit at as nearly 100 per cent efficiency as possible. This is desirable not only because of the damage to rails and rolling stock from loose joints but also because of the necessity for reducing damage by electrolysis to the minimum. A type of arc-welded joint employed by this company, using beveled or planed joint plates, was described in the ELECTRIC RAILWAY JOURNAL, issue of January 26, 1918, page 190. A diversion from this method is now being employed and a description of it may be of interest.

When welding is being done on new rail it is desirable to use beveled plates, specially designed to facilitate the accomplishment of the weld, but when welding is done on old rails it has generally been the practice in the past to remove the old plates and either to furnish new beveled plates or to send the old plates to the shop for the purpose of having the heads planed. This method necessitated either scrapping the old splice bars or keeping on hand duplicate sets of the old joints and resulted in adding considerably to the cost of the joints. In the case of one particular job the cost of planing 246 old plates amounted to $184.98, more than $1.50 per pair, and this is no small percentage of the total cost of such a joint.

Recent improvements have made possible some experimental arc welding of rail joints, in which the old plates were welded without planing the heads. The plates were first removed, cleaned of all dirt and scale and then rebolted and drawn up tight with two bolts. The weld was then applied as shown in the accompanying illustration, and the penetration which was obtained is clearly indicated. A number of joints on this property were welded last fall by this method without interfering in the slightest with the operation of cars. Up to the present time these joints have given satisfactory service in spite of the unusually severe winter and average traffic conditions.

The accomplishment of a satisfactory weld by this process has been made possible by the introduction of a small carbon and short arc, as well as by the use of a flux that will produce a weld which will not crack. It has been proved that it is absolutely essential to get metal into the weld which is ductile. It is evident that the volume occupied by molten steel is greater than the volume occupied by the same steel when it is cold, and the contraction which occurs in cooling must either result in stretching or cracking the metal. Practically all of the trouble experienced with arc-welded joints in the past has been due to the fact that the metal that



SECTIONS OF RAIL JOINTS CUT THROUGH SAMPLE WELD INDICATE PENETRATION OBTAINED WITHOUT PLANING THE PLATES

left the arc was so brittle that in cooling minute cracks developed, and these cracks extended and finally caused the failure of the joint. By using a small carbon and short arc together with a commercial flux which is sufficiently ductile to take up, by stretching rather than cracking, the contraction between the molten stage and the cold stage the number of joint failures has been reduced to a point where it is not more than 1 per cent, and compares favorably with that of any other rail-welding process.

Welding Hard-Center Insert Special Trackwork

ORDINARILY it is considered impracticable to repair broken-down manganese insert special trackwork by welding on account of the melting out of the spelter and the difficulty of repairing the bolts and seat for the insert. However, this type of work has been successfully reclaimed by P. S. Duenweg, engineer maintenance of way Houston (Tex.) Electric Company. This was accomplished by removing the insert and depositing metal to fill up the space occupied by the insert, using high-carbon-steel electrodes for the top layer of the deposit. One crossing was repaired in this manner at a cost of $49.34 for material and labor. It was estimated that it would cost a great deal more than this to replace the inserts. The wear on the crossing at the time of this writing gives evidence of long life.

The first spring conference of the engineering section of the National Safety Council was held in New York City on April 27. It was attended by about 100 men representing the national engineering societies, the universities, the inspection departments of insurance companies and the men in charge of accident prevention in the industries. Papers were read on the inculcation of safety principles in the minds of technical students, on safety standards and on related topics.

Final Report of Pennsylvania Association Meeting

President Pardee Reviews the Washington Hearing—General Discussion in the Meeting and Abstracts of Remaining Papers Are Given

AS MENTIONED in the issue of June 5, J. H. Pardee, president American Electric Railway Association, who spoke at the informal dinner at Harrisburg on May 27, took the opportunity to review the Washington hearings and stated what he thought would be the ultimate outcome of them. He said that what stood out at the hearings, whether the witnesses were railway men, municipal officials, state officials, labor representatives or radicals, might be listed as follows:

1. The electric railway in the social and economic sphere of the country is an absolute necessity. Other means of transportation which have been developed up to the present do not fill the place of the railway, and consequently it is an absolute necessity of the country in both urban and suburban districts.

2. The capitalization of the railways should be disregarded when determining what is best between the public and the corporation. Politicians make a great deal of the electric railway capitalization, that there was money taken in the past and that there was watered stock. But all indications at the present time show that capitalization has nothing to do with the question, but that value of the property is the real test. It was shown in the hearings that the necessity of financing sometimes makes the capitalization greater than and sometimes less than the real value, but in the last analysis value is the determining factor. In other words, the old bugaboo of capitalization is gone, largely as a result of these hearings. Those who would retain capitalization as an argument against the railways would place them in the position of a man who had been run over and injured and taken to the hospital, against whom the argument was then made that the surgeon should not treat him because this man's grandfather's uncle had stolen some money. And so in this hearing the best that even the radical opponents of the railroads could show was that in ages gone by some man had taken undue profit out of the transportation industry by present day standards, but there should be no more fear of the capitalization argument working to the detriment of the railways.

Government Authorities Cannot Escape Responsibility

3. Another point established is that income should be on a parity with expense. In other words, the railways cannot stand the deflation of income and the inflation of expense, and this was admitted even by the opponents of the railways in the Washington hearing.

Two schemes were suggested to make this possible: (a) Service-at-cost franchises, or (b) action by governmental authorities which would allow rates to be raised to meet the rise in expenses.

Since the electric railway is a public necessity it is subject to government control, and this is right. But the moment the government authorities assume control of public utilities that very moment they must assume responsibility. The commissions pretty generally understand this proposition, but the people of the country do not. Electric railway men and other public utility men should, therefore, talk about this question. A few regulatory or governmental bodies do not understand this, and the most notable instance of this is in the case of New York City, where political demagoguery is the controlling factor rather than responsible government actions.

4. The fourth point brought out was that all electric railways are subject to unjust burdens, such as paving, bridges, street cleaning, snow removal and similar indirect methods of taxing the public. There is no reason for this except that it produces money. Even the opponents of the electric railway admitted this fact and, further, that on analysis these indirect taxes were ridiculous.

5. The main difficulty of controlling the situation is the lack of confidence which the public holds in commission decisions. Mr. Pardee said he was pleased to say that one outstanding example of promptness in commission decisions was shown by the Public Service Commission of Pennsylvania. There are two reasons for the Pennsylvania good record, the first being that the law is so worded as to allow increase of rate without previous formal approval by the commission and the second the realization of the necessity by the commission of dealing with things in a businesslike way.

While these five points were brought out in the Washington hearings, nothing tangible has as yet appeared as a result of these hearings. It is understood that the commission staff is preparing a digest of the testimony and a report upon the same, and some sort of an announcement is expected within the next few weeks.

Confidence Is What Is Most Needed

The present situation is that some of the electric railways have died, others are just breathing, while still others are able to sit up and look around a little. In some places there is a real improvement, and much would be satisfactory if it were not for the present credit situation. But lenders have lost confidence in the treatment which the electric railways are going to get. In other words, the situation may appear to be all right today, but what, says the lender, will the public do to the electric railway five or six months from now? The fact that a property is put back on a satisfactory financial basis now is no proof that it will be left alone by the public to continue its satisfactory financial condition in the years to come. Mr. Pardee indicated his belief that the whole attitude of the people is changing fast, but the lenders are still afraid of what the people are going to do.

The people must give more thought to bolshevism, to strikes and to ill-advised labor leaders, and they are doing this, and in the next twelve months many dark clouds should clear away.

Finally, the electric railway industry should use pitiless publicity of its own doings and of the doings of the public, and never cease through all this to smile. The electric railway must exert its best efforts and try to solve this situation.

PUBLIC POLICY TALK

One of the interesting discussions of the meeting was by Capt. J. C. Gredler, formerly with the Harrisburg Railways, who stated that his connection with the railway industry had been so short that he appeared more as a layman or as a member of the much-discussed public than as a railway man. Mr. Gredler urged publicity of the most complete and intelligent kind as an assistance to the industry through the gaining of the confidence of the public. He mentioned the method of publicity used by the Holstein cattle people, the California Fruit Growers' Association and many banks of today who place the true nature of their businesses before the public and urge general programs or give general publicity, the particular result, he said, being an indirect consequence of general familiarity on the part of the public with their particular fields.

By calling attention to the recent indictment of Mr. Wood, president of the American Woolen Company, and the public attitude with reference to high prices of sugar and the sugar industry, Mr. Gredler emphasized his point that the railway industry, as other industries, should conduct its business in such a way that the public may be invited to give it confidence.

As to other means of publicity, the first circle for real effective publicity is within the organization itself. And further, while it has always been urged that the railway companies should tell the public the goal toward which it is striving, an additional reason for doing this is that a published platform is much easier to live up to than one which is unpublished. But even plain facts are not enough. What is wanted is the whole truth, and the whole truth is the sum of facts and imagination.

PULVERIZED COAL ELIMINATES ASH TROUBLE

In his discussion of Mr. Rau's paper,* T. A. Wright of the Wilkes-Barre Railway indicated that one of the valuable results of using pulverized fuel was that the ash was carried up the flue. In one test the entire residue of 120 tons of anthracite burned in the pulverized form consisted of three wheelbarrows of ash. As a result of this situation, fuel which contains 25 per cent of ash may be used with satisfaction as pulverized fuel when it could not be used at all burned in the usual way on grates. The silt, which is the form the ash takes when it goes up the flue, is so fine that it is impossible to locate it in the atmosphere, and it is not deposited to any noticeable degree in the surrounding territory. It is of the nature of the dust such as one sees in sunbeams, being broken into extremely fine particles by the final explosion of the combustion.

Most installations of pulverized fuel at the present time use bituminous coal, and what anthracite will do under similar conditions is so far undetermined. It is doubtful if installations of less than 1,000 kw. will prove to be economic. Mr. Wright mentioned that he was going to make a further silt test of pulverized anthracite by burning anthracite in the pulverized form for a period of one week. The test will be conducted at Lima, Ohio, and 1,000 tons of coal will be used.

In discussing Miss Roadifer's paper on "Mutual Safeguards," C. B. Fairchild, Jr., of the Philadelphia Rapid Transit Company stated that previous to 1910 6 to 8 per cent of the gross receipts of the company were paid out for claims, whereas the present claims account requires not more than 3 per cent of the gross receipts. Expressed another way, the total number of accidents has been decreased 50 per cent, while during the same period there has been an increase in traffic of 53 per cent.

Mr. Fairchild indicated that in the Philadelphia Rapid Transit Company the questions of accidents and claims receive the same careful study and analysis as all other parts of the business. A very complete cross-index card catalog system is followed, by which automatically causes of accidents, or at least facts regarding accidents, are indicated to show whether the accidents occur on a particular car, at a particular point, for some particular reason or on rolling stock driven by some particular motorman.

The papers by C. L. S. Tingley, H. B. Megargee and O. M. Rau were abstracted in the issue of May 29. Abstracts of the other papers follow.

*See abstract in issue of this paper for May 29, page 1094.

Safeguarding Against Intangible Accident Hazards*

BY LAURA M. ROADIFER,
Philadelphia Rapid Transit Company

CLOSE study into accidents and their causes leads us into a field filled with human interest, the safeguarding against the intangible or "inherent" hazards. On the accident-prevention problem the street railway industry has worked perhaps longer and more diligently than any other individual industry, for the reason that upon its operation the pulsebeats of a city's economic life depend. In street car construction unquestionably the first consideration is to comply with all the natural laws evolved by accidents and their material causes, but while modern machinery seems to meet every requirement of prevention that has been made possible for human inventiveness to create, the greater number of accidents occur from intangible causes.

A difficult step in the problem of reducing accidents is the inculcation of the preventive spirit among the employees. By arousing a spirit of emulation among them a natural desire for a clear accident record can be created and accentuated. Recognition of careful service ignites the spirit of emulation readily. One Philadelphia Rapid Transit motorman has operated a car for the past twenty years and holds a "no accident" record. His fellow workers know that this is not merely a stroke of luck, but indicates careful application to his duty at all times.

The development of overzealousness must be guarded against, however, for an industrial organization must have for its foundation "co-operation for continuous mutual benefit." It is very important that each individual understands where the mutuality of interest lies.

One of the most remarkable evidences of the result of industrial co-operative effort in Pennsylvania is furnished by a manufacturing concern which reduced accidents almost 80 per cent in four years. In 1916 this plant averaged the loss of one and one-eighth days per

*Abstract of paper read at meeting of Pennsylvania Street Railway Association, Harrisburg, May 27, 1920.

man per year, while in 1919 it was one-third day. This represented a monetary saving of $50,000 per year.

Educating the public to share in accident prevention is the hardest task of all. The American public has been made familiar with the staggering toll of accidents on our highways, but every year the numbers increase. Hence the reason for our extensive work among the juvenile public of Philadelphia. As a small boy observed to me, "You can pound anything into a fellow's head while it's soft." Encouraged by this cheerful truth, we have been pounding vigorously on the heads of Philadelphia's junior public for several years, with the following compensating results: During the past four years our records show thirty-two fewer children fatalities as compared with the previous four-year period, in spite of the tremendous increase in vehicular and pedestrian traffic. Last year only four children of school age were killed by our cars and not one of these had come under the direction of our safety work. More than 200,000 children pledged their support to our safety plans last year and 300 boys from the upper grades volunteered to patrol the dangerous school crossings to protect the small scholars from injury. The recognition that has been given these boys by permission to assemble monthly the "Junior Safety Council of Philadelphia" in the Chamber of Commerce, where reports and suggestions as to further work are made, has been such an incentive that there is now a long waiting list of applicants for patrol duty.

Hazards of the Electric Railway Field*

By Edward C. Spring
General Superintendent Lehigh Valley Transit Company, Allentown, Pa.

THE accident problem of the electric railways is a serious one, enhanced by the demand of the public for speed, and this over tracks poorly protected by inclosed right-of-way and with countless grade crossings not always guarded. The electric railways have been aware of the fact that there is but one expenditure in their accounts which brings no return—the settlement for accident claims. It would seem only logical that an expenditure of this type should demand the closest vigilance on the part of those interested.

Pennsylvania plays an important part in the electric railway operation of the country because it stands first in number of companies (119), second in electric car mileage (4,477), second in number of cars operated (9,280) and second in invested capital ($757,000,000). The State is, therefore, vitally interested in the matter of accident reduction.

Of the several classes of car accidents, those occurring during boarding and alighting amount to 15 per cent of the total. The prevention of accidents of this class is "up to" the conductor, who must be eternally vigilant.

Collisions between cars have been unusually numerous during the past winter on account of bad rail conditions. The general responsibility for this class of accident rests with the company, and the motorman is the one individually responsible. Such accidents need not occur, as practically all are due to carelessness and disregard of orders.

Of the many problems associated with hazards in the electric railway business, the most important relates to collisions with vehicular traffic, or to accidents on highways. A recent estimate shows that of the nearly 8,000,000 automobiles in the world, 6,500,000 were on July 30, 1919, in the United States. The present output of American automobile factories is 10,000 daily. The increasing importance of the automobile as an instrument of injury and death is being viewed with increasingly greater alarm by electric railway managers. Nearly 65 per cent of all such accidents are reported as due to the negligence of chauffeurs.

The grade crossing hazard is a perplexing problem, due to the fact that the public is careless in crossing railway tracks. An investigation made by the Southern Pacific Railway at two grade crossings, involving a study of the operation of 17,000 automobiles which passed over them, showed that 62 per cent of the drivers did not look up or down the tracks, 2 per cent looked in one direction and 17 per cent looked both ways. Of the total, 19 per cent of the automobiles ran wild. An analysis of 20,000 grade crossing accidents involving electric railway cars and automobiles shows that electric railways were wholly responsible for but 4 per cent.

The problem of the pedestrian in regard to accidents is complicated, and there must be regulation of the pedestrian traffic as well as the automobile traffic. An interesting study made by the Police Department in New York City exemplifies the gross neglect on the part of pedestrians. At Fourth Avenue and Twenty-third Street in that city, between 4:45 p.m. and 5:15 p.m. on a certain day, 924 persons crossed on the south side of Twenty-third Street going east and west after the traffic officer's whistle had given the right-of-way to north and south bound traffic. At Fifth Avenue and Thirty-third Street, between noon and 12:30 p.m., 610 persons crossed Fifth Avenue going east and west after a similar signal had been given.

As to accidents to passengers carried, we find that on the electric railways one person is killed for every 4,393,572 carried and one is killed for every 831,637 miles operated. The average percentage of cost of settling for injuries and damages of the electric railways of the country is 3.68 per cent of the total operating revenue.

By way of summarizing briefly the points which occur to me as being important in preventing accidents in the electric railway field, I submit the following: (1) Systematic education of our own employees; (2) systematic education of the public; (3) teaching safety in public and parochial schools by the adoption of Dr. Payne's system; (4) uniform traffic regulations and safety laws and their rigid enforcement; (5) proper training and licensing of all automobile drivers; (6) enactment of laws requiring the traveler on the highway to give due regard not only to his own safety but to that of those who entrust their lives to his care; (7) prosecution of violators of existing regulations; (8) continuous following up of all activities.

*Abstract of paper read at meeting of Pennsylvania Street Railway Association, Harrisburg, Pa., May 27, 1920.

Accidents and Casualties

THE following table, taken from the eighth annual report of the Connecticut Public Utilities Commission, gives in detail the accidents and casualties reported pursuant to law:

ACCIDENTS ON ELECTRIC RAILWAYS IN CONNECTICUT

	1919	1918	1917
Number of accidents	1,757	2,018	2,376
Killed	39	59	77
Injured	2,029	2,361	2,867
Without personal injuries	85	70	30

Modern Methods of Prolonging Track Life*

One of the Most Important Is a Lavish Use of Arc Welding Followed by Grinding—This Gives a Joint Life Equal to That of the Rail—Careful Attention Also Must Be Given to Bonding, Roadbed Construction and Tie Treatment

BY E. A. HOFFMAN,
Engineer of Way the Wilkes-Barre (Pa.) Railway

IN MODERN methods of prolonging track life there are two divisions which naturally present themselves; first, the prolongation of the life of present tracks, and, second, the methods to adopt in the construction of new track to lengthen its life. The first is the more urgent and is now and has been a very serious problem for many roads during the past three or four years.

Consideration will be given first to a section of double track laid with heavy rail and substantial plain or continuous joints on a substructure apparently in good condition and surrounded with a paving also in fair shape, but with the receiving rail slightly depressed, so that a slight "pound" has developed, which if allowed to continue will surely destroy the joint; the joint plates, however, are still tight.

A few years ago the method of treating this condition would have been to grind off the high rail for a distance of a foot or more from the joint, thus forming a gentle incline to the low rail. The modern treatment consists of applying steel with an arc welder to the head of the low rail, building it up slightly higher than the high rail for a foot or more from the joint and then grinding flush with the high rail at the joint and gradually sloping to the low rail. This avoids grinding away the rail head and, if the welding is skillfully done, requires much less grinding.

Sections of track on our property treated in this manner four or five years ago are still in excellent condition, and the remarkable fact is that the receiving rail has not again become depressed. Apparently, the rails have "found" a bearing on the continuous joint plates. These tracks are from twelve to fifteen years old and subjected to a ten-minute headway of heavy suburban cars running at comparatively high speed, yet this treatment, costing not more than $100 per mile, is practically the only maintenance which has been required during that time.

Again, consider a somewhat worse condition where the joint plates are loose, the rail ends down and the paving at each joint badly shaken but otherwise good for several years. The joints have been tightened from time to time, perhaps new bolts have been installed, but the joint is soon as bad as ever. In this case surface welding alone is of little use.

If the rails are not unevenly worn on the fishing surfaces the application of new joints, followed by surface welding and grinding, may be the most economical remedy. Otherwise, the joint plates may be removed and built up with an arc welder and ground to a good fit on both rails with a suitable grinder. After the plates are reapplied the surface of the rail should be built up with the arc welder and ground to a true surface. If possible, in addition to bolting, the edges of the plates should be welded to the rails. Joints thus treated will stay "put." If there is a large number of such joints the substitution of a Lorain or Thermit joint may be preferable, or joint plates especially adapted to arc welding may be used.

In an extreme case where the rail ends are badly battered or broken out for several inches and the joint plates are hopelessly worn but the ties and the pavement between and outside the rails are in fair condition and good for several years it is certainly most desirable that the life of the track be prolonged until such time as the paving is renewed.

In this case the most satisfactory plan is the application of one of the several types of joints especially adapted to arc welding, the low joints first being raised to as true a surface as possible by the use of metal or wood shims. After the joint plates are applied the battered or broken portions of the rail can be restored by the arc welder and the whole surface ground smooth. In this manner on our property, track which a few years ago would most certainly have been scrapped has been restored to a very fair operating condition with practically negligible maintenance during the past two years and is apparently good for three or four more years.

As another example, consider a section of open track which, having been in service for many years, is now difficult to maintain and noisy owing to the loose parts of the joints. The fishing surfaces of the plates and rails are worn so badly that the plates come in contact with the web of the rail, and the joints when tightened or even when newly bolted become loose again in a few weeks. Before the advent of the electric welder new joints would have been purchased and applied to remedy this condition. Now the joints are removed, built up and ground to a proper fit and replaced.

On a mile section of track where the joints had been restored in this manner nearly five years ago a recent inspection revealed not a single loose joint, although the only maintenance this track has received, aside from tie renewals, was that given to it by the trackwalker. In this instance the rail ends were built up where battered and surfaced with a flexible shaft grinder. The rails have been in service nearly twenty years and under present traffic, consisting of a ten-minute headway, are apparently good for twenty more years. Another method of treating open track is to weld the joints, expansion joints being provided at intervals of about 500 ft.

By Use of Welding and Grinding Loose Joints Are No Longer Serious Problem

In the past loose joints have been the bane of the maintenance man's life, but on roads which have consistently followed the above practices loose joints have ceased to be a serious problem. Defective joints have been the cause of the removal of many miles of track long before the remainder of the rail, ties or the paving

*Abstract of paper presented before the Pennsylvania Street Railway Association, Harrisburg, Pa., May 28, 1920.

were worn out. It has been accepted almost as an axiom among street railway engineers that the life of the joint was the life of the track. The life of the joint today can be made nearly or quite equal to the life of the rail.

In the restoration of special work the worn surfaces of cast or rolled steel pieces can be built up an indefinite number of times and their life greatly prolonged by skillful welding. The welding of broken or worn manganese steel, however, is very uncertain. After six years of experimenting our policy is to avoid heavy or repeated welding of manganese steel.

Some of our most successful special work repairs have been those on built-up railroad crossings of steam lines. When the knee braces and fillers become badly worn it is practically impossible to keep them in good operating condition. By the use of the welding machine the worn knees can be restored to their original dimensions and when bolted up they will remain tight for a considerable time. If the steel fillers become so worn that the gage of the steam track becomes tight they too may be removed, built up and ground to a good fit and the crossing brought to proper gage. It is a good plan when thus repairing a crossing to have the steam gage a trifle wide, as the tendency is for the parts to take up somewhat under service. The battered intersections, after reassembling, should be built up and ground to surface on both the steam and electric runs.

Another innovation which has been practiced with considerable success is to weld the knee braces along the top and bottom edges to the crossing arms, with a heavy fillet of metal at the intersection of the arms built up flush with the surface of the crossing. If this is done it is desirable to let the crossing remain unwelded under traffic for two or three weeks until the different parts have found a bearing. It will then be found that the bolts will take up considerably and when thoroughly tightened the crossing may be welded. The bolts and nuts, however, should not be welded, as there is a movement between the central and outer sections of the crossing around the steel fillers. These will of course wear slightly as a result of this motion and the crossing bolts must be drawn up occasionally to take up this wear. It is not desirable to attempt to eliminate this movement, for then the crossing would be too rigid.

By the methods just described crossings which a few years ago would have been relegated to the scrap heap have been restored at very moderate cost so as to give several additional years of good service. The extent to which this process may be economically applied must be determined by each company. It will depend upon the comparative cost of track labor and new material and in a great measure upon the skill of the welding operator.

Welding Will Increase the Life of Crossings 30 per Cent

As an indication of the extent to which the life of such crossings may be prolonged, the experience of our company may be interesting. We have 110 crossings of steam roads on our system and our normal renewals averaged about nine crossings per year. During the past four years our renewals have averaged two crossings per year and the general condition of this class of special work is better than it was four years ago. This indicates that the welding process has increased the life of crossings at least 30 per cent.

Due to the stress of war conditions, we have undoubtedly applied this process to an extent which would not be economical in normal times, but it is conservative to say that the life of rails and special work can be economically prolonged 25 per cent by the skillful use of welding and grinding machines.

The corrugation of rails under traffic is another serious evil with which the track departments of some railways have to deal. Experiments with rails having a curved surface to conform more nearly to the contour of the wheels indicate that this at least mitigates corrugation. A rigid foundation such as concrete ballast is said to aggravate the trouble. The property of which the writer has had charge during the past nine years comprises more than 100 miles of track and we have no rail corrugation on our system. The track is constructed of some twenty different sections of rail, ranging from very light tee and tram sections to the very heaviest tee and Trilby shapes. The cars are of various types and vary in weight from 12 to 27 tons. There is a headway of approximately one and one-half minutes on some tracks, increasing to fifteen minutes on the lightest routes. The motor and other equipment are substantially the same as on other roads and we have practically the same conditions as many roads throughout the country which have a large amount of corrugation. In one respect only do our conditions differ; we use anthracite cinder ballast exclusively both in open and paved track. This produces a resilient track, and while one example is of course not conclusive, yet it certainly seems to confirm the theory that a rigid track is one of the contributing causes of corrugation.

Careful Attention Should Be Paid to Bonding and Roadbed to Prevent Current Leakage

Rails in paved track often fail through corrosion of the web and base long before the remainder of the rail is worn out. Joint plates, braces, spikes and other fastenings are also badly affected. The writer recently had occasion to remove about ½ mile of track which had been embedded in a dirt and macadam roadway for more than twenty years. The track had never been used and was disconnected from the other tracks of the system. The rails, joints and spikes were in practically perfect condition. The theory has been advanced that rail corrosion is caused by leakage of the return current to the surrounding soil or ballast. The tremendously destructive effect of electric current leaving a metal conductor amounts to about 20 lb. of iron per year for each ampere of current, and when the large number of defective bonds ordinarily found on electric railways is considered the theory appears very plausible. With this in mind the proper bonding of track and the leakage resistance of roadbeds assume a new significance.

A recent report of the Bureau of Standards on this subject brings out the following interesting facts:

> Roadbeds with solid concrete ballast and vitrified brick or other non-porous pavements have a low resistance. Insulating layers of bituminous materials are not of practical value in reducing current leakages from such roadbeds. Roadbeds constructed with a foundation of clean crushed stone under a concrete base have a much higher resistance than roadbeds with a solid concrete ballast. The resistance of earth roadbeds in which the ties are embedded and therefore kept in moist condition is much lower than that of open construction roadbeds. Cinders, gravel and particularly crushed stone when used as ballast in open track produce very high resistance roadbeds. Zinc chloride and other chemical salts used as preservatives greatly increase leakage currents from tracks.

The following suggestions made in the same report, while applying directly to the prevention of electrolysis

of pipes and similar underground structures, are equally significant to the track engineer, for in leaving the tracks the current must be just as destructive as it is when it leaves the pipes.

Solid concrete ballast should be abandoned and clean crushed stone should be used as a foundation under ties. Where crushed stone or gravel is used it should be kept clean by proper covering or pavements. Salt which is often used to prevent frogs and switches from freezing will greatly reduce the resistance of roadbeds and should be avoided if possible. In open construction rails should be kept out of contact with the earth. The roadbed should be well drained to prevent fine material from washing into the ballast and to keep the ties as dry as possible. Vegetation should be kept down, as this tends to keep the roadbed moist and to fill the ballast with foreign materials.

Zinc chloride and similar chemical preservatives should be avoided where the escape of stray currents is objectionable. A treatment of creosote and gas oil improves the insulating properties of wood ties.

Another important part of the track structure upon which the life of the track and the surrounding pavement is just as dependent as it is upon the rail is the tie. Ten or fifteen years ago there was a plentiful supply of good tie timber available and the preservative treatment of ties was of doubtful economy. Today there is no question but that, with the grade of ties now available, it pays and pays well to treat ties.

Treating Ties Increases Life About 250 per Cent

Investigations show that a well treated tie on open track has a life of approximately twenty years, as against eight years for untreated ties. Preservation treatment also opens up a much broader field in the production of ties, in that red oak, beech, maple, gum, elm, sycamore and a dozen or more other species which, due to a life of only about four years, were always rejected as unsuitable for tie timber will, when treated, have a life of about twenty years in open track. If a treated tie will resist decay for twenty years in open track it should give a much longer service in paved streets, for the cause of decay when in open track is due to the fact that the sun and wind and rains eventually remove the preservative, while in paved track the tie, being protected from such actions, should retain its preservative almost indefinitely. While no data are available as to the life of ties in paved streets, a well creosoted tie should last at least thirty years.

It is probable that the rails of a modern, well constructed track in paved streets will under ordinary traffic, if well supported, last twenty-five years. The ballast ordinarily does not deteriorate seriously. If untreated wood ties are used they will begin to decay at the end of eight or ten years, and tie cutting and rail motion with resulting destruction of joints and pavement will follow. If the full life of the rail is to be obtained it soon becomes necessary to renew the ties. Modern heavy track and pavement cost approximately $10 per lineal foot. The use of creosoted ties instead of untreated ties would add about thirty cents, or 3 per cent, to this cost.

While commercial pressure treated ties are preferable, a very satisfactory treatment may be given by the open tank method, using a high boiling oil, such as carbolineum, for exposed ties. Owing to the expense of framing and replacing bridge ties they should, in addition to the open tank treatment, receive a brush or spray coat of carbolineum every four or five years.

Briefly, then, in the construction of new track, having in mind as long a life as is consistent with economy, we should first select the rail, and in so doing the standards and specifications of the A. E. R. A. are the best guide. The rail and special work should be of ample weight to carry the traffic and it is desirable to be liberal in this respect.

When the weight of rails is selected one point very often overlooked is the amount of return current that the rail has to carry. If the current density of the rail is too high it aggravates leakage into the surrounding soils and consequent electrolysis troubles. While negative feeders may be used to relieve this condition it should be borne in mind that steel forms as cheap a conductor as copper, besides furnishing, through the increased weight of rail, a more substantial track structure and lower maintenance charges.

Welded rail joints have now been perfected to such a degree that the number of failures per annum on the best types of joints is less than 1 per cent. On open track a substantial plain joint with heat treated or high strength bolts will require but little care if the rail is of sufficient weight. Treated ties should be used both on open and enclosed track where wooden ties are used. Enclosed track should have frequent tie rods or rail braces to insure proper gage.

A liberal amount of ballast should be used to provide drainage and distribute the load over the sub-grade. Tile drains should be laid where the subsoil is wet or of impervious material; frequent drains should be provided to carry off surface water and every effort made to make the pavement surface as nearly waterproof as possible. This requires attention to details, so that only the finer portions of the aggregate of the concrete foundation are allowed to come in contact with the rail, preferably with a surplus of mortar, care being taken that the pavement grouting is liquid enough to penetrate any voids and that the paving against the web and under the head of the rail is carefully placed.

Handy Shop Torch

THE Indiana Railways & Light Company, Kokomo, Ind., has experienced considerable annoyance when cars are brought in for inspection by finding the brake rigging frozen full of snow and ice. A kerosene torch was formerly used for melting the ice, but it has proved preferable to use a gas burner which has been devised by M. S. Ferguson, master mechanic.

The burner is made of standard box-type fittings and is very simple in construction. A 2-in. pipe plug is drilled and tapped for a ⅜-in. pipe that serves for a handle. From this, 25 ft. of ⅜-in. hose leads to a gas main in the inspection pit. The ⅜-in. pipe handle is reduced to a 7/16-in. opening by inserting into the handle a brass tube extending 1¾ in. beyond the 2-in. plug. Over the 2-in. plug is a 2-in. pipe coupling, with four 15/16 in. holes drilled 1½ in. from the rear end of the burner. These holes are for a free air intake.

Into the coupling is screwed a 2-in. x 2½-in. standard nipple and another 2-in. coupling that has been heated and drawn down to a 1⅝-in. opening to form a nozzle. The gas consumed at 75 cents per thousand feet has proved far cheaper than the kerosene needed to furnish the same amount of heat to the kerosene torch. There is also a large saving in the cost of labor, as the gas torch is always ready for instant use. In addition to being used for melting ice from brake rigging, this torch has proved very satisfactory in thawing out frozen air pipes.

High Spots in A. R. A. Exhibits

Shop Equipment and Tools Were Centers of Particular Interest at the Atlantic City Convention and Welding Exhibits Were More Extensive Than in Earlier Years

IN LAST week's issue of this paper a preliminary account was given of the exhibit features of the convention of the mechanical section of the American Railroad Association held at Atlantic City. Much of the equipment shown was of particular interest to electric railway men, and while space limitations will not permit of extended discussion, a general summary is given to show the advances made.

Industrial trucks and tractors attracted particular attention from railway shop men. A new type with a raising and lowering platform was exhibited by one manufacturer. A storage battery is used to furnish the power for propelling the truck and raising the load. The propelling motor operates at 24 volts and takes 50 amp. when hauling a 2-ton load. The hoisting motor is also a 24-volt motor and takes 20 amp. when operating light and 40 amp. when lifting a load of 2 tons. The storage battery and all equipment and control are installed over the front pair of wheels. The platform for receiving the load is 26 in. wide by 54 in. long. In the "down" position it is 12 in. above the floor and elevates to a height of 64 in. above the floor. The dimensions of the truck are such that it can operate satisfactorily in a 5-ft. aisle, and the turning radius is made very short to accommodate cramped conditions. This type of truck is particularly adaptable to use in shops of electric railways. The platform of the truck can be run underneath the car body, and compressors, switch groups, resistors or other heavy pieces of car equipment can be readily removed and lowered to clear the car body. The apparatus can then be quickly transported to the overhauling bench or placed in racks at any height up to 64 in. without additional handling. For reinstalling the equipment the truck platform can be run underneath the car body and the apparatus raised into position and secured without removal from the truck.

Welding sets and equipment were very much in evidence and the samples and descriptions of the various classes of work accomplished showed an increasing field of usefulness for them. Thirty manufacturers had exhibits of welding equipment.

One manufacturer devoted a large part of his space to arc-welding apparatus. An automatic arc welder was installed in an inclosed booth with colored windows for observation and was kept going almost constantly in demonstrating the various classes of work to which it is particularly adapted. Two sizes of compact portable outfits were also shown. Both single and two operator constant-energy arc-welding sets were mounted on wheels for movement to different locations.

Welding torch exhibitors had sections and details of their equipment to illustrate its construction and advantages. Some special features were: The use of long mixing bores, which assist in maintaining a perfect mixture of the gases and prevent flashback; an interchangeable swivel head for use of the same torch at different angles, and a balancing of the material so as to make handling easier. To prevent flashback one manufacturer has a torch with a chamber surrounding the gas mixer. The chamber is automatically filled with mixed gas through a small hole leading from the bore of the mixer. If the gas in the tip and in the flashback chamber is ignited the carbon dioxide from combustion is driven ahead of the fresh gas coming through the gas inlets and the flame is blown out. The mixed gas flowing through the gas mixer refills the flashback chamber automatically and thereby prevents sustained flashbacks. The gas at the tips is instantly relighted from contact with the hot material without change in the flame.

An exhibit of special interest to shop men in connection with the safety first movement was one of a large variety of guards to cover moving machine parts, also tool room partitions, railings, racks and window guards made of "steelcrete mesh." This material is of a form commonly known as expanded metal and heretofore has been used chiefly in building construction. In appearance it resembles woven wire screen with diamond-shaped mesh, but its construction is such that one entire sheet is an integral piece with no mechanical joints. Various sizes of mesh can be supplied as desired. Some special advantages claimed for this material are: It can be easily cut, bent and attached to supporting frames; it is stiffer and stronger than an equal weight of sheet steel; it is free from rough edges or projection, and it provides accessibility, ventilation and visibility of parts guarded and withstands effects of fire, heat, etc., and allows fire extinguishers to be used on parts guarded.

A reversible driving chuck for driving straight shank reamers and taps was a feature of one exhibit. The chuck has two symmetrically placed jaws with an oval aperture so that the size of the opening can be readily altered by changing the jaws. It is claimed that this chuck will always run central and that it will not lock no matter how hard the pull.

A new type of ball-bearing screw jack was also shown, with the operating mechanism in the base instead of the head of the jack. Advantages claimed for this design are that a greater portion of the weight is concentrated at the bottom so that danger of the jack being top-heavy is eliminated and the point at which the operating lever is pivoted does not rise with the load. Two sizes, respectively of 50 and 75 tons capacity, are furnished. The 75-ton jack has wheels permanently attached to the base and the 50-ton jack has a removable buggy by means of which it can be wheeled about.

Truck Exhibits Were Comprehensive

While the complete trucks shown were intended for steam road service, still many interesting details of truck side-frames, bolsters, journal boxes, brakeshoes, brake rigging and slack adjusters were adaptable to electric railway service.

A rack exhibit with a complete set of foundation brake rigging and both pneumatic-cylinder slack adjuster and truck-lever bottom-rod slack adjuster was of particular interest to electric railway men. The pneumatic type of adjuster was applied to the brake cylinder and adjusted the piston travel while the brakes were applied.

An exhibition of brakeshoes with cast-steel backs embodying several new features that could be used with electric railway equipments to advantage also attracted attention. The backs are reinforced lengthwise by ribs dovetailed to engage the cast wearing portion of the shoe. This eliminates the bolt holes that are ordinarily punched through backs of the pressed-steel type and provides a means for reinforcing the backs. A new type of end-hung brakeshoe was shown in which a lug is cast integral with the back so that it will fit into a hole in the brakehead where ordinarily a bolt is required to fasten the lower end of the brakeshoe to the head. When this shoe is in place a clip is bent over so as to engage the top of the brakehead.

A new form of journal brass lubricator exhibited makes use of wicks attached to the sides of the journal brasses. These are soaked in regular journal oil and are attached to the outside lower edges of the brasses. These wicks are held in place by brackets screwed to the ends of the brass on its sides. The wick is threaded from the rear or high end of the brass through a hole in one of the rear brackets, then through a hole in the front bracket on the same side. It then goes through the bracket on the opposite side in the same manner. When the brass with its wick is installed it is first dipped in oil and then pushed into the journal box over the journal, the looped-back end of the wick being allowed to pass under the journal so that it will lie in the bottom of the journal box. The wick then feeds oil to the edges of the brass as long as there is any oil in the journal box.

Other A. R. A. Convention Items

In addition to the numerous exhibits covered in the general account given above there were a number of items of special interest to electric railway men. A few of these are treated in the following short articles.

Convenient Booklet Describing Exhibit

At the A. R. A. convention the Gold Car Heating & Lighting Company passed out a little booklet entitled "What I Saw at the Gold Exhibit." This gave a list of the various products shown, with a short description of the interesting features. The equipment shown included several types of panel, cross-seat, truss-plank, cab and vestibule heaters, heater switches and thermostatic regulating equipment. A special feature was made of the truss-plank heaters and method of installation used for equipment supplied to the New York Central Railway for a recent order of fifteen cars. These heaters are equipped with Fahnestock connectors, which greatly facilitate installation and repair. The New York Central equipments consist of thirty-four truss-plank and two vestibule heaters per car. All types have interchangeable heating elements. A demonstration equipment arranged with thermostatic control was in operation.

Storage Battery Car for Demonstration

The Railway Storage Battery Car Company had an electric storage battery car in operation between Atlantic City and Ocean City during the convention. The car is 52 ft. 2 in. long, arranged with one baggage and two passenger compartments. Thirty-four persons could be seated in the main passenger compartment and sixteen in the smoking compartment. The car weighs 30 tons without load and is equipped with four 25-hp. 220-volt motors and has a maximum free running speed on tangent level track of 45 m.p.h.

Power is furnished by 240 Edison type A-12 alkaline storage cells, capable of propelling the car 125 miles from one charge. The average energy consumption per car mile is stated to be 2¼ kw.-hr., measured on the basis of input at the charging station. Ampere-hour meters are provided to insure proper charging.

The car has two Brill 69-E trucks with axles run in Gurney ball bearings. Couplers, axles, wheels and other interchangeable parts are built to M.C.B. standards.

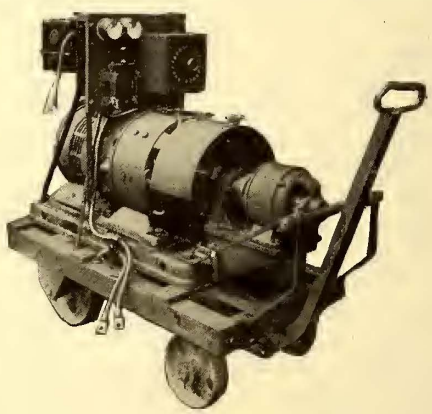
The heating equipment is Peter Smith forced draft, similar to the equipments usual in electric railway service. The car is arranged for double-end operation, duplicate control equipment being installed in both vestibules. This type of car also can be arranged for train operation by use of the multiple-unit system. General Electric straight and automatic air brakes are used.

Single-Operator Electric Welding Outfit

The Westinghouse Electric & Manufacturing Company, as a part of its electric arc-welding exhibit, had its new type of single-operator electric arc welding equipment, for which exceptional efficiency is claimed because the generator operates at arc voltage and no resistance is used in series with the arc. The generator is designed to stabilize the arc and thus automatic devices, such as relays, solenoid control, resistors, etc., are rendered unnecessary.

The generator of the set has a capacity of 175 amp. and is provided with commutating poles and an exceptionally long commutator which enables it to carry the momentary overload at the instant of striking the arc without special overload protection.

The design of the control is such that very close adjustment of current can be quickly made, and when



SINGLE-OPERATOR ELECTRIC WELDING OUTFIT

once set the current at the weld will remain fixed within reasonably close limits until changed by the operator. There are twenty-one steps provided, from 50 to 225 amp. This gives a current regulation of less than 9 amp. per step, which makes it easy for the welders to do vertical or overhead work when necessary.

Although the generator is strictly a short-arc machine, the arc produced is very tenacious and causes the deposited metal to penetrate deeply into the work.

The generator is mounted on a common shaft and bedplate with the motor. A pedestal bearing is supplied on the commutator end which carries a bracket for supporting the exciter, which is coupled to the common shaft. Motors can be supplied for either di-

rect or alternating current circuits. Where an alternating-current motor is used leads are brought outside the motor frame for connecting to either 220 or 440-volt circuits, a desirable feature on portable outfits.

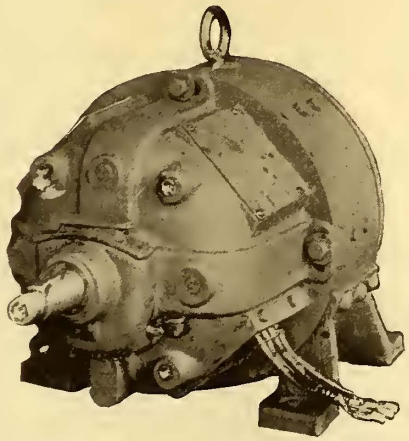
Where the equipment is required for portable service the motor-generator set, with the control panel, is mounted on a steel truck equipped with roller bearing wheels. This equipment can be easily hauled about the shop or yards by one man. Suitable plugs and receptacles for three-phase, three-wire or two-phase, four-wire alternating current motors allow the set to be quickly and conveniently connected to supply circuits at any desirable points. Only one plug is required for the motor, but the number of receptacles required depends upon the number of points at which it is desired to do welding work. These plugs and receptacles are supplied on special order.

The control for the single-operator equipment consists of a small ebony asbestos panel, mounted upon angle iron framework. The field rheostats for regulating the welding current, voltmeter, ammeter and a two-pole knife switch are mounted upon this panel.

In using the multiple-operator equipment each operator is provided with a separate control or outlet panel, so that each may take current from the same generator without interference. For convenience, multiple-operator equipments are divided into classes 1 and 2, depending upon the type of control supplied. Class 1 equipment has the main control panel arranged for the control of the generator and one welding circuit. The class 2 equipment has the main panel similar to class 1 except that it controls the generator only and separate outlets are used for all operators. A metal or graphic electrode holder is supplied with each welding panel, according to the work for which the panel is designed. The holders are of light weight, well balanced, and are designed so that they may be used continuously without overheating. Hoods or shields provided with colored lenses are supplied for the protection of the operator.

Direct-Current Series-Wound Motor for Crane and Hoist Service

For severe, intermittent, varying-speed service, as in crane operation, where heavy starting torque is required, the Westinghouse Electric & Manufacturing



D.C. SERIES MOTORS FOR CRANE SERVICE

Company has developed its type "HK" direct-current series-wound motors.

These motors are of inclosed construction with small openings in the lower part for ventilation. Covered openings in the top half of the frame give access to the brushes and the commutators. The most prominent feature is the compact construction, resulting in small over all dimensions and light weight.

The motors are of 3-hp. rating and equipped with commutating poles, so that high momentary loads can be carried without serious sparking at the brushes. Oil lubrication is used. The brushholders are clamped to insulated rods mounted on the front brackets, which are doweled in place. The position of the brushes is thereby fixed for both directions of rotation.

A blower is placed in the rotor, which effectively ventilates both armature and field windings and allows a small diameter armature to be used. In order to utilize to advantage the ventilating feature these motors have been rated on the quarter hour basis. On this basis these motors are said to have a larger continuous rating than non-ventilated motors of the same half hour rating.

Electrically operated shoe-type brakes are supplied when ordered. They are bolted to machined lugs on the motor bracket, making a compact unit. The brake is simple and rugged and provision is made for adjusting the wearing of parts.

Method for Packing Journal Boxes*

A Description of Methods Recommended for Cleaning and Packing Journal Boxes and Renovating and Applying Waste Packing

THE following practice was recommended for adoption as standard by the A. R. A. committee on standard method of packing journal boxes.

Preparation of New Packing: The waste must be loosened, placed in a saturating vat and kept completely submerged in car oil, at a temperature of not less than 70 deg. F., for a period of at least forty-eight hours to insure thorough saturation. It shall then be drained for the purpose of removing the excess oil until the packing is in a resilient or elastic condition.

Prepared packing in storage should be turned over at least once each twenty-four hours, or the oil which accumulated in the bottom of the container shall be drawn off and poured over the top of the prepared packing.

Preparation of Renovated Packing: All packing, when removed from journal boxes for the purpose of periodical repacking or renovating, should be pulled into a container, avoiding contact with the ground or any other place where it may pick up dirt, and taken to the waste-reclaiming plant. This packing must not be reused until renovated.

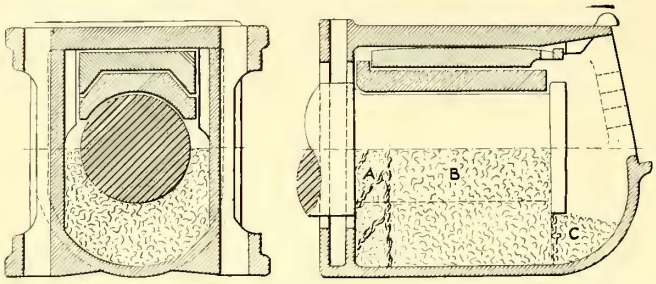
In reclaiming packing it should be first picked over carefully and dirt, metal, etc., shaken out, the knotted strands of waste pulled apart, and then placed in hot oil in renovating tank for a short time, working it with a fork for the purpose of thoroughly washing and loosening it. It should then be rinsed in clean oil, then drained for the purpose of removing the excess oil.

Cleaning Boxes: Before packing a journal box the oil well shall be thoroughly cleaned of all dirt, sand, scale and grit, and if water is present it must be removed. When new journal boxes are applied or when reapplying journal boxes the interior of the box, includ-

*Abstract of report of committee on standard method of packing journal boxes presented at Atlantic City convention of American Railroad Association, mechanical section.

ing the dust-guard well, shall be so treated, and close-fitting dust guards and lids should be applied.

Cleaning and Applying Bearings: Before applying journal bearings they shall be thoroughly clean, have a smooth bearing surface, free from irregularities, and shall have a proper bearing. Under no circumstances is it permissible to use sandpaper, emery paper or emery cloth for the purpose of removing irregularities from the bearing surface. A half-round file or scraper

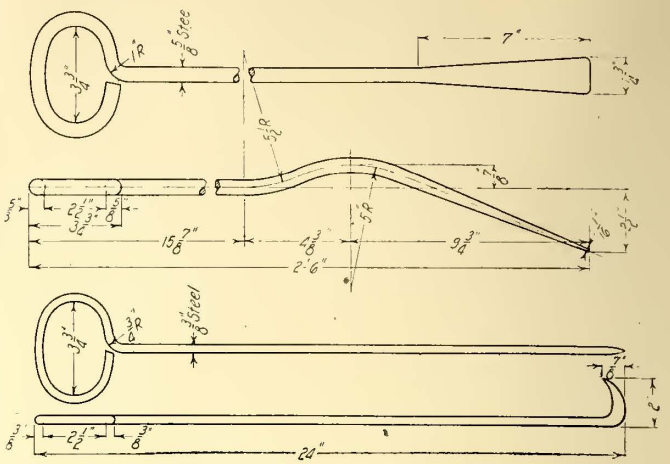


RECOMMENDED METHOD OF PACKING JOURNAL BOXES

should be used. Care must be taken that the wedge has a good contact on the crown of journal bearing. The surface of the journal should be smooth and thoroughly clean before bearing is applied. When applying a journal bearing a coat of lubricating oil must be applied to the bearing surface of same. Never wipe the bearing surface of the journal bearing with waste.

Application of Packing: (a) Inner—In packing a journal box twist somewhat tightly a rope of packing and place it in the extreme back part of the box, as shown at *A* in the accompanying drawing. Make sure that it is well up against the journal so as properly to lubricate the fillet on the journal and keep out the dust.

(b) Main—Apply sufficient packing (preferably in one piece) to fill the space shown at *B*. Take care to have this packing bear evenly along full length of the lower half of the journal. The packing should not be too tight, but should be tight enough to overcome any tendency to settle away from the journal. The packing should extend to approximately the center line of the journal, but not above at any point, and should be pressed down evenly at sides so that no loose ends may work up under the journal bearings.

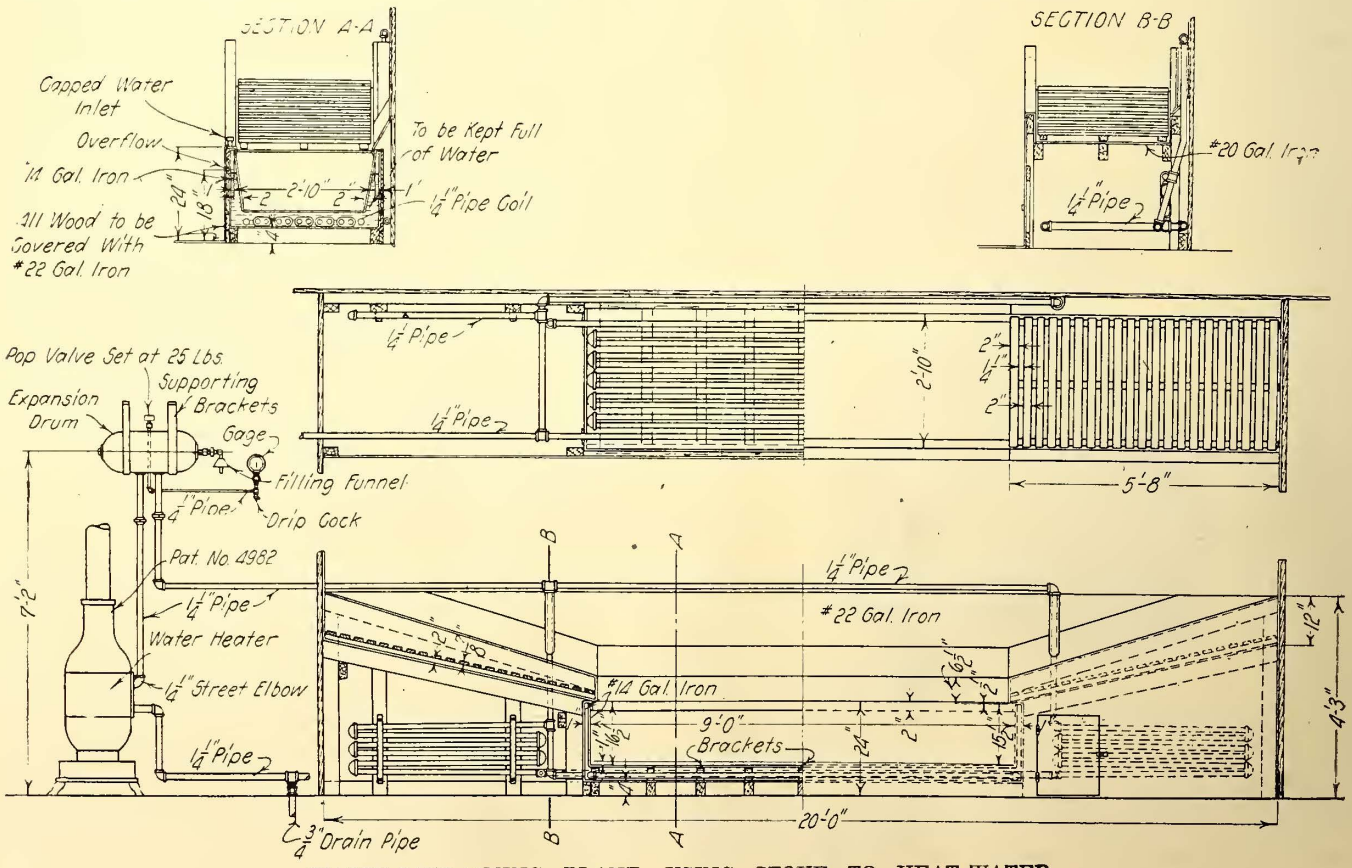


JOURNAL BOX PACKING TOOLS

(c) Outer—Apply a third piece of firmly twisted packing, as shown at C, and pack tightly in order to prevent displacement of the main packing. There should be no loose ends hanging out of the box, as they would tend to draw out the oil.

General Remarks: In addition to the above recommended practice the committee desires to emphasize the importance of causing the observance of several other factors as follows, with the view of reducing hot boxes to the minimum:

It is very essential that journals, after being turned,



WASTE-RECLAIMING PLANT, USING STOVE TO HEAT WATER

should be cylindrical, free from taper, tool marks, ridges, corrugations and other defects. In other words, a turned journal should reflect first-class workmanship, which is only possible of attainment through the use of machine tools, in good condition, of a design suitable for the nature of the work and capable of producing same with precision. The committee feels that an attitude of indifference prevails in many quarters with respect to the necessity of providing suitable heavy-duty lathes for the machining of axles, especially the larger sizes, and, as a result, many obsolete and worn-out axle lathes that have outlived their usefulness are being continued in service, whereas a close examination would disclose defects in the machining of the axles that would prove such lathes incapable of meeting the requirements.

It is suggested that the attention of all concerned be directed to the necessity of fully protecting journals against rust and corrosion during storage and that due care should be exercised in the handling and shipment of mounted wheels to guard against the damage which journals are subjected to through coming in contact with flanges of wheels as a result of improper loading or careless handling around shop yards.

It is also highly desirable that rigid instructions be issued to effect a more careful practice in the handling of journal bearings, especially for shipment, to prevent the indiscriminate tossing of journal bearings against each other, thus nicking and needlessly damaging the smooth bearing surface of the babbitt metal lining.

Drawings showing a representative waste-rec'aiming plant and a representative set of journal box packing tools are shown herewith.

New Carhouse in Akron

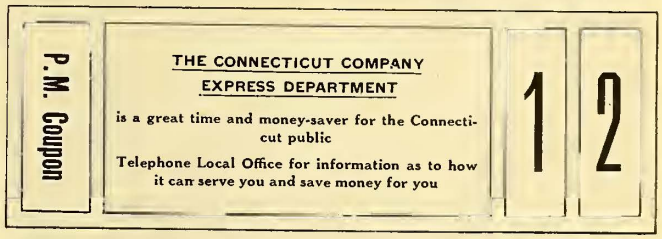
A SAVING of about 400 car-miles a day is expected to result when the new carhouse in East Akron planned for immediate construction by the Northern Ohio Traction & Light Company is completed. At present all the cars in Akron are stored at the Kenmore carhouse, to the south of Akron and just beyond the city limits. One of the heavy rush-hour lines is that serving the Goodyear Tire & Rubber Company, which is located in the east section of the city, necessitating a dead mileage haul of about 5 miles for the extras and trippers across the city to take care of the peaks occurring with changes in shifts at the rubber plant. The new carhouse will be located very near the rubber plant, thus eliminating this dead mileage to a large extent and further eliminating the source of tie-up and delay which now results from the fact that these extra cars must traverse the central business district on their way out to the rubber plant.

There are now 137 base runs operating out of the Kenmore carhouse. It is planned to put sixty-five of these in the new carhouse, which will be built for an initial capacity of seventy-five cars and planned for an ultimate of 185 cars. A five-track two-story brick building will be provided, with facilities for light repairs on the main floor and trainmen's quarters on the second floor.

With the East Akron carhouse completed it is planned to remodel two bays of the Kenmore carhouse into an addition to the Kenmore shops, adjacent. A floor will be put in to make the building two stories, providing an addition to the wood shop below and an armature shop above.

Advertising the Express Department

THE Connecticut Company, New Haven, does an extensive express business in its territory, as was covered in an article in the issue of this paper for Nov. 3, 1917, page 802. The express service is advertised in numerous ways, some of the most recent being illustrated in accompanying cuts. One shows the legend carried by the company's express trailer cars, and in another can be seen the straight-line map which is now being placed on all of the express cars. V. S. Curtis, general traffic agent, states that other signs probably will be used, including one showing the points of origin and destination of the car and another carrying the legend: "The capacity of this car is 40,000 lb. It saves five motor trucks and ten men."



TRANSFER BACK USED FOR POPULARIZING EXPRESS SERVICE

Transfer backs are also being utilized, as shown by the one reproduced.

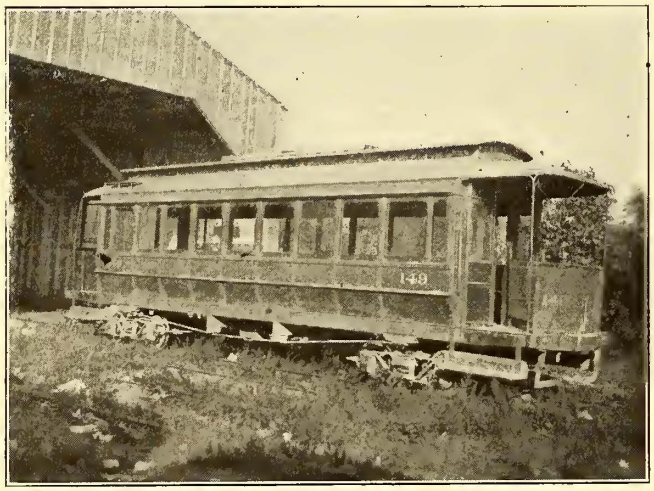
AT LEFT, ADVERTISING LETTERING ON REAR OF EXPRESS TRAIL CARS. AT RIGHT, STRAIGHT-LINE MAP SHOWING SCOPE OF CONNECTICUT COMPANY'S EXPRESS SERVICE

Converting Old Summer Trailers Into Closed Cars

Imperative Need for Additional Equipment Met at a Small Cost by a Few Changes in Open Car Bodies

THE extensive war activities around Hampton Roads and Newport News, Va., forced the Newport News & Hampton Railway, Gas & Electric Company to press into service a number of old open cross-seat trailer cars which had been practically discarded. These cars served satisfactorily in their original condition to handle the shipyard workers until the winter months came on. Unable to secure additional cars quickly, and feeling the uncertainty as to how long the war business might continue, the company endeavored to make these old cars suitable for winter travel. The object was accomplished by a simple reconstruction of the body, which involved only a small expenditure per car.

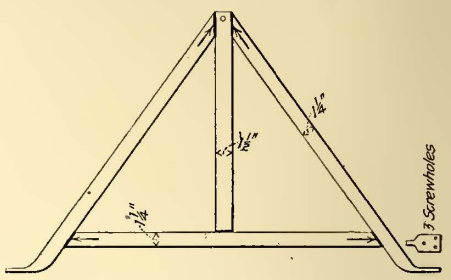
The first step was to remove the running board and place 30-in. wide plates of No. 20 steel over the side posts. This side plate was made in one piece, extending from corner post to corner post, and bolted



CROSS-SEAT SUMMER CAR REMODELED TO MAKE CLOSED WINTER CAR

to each side post. A window sill was then installed along the top edge of the plate and, by notching it to fit around the posts, it was made continuous for the full length of the body. Removable wood window sash for 26-in. x 27-in. glass were fastened in place in the storm curtain grooves (the curtains having been removed) by wood battens screwed to the posts. Then to relieve the plainness and improve the appearance of the side construction, a false water table was bolted near the center of the steel side plate.

As the next step the middle window was cut out of each bulk-head to make a door 24-in. wide in which roll doors were hung. These doors were taken from old cars which had been removed from service. The long cross seats were then sawed in two places through the center, taking out a piece long enough to give a 20-in. aisle when the seats were in their new position. The outer ends of the seats were then squared off and pushed over against the steel side plates and notched to straddle the side posts. New aisle legs for the seats were cast in a local foundry, these being of the walkover type. The old seat backs were used by cutting them down. The old seat-back fixtures were also used with the aid of seat brackets which were made in the local shops. These were made from four pieces of ¼-in. x 1¼-in. and 1½-in. strap iron placed edgewise to each other and welded together electrically at the five points of contact to form a triangular support. These brackets were fastened to the seats with six screws and the seat-back fixtures carried at the apexes. This construction is shown in an accompanying sketch. The company has reconstructed nine cars in this manner, some of which were formerly fourteen-bench cars seating seventy passengers, and the others, twelve-bench cars seating sixty passengers. The seating capacity with the new arrangement in the closed car is forty-eight and forty, respectively. The cost of converting the fourteen-bench cars was $650 each and of the twelve-bench cars $550.



SEAT BRACKET USED ON CONVERTED CARS, ARROWS INDICATE FIVE WELDED JOINTS

One-Man Operation of Double-Truck Cars

THE Houston (Tex.) Electric Company is having unusual success in operating some of its double-truck cars with one man. Fourteen cars with 28-ft. bodies between bulkheads, equipped with maximum traction trucks and weighing 31,000 lb., have been equipped with safety devices and the rear platform closed up and seats installed, bringing the seating capacity from forty-three up to fifty-three passengers. The bodies being of the open bulkhead type, no other changes were made. Of these cars six form the regular equipment on one line, and the others are used as extras during rush hours. In the latter case these one-man cars seating fifty-three people are mixed in with the same type of cars operating with two men and seating forty-three people, and even when handling loads of seventy-five to ninety people on a heavy line with close headway it was stated they maintain the same schedule speed as the two-man cars, and this speed has not been reduced over what it was for all two-man operation. At the time of this writing it was understood that as soon as four more of these cars could be similarly equipped another line would be completely equipped for one-man operation with the double-truck cars. The Houston company also operates a number of standard Birney safety cars.

Indianapolis Converts Summer Cars to Pay-as-You-Enter Type

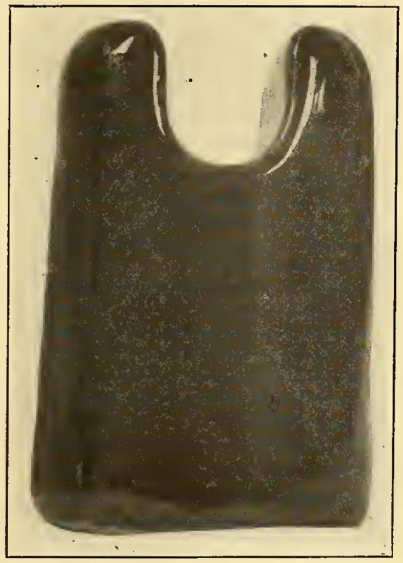
SEVERAL months ago the Indianapolis Street Railway sent ten of its summer cars to Dayton, Ohio, to be converted into the pay-as-you-enter type. Five of these have now been returned for service. In remodeling the cars special attention has been given to providing as large a platform space as possible, to prevent crowding and to reduce the time required for boarding and alighting. New routing signs of a transparent type have also been added.

New Porcelain Feeder Insulator

Porcelain Insulator Is Now Being Tried in Brooklyn for Supporting 500,000 Circ.mil Direct-Current Feeders

By G. H. McKelway
Engineer of Distribution Brooklyn (N. Y.) Rapid Transit Company

THE accompanying illustration shows a porcelain feeder insulator which is being used on the lines of the Brooklyn Rapid Transit system. Insulators of this type support the 550-volt direct-current feeders of 500,000-circ.mil. section and, so far as the writer knows, are the first porcelain insulators to be designed for such service. They are made of wet-process porcelain and are of approximately the same dimensions as the ordinary composition tree-top insulators used for similar work. They are 5¼ in. high, with a diameter at the base of 3¾ in. and at the top of 3⅜ in. At the bottom a single petticoat extends down ¾ in., while the pinhole has a drawn-steep thimble of the Hubbard type cemented into it and is large enough to take the 1-in. tapered steel pin which is standard on the lines of the Brooklyn Rapid Transit system. The outside of the insulator is covered with a brown glaze.



PORCELAIN FEEDER INSULATOR

The reason for the decision to try out the new type of insulator was that it was believed it would last longer than the composition type, would be just as satisfactory, if not better, and would certainly be no more and probably be less expensive in first cost. Some composition insulators have been found not to "weather" well and to deteriorate quite rapidly, especially in hot weather. With such insulators the threads in the composition often become soft, causing the insulator to "freeze" to the pin, from which it can be removed only with considerable labor and by damaging the insulator so much as to render it valueless for reinstallation.

Another point in which this insulator would appear to have an advantage over the ordinary type of feeder insulator is that the prongs which hold the wire in place are of porcelain and integral with the rest of the insulator. This does away with the metal saddle used with most of the composition insulators, which is a factor of danger to unskilled men working near such insulators owing to the fact that the saddle may be alive due to the movement of the wire, causing the insulation to be worn through at the point where it rubs against the saddle. This is of very little importance where the feeders are installed on poles, as there the only men working near them are linemen, who are accustomed to the risks of their trade and who are taught to consider no insulation as affording complete safety. Where the wires are hung from bridges or elevated structures there are, on the contrary, painters or iron workers often working near the wires, and they are apt to consider anything but a bare wire as being safe to touch. Such men are occasionally shocked or burned by coming into contact with or letting their tools touch live parts that are normally safe.

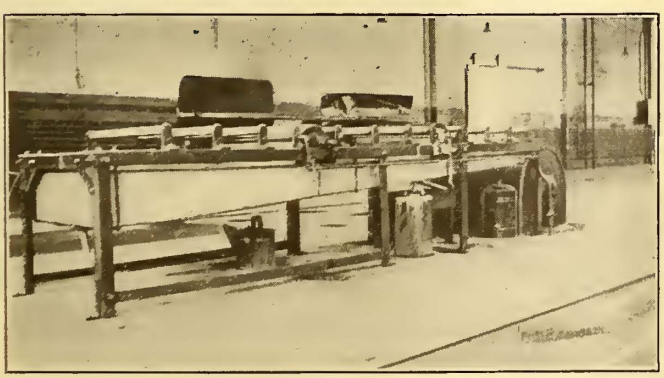
So far as cost is concerned there is very little difference at present between the two types of insulators, but the porcelain insulators should be cheaper if there is ever a demand for them sufficient to warrant the makers turning them out in large quantities, especially after the development charges have been absorbed.

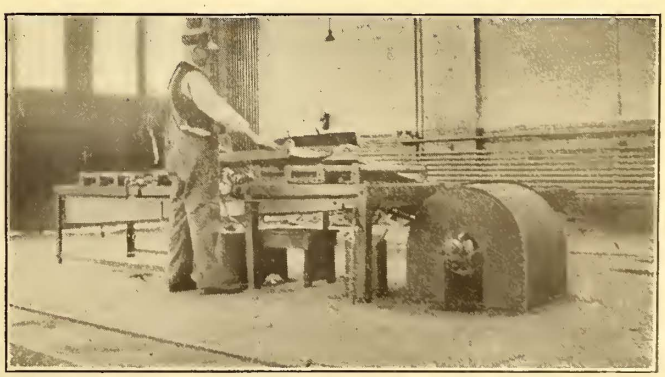
Seat-Cleaning Machine Used in Cleveland

By R. C. Sohl
Cleveland (Ohio) Railway Company

THE cleaning of rattan seats by the Cleveland Railway Company is accomplished by means of the cleaning or scrubbing machine furnished by the Wilson Imperial Company, Newark, N. J. The seats are first run over the steel brush, through which a small stream or spray of Wilson's O.N.C. imperial emulsion is forced. This solution is contained in a 2½-gal. can which is fitted with a small hand pump for putting the contents under pressure. It is made by mixing one part of hot water with one part of emulsion. One filling of the 2½-gal. can is enough to clean the seats of one car, whether of the cross or longitudinal type.

After the seats have been scrubbed with the steel brush they are run over the broom brush, through which is sprayed a generous supply of water for rinsing. Thereafter, the seats are thoroughly dried and given one coat of Wilson's imperial cane glaze, which is put on with a varnish brush. This preserves the cane, so that the seats are thereafter more easily washed and kept clean.





TWO VIEWS OF RATTAN SEAT-CLEANING MACHINE WHICH HAS A STEEL AND A BROOM BRUSH, MOTOR DRIVEN, FOR SCRUBBING OFF THE DIRT

In putting cushions through the scrubbing machine the small cross-seats are handled by one man, but two men are required for the larger longitudinal seats. The latter, ranging from 8 to 16 ft. in length, require from five to seven minutes for a thorough scrubbing, using two men, whereas one man can put a smaller cushion through the machine in from three to five minutes.

In reference to the maintenance of curtains, we do not use any cleaning material on our curtains, but there is a preparation manufactured by the Standard Oil Company, called Matchless Gloss, which has been found satisfactory for renewing and brightening the colors in the fabric when it becomes faded.

To Vote Upon Strikes

United States Chamber of Commerce Issues Full Text of Report of Public Utility Committee on Strike Legislation

DURING the past week the United States Chamber of Commerce has issued its blanks for referendum No. 32 on the subject of anti-strike legislation. Each member is asked to express his opinion before July 24 on the following two points:

1. Should strikes by employees of all public service corporations performing public service essential to the lives, health, security, comfort and well being of the people, by law, be explicitly prohibited?

2. Should suitable tribunals be created by law to adjudicate differences between the employees of public service corporations and their employers, and the decisions of such tribunals be final and binding upon both parties?

The committee on public utilities of the United States Chamber of Commerce was appointed about a year and a half ago, with Lewis E. Pierson, chairman of the board Irving National Bank, New York, as chairman. The other members are:

Henry G. Bradlee, Boston; Arthur W. Brady, Anderson, Ind.; F. B. DeBerard, New York City; E. K. Hall, New York City; Albert W. Harris, Chicago; Charles L. Harrison, Cincinnati; James S. Havens, Rochester, N. Y.; J. W. Lieb, New York City; H. L. McCune, Kansas City; P. N. Myers, St. Paul, and John W. Van Allen, Buffalo.

The report of the committee consists for the most part of a series of principles by which, it says, in its opinion, the relations of employer and employee engaged in the service of the public should be regulated. These principles follow:

PRINCIPLES ENUNCIATED BY COMMITTEE

No corporation or person individually or collectively may lawfully or rightfully obstruct or impede the performance of any duty or obligation of the state or of any agency created by the state for the performance of a public service.

The state is sovereign. Its will is expressed through the government created by it. That will cannot be given effect if the servants of the government refuse to obey its behests. Therefore, no servant of the government has either moral or legal right to obstruct the lawful processes of the government. If such assumed right were successfully asserted, the will of the servant would override the will of the people, the government would be subverted and the servants would become the masters.

It is the obligation of the state to protect the lives, health, security, rights and property of all its people.

These depend upon the uninterrupted operation of the agencies which provide transportation, water, light, heat, power and means of communication. It is, therefore, the right of the people that such uninterrupted operation be guaranteed by the power of the state.

These agencies are created by the state for the performance of services of a public character; they are devoted exclusively to the service of the public; they operate by virtue of public powers delegated to them by the state, and they are thereby public agencies employed by the state to perform public services indispensable to the well being, comfort, security and often to the health and the lives of all the people. The state is, therefore, bound so to exert its powers as to enable these agencies and instrumentalities fully and effectively to perform the public purposes which have been delegated to them.

The immediate result of a strike is to compel the suspension of the industry against which it is directed. When directed against a public utility it is an invasion of that which is indispensable to the community.

The effect of a strike against a public utility is to inflict great harm upon the community. It often entails widespread suffering, seriously endangers the public health, deprives large populations of a sufficiency of food, fuel and other necessaries of life. It deprives the people of the instrumentalities of commerce, thereby causing widespread suspension of industry and taking from many the means of livelihood, and in many ways inflicts great distress upon all.

We believe it the duty of the state by suitable legislation to protect the people against these dire consequences. Strikes by employees of public service corporations should be prohibited by law as conspiracies against the paramount rights of the public. It is obvious, however, that the great class of employees thus deprived of the power of self-protection by means of the strike should be otherwise protected against unjust relations with their employers, through suitable tribunals empowered equitably to adjust differences, whose findings should be final and supported by due provision for enforcement.

The recently pending Cummins bill regulating railroad transportation contained a provision (adopted by the Senate but discarded by the House) which made it unlawful for any two or more persons, being employees of any common carrier or carriers, "to enter into any combination or agreement with the intent substantially to hinder, restrain or prevent the operation of trains or other facilities of transportation for the movement of commodities or persons in interstate commerce or, in pursuance of any such combination or agreement and with like purpose, substantially to hinder, restrain or prevent the operation of trains or other facilities of transportation," etc., under penalty of a fine of $500 or six months' imprisonment, or both. A similar inhibition was laid against aiding, abetting or procuring such interference. The Cummins bill also contained provisions whereby the employees were protected against imposition of unjust conditions of labor.

The purpose of these provisions was to prevent the interruption of service by strikes and compel resort by both parties to settlement by the legal boards proposed for that purpose.

We believe that these or similar provisions should be

made law not only as to railroads but as to all public utilities.

In view of the proposed denial of the right to strike by employees, the committee does not at this time consider it necessary to adopt the proposal of the Merchants' Association as to contractual relations.

Applying the principles stated above, we are of the opinion:

1. That strikes by employees of all public service corporations performing public service essential to the lives, health, security, comfort and well being of the people should, by law, be explicitly prohibited.

2. That suitable tribunals should be created to adjudicate differences between the employees of public service corporations and their employers, and that the decisions of such tribunals should be final and binding upon both parties.

Letters to the Editors

The Electric Railway Must Not Become Anti-Social

NEW YORK, May 18, 1920.

To the Editors:

The report of the Boston Elevated Railway for the year ended Dec. 31, 1919, published in your issue for May 8, shows that while the 10-cent fare is placing the company on a sounder basis this surplus of income over expenditures is still being obtained at a decided decrease in the usefulness of the Boston transportation system to the public. Here we are brought face to face again with the question whether a straight-out increase in flat fare is really the best solution.

According to the official report, the total number of revenue passengers for the year ended Dec. 31, 1919, was 324,758,685. This was 6.86 per cent less than the 348,664,700 passengers carried for the year ended Dec. 31, 1918. Yet the latter part of the year 1918, according to official statements, was an exceptionally bad one from the traffic standpoint. The public had been unsettled by the inauguration of the 7-cent rate in August, 1918; by the arrival of the influenza epidemic in September and by the increase to the 8-cent rate on Dec. 1 of 1918. It follows, then, that if the public had accommodated itself to the 10-cent rate inaugurated June 10, 1919, the passengers carried during the year 1919 would have exceeded the disturbed year 1918.

Now checking portions of the year 1918 against the preceding year will show us still more vividly how much the public usefulness of the Boston transit system has been impaired since the arrival of the increases in rate of fare. Here are the figures for four months of 1918 and 1917, the former covering the period of the 7-cent fare and the start of the influenza in September, while the latter is for operation in 1917 at the 5-cent fare:

For August, 1918,	shows 11.49 per cent less travel than 1917
For September, 1918,	shows 20.02 per cent less travel than 1917
For October, 1918,	shows 26.48 per cent less travel than 1917
For November, 1918,	shows 13.64 per cent less travel than 1917
For these 4 months, 1918,	shows 17.38 per cent less travel than 1917

In December, 1918, came the 8-cent rate, and this showed a decrease of 14.86 per cent in traffic as compared with December, 1917.

The total traffic for the year 1917 appears to have been 381,017,338, as compared with the 348,664,700 passengers of 1918. Hence, while the traffic of 1919 was 6.82 per cent less than that of 1918, the year 1918 in turn was 9.3 per cent short of the record for 1917. In contrast to this, we find that in 1916 the traffic was 363,477,041, or 4.96 per cent increase over the 346,316,584 passengers of the year 1915, just as 1917 had shown an increase of 5 per cent over 1916. Available figures for earlier years cover fiscal periods ended June 30. While these do not compare fairly with the calendar periods, that for the year ended June 30, 1914, covers the carriage of 343,181,049 passengers, which was given as an increase of 5.16 per cent, or 16,828,186 passengers, over the fiscal year ended June 30, 1913. To summarize:

324,758,685	passengers were carried Jan. 1—Dec. 31, 1919
348,664,700	passengers were carried Jan. 1—Dec. 31, 1918
381,017,338	passengers were carried Jan. 1—Dec. 31, 1917
363,477,041	passengers were carried Jan. 1—Dec. 31, 1916
346,316,584	passengers were carried Jan. 1—Dec. 31, 1915
343,181,049	passengers were carried year ended June 30, 1914
326,352,863	passengers were carried year ended June 30, 1913

From these figures we have to draw the conclusion that, despite the growth of the community, the absence of jitney competition and comparatively unimportant losses to private automobiles, the Boston Elevated Railway carried last year no more traffic than six to seven years ago. Since the normal annual increase in traffic in 5-cent years seems to have equaled at least 5 per cent, the actual traffic for 1919 should have been in excess of 400,000,000 instead of approximately 325,000,000. The difference between these figures represents 75,000,000 rides that would have been taken otherwise for purposes of business or pleasure. Their absence means just that much slowing down of community life, because in any large city the index of activity is furnished by the car-riding statistics.

In presenting these figures I intend no criticism of either past or present managements of the Boston Elevated Railway. The necessity for more revenue goes without saying, and in view of the pointless objections raised to trying the principle of a short fare for the short rider the trustees cannot be blamed for going up and up until they found a fare which brought in enough revenue to meet expenses and to permit modernization throughout.

But what I do wish to point out is that the policy at present being followed is forcing the electric railway to become of declining, instead of rising, value to the citizens of Boston, because it maintains a system of fare charges which discourages the short riders at all times and also those long riders, like women shoppers, who are desirable because their riding is largely of off-peak character. Instead of making the car rider carry all the burden of increased costs these communities would be doing a wiser thing from the social and business welfare standpoints if they returned to the old fares and made up the deficits by a direct tax on all the citizens—both the car riders and the limousine riders whose factories, stores and apartment houses are bound to drop in value with every impairment of electric railway service. In short, the electric railway is too important to the well being of the modern city to be forced into a position of declining usefulness. The Boston 10-cent flat fare may be getting the money, but the possible effect on the longevity of the street railway may be described by that famous phrase: "The operation was successful but the patient died."

CONSULTING ENGINEER.

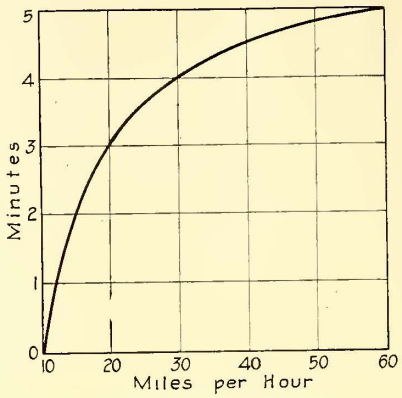
Why Take a Chance?

L. HEYNEMANN
Consulting Engineer

SAN FRANCISCO, CAL., June 8, 1920.

To the Editors:

Allow me to call your attention to a matter which I think should be driven hard into the minds of all automobile drivers. It is the folly of speeding in driving automobiles on short runs in city streets. Here the risk of accident is very great and, as I shall show by means of a simple diagram, the time saved per mile of run, on short runs, between moderate speed and very high speed is quite small. Unless your readers have studied the matter, they will probably be surprised to note the small time saving, per mile run, between a high speed and a relatively low speed. This is due, of course, to the fact that at high speed it takes much less time to cover one mile. The accompanying diagram shows the time saved between speeds of 10 m.p.h. and higher, the minutes saved being represented by the vertical spaces on the chart. The data for the curve were calculated as follows:



CURVE SHOWING TIME SAVING AT DIFFERENT SPEEDS AS COMPARED WITH 10 M.P.H.

At 10 m.p.h. one mile is covered in six minutes and at 60 m.p.h. it is covered in one minute. The difference of five minutes is the time saved per mile as between the two speeds. On the chart this saving is plotted against the speed of 60 m.p.h. Similarly at 30 m.p.h. one mile is covered in two minutes, a saving of four minutes as compared with the six minutes required at 10 m.p.h., etc.

I trust that the above will be interesting and useful to the readers of the ELECTRIC RAILWAY JOURNAL.

L. HEYNEMANN.

Association News

Fare Systems Discussed

THE committee on fare systems of the American Association met at headquarters on May 24. There were present, in addition to the chairman, W. H. Sawyer, East St. Louis; Thomas Conway, Philadelphia; W. J. Flickinger, New Haven; L. H. Palmer, Baltimore; A. S. Richey, Worcester, and C. L. S. Tingley, Philadelphia.

The replies received to the questionnaire which had been sent out by the committee requesting specific information on fare systems upon analysis failed to prove statistically that any one system was the "best seller." Existing local conditions at the time of the fare changes, the committee believed, greatly influenced the amount of traffic handled. To obtain facts about these conditions a further letter is to be addressed to the railway executives asking their personal opinion as to the effect of fare changes and to enumerate in detail the reasons advanced for their conclusions.

A method of analyzing the various kinds of zone fare increases was prepared for the guidance of committee members in their preparation of data to appear in the final report. It is essential that such studies should be made upon a uniform basis so that comparisons can be made of the details existent in each system.

The committee plans to meet again on Tuesday, June 29, at association headquarters.

Busy Month for Bureau of Information and Service

DURING May the American Association bureau on information and service prepared for the benefit of member companies the following compilations and reports:

Trackless Trolleys. Dated May 28, 1920—Theoretical comparisons under assumed conditions of the relative efficiency of the street railway, the motor bus and the trackless trolley together with actual statistics of trackless trolley operations in Bradford and Leeds, England.

Cost-of-Living Studies. Dated June 1, 1920—Summary of reports of following agencies showing present, compared with last year's and pre-war prices: National Industrial Conference Board, Bureau of Labor Statistics, Annalist Food Index, Gibson's Food Index, Dun's Wholesale Index, Bradstreet's Wholesale Index.

Summary of Opinions of Railway Executives on Effect of Increased Rates on Their Properties. (Based on data sheet No. 199.)

Supplement to Wage Bulletin No. 124—Bringing information on trainmen's wages up to June 1.

Supplement to Cities Having Increased Rates of fare. Dated April 14—Bringing information up to June 1.

Supplement to "Methods of Interurban Companies in Increasing Rates of Fare" of Jan., 1920—Bringing information up to June 1.

Association Publishes Important Work

THE American Association is issuing a book by Harlow C. Clark, entitled "Service-at-Cost Plans." The work is reviewed elsewhere in this issue. It is an octavo volume containing 315 pages, in cloth binding. The present plan of the association is to furnish each company member with one copy free and to sell copies to individual and company section members at $2. The association expects a wide distribution of the book, and hopes that companies will order extra copies for local distribution. To encourage this practice the association will furnish such copies at $1.85 each in lots of twenty or more. The price to the public is $2.50.

Chicago Safety Committee Activity

DURING the first four months of activity of the new safety organization of the Chicago Elevated Railway the safety committees considered more than 800 safety suggestions, of which 75 per cent were approved. More than 65 per cent of the approved suggestions have already been carried out. This excellent record is due in a great degree, it is said, to the consideration and study given each suggestion by the employees' committee before passing it on to the division committees.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

New Orleans Men Ask More

Trainmen Want Seventy-seven Cents an Hour—Receiver Sees No Escape from Increase in Fare

The public of New Orleans, La., is between two horns of a dilemma; it faces either a car strike or higher street car fares. The fare is now 6 cents, with no charge for transfers. The trainmen of the New Orleans Railway & Light Company working under a scale of wages accorded them by the War Labor Board in July, 1918, have demanded of Receiver J. D. O'Keefe an increase of wages from 38 and 42 cents an hour, according to length of service, to 77 cents an hour flat for platform men and 35 cents an hour for all other employees. They also ask that all overtime shall be paid at the rate of time and a half, Sundays and holidays being considered overtime. They also demand an eight-hour day.

Public Discussion Planned

Previous to the contract under which they are now working, and which expires on June 30, the platform men were paid 24½ cents, maximum, per hour. Overtime was granted only after ten hours' service and Sundays and holidays were paid regular time.

Receiver O'Keefe frankly conceded that the men should receive some increase, but contended he could not increase their pay without additional revenue. He further pointed out that he is being asked to surrender his management of the railway to the union, and that this would conflict with his responsibility to the federal court, to the creditors of the company and to the interests of the public in general.

Receiver O'Keefe is in great doubt whether a 10-cent fare would be sufficient to produce enough revenue to meet the demands of the men. It is estimated that the additional expense for wages would be $3,000,000 a year.

The officials of the union have asked and have obtained Receiver O'Keefe's consent to discuss the matter publicly and a conference was arranged to be held on June 14.

Ordinance Passed for Seattle Purchase Inquiry

Hugh M. Caldwell, Mayor of Seattle, Wash., has accepted the $10,000 offered him by the City Council to be expended in an inquiry to determine whether the city paid an excessive price when it acquired the railway lines of the Puget Sound Traction, Light & Power Company for $15,000,000. The Mayor approved the bill after he had been informed that the City Council has permanently "filed" his request that Corporation Counsel Walter F. Meier be directed to conduct the proposed inquiry into the matter.

In a letter to Corporation Counsel Meier on May 20, the Mayor asked Mr. Meier to state whether the city has any ground for action against the former owners of the railway to recover damages for misrepresentation, or to void the transaction.

When Mr. Meier declined to pass on questions of fact in the case, Mayor Caldwell asked the Council to direct the city legal department to make an investigation of the transaction. Councilman Moore then introduced the ordinance authorizing the Mayor to conduct the inquiry personally, and appropriating the sum of $10,000 to cover expenses involved.

Publicity Planned for Nebraska

A committee on public utility information has been organized in Nebraska along lines similar to those in Illinois, Indiana and Kentucky. The committee has headquarters in the Brandeis Theater Building, Omaha. Its chairman is W. B. Roberts, president of the Union Power & Light Company, Omaha. Horace M. Davis is actively in charge as director. Members of the executive committee include James B. Harvey, Continental Gas & Electric Company, Omaha; Thomas H. Fritts, vice-president of the Central Power Company, Grand Island; J. E. Harsh, vice-president of the Lincoln Gas & Electric Company, Omaha; Leroy Corliss, Waterloo Creamery Company; W. H. Wood, Peoples Ice Company, Omaha.

It is interesting to note that other states in which preliminary organizations along similar lines have been effected are Ohio, Wisconsin and Iowa, and that action looking forward to committees of this kind has been taken in Michigan, Missouri and Texas.

Chile Electrification Proposed

Reports through banking circles indicate that the long deferred electrification of the Valparaiso-Santiago Railway is to be prosecuted. A double track would be laid on certain portions of the system and a large number of sheds, side tracks and bridges provided. At the same time electrification of the entire system of State Railways is under consideration, the estimated cost being $13,500,000, and new equipment to the extent of 214,000 pesos, gold, is to be bought for the Arica-La Paz Railway. A railway line is planned from Galvarino to Quinoa to join the branch of the Naiguero between Temuco and Carahue.

Eighty Cents in Chicago

New Pay Arranged in Conference Accepted by Men—Surface and Elevated Men Included

By referendum vote the employees of the Chicago Surface Lines on June 14 accepted the new wage scale offered by the management. The radical element in the union was routed by a vote of eleven to one. Thus the possibility of a strike was removed. The only doubtful element in the situation now is whether the Illinois Public Utilities Commission will fix a rate of fare sufficient to cover the new wage scale. This will not be known until about July 1.

Increase Fifteen Cents an Hour

The new wages will be 15 cents an hour over the former rates, that is, 75 cents for the first six months, 78 cents for the next nine months and 80 cents after one year. Night car men will receive 82 cents an hour. There will be no change in working conditions except that the management agrees to make the runs on Sundays and holidays as near six hours as possible, but to pay only straight time until after eight hours, when the rate is on the time and a half basis. Other classes of employees will receive increases ranging from 10 to 20 cents an hour.

The Chicago wage scale is now said to be the highest in the country for surface lines. These employees have usually had an hourly wage higher than in other cities, their contention being that working conditions are more difficult in Chicago. Discussions between company officials and the union committee lasted about one month. The original demand was for a $1 hourly maximum wage. The men had previously rejected the company's offer of 75 cents an hour. The new wages will be effective from June 1.

Elevated Wages Also Increased

The Chicago Elevated Railways has agreed to an increase in wages for its employees practically identical with that granted by the surface lines. Motormen, conductors, guards, platform men, switchmen, switch-tenders, car couplers, towermen and bridgemen will receive an increase of 15 cents an hour. This will make the maximum wage for motormen 82 cents an hour. Increases to other employees will range from 5 to 15 cents an hour.

Neither company is earning sufficient now to pay the higher wage scales and inasmuch as the new rates of fare probably will not become effective until July 1 the officials have agreed to make up the back pay in installments.

More Tolerant Attitude in Birmingham

City Shows Disposition to Co-operate with Railway Toward Orderly Settlement of Utility Problem

Seeking to work out a plan by which the receivership may be lifted and the Birmingham Railway, Light & Power Company may be put on a sound financial basis, a series of conferences between the City Commission, Lee C. Bradley, receiver, and officials of the company will be held. Several preliminary conferences have been held between J. Ellis Brown, Commissioner of Public Utilities; Mr. Bradley and J. S. Pevear, general manager of the railway. Just what results may be obtained from the conference none of the interested parties will forecast. The officials of the city of Birmingham have formulated some plans and are making efforts to co-operate in the matter. In the meantime the receiver and officials of the company are using every effort to improve the railway system and the entire plant of the company and give better service.

ON THE part of the public there has been a marked change in attitude toward the company since the latter part of the year 1918 and the first of 1919. Hostility, which reached a climax when car windows were broken in several instances, has been allayed by a policy of publicity and by the recognition of the fact that the company was making improvements in its service as rapidly as conditions would permit. Since the receivership $1,500,000 has been spent on improving the service, rebuilding equipment, and making necessary repairs.

Reorganization the Object

A general reorganization of the company is the object which will be sought by the City Commission in its negotiations with the receiver and officials of the Birmingham Railway, Light & Power Company in the conference to be held. City officials hope that their plan may be worked out so that the receivership may be lifted and the company may be put on a sound and paying financial basis with guarantees as to extensions and several other matters now in an unsettled condition.

Plans advocated by the city officials call for a reduction of the capital stock of the Birmingham Railway, Light & Power Company to a figure representing the real and actual value of the plant and equipment of the company, maintaining that the company is at present overcapitalized. Two plans are suggested for arriving at the actual value of the plant and equipment and the figure at which the capitalization may be fixed. An agreement as to the value is favored by city officials. The alternative plan is for an appraisal of the property, but the latter plan is opposed because of the cost. City officials believe that it should be possible to reach a basis of agreement as to the value without a formal engineering inquiry.

Division of Earnings Planned

Of first importance in the city officials' plan is an agreement as to the fair return the company may make on its investment. It is proposed that this agreement be made, and that the city under the agreement shall share in any earnings the company may make over and above the return contained in the agreement. It has been suggested, further, that the president of the City Commission and the Commissioner of Public Utilities of the city shall be members of the board of directors of the company, and shall care for the interests of the public in the operation of the affairs of the system. Definite understandings as to all extensions, both of street railway lines, electric and gas lines, form a part of the general plan. The matter of extensions has, for some time, been unsettled.

Dates for the opening of the conference have not yet been fixed. Commissioner Brown and officials of the company state that the conferences will probably be taken up in a short time. Neither city nor company officials has indicated any detail of plans.

Every effort is being exerted by the officials of the company to get the plant and equipment in the best possible condition. Tracks are being repaired, numbers of new crossings, frogs and switches have been installed where old ones were worn out.

New Cars Purchased

Twenty-five new one-man safety cars have been purchased and are now in operation. These cars cost $150,000. Fifteen additional safety cars of the same type have been ordered at a cost of $100,000. All of the old cars are being overhauled and in a number of instances they are being practically rebuilt. A total of 144 new motors was purchased for installation by the company in the old cars.

In the gas department, the company has installed a new water gas set at a cost of $100,000. This additional equipment practically doubles the capacity of the plant and makes much better service possible.

Electric light service has been maintained, throughout, at a higher standard than either the railway or the gas service. In this department a new rotary converter was installed at a cost of $30,000. Lines have been renewed and other repairs and improvements made. Current for the lighting system and operation of the cars comes from the water power plants of the Alabama Power Company. This power is used exclusively. The old steam plant of the Birmingham Railway, Light & Power Company is maintained as an emergency plant.

Six-cent car fare went into effect in Birmingham on Sept. 4, 1919. The City Commission waived the 5-cent fare clause in the franchise of the company. A petition was filed and the increase in fare to 6 cents was granted by the Alabama Public Service Commission at Montgomery. Added receipts, from the increase of the fare, amount to approximately $300,000 a year.

Shortly after the increased fare went into effect, a new wage scale for employees was put into effect. This new scale, it is stated, increased the pay roll of the company by about $350,000 annually, and amounted to an increase for the men varying from 40 per cent down.

During the sixteen months the company has been in the hands of a receiver there has been a marked improvement in the service. The City Commission waived the fare clause of the franchise to enable the company to improve the service. City officials state that their object in the conference is to secure a complete reorganization and put the company on its feet financially, so that it can function properly, make a fair return on its investment, and give the people proper service.

Strike Lasts One Hour

The strike of the employees of the Toledo & Indiana Railroad threatened for June 1 was settled after the men had been out one hour. The men accepted the terms laid down by the railroad.

Suspension of light and power as well as traction service in six towns along the Toledo & Indiana Railroad was imminent last week when employees threatened to strike for higher wages. The organization includes both platform men and powerhouse operators.

The company offered a 15 per cent increase to the men. The wages paid ranged from 36 to 43 cents an hour. The new scale demanded was 51 to 55 cents an hour.

President L. R. Schenk's statement follows:

> The aggregate of the bonds and stocks of the company, outstanding, is approximately 80 per cent of the value of the property as fixed by Henry E. Riggs, now professor in the University of Michigan, upon the reorganization of the company. This valuation was made in 1909 at a time when unit prices were the lowest in the history of construction. Since that time several hundred thousand dollars have been expended for necessary improvements to the property. The stock outstanding has never received more than 4 per cent yearly dividends and no dividends have been paid to stockholders since Dec. 31, 1916.

Republicans Against Interruptions to Utility Service

Messrs. Harding and Coolidge stand upon a plank in the Republican platform which in the case of public uitlities favors the establishment of an impartial tribunal to make an investigation of the facts and to render a decision to the end that there may be no organized interruption of service necessary to the lives and health and welfare of the people. On industrial relations the Republicans say:

> There are two different conceptions of the relations of capital and labor. The one is contractual and emphasizes the diversity of interests of employer and employee.

The other is that of copartnership in a common task.

We recognize the value of collective bargaining as a means of promoting good will, establishing closer and more harmonious relations between employers and employees and realizing the true ends of industrial justice.

The strike, as a means of settling industrial disputes, inflicts such loss and suffering on the community as to justify Government initiative to reduce its frequency and limit its consequences. The extent and character of Government action must, however, be determined by the nature of the industry.

We deny the right to strike against the Government; but the rights and interests of all Government employees must be safeguarded by impartial tribunals.

In public utilities we favor the establishment of an impartial tribunal to make an investigation of the facts and to render a decision to the end that there may be no organized interruption of service necessary to the lives and health and welfare of the people. The decisions of the tribunals should be morally, but not legally, binding, and an informed public sentiment be relied on to secure their acceptance. The tribunals should, however, refuse to accept jurisdiction except for the investigation, as long as the public service be interrupted. For public utilities we favor the type of tribunal provided for in the transportation act of 1920.

No general plank was adopted appreciative of the conditions which confront the public utilities.

Vast Improvement in Kansas City Morale

A brief review of conditions on the Kansas City (Mo.) Railways offers encouragement with reference to relations between employers and employees. In the fall of 1918 there was a strike. Only 180 of the 2,000 employees remained with the company. Since that time, about 300 of the former employees have been reinstated—so that the personnel is mostly of new men.

The struggle to build an organization was exceedingly difficult. Numerous conditions intervened to prevent the company from securing men of the type it desired. In the past few weeks, however, the number of applicants for places has been beyond the company's needs, and it is now able to pick exactly the men it wants and retain those best fitted to the organization. Increased wages have, of course, proved an important element in the improvement with reference to labor supply. The company has raised the pay of the men three times since Jan. 1, 1919, the date from which the operation without connection with a union is counted. On June 1, 1920, a fourth voluntary increase was given, making a total of about 20 cents advance to the men in eighteen months. Many of the employees earn from $150 to $190 a month.

Another gratifying improvement is in the smoothness of operation. This has resulted in providing high-type service to the public. The car mileage per day is greater than ever before, but there are proportionately fewer accidents. Definite accident-prevention work in the organization has something to do with this result, but the spirit of the men is the potent factor. Operation has, of course, been improved by following the suggestions made by John A. Beeler, but again the interest taken by the men in their work has much to do with the gratifying results.

Toledo to Vote August 10

Plan to Authorize Two Bond Issues Aggregating $7,000,000 to Acquire Local Railway

When the City Council at Toledo during the week ended June 12 passed unanimously a resolution thanking the cost-of-service and municipal ownership commissions for their half year of labor in attempting to get a settlement for the Toledo railway problem another chapter in a quarter century story was completed. The twin municipal ownership measures submitted by the commission appointed by Federal Judge John M. Killits were promptly ratified by the Council at its regular meeting last week and will be submitted to the voters of the city at the time of the August primaries. The voters will be asked on Aug. 10 to authorize two bond issues aggregating $7,000,000 to acquire and construct a municipally owned railway system.

WHEN these measures passed Council it was by a vote of thirteen to three. The minority wanted to submit both municipal ownership and service-at-cost plans at the same time so that voters might make a choice.

To satisfy these members it was agreed that should the commission and Henry L. Doherty reach an agreement within the next week both plans should be submitted at the same referendum and it would be held two weeks later in the fall. Mayor Cornell Schreiber presented this plan.

The matter was taken up immediately by the commission and Mr. Doherty and the final draft was whipped into shape. Practically every point was yielded to Mr. Doherty with the exception of valuation. He steadfastly held out for a $9,000,000 price and the commissioners would approve nothing in excess of $8,000,000.

Cost-of-Servce Plan Dead

At that point the cost-of-service plan met its death. When the latest draft, together with all the compromises, was read before the commission Mr. Doherty declared it was the "best ever drawn." He was commenting upon the general features of the plan. He said it was the finest method to obtain ultimate municipal control of a street railway system that he had ever seen. But he disagreed on the valuation. He offered to present a plan of his own, however, after he refused to accept it without the commission's approval when he had his own valuation figures in the ordinance.

Undoubtedly he will offer a cost-of-service plan ordinance or the one which the company now has signed up ready to submit directly to the people by the initiative provisions of the city charter. In either event it is probable that Mr. Doherty will submit a newly drawn plan within a few days.

Mr. Doherty claimed that the commission had not given him time to submit figures on the valuation. He said he could prove that the lines and equipment were worth $12,000,000 at the present time, but would still offer them at $9,000,000. His suit in federal court on an amended cross-bill to the order which now establishes the right for the cars to operate contends that the property is worth $15,000,000.

The commissioners wanted to change the arbitration feature of the original Tayler plan idea from appointment of the third arbitrator in any settlement of a dispute by the judge of the District Court of Appeals—a federal court—to the elected judge presiding over the State Circuit Court of Appeals for the Toledo district. It was thought such a plan would secure popular support for the ordinance. Mr. Doherty would not agree to any change in this provision of the measure.

Court May Intervene

Judge Killits when advised of the final closing up of the work of the commission declared he would not attempt to offer his services further in the matter of getting a settlement of the railway problem. It is quite probable, however, that he will have to take a hand in the proceedings now instituted in his court to restrain the city from interfering with the collection of a 10-cent fare. This matter will come up for some disposal before the end of the present term of court, which is the last Monday in October.

Pending the vote on the municipal ownership ordinances in August, the Toledo Railways & Light Company is keeping its stocks of materials low and is not buying supplies in large quantities.

Before the ordinances are put into effect, at least the one which provides a fund with which to purchase parts of the existing railway system for $4,000,000, a new proposition in street railway condemnation will have to be settled, probably in a court. The commission which drew up the ordinance planned to take the paying parts of the system and leave the parallel lines and other low earning lines. The poorer paying lines in the present system have become a part of the Toledo system by the historical plan of competition and absorption.

Loss to City Estimated

It is the opinion of company lawyers and many legal authorities in the city that such a plan could not be put over without damages being awarded to the company as to make it profitable to the city to take the system as an entirety.

It is estimated that the city will lose in taxes paid by the company about $250,000 annually in addition to an additional levy of nearly $750,000 for interest and sinking fund payments on the thirty-year indebtedness.

Detroit's New Railway Ordinance Upheld

District Court Dismisses Detroit United Railway's Plea — City, However, Cannot Condemn Existing Lines

Suits brought by the Detroit (Mich.) United Railway and the New York Trust Company against the city of Detroit to restrain the city from proceeding with construction of a municipal railway system have been dismissed by Judge Arthur Tuttle of the United States District Court. The court ruled, however, that before the city could acquire by purchase or condemnation any lines now operated by the Detroit United Railway another vote of the people must be taken. Counsel for the railway at once declared intention of appealing to the United States Supreme Court. The validity of the railway ordinance adopted by the voters on April 5 was upheld by the court, against the contention of the Detroit United Railway, and it was denied that the company had acquired any new rights on Fort Street since the Fort Street decree giving the city the right to compel the company to remove its tracks. This same right to order the company off the street was held to apply on other streets where franchises have expired.

IT WAS further stated by the court that although the city has the authority to move the company off the streets, it has no power to purchase, lease or condemn any of the company's holdings against its will. It was held that to establish such authority would require a three-fifths vote of the people.

Confiscation Claim Disallowed

Inasmuch as the ordinance adopted on April 5 gave the city no right to buy, lease or condemn any Detroit United Railway property, but only to construct a municipal railway, Judge Tuttle stated that the company could not claim that it was intended to confiscate its property. Attorneys for the company in arguing the case claimed that the city had forfeited its right to oust the Detroit United Railway from Fort Street, because instead of taking advantage of the decree, it had allowed the tracks to be rebuilt and had provided for continued operation of the line as well as others by entering into the day-to-day agreement of 1913 and had passed the Kronk ordinance in 1916, fixing the rate of fare for continued operation of non-franchised lines.

On the contrary the city attorneys claimed that the city could not be stopped from availing itself of the right to order the company off Fort Street and Woodward Avenue because the city lacked the authority to surrender this right. It was held that no rights in the street could be granted the Detroit United Railway without submitting such rights, in effect a franchise, to the people for a three-fifths vote of approval.

Rights Defined by Statute

In assenting to this view, Judge Tuttle states:

> Methods for acquiring new rights in the streets of the city are so well and clearly defined that I cannot reach the conclusion that a public service corporation can acquire rights in any other way than those defined in the statutes.

In reviewing the decision of the United States Supreme Court in the case of the Kronk ordinance, the statement was made that the city must regulate justly if it assumed to regulate. The company has the right to terminate operation of the lines and remove its tracks upon the expiration of contractual rights and on the other hand the city has the right to require the tracks removed, giving the company a reasonable time in which to do it. The Supreme Court held that the passage of the Kronk ordinance was an invitation to the Detroit United Railway to continue on the street, and that the rate of fare to be charged must be sufficient to pay the company a reasonable return on the reproduction cost of its equipment.

The judge stated that the situation was not changed by the day-to-day agreement. His decision was not based on the decree in the Fort Street case, but on the law in that case and on the Supreme Court's decision in the Kronk case.

It was held by attorneys for the Detroit United Railway that the ordinance of April 5 was invalid because it did not specifically state to the voters that it was intended to construct a new street railway system. The Mayor and Council, it was claimed, misled the voters through the Mayor's speeches and the sample ballots into believing that it was intended to force the company to sell certain lines to the city at confiscatory prices.

The court ruled that the ordinance as submitted gave the city no right to purchase, condemn or lease Detroit United Railway lines and therefore there was only one course for the city under the terms of the ordinance—to acquire a railway system by construction. The ballot was held legal in that it properly submitted the question to the people, inasmuch as it is not necessary under the law that the entire ordinance be on the ballot.

Judge Tuttle said that if the City Council or the Mayor made any agreement with the company for the purchase of the lines without a vote, they were guilty of a violation of the city charter.

Wage Crisis in Twin Cities

The trainmen of the Twin City Rapid Transit Company gave the company until June 15 to put in a wage increase of 20 cents an hour, time and a half for overtime and holidays and an eight-hour day. The company announced that it would refuse to make this advance because of its inability to grant the increase without getting more than the 5-cent fare which prevails in Minneapolis and St. Paul. The men will appeal to the City Councils for permission for an increased fare by July 1. Meanwhile the City Council of Minneapolis has ordered public hearings beginning June 14 and the Council of St. Paul has considered the subject behind closed doors.

Horace Lowry, president of the company, addressing the men, urged against drastic action.

The Car Riders' League, which opposed the referendum franchise that was defeated in Minneapolis last December, announces it will propose a new franchise. In St. Paul the people at the May election voted an amendment to the ordinance which places the matter of fare increase in the hands of the Council, but that body insists on better service before it will grant the increase.

A request made by the Minneapolis Street Railway two years ago for permission to charge a fare of 6 cents is still a live matter in the Council and can be revived. The situation is complicated by the fact that it will be practically impossible for Minneapolis and St. Paul to have different rates of fare, as the fare limits overlap on four interurban lines.

Mr. Lowry has submitted to the Councils of both cities a request for a 7-cent fare with tickets at the rate of four for a quarter.

Railway Speakers' Handbook Issued

The Illinois Committee on Public Utility Information, 203 S. Dearborn Street, Chicago, Ill., has issued *Speakers' Bulletin No.* 1, which presents a compilation of authoritative definitions, facts, statistics, statements of experts and similar data for use in public addresses. The bulletin also contains outlines of a number of different speeches, suggested introductions for addresses, and a sample 15-minute speech. The contents cover electric railway, gas, electric light and telephone utilities, and form a prolific source of information and suggestion for the use of any one who may have an opportunity to assist in the work of enlightening the public on the services of public utilities and their relation to the economic progress of any community.

This is the first of a series of pamphlets which the committee plans to issue, and it bears the title: "The Nature, Development and Service of Public Utility Companies." Subsequent issues of the bulletin will cover the topics: "The Prosperity of Communities and of Public Utilities"; "Fair and Just Methods of Regulation"; "Increase of Public Service Rates Compared with That of Other Commodities"; "Stability of Investment in Utility Securities"; "The Fixing of Rates on a Fair Basis"; "Conditions of Work, Wages, Welfare Agencies," etc.

Akron Wage Findings

Award for Non-Paying City Lines Made Contingent Upon Increased Rate of Fare

An award of a maximum rate of pay of 65, 66 and 67 cents an hour for city, suburban and interurban trainmen, respectively, was announced June 10 by the board of arbitration which has had under advisement since May 20 the matter of wages of employees of the Northern Ohio Traction & Light Company, Akron, Ohio. The arbitrators were S. D. Hutchins, Ernest E. Zesiger and Charles Currie. The board was directed to fix three scales of wages based on an eight-hour, nine-hour and ten-hour minimum day. The findings on these three bases are as follows:

INTERURBAN

Comprising Akron-Bedford & Cleveland; Canton-Akron; Massillon, New Philadelphia and Ulrichsville Lines

Present Scale:	
First year	45
Second year	48
Third year	50

Awarded Scale:	First Year	Second Year	Third Year
Eight hours minimum.	61	64	67
Nine hours minimum..	56	59	62
Ten hours minimum...	54	57	60

SUBURBAN

Comprising Akron, Kent and Ravenna Line, and Akron, Barberton & Wadsworth Line

Present Scale:	
First year	44
Second year	46
Third year	49

Awarded Scale:	First Year	Second Year	Third Year
Eight hours minimum..	60	63	66
Nine hours minimum..	55	58	61
Ten hours minimum...	53	56	59

CITY

Comprising Akron, Canton and Massillon City Lines

Present Scale:	
First year	43
Second year	45
Third year	48

Awarded Scale:	First Year	Second Year	Third Year
Eight hours minimum.	59	62	65
Nine hours minimum..	54	57	60
Ten hours minimum...	52	55	58

The board also included in its findings the statement that in view of this substantial increase, the rate applying to the city lines is also to prevail for safety car operators.

The board was given jurisdiction over the wages to be paid employees of the Akron, Canton and Massillon city lines and the interurban and suburban lines of the company, comprising contracts with four locals of the Amalgamated.

CITY INCREASE CONTINGENT ON FARES

In its findings the board of arbitration reviewed the fact for the year ended Dec. 31, 1919, the company had a deficit of $30,169 in Akron, $46,364 in Massillon and a net revenue of only $25,107 in Canton. These figures are without taking into consideration any return on the value of the property and without any allowance for depreciation. Making allowance for a 4 per cent depreciation account, there was a deficit of $925,260 in Akron, $254,893 in Canton, and $116,363 in Massillon. Continuing, the finding read as follows:

> However, the fact remains that the employees are asking for an increased wage; the public is asking for improved car service and the cities for improvements and extensions; all of which, owing to the fact that the company is operating at a deficit, are financial impossibilities.

The board then said that the present wages of the employees are inadequate, but that since Akron, Canton and Massillon have not afforded the company any improvement in its revenue by way of increased passenger fares, any increase of wages which the board might impose would inevitably create larger deficits to the great detriment of the company and the public. The award then reads:

> As a matter of equity and justice, we cannot increase the deficits resulting from such operations and are obliged to make an award as to wages which shall be granted to the company's employees in the cities of Akron, Canton and Massillon, conditioned and contingent upon the company and these municipalities solving the problem as to the source of increased revenue to defray the additional burden placed upon the company by our award. To this end we may add that the rates of passenger fares on the railway lines in Akron, Canton and Massillon are lower than in any other cities in the United States so far as we have been able to ascertain.

The arbitrators also point out that the revenue must not only be sufficient to care for the increased wages, but that the cities must take into account the fact that there is a deferred maintenance account of $1,110,000.

MEN EXPECTED TO ACCEPT

The awards on the interurban and suburban lines were made without contingencies, since it was admitted by the company that these lines were earning sufficient to warrant the payment of a just and reasonable scale of wages. The contract with all the locals is for the year ending May 1, 1921. The awards are retroactive to May 1 of this year, though the city increase is contingent upon an increased rate of fare.

At the time of this writing it is understood that the men will probably accept the award, though it is considerably below the amounts which they demanded. It is not yet known which minimum day basis will be accepted. It is also understood that the company will undertake immediately the work of entering into some temporary arrangement with the municipalities to secure an increased fare which will permit the new wage scale to be put into effect.

Connecticut Wage Offer Accepted

The wage offer made by the Connecticut Company to its platform employees on June 14 that it would change the six-year system of establishing the wage scale and substitute for it a system whereby employees get the maximum of pay at the end of three years was accepted by the men by vote on June 17.

The men had previously voted not to accept the offer of the company for a wage scale which provided 54 cents an hour for those entering the company's employ, with 1 cent a year increase up to the sixth year, and with 60 cents as a maximum. The new offer makes the first year wage 54 cents, the second rate is 57 cents and the third and succeeding years is 60. One-man car operators are to receive 15 cents an hour more than these respective amounts. The new contract dates for one year from June 1.

Water Power Bill Signed

President Wilson has signed the water-power bill. This was learned from Washington by telephone at 4 p.m. on June 18. At one time it was thought that this important legislation had been lost in a pocket veto. It was later stated that an informal ruling had been made by Attorney-General Palmer that the time had not expired in which the President was authorized to act on this and other measures.

The effort to secure comprehensive water-power legislation really dates back to 1890. Vetoes of water-power bills in 1908 and 1909 by President Roosevelt put an end for the time to the introduction of water-power bills. Other measures followed in 1914 and 1916.

Attractive Program for Bluff Point Meeting

William B. Wilson, United States Secretary of Labor; John A. Barhite, Public Service Commissioner of the Second District of New York, and Douglas Malloch, president of the Press Club, Chicago, Ill., are to be the speakers at the banquet at the thirty-eighth annual meeting of the New York Electric Railway Association at the Hotel Champlain, Bluff Point, New York, on June 26. The toastmaster will be Edward A. Maher, Jr., president of the association. Dancing will follow the banquet.

The subjects for discussion at the business session on June 26 are as follows:

"The Collection of Revenue," by Thomas P. Whelly, New York State Railways, Utica, N. Y.

"Reducing Transfer Abuse," by Charles A. Coons, general superintendent of the United Traction Company, Albany, N. Y.

"Cost of Interurban Freight Service," by W. K. Zinsmeister, auditor and treasurer of the Rochester & Syracuse Railroad.

Mr. Whelly's subject is a particularly live one just at this time, in view of the fact that the volume of revenue taken in has increased tremendously, since increases in fares have become general.

The following committee reports will be presented: Military Operations, by James P. Barnes, chairman; Standards, by W. G. Gove, chairman; Membership, by H. B. Weatherwax, chairman.

The program of entertainment is an unusually attractive one. There will be a handicap golf tournament for novices, a baseball game between the supply men and the railway men, ladies' bridge tournament, and water sports. Many delightful short motor trips can be made from Bluff Point. Especially attractive is the steamer trip across Lake Champlain to Burlington, Vt.

Requests for hotel accommodations should be made to James P. Greaves, 243 Fifth Avenue, New York City. Arrangements for transportation can be made through J. R. Ellicott, Jr., 165 Broadway, New York City.

News Notes

Franchise Vote on July 15.—The qualified voters of the city of Houston, Tex., will vote on July 15 on the new franchise for the Houston Electric Company.

Men in Albany Prepare Demands.—The trainmen of the United Traction Company in Albany, N. Y., have decided to ask for an increase in pay calling for a minimum of 81 cents an hour and a maximum of 85 cents an hour. It is expected that the men on the Troy and other divisions will approve this proposed scale.

Men at Levis Strike.—Following upon the decision of the Public Service Commission to decline an increase in wages, the employees of the Levis (Que.) County Railway declared a general strike on June 10. The company claimed before the commission that it could not pay any increase in wages at the present rates of fares.

Men Gain 1 Cent an Hour by Arbitration.—The board of arbitration appointed to settle the controversy of more wages between the conductors and motormen and the Cumberland (Md.) Electric Railway has decided upon an increase of 9½ cents an hour to 52 cents. The increase dates from May 1. The company endeavored to compromise the demand for 60 cents an hour by offering the men 51 cents.

Service Resumed After Three Weeks Suspension.—The Butte (Mont.) Street Railway resumed service on June 1 under the arrangement made the previous day by Manager J. R. Wharton by which members of the workingmen's union in the employ of the company will receive $5.50 a day. The union was on strike to enforce a scale of $6. Butte had been without electric railway service for three weeks.

London Employees Strike.—During the week ended June 5 it was announced that the employees of the London (Ont.) Street Railway had been granted an increase of wages. It appears, however that the increase was contingent upon the City Council passing a by-law providing for an increase in fares. On June 6, the Council refused to pass the necessary by-law. As a result the men struck the next day.

Five-Cent Increase in Brockton.—An increase of 5 cents an hour has been granted motormen and conductors of the Brockton & Plymouth Street Railway, Brockton, Mass., by Receiver Gleason, on recommendation of C. W. Gifford, superintendent, the increase being dated from May 19. The raise affects about 50 men and makes their pay 52 cents an hour maximum and 46 cents minimum an hour.

Five-Cent Advance at Evansville.—The Public Utilities Company, Evansvill, Ind., has granted increases to trainmen of practically 5 cents an hour, effective June 1, when the old agreement expired. Regular employees will receive 50 cents an hour instead of 45 cents and operators of one-man cars will draw 54 cents an hour instead of 49. Interurban men will get 52 cents an hour instead of 47 cents.

Five-Cent Wage Increase.—A contract has been signed between the Little Rock Railway & Electric Company, Little Rock, Ark., and its union employees, whereby the present wage schedule was raised 5 cents an hour. The new schedule runs 46, 47, 48, 49 and 51 cents an hour for the men who have been employed one, two, three, four and five years, an increase of 5 cents an hour over the old schedule.

Compromise Offer at Bloomington.—D. W. Snyder, superintendent of the Bloomington & Normal Railway & Light Company, has suggested a new scale of 46, 48 and 50 cents an hour for the trainmen of the company. The employees are holding for a scale with a top of 57 cents an hour. This is 2 cents under the settlement arrived at with the employees of the Peoria Railway, also included in the Illinois Traction System.

Closed Shop Demanded.—A demand for a closed shop has been made on Manager E. C. Deal of the Springfield (Mo.) Traction Company by the railway union. There are nine men running on the lines who are not members of the union. Mr. Deal stated that the demand would be forwarded to the New York office with the recommendation that it be refused. The demand is separate from the one for higher wages now pending before the Public Service Utility Commission.

Wage Award Accepted.—The trainmen of the Boston (Mass.) Elevated Railway have ratified the wage award of the arbitrators granting them an increase in pay of 10 cents an hour. The award is retroactive to May 1. The company is allowed until Aug. 15 to settle the question of back pay. Extra compensation for Sunday work and one day off in seven with pay were refused to the workers. The conditions of the award were reviewed in the ELECTRIC RAILWAY JOURNAL for June 12, page 1222.

Power Station Not Affected by Strikes.—Despite a strike of members of the steam and operating engineers' union at the Rivesville, W. Va., power plant of the Monongahela Valley Traction Company, on June 1, the station is being operated. Office engineers and other employees of the company were called upon for emergency service. Negotiations between the members of the union and the company in regard to an increased wage scale have been pending since March 15. No disorder marked the break. An increase of 15 cents an hour was the demand made by the union.

Toronto Wage Arbitrators Chosen.—Justice F. S. Maclennan of the Supreme Court, Montreal, has been chosen by the Minister of Labor as chairman of the board of conciliation in connection with the wages, hours of service and other matters now in negotiation between the Toronto (Ont.) Railway and the employees. The board, which is composed of Justice Maclennan, acting as chairman; William H. Moore, general manager of the Toronto & York Railway, for the Toronto Railway, and John T. Vick, representing the railway employees, is now taking evidence on all matters in question preparatory to making an award.

Increase in Wages in Ottawa.—A general increase of 10 cents an hour to motormen and conductors and an increase of 20 per cent to all other employees with time and a half for overtime and time and a quarter for Sundays and legal holidays has been awarded by the board of conciliation which investigated the dispute between the Ottawa (Ont.) Electric Railway and its employees. The new rates for motormen and conductors will be 49, 51, 53 and 55 cents an hour for first, second, third and fourth year men respectively. Other employees will receive between 53 and 65 cents an hour. Spare men's wages are increased from $75 to $85 a month provided they report regularly.

Massachusetts Companies Propose Arbitration.—Arbitration has been offered the employees of the Springfield (Mass.) Street Railway and the Worcester Consolidated Street Railway by President Clark V. Wood of the New England Investment & Security Company, after three conferences had failed to bring a solution of the employees' demands for a 40 per cent increase in wages and an eight-hour day. Mr. Wood named Bentley W. Warren, Boston, as the representative of the companies. Officials of the railways declare that it would cost each corporation about $1,000,000 a year to meet the wage demands, and that neither company is in a financial position to carry this burden. James Vahey will represent the men.

Open Shop in Grand Forks.—The employees of the Grand Forks (N. D.) Street Railway have accepted the open shop agreement. The company will not discriminate against any employee because of union membership and the trainmen are not to discriminate against any person in the employ of the company because of his refusal to join their association. The company offered its men an increase of 10 cents an hour, effective June 1, with the open shop. This increase was offered for a period of one year, inasmuch as the system will be operated entirely with Birney safety cars after Sept. 1. The men asked for an increase in pay of 15 cents an hour, but after a meeting held on May 24 the wage scale offered and the open shop principle were accepted by the trainmen.

Financial and Corporate

Service-at-Cost Charges

Matter of Increasing Youngstown Operating and Maintenance Allowances to Be Arbitrated

In accordance with the provisions of the service-at-cost franchise now operative between the city of Youngstown, Ohio, and the Pennsylvania-Ohio Electric Company, arbitration is about to begin on the application of the company for an increase in the operating and maintenance allowances. There have been deficiencies in these allowances since the franchise went into effect which have been deducted from the stabilizing fund in accord with the provisions of the contract.

CITY ALLOWANCE INADEQUATE

The City Council recently passed a resolution which in effect stated that the company must keep within the allowances for operating and maintenance expenses. As this seemed to the company to be impractical, application was made for an increase. This the Council disapproved. An arbitration of the matter was therefore undertaken.

As its representative, the company selected J. H. Alexander, vice-president Cleveland Railway, and the city chose John Ruffalo, a local attorney. These two men finally agreed upon L. B. McKelvey, a prominent Youngstown merchant, as the third member of the board. The allowances fixed by the original draft of the contract are 22 cents per car-mile for operating expenses and 8 cents per car-mile for maintenance, renewal and repairs for motorcars, and 60 per cent of these sums respectively for the operation and maintenance of trailers.

ARBITRATION DECISION BINDING

There has been some talk in Youngstown that in case the arbitrators award an increase in these allowances to the company, the Council will not abide by the decision. The contract seems to be specific on this point, however, for it states that after delivery to the company and to the city, "the finding of the board of arbitration shall be binding and operative," apparently without any conditions.

The contract of the company also provides that in case of any failure on the part of the company to perform fully and in good faith any direction or award made by the board of arbitration, the rate of return on the capital value shall be reduced by such amount as the arbitrators may determine, but not to exceed 1 per cent below the 6 per cent rate set up by the contract, or on the other hand, in case of failure of the city, that the return on the capital value shall be increased not to exceed 1 per cent, these orders to continue only until, in the opinion of the board of arbitration, its order or direction has been carried out.

The contract provides that the board of arbitration shall make its finding within a period of twenty days, so that it is expected that a decision will be reached not later than the first week in July. Meantime, the stabilizing fund in Youngstown, with an 8-cent fare in force, has diminished to a sum below the minimum of $50,000, and the company has in effect the next higher rate of fare. This calls for a 9-cent cash fare. Presumably this will build up the stabilizing fund.

City Appoints Valuation Representative

William H. Weiss, Kansas City, Mo., has been appointed by the city of Knoxville, Tenn., as its representative in the joint appraisal of the property of the Knoxville Railway & Light Company ordered by the Tennessee Railroad and Public Utility Commission. The appointment of representatives for the company and the commission had been made previously. These appointments have been referred to before in the ELECTRIC RAILWAY JOURNAL.

Under the terms of his contract with the city Mr. Weiss is to put in such time as in his judgment is practicable and consistent with the best interests of the city. The city is to furnish a suitable work room, typists, local transportation and reasonable assistance from its engineering department to the end that the best interests of the public may be conserved.

The contract also provides that the cost of the appraisal work shall not exceed $7,000, and shall be paid in semi-monthly installments. Mr. Weiss is to be paid $75 a day for the first sixty days and $50 a day thereafter. His first assistant is to receive $40 a day for the first thirty days and $35 a day thereafter. Assistant engineers and computators will receive $20 for the first thirty days and $15 a day thereafter.

In addition to the per diem compensation the city agrees to pay traveling and reasonable hotel and living expenses while the engineers are engaged in the work. It will also pay for local transportation, stationery, printing, postage, etc.

The city has the right to retain 20 per cent of the semi-monthly estimated expenses until the completion and delivery of the appraisal report, whereupon it agrees to pay any balance that may be due. As stated previously, the contract provides that the total of such payment, however, must not exceed $7,000.

Complications in Dividend Case

Judge Willis Vickery of the Appellate Court on June 8 addressed a letter to Chief Justice Hugh Nichols of the Ohio Supreme Court, in which he recommended the assignment of another judge to hear the appeal of Edwin D. Barry from the Common Pleas Court in its decision sustaining the right to a referendum on the ordinance granting the Cleveland (Ohio) Railway authority to increase dividends to stockholders from 6 per cent to 7 per cent.

On June 4 attorneys filed affidavits of prejudice in the Court of Appeals against Judge Vickery, because of certain statements he is alleged to have made in regard to the justice of the referendum decision. Attorney Thompson stated that Judge Vickery had criticised him for having anything to do with the referendum suit.

Attorney Fisher said that Judge Vickery had told him that Judge Cull's decision was erroneous. This referred to the first decision when the referendum was enjoined for lack of a proper number of signatures to petitions. Another charge made was that the court did not furnish desired information about the docket.

In his letter to Supreme Judge Nichols, Judge Vickery said he was convinced that the attack of the attorneys was against him rather than the court and that he was receding from his position for this reason. He made a reply to the affidavits of the attorneys in which he denied being prejudiced in any way. He gave reasons for what was said in the conversations.

The following appellate judges have been assigned by Chief Justice Hugh L. Nichols of the Ohio Supreme Court to hear the appeal in the case: Judge William H. Middleton, Waverly; Judge James I. Allread, Columbus, and Judge Frank Patterson, Canton. The case was called on June 15.

Small Roads Do Better

According to the annual report of the Northern States Power Company, Chicago, Ill., for the year 1919 the electric railways operated in Fargo and North Fargo, N. D.; Moorhead and Dilworth, Minn., and serving an estimated population of 29,500 earned $126,395 as against $91,153 in 1918, equivalent to an increase of 38.8 per cent. Net earnings increased 295 per cent or from $805 to $3,186 in the same period. These gains were the result of additional business, there having been no rate increases during the year.

The railways have a total of 15.58 miles of track, of which 0.93 miles are sidings and turnouts. About half of this trackage, 7.26 miles, is paved, mostly with brick on concrete. The rolling stock consists of seven closed cars, five semi-convertible passenger cars, nine open passenger cars and twenty-one trailers, a total of forty-two passenger cars, one freight car and four service cars.

Indianapolis Doing Better

Company Meeting Current Interest Obligations on Time—Situation Now Appears Improved

All deferred coupon interest on the Indianapolis (Ind.) Street Railway and the Indianapolis Traction & Terminal Company's bonds has been paid. The company is now meeting its current interest obligations on time. These facts are pointed out in the annual report of the Indianapolis Street Railway (Inc. 1919). This report shows separately the results of the six months' operation Jan. 1 to June 30, 1919, under the lease to the Indianapolis Traction & Terminal Company, and the result of six months' operation July 1 to Dec. 31, 1919, under the operation of the new consolidated Indianapolis Street Railway, which took over the properties of the old Indianapolis Street Railway and the Indianapolis Traction & Terminal Company. The income account for the year ended Dec. 31, 1919, is shown in the accompanying table.

Total assets of the company are given as $23,442,206. Liabilities include $7,500,000 capital stock; $13,948,802 in bonds; current liabilities, $346,636; deferred liabilities, $404,932; reserve for injuries and damages, $164,346, and total surplus, $1,077,489.

The report reviews the steps leading up to the consolidation of the properties in Indianapolis, the validity of which was affirmed in the United States District Court of Indianapolis on Aug. 29, 1919, and the action of the Public Service Commission authorizing the consolidation. Quarterly dividends at the rate of 6 per cent per annum were shown to have been paid on the preferred stock Dec. 1, 1919; March 1, 1920, and June 1, 1920. The report reviews various improvements to roadway and track extensions made during 1919.

The report states that the new company has consistently followed the policy that the public should be fully informed as to its affairs. Comment is made on the courtesy campaign among car service employees in 1919. The report calls attention to the twenty-five double-truck closed cars purchased during the latter part of 1919 and the ten open cars which were rebuilt into closed cars during the winter.

The necessity of providing additional freight terminal facilities in Indianapolis in the near future is commented upon, and it is suggested that as soon as the service-at-cost plan is established, new terminals will be provided.

It is suggested that the financial status of the company should be established whereby the company would be permitted to earn sufficient revenue to provide for much needed improvements and obtain necessary loans from banks to make extensive additions and betterments. The company requires fifty additional double-truck pay-enter cars. The present car shops are totally inadequate, and new modern shops and equipment with additional storeroom capacity should be provided as soon as finances will permit. Additional carhouses will also have to be provided. The company has contemplated since 1912 the installation of substations throughout the city in order to effect saving in power distribution from the two main power stations, and these will probably be installed as soon as the necessary finances can be provided.

Increases in the wages of motormen, conductors, shop men and track men aggregated about $300,000.

Service at Cost Studied

Attention is called to the service-at-cost plan drafted by the Corporation Counsel of the city of Indianapolis, which is now before the Indiana Public Service Commission and which it is hoped will be placed in operation in the near future. The chairman of the Public Service Commission, the Corporation Counsel of Indianapolis, and officers of the railway recently visited in Cincinnati and Cleveland for the purpose of studying the practical working of the service-at-cost systems in these cities.

An inventory of the combined properties which were consolidated in the new Indianapolis Street Railway was made as of June 30, 1919. It shows physical property to the value of $18,641,151. These figures do not include expenditures for engineering supervision, insurance, interest during construction, legal expenses and taxes during construction, etc.

STATEMENT OF EARNINGS OF INDIANAPOLIS STREET RAILWAY

	Jan. 1 to June 30	July 1 to Dec. 31	Total for Year
Gross Earnings from Operation:			
Passenger receipts—city lines	$1,957,615	$2,244,435	$4,202,051
Track rentals interurban passenger cars	111,152	113,382	224,534
Track rentals interurban freight cars	9,177	10,463	19,641
Chartered cars	266	1,393	1,659
Advertising	13,914	13,914	27,828
Dog permits	98	123	222
Rent of land and buildings, miscellaneous	9,104	9,106	18,211
Rent of terminal building and stations	110,518	120,919	231,438
Rent of equipment	2,397	2,769	5,166
Miscellaneous income	5	5,566	5,572
Interest, discount, etc.	1,299	1,314	2,614
Total gross earnings	$2,215,550	$2,523,390	$4,738,941
Operating expenses:			
Maintenance of way and structures	$176,922	$252,648	$429,571
Maintenance of equipment	242,787	277,152	519,940
Operation of power plant	322,400	334,976	657,376
Operation of cars	601,790	679,591	1,281,382
General expense	203,653	166,274	369,927
Total operating expense	$1,547,554	$1,710,642	$3,258,197
Total net earnings	$667,995	$812,747	$1,480,743
Less taxes	162,000	239,806	401,806
Total net earnings less taxes	$505,995	$572,941	$1,078,936
Deductions:—Bond Interest:			
Interest on $4,000,000 Citizens Street Ry. 5's	$100,000	$100,000	$200,000
Interest on $4,987,000 Indianapolis St. Ry. 4's	99,740	99,740	199,480
Interest on $3,833,000 Indianapolis Traction & Terminal 5's	95,825	95,825	191,650
Interest on $200,000 Broad Ripple Traction 5's	5,000	5,000	10,000
Interest on trust equipment notes	5,658	4,941	10,600
Interest on Indianapolis car equipment pref. stock		2,500	2,500
Interest on notes	19,814	1,769	21,583
Office maintenance Indianapolis St. Ry. (1899)	1,776		1,776
Total deductions	$327,814	$309,776	$637,590
Surplus	$178,181	$263,165	$441,346
Deduction from Surplus:			
Indianapolis Street Ry. sinking fund not paid but expended for construction year 1919			$60,000
Indianapolis Trac. & Term. Co. sinking fund not paid but expended for construction year 1919			60,000
Dividend paid Dec. 1, 1919, on $5,000,000 preferred stock for quarter June 1 to Aug. 31, 1919			75,000
Dividend accrued on preferred stock not paid in 1919			100,000
Total deduction			$295,000
Balance			$146,346

Grafton Property Ordered Sold

At a meeting of creditors in the bankruptcy proceedings of the Grafton (W. Va.) Traction Company and its affiliated company, the Grafton Light & Power Company, in the office of Referee in Bankruptcy O. E. Wyckoff, it was ordered that the property be sold without delay free and clear so as to close up the case.

John M. Peary, representing the Central Union Trust Company, New York, and Nicholas Brady, New York, representing holders of mortgage liens upon the properties for large sums of money, insisted that the sale be made subject to these liens. Mr. Peary petitioned Judge A. G. Dayton of the United States District Court for an appeal from the decision of the referee.

At the meeting of the creditors it was brought out that there is an accumulation of $20,000 in the hands of the trustee derived from the operation of the two plants during the pendency of the present proceedings. It was also disclosed that both the railway and electric equipment is badly in need of rehabilitation.

An appraisal of the two properties made at the beginning of the proceedings nearly two years ago fixed the total value of the properties at that time at $232,634 without including the franchise. So materially has the valuation decreased since then that the referee has ordered an amended report to be filed showing the present value of the property, before it is offered for sale.

$100,690,962 Detroit Value

Dean Cooley of the University of Michigan has completed the appraisal of the property of the Detroit (Mich.) United Railway which he made for the Michigan Public Utilities Commission. This appraisal covered the properties as they existed on July 1, 1919, since which time and up to March 31 this year the company has expended in addition $834,113 within the one fare zone and $689,692 outside the one fare zone.

According to the appraisal at 1919 prices it would have cost $100,690,962 to reproduce all these properties, of which $55,840,184 would have to be spent in the city of Detroit. Upon the average of prices prevailing between the time of the previous appraisal and this one the cost of reproduction is fixed at $81,538,136 for all the properties and of $46,202,235 in Detroit.

Two other forms of appraisal were made. One took the existing properties of 1915 and prices prevailing then, except in the item of real estate, with all added property at the 1915-19 average of costs. This gave the value of $63,303,962 for all the properties, of which the city part was $36,228,918. The other form was to take the actual appraisal of 1915 and add to it the additions made at the costs as shown by the vouchers, bills and reports of the company. This gave the system a value of $57,969,062, of which the city's part was $33,050,255. The report points out that the value of the same land in 1915 had increased by more than $4,000,000 in 1919, due to the greatly increased land values in Detroit and Flint.

These figures cover merely physical property. Intangible values, such as organization, going concern, etc., are to be reported upon later.

The appraisers in no case found the property to be in a condition less than 83½ per cent. In some cases the condition was more than 90 per cent. The average was better than 88 per cent.

Emergency Fleet Railway Seized

Deputy Sheriff James Hewitt of Gloucester County, N. J., has levied on the railway line of the Emergency Fleet Railway Corporation of New Jersey, which runs from Gloucester to Yorkship Village, where the government built 1,500 homes during the war for shipyard workers. The levy was made to collect a judgment of $9,810 plus $56.70 costs obtained by Mary B. Chew and Martha M. Brown, Philadelphia, for land seized by the government corporation when the railway was built. The levy, however, will not affect the operation of cars over the railway, which is leased by the Public Service Railway operating from Gloucester to the shipyard village. Deputy Sheriff Hewitt seized the rails, ties, stringers, poles, wires, apparatus and personal property of every kind of railway, including the bridge which spans the tracks of the West Jersey & Seashore Railroad. Unless the judgment is satisfied the railway will be sold on June 18.

Financial News Notes

City Elects P. R. T. Directors.—Colonel Sheldon Potter and Ernest T. Trigg have been elected by Council as the city's representatives on the board of the Philadelphia (Pa.) Rapid Transit Company.

Taxes in Default.—The time allowed by the city treasurer of North Adams, Mass., to the Berkshire Street Railway for the payment of its 1918 real estate tax to avoid having its property sold at public auction has expired without the company having made a settlement.

Road at Valdosta Sold.—D. A. Finley, Valdosta, Ga., has purchased the Valdosta Street Railway from C. M. Killian, who bought the system some time ago, and under whose management improvements were instituted and the line placed on a paying basis. Mr. Killian expects to reorganize the company with the aid of local capitalists and further improve and expand the line.

Colorado Road Suspends—The Colorado Springs & Cripple Creek District Railway, Colorado Springs, Col., suspended operation on May 17. Abandonment of service followed a plea by Judge Horace G. Lunt, attorney for the company, to the federal court for permission to discontinue. Service was abandoned primarily because of lack of freight shipments and consequent loss in operating revenue.

Line in Camden Abandoned.—The Public Service Railway, Newark, N. J., has filed plans with the Common Council of Camden, N. J., for the abandonment of tracks on Ferry Avenue, Camden, the dividing line between Camden and Woodlynne. The company will now divert the cars to the Haddon Heights line. The Ferry Avenue line is in poor condition and the company does not care to rebuild it.

Car Trust Certificates Authorized.—The Empire State Railroad Corporation, Syracuse, N. Y., has been granted permission by the Public Service Commission to issue $28,000 in 6 per cent equipment bonds under a car trust lease agreement with the Osgood Bradley Car Company. With the proceeds of this sale and with $9,016 from the treasury the company is to purchase six one-man cars for use on its city lines in Oswego.

Court Approves Segregation. — The Superior Court at Providence, R. I., has decreed that the properties of the Providence & Danielson Railway and of the Sea View Railroad shall be turned over by the receivers of the Rhode Island Company to the owners of those lines on Sept. 7. The receivers told the court that the two leased lines had been operated at a loss and they did not care to burden the Rhode Island Company with their maintenance. The plea to the court in connection with this matter was referred to in the ELECTRIC RAILWAY JOURNAL for June 12, page 1224.

One New Indianapolis Director.—At the annual meeting of stockholders of the Indianapolis (Ind.) Street Railway, held on June 9, all of the directors of the company were re-elected with the exception of Charles S. Becker, who was succeeded by Henry H. Hornbrook. Following the stockholders' meeting the board of directors re-elected the officers. Dr. Henry Jameson was re-elected chairman of the board. The directors chose the following executive committee: Dr. Henry Jameson, chairman; Henry C. Thomson and Winfield T. Durbin. Dr. Jameson and Mr. Thomson were re-elected to the executive committee and Mr. Durbin succeeded Mr. Becker, the retiring director.

Financial Readjustment Indicated.—The Montgomery Transit & Light Company, Montgomery, Ala., recently filed a notice increasing its capital stock from $1,000,000 to $1,500,000. This is taken to presage a financial readjustment for the company. Jay R. Grier, C. P. Sterner and Frank A. Harrigan, Philadelphia, are acting as a committee to look after the bondholders' interests. It is stated that funds deposited with the trustee were not sufficient to pay all of the coupons due on Dec. 1, 1919, on the $200,000 of 6 per cent bonds. It is said that in order to meet the operating and financial conditions which confront the company those in control of the property plan to offer the bondholders in exchange for their bonds an equal amount of 7 per cent preferred stock with a bonus of half the number of shares of common stock.

Terminal Railway Sold.—Attorneys for Hyney, Emerson & Company, Chicago, Ill., said to represent the committee of bondholders of the Springfield Terminal Railway & Power Company, Springfield, Ohio, on June 5 purchased the property of that company at receiver's sale at the upset price of $300,000. It is stated that new bonds in the sum of $250,000 and $125,000 of preferred stock will be issued under the reorganization plan. The bonds, it is understood, will go to the former security holders, while the stock will be sold to residents along the line. The road connects Springfield and Troy. It was built by the late Governor Asa S. Bushnell in 1903. Cars are taken from the steam roads some distance outside of Springfield and switched through the streets to the various industries. It was Governor Bushnell's intention to extend the road to Fort Wayne, Ind. The Bushnell estate disposed of its interest in the property four years ago. There are four grain elevators on the line. It has physical connections with the Baltimore & Ohio Railroad at Troy.

Traffic and Transportation

Mr. Witt Praises Springfield

Traction Expert, Reporting for City, Suggests Some Changes, but Finds Road Ably Managed

The City Council of Springfield, Mass., on June 14 accepted the report of Peter Witt, transportation expert, on his recent investigation of the Springfield Street Railway system. Mr. Witt completed the investigation during the week of June 7-12. His report recommends several drastic changes in the traffic system of the city during the rush hours of the afternoon. The report was accepted.

Vehicular traffic on Main Street would be prohibited between 4:30 and 6:30 in the afternoon under Mr. Witt's scheme. During those two hours he would route southbound traffic through Cypress to Water Street to State and back again on to Main, making State Street a one-way thoroughfare during the time. Northbound traffic he proposes to send east of State Street through Dwight to Liberty to Main, making Dwight and Liberty Streets one-way streets during these two hours.

MR. WITT'S REPORT

Practically all of the detailed suggestions made by Mr. Witt with respect to rerouting are only of local interest. His report, except for these changes, follows susbtantially in full:

The investment in road and equipment, including land and buildings, was on Dec. 31, 1919, $7,534,067. Reducing this to a mileage basis, it means a capital charge of $42,000 per mile. This is remarkably low.

Paradoxical as it may seem, it is nevertheless true that while all cars operating on base schedules are over-seated, most of the lines are under-serviced. The headway of fifteen minutes must be reduced. Such a reduction will not only improve the service for the car rider but will, in my opinion, give the company what is most sorely needed—more revenue.

The company must cease wasting the car riders' money in the employment of conductors on cars carrying so few riders per trip. A fare box placed beside the motorman and making an entrance and exit at the front door of the car is all that is needed or required to make possible the change suggested.

The company has not only met the requirements so far as the extension of its lines are concerned, but also with few exceptions, has its tracks in a good state of upkeep and repair.

DOUBLE-TRACK LINES NEEDED

Improvements nevertheless can and must be made, for the city is too large in numbers to be properly served with single-track operation. All streets having width sufficient to carry double tracks must be so provided. In all streets the width of which makes double tracks impossible, additional turnouts must be installed not only in order to reduce to a minimum the nuisance the car rider now endures in long waits on present turnouts, but to make possible the increased service the needs of the future will require.

The purchase of additional cars when needed and the replacement of its present cars when the same become imperative, should be restricted to smaller cars for base table operation and large center-entrance trail cars for peak load requirements. The use of smaller cars for base table operation will make possible a more frequent service without a corresponding increase in operating expense.

The use of trail cars means a smaller capital investment and has the additional advantage, by reason of its construction, of being able to carry more passengers than a motor car of equal length.

A speed of 9 m.p.h. is shamefully slow. It should be changed at once and at least to 11 m.p.h. for base table operation and not less than 10 m.p.h. during the morning and evening tripper service.

To accelerate the movement of the cars and at the same time make easier the payment of fares the system of fare collection should be changed from pay enter to pay leave.

Total receipts for last year amounted to $3,064,636. There was paid out for operation, plus interest on funded and unfunded debt and taxes, $2,818,355, leaving a net for dividend purposes, but not paid out, of $246,281, approximately 5 per cent on its capital stock. * * *

COMPANY WELL MANAGED

The company is properly officered, conservatively managed and its employees wisely directed in the discharge of their duties, and all at an insignificant cost to the car riders. The item covering expenditures for officers' salaries as apportioned to the property here under investigation totaled last year $25,364.

If all the recommendations of car rerouting are carried out all cars will reach the car riders' objective—Main Street. I know it will be argued that Main Street, as it is, is too much congested to permit the bringing in and through it of more street cars. I will grant that in the evening rush perhaps there is congestion to the extent of unduly slowing down of traffic movement. Removing the street cars will not remove the trouble for, to the extent that street cars are removed, other vehicles will be invited to take the place of the removed street cars. What is the remedy? Remove the flexible traffic, the autos and horse-driven vehicles. * * *

Last, but not least, is the car rider; don't blame the company for everything that happens. Most of the interruptions to the regularity of the service are beyond its control. In the rush period don't stand on the platform when there is plenty of room inside. Move quickly and promptly and try always to have the exact fare ready.

Company, city, car riders, co-operate, for it is only through co-operation that it will be possible to give Springfield what Springfield is entitled to, a system and service equaling the best and superior to most to be found anywhere.

Better Traffic Regulation Proposed

Action taken by the local transportation committee of the City Council of Chicago, Ill., on June 3 has paved the way for better traffic regulations in Chicago. The committee decided to recommend to the Council an amended ordinance which would prohibit all parking of vehicles along car lines in the congested district from 7 a.m. to 7 p.m. At present this prohibition extends from 7 a.m. to 10 a.m. and from 4 p.m. to 7 p.m. In the non-rush hours vehicles are permitted to stand at curbs 30 minutes. The result has been that many of them remain stationary all day. Even in the rush hours the police have found it impossible to clear the streets It is hoped that the amended ordinance would make it possible for cars to make better schedule time and for all moving vehicles to clear the loop district more quickly. The Council committee is also considering the advisability of one-way traffic on certain streets.

Jitney Regulation Upheld

Federal Court Holds a License Is Not a Franchise—City Has Control of Its Streets

The city of Seattle's jitney ordinance, attacked in the federal courts by the Jitney Drivers' Union, has been upheld in all respects in a decision filed in the federal court recently by three United States federal judges, who heard the case on May 31. As a result, the city may fix schedules, routes, terminals and fares for jitneys.

Drivers contended that the real purpose of the ordinance was to run them from the streets, as the council was likely to fix routes on which they could make no money, outline impossible schedules, and limit fares to 10 cents at all hours.

COURT DENIES INJUNCTION

The ruling of the three federal judges holds that the city has control of its streets, and can legislate with relation to their use in a reasonable manner. The ordinance is held to be reasonable and proper. The decision also denies the petition for an interlocutory injunction, brought by a representative jitney bus owner, and grants a motion of City Attorney George A. Meagher to dismiss the action brought by the jitney driver in the form of complaint in equity.

The decision states, in part:

The labors of this court upon the issue before it are simplified by the decision of the Supreme Court of Washington, whose decision upon construing a municipal ordinance are binding upon this court. The exclusive control of the streets of the city vest in the defendant is provided by Sec. 11, Art. 11 of the State Constitution.

There is no merit in the contention that the city, being the owner of the railway in the city, acts in relation to this issue in its proprietary or business relation, and that in such relation it has a status as an individual or private corporation, and may not for the purpose of advancing its proprietary or business interest legislate with relation to the use of its streets by the plaintiff, where the results of such legislation would affect beneficially its proprietary interest.

No right was acquired by the plaintiffs by reason of establishment of route termini, and the operation of jitney buses over such routes; nor did privilege accrue by reason of the fact that he invested money in jitney buses, nor is there force in the contention of the plaintiff that the issuance of a vehicle license for permission to operate a vehicle for hire confers upon the plaintiff the right to operate such jitney bus in violation of the ordinance of the city. A license is not property, or is it franchise.

DEATHBLOW TO JITNEYS

It is conceded that if the regulations now outlined are approved by the Council, they will result in, if not actual elimination, certainly a large reduction in the number of jitneys now operating on all lines. Downtown terminals limited to points outside the business districts, making it impossible for jitneys to traverse the business district, are regarded as almost a deathblow to the jitney business.

The attorney for the jitney drivers' union states that he cannot say whether the jitney drivers will accept the provisions of the jitney ordinance, although a number of drivers have signified their willingness to try operating under its restrictions.

Seven-Cent Fare in Seattle

City Council Acts to Relieve Municipal Railway—Deficit Estimated at $83,428 Monthly

The City Council of Seattle, Wash., has adopted by a vote of 7 to 1 a report of the committee of the whole, recommending for passage the 7-cent fare ordinance introduced by Councilman R. H. Thomson. Mayor Hugh M. Caldwell has announced that he will sign the bill, which contains an emergency clause making it effective immediately. The ordinance provides that transfers shall be issued without charge, and that fifteen tickets or tokens may be purchased for $1. School children will pay a 3-cent fare, going to and from school, and two will be permitted to ride for one nickel.

IN view of the prospective fare increase the municipal railway fund was not placed on a warrant basis on June 10, as City Treasurer E. L. Terry had notified the Council would be necessary if fares remained at 5 cents. At a recent conference attended by Mayor Caldwell, the city advisory board, members of the Council, D. W. Henderson, general superintendent of railways, and officials of the Seattle Clearing House Association, called to consider the railway finances in connection with the proposed warrant basis, the decision to increase the fare was reached.

Will Yield 40 per Cent More

Superintendent Henderson presented figures to show that the fare increase would result in an added revenue of approximately $164,078 a month, a gain of 40 per cent over the present income of the railway. The estimated monthly operating revenue is placed at $574,261 under the new fare. Mr. Henderson presented the following figures showing the monthly income under various fares: Revenue at 5 cents, with free transfers, $410,186; at 5 cents, no transfers, $475,255; at 6 cents, with free transfers, $492,224; at 6 cents, with 1-cent transfer charge, $50,238; at 7 cents, with 1-cent transfer charge, $587,275.

Mr. Henderson estimates that it will require $513,428 a month to operate the railway during the remainder of the year, or a total sum of $3,594,001, exclusive of the sum set aside to redeem bonds. The various monthly cost items as estimated by Mr. Henderson are as follows: Maintenance, $45,000; equipment, $55,000; power, $60,000; transportation, $210,000; traffic department, $250; general and miscellaneous, $27,750; interest on bonds, $71,562; depreciation, $43,886. Mr. Henderson estimates the deficit under which the system is at present operating at $83,428 a month.

Mayor Caldwell's Attitude

Mayor Caldwell, who had championed the plan to increase the fare to 6 cents, charging the other 1 cent needed to general taxation, stated that he had reconsidered his views, and was wholly in favor of the 7-cent fare, dispensing with an increase in taxation. In discussing the matter, he said:

> Regardless of what we ought to do in theory, the rate of taxation makes it inadvisable to place an additional burden on the tax rolls. According to statistics furnished me by the county assessor, the tax rate this year was over 70 mills. Next year it will be 80 and 85 mills, without including any provision for a street car deficit. The assessed valuation of the street railway has been $5,640,000. The 1920 assessment will sustain this as a loss. The amount so lost in taxes is about $400,000. The argument that the street railway is a benefit to the entire city and therefore a part of the burden should be borne by taxpayers is offset by the fact that we lose that $400,000 in taxes, which will have to be spread on the general tax rolls.
>
> Furthermore, the residents of Rainier Valley pay a 7-cent fare in addition to their taxes, and if they paid taxes to support the street railway, they would receive none of the benefits of the general tax rolls.

The Mayor outlined his position more fully in the following letter:

> The holders of the fifteen millions of bonds must now look to the receipts from the operation of the street cars for their money, both principal and interest. I am unwilling to place these bondholders in any better position than they now are. Should we undertake to transfer the payment of the principal as an obligation on the general fund, it would make the bonds gilt-edge security and would probably enhance their value $1,000,000 or more.
>
> Under present changing conditions in modes of transportation no person is able to say that ten years from now transportation on our surface railways will not be as obsolete as horse-car transportation is now. Under the ordinance consummating the purchase, the city obligated itself to charge a sufficient rate to pay the principal and interest.
>
> Beyond this, however, its obligation does not extend. Consequently, if ten years from now—to use an arbitrary date for purposes of illustration—the present mode of travel is so obsolete that people are unwilling to use it, it may be necessary to continue the increase of rates in an effort to obtain enough receipts to make the payments, until ultimately the rate charged would further deter the use of this mode of transportation.
>
> We could then no longer operate the lines; the operation supplying all demands would be so limited as to produce insufficient revenue to make the payments to the bondholders. Under such a contingency the bondholders would doubtless be in a precarious position, and I know of no way in which they could enforce the collection of the amount due on the bonds. Consequently I am unwilling to adopt any course now that would transfer their obligation to the general fund, making it gilt-edge security.

Court Halts City Buses

Three municipal bus lines operating in competition with the Brooklyn (N. Y.) City Railroad discontinued service on June 12 as the result of a decision handed down by the New York Court of Appeals. The court sustained the action of Supreme Court Justice Cropsey, who some time ago issued a temporary injunction against the buses, holding their operation to be unlawful. Supreme Court Justice Callaghan recently announced that he would make the injunction permanent.

The Brooklyn City Railroad brought suit against the City of New York several months ago in an effort to have the buses halted. Grover A. Whalen, Commissioner of Plant and Structures, in charge of bus operation, contended that an emergency existed for the installation of the bus service. The Court of Appeals decision leaves only the Lafayette Avenue line operating in Brooklyn. The railway did not seek an injunction against this line as it did not regard it as a competitor.

The Appellate Division of the Supreme Court heard argument on June 11 on the appeal from an injunction granted by Justice Lydon restraining the operation of buses on routes paralleling the Eighth and Fourteenth Street crosstown lines of the New York Railways. Decision was reserved.

Seeks Milwaukee Rise

Company Presents Case for Higher Fare—President Beggs Points Out Need of Extensions

That an increase in fare would be necessary to enable it to pay increased wages to its railway employees was the claim made by representatives of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., at a hearing on June 11 before the State Railroad Commission. A wage increase was recently recommended by the State Board of Conciliation and under the Wisconsin law the Railroad Commission must now determine the need of additional revenue to meet the increase.

Testifying for the company John I. Beggs, president, called attention to the great increase in the cost of labor and materials, to the difficulty of raising the capital needed and to its present high cost. He testified that the 1920 budget of the company called for the expenditure of over $9,500,000, a large part of which is to be spent in connection with the construction of a new and much-needed power plant. "We have got to spend that much whether we raise it or not," Mr. Beggs replied when questioned on this subject.

Many Extensions Needed

He also called attention to the vital need of extensions to certain industrial plants. These, he said, could not be made under present conditions unless the industries affected purchased sufficient securities of the company to pay for the cost of construction. Incidentally, Mr. Beggs pointed out that the suburbs of Milwaukee are an integral part of the city and should therefore be annexed to it. "They are receiving the benefits and they should not be selfish and remain outside," he said.

Testimony was introduced by the company to show the probable cost to it of the wage increase recommended. Testimony was also given regarding the difficulty of obtaining a sufficient coal supply and regarding the present high cost of coal.

The city of Milwaukee was represented at the hearing by City Attorney Williams and his staff. The hearing was adjourned until June 21 to permit the outlying towns and villages to be heard, as it is contended that a change in fare in Milwaukee would in all probability affect the rates on the suburban lines.

Court Scores D. U. R.

Judge Jayne Says City Met Company More Than Half Way on Fares —Informal Agreements Urged

The Detroit (Mich.) United Railway's announced plan arbitrarily to sell five tickets for 30 cents, which arrangement was not part of the agreement reached by the company and the city in Judge Jayne's court, caused a split in negotiations and Mayor Couzens declared that all negotiations were off and that the city would withdraw its acceptance of the new agreement. The Mayor saw in the plan to sell five tickets for 30 cents a device to avoid selling the strips of nine tickets for 50 cents, the ticket rate agreed upon.

Plan Encounters Opposition

The announcement concerning the sale of five tickets for 30 cents appeared in the cars the day before the 6-cent fare was scheduled to go into effect. After city officials were advised of the plan, communications were sent to the attorneys of the railway and after unsuccessful attempts to have the five-ticket strips dispensed with, Judge Jayne returned from Chicago and went immediately to the court room.

The five for 30 cent strips were finally withdrawn after the Judge had denied having stood sponsor for the issuance of such strips or even having heard of them until after the company had put them on sale. It was claimed by the Mayor that in some instances people who boarded the cars and asked for the nine for 50 cent tickets were offered the five for 30 cent rate instead by the conductors, who said they did not have any of the cheaper tickets.

The court agreed with the contention of the city that the five for 30 cent tickets were confusing to the public. It was held by the Judge that the city in receding from its demand for a rebate slip on cash fares, and asking only for rebate slips on tickets, had more than met the company half way.

Both sides agreed that the fare determined as the proper one to give the company a reasonable return, if it is found that the court has jurisdiction, would merely be a recommendation by Judge Jayne which neither side could be forced to accept and that all the legal rights of both sides would be preserved, the city making no grant of fares but simply announcing it would not oppose the rate fixed.

Informal Agreements Suggested

The Judge said he understood that his court was to be available as a sort of permanent, but informal forum where the matter of fixing proper fares could be thrashed out at any time. The agreements could be reached, he said, in the same manner as the present one with both sides retaining their legal rights by making the agreement wholly informal.

Rebate slips are attached to the nine-ticket strips and will be redeemed by the company if the permanent rate should be set lower than the temporary rate now in force. There will be no refund coupons with cash fares.

In commenting on the situation the company states that a tie-up of the city's transportation facilities with attendant disorder and inconvenience and suffering was avoided by the company agreeing to continue operations at a very substantial loss. This was done by assenting to put into effect a maximum fare of 6 cents and a minimum fare of nine tickets for 50 cents with a continuation of existing transfer regulation. The company agreed to this because of the assurance that in or connected with the pending suit before Judge Jayne it would have a just and lawful rate of fare determined.

Transportation News Notes

Traffic Survey for Kansas Side.—A survey of traffic conditions in Kansas City, Kan., is now under way, under direction of John A. Beeler. Mr. Beeler has been making an exhaustive study of the traffic situation in Kansas City, Mo.

Ten-Cent Jitneys in Atlantic City.—The City Commissioners of Atlantic City, N. J., have issued an order allowing jitneymen to raise fares from 5 cents to 10 cents. School teachers and students will be allowed to ride for 5 cents.

Approves Glen Cove Rise.—The City Council of Glen Cove, N. Y., has adopted a resolution approving the modified franchise of the Glen Cove Railroad permitting an increase in fare to 7 cents. The franchise has been accepted by the Nassau County Supervisors.

Hearing on Atlanta Plea. — The Georgia Railroad Commission convened on June 8 to hear the petition of the Georgia Railway & Power Company, Atlanta, for permission to charge an 8-cent fare on its city and suburban lines. The company also seeks permission to increase its rates for light and power.

Three Cents a Mile on Ohio Line—Fares on the lines of the Columbus, Marion & Bucyrus Railway, Marion, Ohio, were raised to 3 cents a mile on May 25. No reduction is made for round trip tickets, making the fare from Marion to Bucyrus, terminals of the railroad, 54 cents. The fare was formerly 45 cents.

Seven Cents in Helena—A 7-cent cash fare with four tickets for 25 cents will go into effect on the lines of the Helena Light & Railway Company, Helena, Mont., on July 1. The increase was authorized in an order handed down by the State Public Service Commission on May 24. At the same time the company was authorized to increase lighting rates. The present fare is 6 cents.

Eight Cents in Kewanee.—The Illinois Public Utilities Commission on May 28 issued an order authorizing the Galesburg & Kewanee Electric Railway to charge 8-cent fares on its lines. The company was ordered to sell five tickets for 35 cents. The new rate applies to the lines in Kewanee and Wetherfield. The company has been charging 7-cent fares in these cities since August, 1919.

Wants More in Portsmouth.—A petition has been forwarded to the New Hampshire Public Service Commission by the Portsmouth Electric Railway, Portsmouth, asking for permission to increase its fares from 7 cents to 10 cents, effective July 1. The Portsmouth Electric Railway is a subsidiary of the Boston & Maine Railroad.

Voters Approve Higher Fare.—At a referendum on May 28 the voters of Moorhead, Minn., approved an increase in the fare charged by the Northern States Power Company, Fargo, N. D., from 5 cents to 7 cents. The company operates in Fargo and Moorhead. Some time ago it applied to the City Councils of these cities for financial relief.

Seven-Cent Fare in Peoria.—The Peoria (Ill.) Railway began charging a 7-cent fare on June 3. The new rate was authorized by the State Public Utilities Commission as a temporary measure of relief for the company, which had asked for a 10-cent cash fare. It will stand pending the fixing of a permanent rate. The fare was formerly 6 cents.

Asks More in Colorado Springs.—A 7-cent fare was asked by the Colorado Springs & Interurban Railway, Colorado Springs, Col., in a petition filed recently with the City Council. The Council requested the company to furnish operating figures before acting on the fare plea. The company stated in its petition that it could not raise trainmen's wages unless fares were increased. It now charges a 6-cent fare.

Seven Cents in Rutland.—Cash fares on the lines of the Rutland Railway, Light & Power Company, Rutland, Vt., were raised from 6 cents to 7 cents on May 20. The commutation tickets which sold in books of 50 tickets for $2.70 now cost $3.15 and the school books which also contained fifty tickets, and which formerly sold for $1.25, have been raised to $1.50. The company has also raised its express rates.

Uniform Fare Collection Sought.—A meeting was recently held by the patrons of the Cumberland County Light & Power Company, Portland, Me., in regard to the adoption of a uniform system of fare collection on the various lines. On some lines the fares are collected when the passengers leave the car, while on other lines the fares are taken up as riders board the car.

Asks 8 Cents in Wilmington.—The Wilmington & Philadelphia Traction Company, Wilmington, Del., has peti-

tioned the Wilmington Board of Public Utility Commissioners for permission to charge a straight 8-cent fare and to discontinue the sale of commutation rates. The company is now charging a 7-cent cash fare with four tickets for 25 cents. In its petition the company contends that to procure the revenue to which it is entitled it would require a fare of 9.049 cents.

Denies B. R. T. Plea.—Public Service Commissioner Lewis Nixon of the First District has denied the petition of Lindley M. Garrison, receiver of the New York Consolidated Railroad, New York, N. Y., for a hearing upon the application for an increase in fare from 5 to 8 cents, made to the commission some time ago. When the application was filed with the commission its formal filing was directed by Commissioner Nixon, and no other action was taken. The company has announced that it will appeal to the courts for a decision as to the commission's power to act upon the application.

Wants More in Waterloo.—The Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa, has applied to the Waterloo City Council for an increase in fare from 5 to 10 cents. The company agrees to furnish twenty-five work tickets for $2 and twenty children's tickets for $1. It also agrees to purchase twenty safety cars as soon as the increase is granted and to take other steps to improve the service. The company presented a statement showing the receipts and expenditures during the past year. The City Council has authority to grant an increase in fares.

New Transfer for Albany.—The United Traction Company, Albany, N. Y., is now using the "line to line" transfer system. Each line has its individual transfer, upon which is printed a list of all the lines to which it is possible to transfer. The names of these lines are printed in separate blocks and when a passenger requests a transfer to a certain line the conductor punches the block in which that line is printed, thereby making the transfer good for transportation only on that line. The company has also introduced the "near side" stop on its lines.

Must Obey Traffic Rules.—All cars of the Portland Railway, Light & Power Company, Portland, Ore., will hereafter be required to travel at the same speed as automobiles in all sections of the city, except where the company has exclusive right of way, according to recent announcements of the traffic department. Patrolmen are instructed to arrest all motormen caught exceeding the speed limit. The new ruling limits car speed to 20 m.p.h. Electric car operators will also be compelled to adhere to the low speeds provided for automobiles in passing schools, crossing bridges and in other similar restricted districts.

Six Cents in Little Rock.—A 6-cent fare became effective in Little Rock, Ark., on June 3. The Arkansas Corporation Commission on June 1 issued an order granting the petition of the Little Rock Railway & Electric Company. On May 17 the City Council adopted an ordinance amending the contract of the company with the city so as to permit the company to charge a 6-cent fare, as far as the city was concerned. The assent and formal order of the Arkansas Corporation Commission was necessary before the ordinance could be put into effect. The company thereupon filed a petition with the commission.

Hears Springfield Plea.—Judge D. E. Blair, representing the Missouri Public Service Commission, held a hearing recently in Springfield on the application of the Springfield Railway & Light Company for permission to increase its revenue in order to grant a wage increase to its employees. The application requested permission to increase fares from 6 cents to 7 cents, with a 2-cent charge for transfers. Employees are to receive an increase of 4 cents to 6 cents an hour. Tickets are to be sold at the rate of five for 30 cents. Sanderson & Porter, consulting engineers of New York, are now making an appraisal of the property of the company.

Seeks Rise for Shore Line.—R. W. Perkins, receiver of the Shore Line Electric Railway, Norwich, Conn., has applied to the Public Utilities Commission of Rhode Island for an increase in the rate of fare on a number of the company's Rhode Island lines. Since October 1, when the property passed into the hands of the receiver, the lines in Rhode Island, as well as some in Connecticut, have been operating at a direct loss, exclusive of any question of taxes or interest. Mr. Perkins states that he has several times been on the point of asking the court to suspend operation on these lines but that, appreciating the importance of a continuance of transportation service to the communities affected, he has decided to test the property through an increased fare.

Galveston Hearings Concluded.—Hearings on the application of the Galveston (Tex.) Electric Company for an injunction restraining the city of Galveston from interfering with collection of a 7-cent fare have been concluded before Judge J. C. Hutcheson of the United States District Court. Judge Hutcheson has taken the application under advisement, intimating that he will appoint a master in chancery to hold further hearings on questions of valuation and equitable return on the property. The company in its petition and in argument before Judge Hutcheson contended that the present 5-cent fare imposed by the City of Galveston is confiscatory, in that on a valuation of $1,096,000 for the railway department it provides a return of between 1 and 2 per cent. Segregation of the railway and lighting departments is asked by the company in order that each may hear its true relation to the other.

New Publication

"Service-at-Cost Plans"

By Harlow C. Clark, Editor of *Aera*. Published by American Electric Railway Association, 8 West 40th Street, New York, N. Y., 1920, 315 pages.

Nothing could more clearly show the great changes which have taken place in the conceptions of the functions of an electric railway during the past twenty years than Mr. Clark's book on service-at-cost franchises. The popular view of an electric railway a decade ago, both in and out of the industry, was that of a private enterprise whose use of the public streets was merely incidental.

The modern view is that an electric railway is a public enterprise, and the fact that its management is in private hands is purely incidental. That is to say, private management is preferred because it is conducive to economy and good service, but the service supplied is just as necessary to a community as many activities under the direct management of the public. From this modern point of view, some service-at-cost plan is the only logical form of franchise, whether it is the indirect system represented by commission control of rates or the direct plan with automatic methods for determining fares and rate of return. It is this fact that makes Mr. Clark's book a welcome addition to the literature on the electric railway.

Six Principles Laid Down

"Service-at-cost Plans" is divided into three parts. The first, or that up to page 67, consists of nine chapters in which the author discusses under such chapter headings as "Risk of Supercession," "Risk of Termination" and "The Investor's Requirements" the fundamental considerations by which private capital can be secured to develop public utilities. In this part of his book Mr. Clark lays down six essential principles governing the relations between communities and private enterprise engaged in local transportation. An excellent feature of these chapters is the enumeration at the end of each of the conclusions reached on the topic considered.

The second part of the book gives the salient features of existing service-at-cost franchises in Cleveland, Youngstown, Cincinnati, Boston, Montreal, eastern Massachusetts, Westerville, Dallas and Memphis. This analysis is made under subject headings, such as general conditions, public purchase, control, etc., so that comparison of the different provisions can easily be made.

The final or third division of the contents of the book gives a similar analysis of the principal service-at-cost franchises which have been proposed but have not gone into effect.

The volume is well written and should be of great assistance in popularizing the knowledge, and in helping the adoption, of new service-at-cost franchises.

Personal Mention

Mr. Mortimer Retained by Bondholders as Consultant

James D. Mortimer, until recently president of the North American Company and its subsidiaries, has been retained to represent the protective committee of the security holders of the Kansas City (Mo.) Railways. This committee, of which Arthur Reynolds, Chicago, is chairman and H. L. Stuart, Chicago, is vice-chairman, has assumed active participation in the management of the affairs of that company. Mr. Mortimer will devote a portion of his time to assisting the company management on the ground.

Mr. Mortimer is by training and profession an engineer. Many conspicuous things along engineering lines were done by the North American Company and its subsidiaries during his connection with them, but most important of all the duties which Mr. Mortimer was called upon to perform while associated with the company were those relating to finance. Especially in the councils of the American Electric Railway Association has his advice always been highly valued. Mr. Mortimer's career in public utility work was reviewed at length in the ELECTRIC RAILWAY JOURNAL for April 3, page 731.

Mr. Caldwell Honored

Edward Caldwell, treasurer of the McGraw-Hill Company, publisher of the ELECTRIC RAILWAY JOURNAL, was tendered a dinner by his business associates on June 15 on the occasion of the thirtieth anniversary of his connection with that organization. Mr. Caldwell was graduated from the University of Michigan in 1886 with an A.B. degree and two years later as mechanical engineer from Cornell. For two and one-half years Mr. Caldwell was assistant editor of the *Electrical World*, and in January, 1893, he went to Chicago as editor of the *Street Railway Gazette*. In June, 1894, he became business manager for the *Street Railway Journal*, the predecessor of the ELECTRIC RAILWAY JOURNAL, and he continued in this work until January, 1897, when he became associated with Hugh J. Grant, former Mayor of New York City, in street-car advertising.

After a year spent in this work he devoted a year to trade-paper advertising agency work. In January, 1899, he returned to the McGraw Publishing Company and took charge of the book department. At that time the department had to its credit between thirty and thirty-five book titles. In 1909 this department was consolidated with a similar department of the Hill Publishing Company, thereby forming the McGraw-Hill Book Company. Since that time the company, of which Mr. Caldwell is treasurer and a director, has grown until it now has more than 1,000 titles on its lists. Two years ago Mr. Caldwell became treasurer of the McGraw-Hill Company, retaining his connection with the book company.

Professor Harding Joins Staff

C. Francis Harding, head of the School of Electrical Engineering at Purdue University, Lafayette, Ind., will serve as a special editorial representative of the ELECTRIC RAILWAY JOURNAL for the summer months, with headquarters at the New York office. Professor Harding is well known in the electrical engineering profession in general and in railway circles in particular.

PROF. C. F. HARDING

For two years following his graduation at Worcester Polytechnic Institute, he was electrical engineer of the Worcester & Southbridge Street Railway, Worcester, Mass. He devoted one year to instructional and graduate work at Cornell University, and later served as assistant electrical engineer, principally upon electric railway projects, with Stone & Webster.

During his connection with Purdue University he has acted in a consulting engineering capacity upon many utility projects in the Middle West, including several in connection with the Public Service Commissions of Wisconsin and Indiana. He is the author of a text book entitled "Electric Railway Engineering," published by the McGraw-Hill Book Company, which has been extensively used in many of the leading universities of the country.

A. D. Knox has also joined the editorial staff. He will devote most of his time to the statistical work of the paper. Mr. Knox graduates this year from the electrical engineering course of the Sheffield Scientific School at Yale.

R. R. Loening has been elected first vice-president and general counsel of the Havana Electric Railway, Light & Power Company, Havana, Cuba, to succeed the late David T. Davis. Mr. Loening was formerly an Assistant District Attorney in New York City.

Frank H. Renninger, general manager of the Montoursville (Pa.) Passenger Railway and the Montoursville Electric Light Company, has resigned to accept the position of shop foreman of the Central Pennsylvania Lumber Company, Laquin, Pa.

H. W. Price of Martinsburg, W. Va., has been appointed manager of the Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa., to succeed the late R. D. Sefton. Since returning from fourteen months' service with the A. E. F. in France, Mr. Price has been acting as superintendent of the Potomac Light & Power Company, Martinsburg. He was formerly connected with the Edison Electric Illuminating Company and the Cumberland & Westernport Electric Railway, Cumberland, Md.

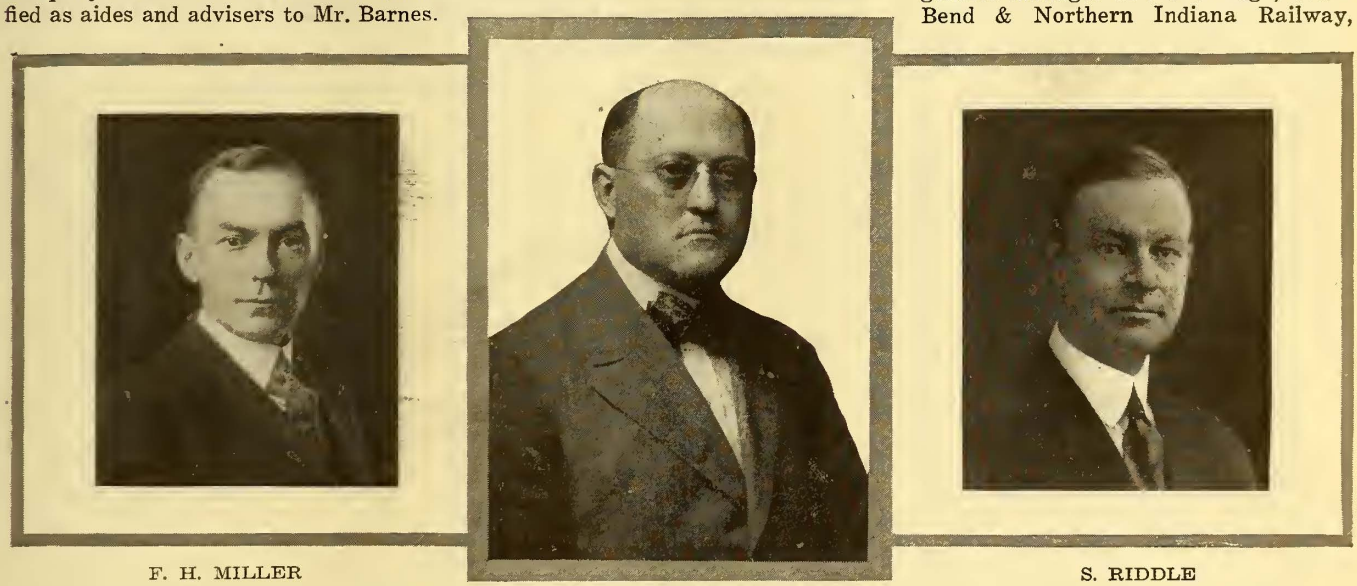
Henry Stanley has retired from the Detroit (Mich.) United Railway after twenty-five years of service to return to England to live. Mr. Stanley is the father of Lord Ashfield, well known in the United States as Albert Stanley. Lord Ashfield was connected with the Detroit United Railway and the Public Service Railway of New Jersey for many years before becoming connected with the underground electric railways in London. Henry Stanley had been a statistician in the schedule department at Detroit for the last twenty years. Five years previous to that he was in the mechanical department. He intends to spend the remainder of his days in Derby in which city he resided before going to Detroit some forty-five years ago.

Joseph S. Goodwin, manager of the Bridgeport lines of the Connecticut Company, New Haven, Conn., has resigned to become associated with the firm of Charles E. Morse, Inc., Boston, Mass. Mr. Goodwin will make his headquarters in Hartford, Conn. He entered railway work in 1895 as a motorman on the Gloucester, Essex & Beverly Street Railway, now a part of the Eastern Massachusetts Street Railway. He was subsequently employed as a motorman for a short time with the Rhode Island Company, Providence, R. I. In 1901 he entered the employ of the Hartford & Springfield Street Railway as a motorman. He was later appointed a dispatcher of the company. In 1906 he was advanced to chief dispatcher and served in that capacity until February, 1914, when he was made secretary and superintendent of the company. Later he was made general manager of the road. He resigned three years ago to become manager of the Connecticut Company's Bridgeport lines. Mr. Goodwin won for himself in all of his positions popularity with his men and the public.

Louisville Executives Are All Practical Operators

To J. P. Barnes, the New President, and Messrs. Riddle and Miller, the New Vice-Presidents, Will Fall the Important Task of Rehabilitating This Southern Road

THREE practical operators of proved ability as traction executives have been chosen to manage the electric railway system of Louisville, Ky. James P. Barnes, the new president of the Louisville Railway, takes up his duties at Louisville with the fresh point of view and the keen understanding of railway problems gained from many years' experience with properties in the North, most recently as general manager of the Schenectady (N. Y.) Railway. Samuel Riddle and Francis H. Miller, who become vice-presidents, are, by reason of their long connection with the Louisville system, thoroughly familiar with the company's needs and hence well qualified as aides and advisers to Mr. Barnes.



F. H. MILLER

J. P. BARNES

S. RIDDLE

The task which confronts the new management is one of considerable magnitude. The company for some time has been in need of financial relief. Early in the present year it applied to the City Council for an increase in fare, but its application was denied. Shortly thereafter Thomas J. Minary, who had directed the company's affairs for thirty years, retired as president to become chairman of the board. The management of the system was then placed in the hands of a committee of three of the directors, W. S. Speed, W. H. Kaye and John W. Barr, Jr.

This committee has discharged its duties in a highly efficient manner. Many questions, however, have been left unsettled pending the selection of a new president. These matters will now come before Mr. Barnes for settlement. In reaching his decisions he will profit by the advice of Messrs. Riddle and Miller. These men, steeped in the traditions of the company, will be in a position to make clear many points necessarily unfamiliar to a newcomer.

Mr. Barnes is a native of Syracuse, N. Y. For six years following his graduation from the Massachusetts Institute of Technology in 1905, he served in various capacities with the Oneida (N. Y.) Railway and the Syracuse Rapid Transit Company. While associated with the latter company he was responsible for the layout and construction of the Wolf Street shops in Syracuse and he also assisted in the electrification of a division of the West Shore Railroad in central New York.

In 1912 he resigned the position of chief engineer of the Syracuse Rapid Transit Company to become general manager of the Syracuse & Suburban Railway. Later he was appointed general manager of the Buffalo, Lockport & Rochester Railway. Three years ago he became general manager of the Schenectady Railway.

Mr. Barnes is among the most active workers in the interest of the American Electric Railway Association, rendering valuable service as a member of various committees of the national organization. He has also been prominently identified with the activities of the New York Electric Railway Association, of which he served as the president in 1916. In his work for both the national and state organizations he has demonstrated a breadth of vision and a grasp of the industry's problems which place him in the forefront of electric railway executives.

Mr. Riddle is forty-two years of age. He was graduated from Swarthmore College, Pennsylvania, in 1897, with the degree of Bachelor of Science and Engineering. In the fall of 1897 he became associated with Dr. W. A. Drysdale, consulting and mechanical engineer, Philadelphia, Pa., and continued in that position for five years. He then went with the engineering department of the United Gas Improvement Company, Philadelphia. In 1903 he was in charge of the erection of buildings and installation of equipment, power stations, etc., for the Connecticut Railway & Light Company, in New Britain, Waterbury and Cheshire. In March, 1904, Mr. Riddle entered the service of the Rhode Island Company, Providence. He served this company in various departments, finally becoming superintendent of transportation in the spring of 1906. In February, 1907, he became general manager of the Chicago, South Bend & Northern Indiana Railway, with which he continued until March, 1909. He next entered the service of the transportation department of the Philadelphia Rapid Transit Company, where he remained until February, 1910. He then became superintendent of transportation at Louisville.

Mr. Miller was born in 1874 near Louisville. He was graduated at Rose Polytechnic Institute in 1895 and afterward by post-graduate work at Rose took the degrees of E. E. and later M. E. He has been with the Louisville Railway since the fall of 1895, starting in the car repair shops and occupying the positions successively of timekeeper, store-room man, car tester, truck repair man, assistant shop superintendent, superintendent of wire work, assistant and then superintendent of power station.

Under his direction the electric features of some 100 miles of suburban and interurban lines have been installed. He has rebuilt and enlarged an existing power station, and has recently designed and built a modern steam turbine station.

Manufactures and the Markets

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

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Extreme Shortage in Wooden Tool Handles

Inferior Hard Wood Handles Substituted for Firsts, with Shipments Eight Months Behind

Demand for wood handles for boiler room and track tools has been so heavy all this year that manufacturers are up to six and eight months behind on their shipments. Particular reference is made to scoops and shovels, but all construction tools have suffered because of the shortage of first grade ash and hickory. In one case wood which was ordered in February is just coming in to be made up into handles.

As a consequence of this shortage in first grade material customers have been forced to use second and more inferior grade wood and have not received the customary service from the utensils.

At this time there is no hope held out of a substantial clearing in the situation, as it will take months to fill back orders before anything like normal conditions of shipment can be met. Prices are stiff and generally steady for the present, but the tendency for the last three months has been upward.

High Tension Insulator Shipments Long

Manufacturers Are Booked Up for Several Months in the Face of a Heavy Demand

Demand for porcelain high-tension insulators continues to rule strong. One representative manufacturer states that he is booked up solidly with orders until January and February and cannot promise deliveries of present orders before then. He further says that the volume of insulator buying on the part of the railroads has increased greatly since the government relinquished its control. Foreign demand is also beginning to make itself felt strongly, coming especially from the Scandinavian peninsula, Italy and France. Producers were looking to the hydro-electric field as a source of demand which would result in heavy orders, but the President's failure to sign the water-power bill has put off the development of this market. Agents report practically no stocks on hand, while manufacturers are from five to seven months behind in orders, compared with normal shipments of from four to six weeks.

An important factor in checking production has been the general shortage of raw material. This is reported as caused by the irregularity of shipments rather than by an actual dearth of sand, clay, etc. In the light of these conditions the general trend of insulator prices has been upward, although since March and April the market has held steady. One of the largest dealers in insulators in the country reports that he is unable to obtain any quotations on the porcelain high-tension types, while another company says it is now able to get quotations for six months ahead, but the prices listed are high enough to guard against any fluctuation within that period.

In view of these facts the number of order cancellations has been exceedingly small, a local manufacturers' agent reporting only one cancellation within the past year. This would seem to indicate the continuance of construction programs.

Foreign competition is spoken of in many quarters, but is not greatly feared, For one thing, American models of porcelain insulators made rapid strides while European production was at a standstill during the war. These countries have not sufficiently recovered from their industrial chaos to provide sufficient insulators to affect the market very seriously at this time.

Critical Coal Situation Foreseen in New England

Electric Railway Properties Likely to Suffer if Embargoes Are Not Placed on Coal Exports

Overseas shipments of bituminous coal are threatening New England industries with serious curtailment next winter and electric railway purchasing agents are disturbed about the outlook, even with preferential shipments likely for public utility uses. Nothing in the supply market situation in the northeast is so fraught with danger as the inadequate flow of coal now under way into that section of the country. A prominent electric railway coal buyer from Massachusetts who has spent most of his time since early spring at the Virginia tidewater ports informed a representative of the ELECTRIC RAILWAY JOURNAL last week that an industrial coal famine is entirely within the probabilities in the coming winter, at least in New England; and the primary cause is unquestionably the successful competition of foreign buyers.

The increasing cost of coal to the railway companies, growing out of the shortage, has become so great a burden that in some cases vigorous appeals to the public and to governmental authorities have been made. Further increases of fare or suspension of service are threatened in some cases. With soft coal selling around $15 or $16 per ton, an advance of at least $3 or $4 within the past two weeks, the situation has become painfully acute. It would be worse in the interior of Massachusetts were it not for the service rendered by the hydro-electric companies, still favored with unusually satisfactory water conditions for this time of year.

The demand for central station and wholesale electric energy now exceeds the available supply in this district, and unless something like a normal flow of bituminous coal can be assured at fair prices transportation service in eastern New England, especially on suburban and rural lines, will be hard hit. Personal attention to purchases and close follow-up methods on the ground are the best assurance at present of securing deliveries. The purchasing agent who sits back in his office and anticipates smooth sailing in regard to coal shipments this summer bids fair to be "out of luck" before snow flies.

Meanwhile a great wave of public opinion is forming to demand that until domestic requirements are met the President or the Interstate Commerce Commission shall put an embargo upon foreign shipments of coal, or at the very least greatly restrict these in the interests of American industries. These are now threatened with a disaster whose extent cannot be fully measured, but which may yet be warded off if prompt and energetic steps are taken by those in authority.

Use of Hand Fare Registers Increasing

Raw Material Receipts Below Normal So Shipments Are Advanced to About Two Months

A steadily growing market for hand registers is a feature of the electric railway supply business today. In a leading manufacturing plant producing these equipments the statement was made a few days ago to a representative of the ELECTRIC RAILWAY JOURNAL that the volume of business this year is about double that of last year to date. The indorsement by the American Electric Railway Association of methods of collection, illustrated by the fare box and by the portable register, has been a potent factor in increasing the number of inquiries and orders for leased service. Roads, which formerly manifested no interest whatever in portable registration, are now asking

for figures. The development of improved equipment has also been influential in stimulating new business.

The growing use of the fare box has accustomed the public and car service men alike to "counting the fare" rather than counting the passenger. It is common practice today to "tie in" the passenger in connection with fare recording, and much of the earlier opposition of car crews to portable registration has disappeared with the larger and larger use of the fare box. Heretofore, the limitations of hand registration equipment as regards multiplex fare service have somewhat restricted its use, but today devices are on the market for recording nickels, dimes and quarters, and they may be adapted to tokens. Interurban inquires are coming in rapidly and the growth of this business is expected to be continuous.

Manufacturing conditions in this field are unsatisfactory on account of the difficulties encountered in securing raw material. No serious curtailment of output has been necessary so far, however, and labor conditions are in pretty fair shape. No recent change has been made in leasing prices, except that a slight advance on three-coin machines accompanied the entrance of these new units into the operating field. Deliveries are a little slow at present, about two months being required to establish a new installation in view of orders which are now on the books.

1920 Railway Material Prices Far Surpass 1919

Middle Western Utility Compiles Table Showing Relative Prices on Traction Supplies Most in Use

In the general desire of electric railways for higher rates to enable them to perform better their function of giving service to the traveling public, the question of maintenance and operating costs has figured largely. One of the representative Middle Western electric railway interests has just compiled a table giving comparative cost data on the items which that railway is constantly using. This covers present prices in relation to those existing last year and in 1914 and gives percentages of increase. It can readily be seen that even down to office supplies virtually every item has increased since last year, when prices were thought to have about reached their maximum level, and to date no tendency toward retrogression is apparent, from all reports that have come in.

The smallest increase since 1914 is shown in brake shoes, which have advanced only 13.75 per cent, while 6-in. trolley wheels are next at 22.31 per cent. Against these is found a rise in steel castings of 525 per cent.

COMPARATIVE PRICES OF MATERIALS

Name of Material	Prices 1920	1919	1914	Percentages 1920 Over 1919	1914
Axles, each	40.50	28.13	16.54	4.12	145.53
Bonds, rail, each	1.11	1.06	.68	4.72	63.24
Brake shoes, per lb	.364	.364	.32	.....	13.75
Bearing, axle, each	4.80	4.27	3.40	12.41	41.18
Bearing, journal, each	3.60	2.70	1.72	33.33	109.30
Bolts, machine, each	.0238	.0162	.009	46.91	164.45
Brooms, per dozen	7.50	6.50	2.50	15.39	200.00
Brushes, carbon, each	.255	.195	.12	30.76	112.50
Cable for cars, per cubic foot	.186	.098	.0515	89.80	261.17
Controller rep. coils, each	13.20	9.75	7.70	35.38	71.43
Controller rep. segments, each	.65	.52	.29	25.00	124.14
Controller rep. finger, each	.24	.21	.16	14.29	50.00
Castings, steel, per lb	.15½	.13½	.026	12.96	525.00
Cement, per sack	.72	.68	.42½	5.88	69.41
Coils armature No. 68, per set	42.50	37.00	18.00	14.86	136.11
Coils armature No. 67, per set	35.00	29.00	17.30	20.69	102.31
Ears, trolley, 2/0, each	.550	.544	.300	1.10	83.33
Ears, splicing, each	1.72	1.396	1.25	23.21	37.60
Envelopes, 3½x7½, per thousand	.....	2.40	1.00	.....	140.00
Gears, each	56.00	48.80	26.25	14.75	113.33
Glass, 26x40, each	2.55	1.78	1.20	43.26	112.50
Gravel, per yard	2.25	1.63	.95	38.04	136.84
Headlights, each	7.50	6.40	3.90	17.20	89.19
Lamps, each	.28	.245	.21	14.29	33.33
Leather cord, bell, per foot	.052	.044	.00875	18.18	494.26
Limestone, per yard	2.56	1.56	.715	64.10	258.04
Lumber, oak, per foot	.15	.12	.045	25.00	55.56
Printing letter heads, per thousand	4.18	4.90	1.25	.....	234.40
Pinions, each	10.14	7.27	4.00	39.48	153.50
Paint, gray, per gallon	2.25	1.75	1.25	28.57	160.00
Paint, yellow, per gallon	3.50	2.75	2.50	27.27	40.00
Rattan, per square foot	.505	.39	.21	29.49	140.48
Rails, steel, per ton	64.00	48.00	29.50	33.33	116.95
Retrievers, each	20.35	14.85	10.00	37.04	103.50
Steel, sheet, 14 g., per pound	.15	.10½	.04	45.00	275.00
Steel, bar, per pound	.04	.032	.0173	25.00	131.21
Steel, pike, 1 g., per foot	.95	.75	.21	26.67	352.38
Shovels, track, each	2.15	1.58	.89	36.08	141.57
Sand, per yd	2.75	1.69	.60	62.72	358.33
Screws, per gross	1.07	.68	.44	57.35	120.45
Ties, steel, each	7.75	5.57	4.40	39.14	76.14
Ties, wood, each	1.78	1.33	.60	33.83	196.00
Trolley harps, each	1.80	1.45	.60	24.14	200.00
Trolley poles, each	3.25	2.55	1.10	27.45	195.45
Trolley wheels, 6 in., each	1.59	1.56	1.30	1.92	22.31
Tickets, city, per thousand	.30	.16½	.10	81.82	200.00
Transfers, city, per thousand	.24	.24	8.75	.....	174.29
Trolley rope, per pound	.95	.75	.21	26.67	352.38
Wheels—33 in., each	36.75	23.75	14.50	54.74	153.45
Waste cotton, per pound	.125	.11	.065	13.64	92.31
Waste wool, per pound	.305	.20	.....	52.50	.....
Wire, guy, per pound	.0135	.0092	.0069	46.74	95.65

Southern Pacific Plans $22,500,000 Issue

Listing Includes 118 Motor Cars and Two Locomotives for Roads Leased by Company

In an application filed with the Railroad Commission a week ago, approval is asked by the Southern Pacific Company of its $22,500,000 equipment program. Of this amount there have been listed twelve motor cars for the Fresno Traction Company, fifteen for the Stockton Electric Railroad Company, twenty-two for the San Jose Railroads, all of which are leased by the Southern Pacific, and sixty-nine for the Pacific Electric Railway. In addition, there are plans for two electric locomotives.

The application asserts that the company understands that the Railroad Commission has authority only to pass upon that portion of the financing which concerns intrastate commerce, and the approval is sought in order that the financing which shall be conducted outside the state may proceed.

Rolling Stock

Androscoggin & Kennebec Electric Railway, Lewiston, Me., has placed an order with the Wason Company for ten double-truck interurban cars to be delivered early in the fall.

Recent Incorporations

Cleburne Interurban Association, Cleburne, Texas.—Judge J. D. Goldsmith of Cleburne, Texas, has been elected permanent chairman of the Cleburne Interurban Association, which is promoting the building of an electric interurban line from Cleburne via Stephenville, Dublin and Desdemona to the West Texas oil fields. The line will be approximately 100 miles in length and will traverse a section of country now practically devoid of railway transportation.

Power Houses, Shops and Buildings

Alabama Power Company, Anniston, Ala.—It is reported that the Alabama Power Company plans shortly to begin the construction of a large hydro-electric dam and a power station on Little River 7 miles from Fort Payne. The company several years ago made a survey of the river and purchased several thousand acres of land above the site of the proposed development.

Connecticut Company, New Haven, Conn.—The Connecticut Company is reconstructing its express buildings and yards at Silver Street, New Haven. The yard trackage is being relaid.

Boston (Mass.) Elevated Railway.—The Boston Elevated Railway has begun work on the construction of a

fireproof carhouse and office building at Fields Corner. The wooden carhouse now occupying the site is being torn down to make room for the improvement.

Ohio Electric Railway, Springfield, Ohio.—The Ohio Electric Railroad is building a new power line from Toledo to Lima so that it may secure power from the Acme Power Company, without enlargement of its own facilities at the present time. The Acme Company is serving several of the interurbans out of Toledo at the present time.

Tacoma Railway & Power Company, Tacoma, Wash.—The power station of the Tacoma Railway & Power Company was damaged by fire on June 2. The loss is estimated at $50,000. Service was suspended for several hours.

Track and Roadway

Connecticut Company, New Haven, Conn.—The State Public Utilities Commission has approved a petition of the Connecticut Company to construct a single track curve at Elm and College Streets, New Haven. The commission has also approved a petition of the Connecticut Company to construct a crossover track on East Chapel Street, New Haven.

Connecticut Company, New Haven, Conn.—The Connecticut Company is putting in new ties and rails on its line in West Chapel Street, New Haven, from York to Norton Street.

Tampa (Fla.) Electric Company.—The Tampa Electric Company will double-track its line in Tampa Street from Michigan Avenue to the city limits. The company will also pave its share of the roadway.

United Railways of St. Louis, St. Louis, Mo.—The United Railways plans to extend its Tower Grove line from Arsenal and Fifty-ninth Streets to Jamieson Avenue. The Board of Aldermen has passed an ordinance granting the company the use of the streets through which the proposed line will run. The line will be double-tracked throughout part of its length.

Omaha, Lincoln & Beatrice Railway, Lincoln, Neb.—The Lincoln City Council has passed an ordinance authorizing the Omaha, Lincoln & Beatrice Railway to construct and operate a switch at the intersection of its line with that of the Lincoln Traction Company at Fourteenth and R Streets.

Trade Notes

The Electric Controller & Manufacturing Company, Cleveland, Ohio, has opened an office at 208 North Broadway, St. Louis, Mo., in charge of R. J. Ehrhart.

The Ingersoll-Rand Company of Illinois and A. S. Cameron Steam Pump Works, Chicago branch, announce the removal of their offices to 709 Fisher Building Chicago, Ill.

Willard S. Sisson has resigned as secretary and treasurer of the D. & W. Fuse Company, Providence, R. I. He will continue in the electrical business, but has not announced his plans.

The Electric Storage Battery Company, Nineteenth Street and Allegheny Avenue, Philadelphia, has filed plans for a two-story addition to its plant, 82 ft. x 160 ft., to cost with equipment about $125,000.

C. A. Eggert, Western sales agent, Consolidated Car Heating Company, Fisher Building, Chicago, has resigned. Mr. Eggert has been with the company for nineteen years and has been the Western sales agent since 1916.

The Buda Company, Harvey, Ill., has completed an additional foundry for casting small engine parts. Only thirty days elapsed from the leasing of the ground to the complete construction and equipment of the building.

The Electric Hammer Corporation has been organized with a capital of $1,000,000 to take over the business and property of the Reciprocating Electric Tool Company, St. Louis, Mo. James K. Jarvis is president.

The American Chamber of Commerce in France, 32 Rue Taitbout, Paris, has established a catalog file system for the benefit of French purchasers seeking American goods, where catalogs of business houses may be placed on file.

W. J. Jeandron, sole selling agent for the "Le Carbone" carbon brushes, has been in France for the past month visiting the factory in order to obtain a larger supply of carbon brushes to care for the great increase in demand that it expected in this field.

The Electric Storage Battery Company, Allegheny Avenue and Nineteenth Street, Philadelphia, has removed its Cleveland offices from 1217 Citizens' Building to Chester Avenue and East Twenty-fourth Street. H. F. Sauer is acting manager of the Cleveland office.

The Westinghouse Electric & Manufacturing Company authorizes the statement that the Westinghouse Union Battery Company is owned and controlled by the Westinghouse Air Brake Company, Wilmerding, Pa., and the Westinghouse Electric & Manufacturing Company is not in any way connected with the manufacture, sale, distribution or service of its product.

The Bayer Steam Soot Blower Company, St. Louis, has recently completed its new plant at 4067 Park Avenue, to provide for the increasing business in soot blowers, as well as the business of its subsidiary companies, the Bayer Valve Company and the Bayer Brass Foundries Company. The main machine shop building is 200 ft. x 120 ft., and the foundry building is 175 ft. long, the latter providing space for thirty molders on brass and aluminum castings.

New Advertising Literature

Punches. — Bonney-Vehslage Tool Company, Newark, N. J., is distributing a 32-page illustrated catalog on its various types of ticket punches.

Gears.—R. D. Nuttall Company, Pittsburgh, Pa., is circulating Bulletin No. 27, on "Nuttall Gears for Steam Road Electrification and Multiple-Unit Cars."

Triplex Pumps.—The National Transit Pump & Machine Company, Oil City, Pa., has issued bulletin No. 302-A, in which it describes its Transit power pumps.

Insulators.—Catalogue No. 2 has just been received from the Lapp Insulator Company, Inc., Le Roy, N. Y., on high-voltage insulators and power line appliances.

Hydro-Electric and Steam Power Plants.—Viele, Blackwell & Buck, New York City, in bulletin No. 9, reproduce photographs of some of their engineering and construction work.

Combustion.—The General Fuel Saving Corporation, Rochester, N. Y., is issuing a small booklet describing the use of its "Oxy-Blast" in connection with gaining complete combustion of fuel.

Drinking Cups.—Individual Drinking Cup Company, Inc., New York City, has issued an illustrated booklet on its cup vending machines and Dixie paper drinking cups for railway and station use.

Flexible Armored Hose. — The Sprague Electric Works of the General Electric Company, New York City, has issued bulletin No. 44553.1, on Sprague flexible steel armored hose for railroad service.

Emery Grinders.—A bulletin on "Challenge" emery wheel grinders, polishing machines and emery wheel dressers has just been brought out by the Challenge Machine Company, Inc., Philadelphia, Pa.

Jacks. — The Duff Manufacturing Company, Pittsburgh, Pa., has just issued bulletin No. 303, describing Duff trip jacks, including various styles and sizes of jacks used for constructing, surfacing, ballasting and repairing railroad track.

Data on Insulating Varnishes.—The characteristics of insulating varnishes are explained on five loose-leaf sheets published by the Sherwin-Williams Company and entitled "Efficiency Information on Sherwin-Williams Ajax Insulating Varnishes and Compounds."

Equipment.—The Electric Service Supplies Company, Philadelphia, Pa., has issued a new 608-page catalog, No. 6. It lists and illustrates material for railroads, mines and industrial organizations, including steam and mine locomotive headlights, marine searchlights and projectors, turbo-generators and headlight switches, contact rail material for cranes and haulage systems, armature repair machinery and coil winding machinery.