

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 54

New York, Saturday, August 16, 1919

Number 7

Will a P. O. and Nickel Fare Platform Elect?

EX-GOVERNOR EUGENE N. FOSS of Massachusetts has announced his intention to be a candidate for the gubernatorial nomination at the primaries next month on a platform of public ownership of the public utilities and 5-cent street car fares. This he believes is the issue of the hour, at least in Massachusetts, and his announcement repeats his statement made at the hearing in Washington that he was advocating public ownership in the interest of a better democracy. Electric railway interest may watch this movement in Massachusetts with keen attention, for the results will give an expression of the will of the people on this subject as of to-day. It may be that the public is thinking differently of the matter now than it has in the past and hence, if the final campaign issue in Massachusetts proves to be the ex-governor's platform, then the answer which will be supplied will throw much light on this situation generally.

Mr. Foss is the only Democrat who has ever served three terms as governor of Massachusetts. He has also been prominently identified with a number of traction properties in New York and Massachusetts, so that he has studied the matter both as owner and from the public point of view. This adds to the interest of his present platform.

Higher Fares Will Succeed with Better Service

THE fact that the makers of other commodities have succeeded in getting higher prices for their product without improving its quality or the quantity of the same is small consolation for the electric railway operator who faces a diminishing clientele because of much smaller increases in street railway fares. The only way to do is to take the phenomenon for granted regardless of theories, and try to find a way out of the tangle.

Perhaps there is no one best course out of that tangle. Still, a reasonably safe road is the introduction of more service rather than less when a fare increase is necessary. We can think of nothing less likely to coax back the patron of 5-cent days than the cutting down of mileage in proportion to the losses that usually follow in the immediate wake of a fare increase. Many a man who dropped off upon the increase in fare would come back in a few weeks if his determination to stay away were not stiffened by cuts in service which turn him into a confirmed walker, a jitney patron or an automobile owner.

"But," says the despairing management, "what else is there for us to do? We must earn so many cents per car-mile run." Herein lies the fallacy of the long headway. Better to earn less per car-mile but run more

car-miles and at a lower cost per car-mile. That lower cost is obtainable to the greatest degree with new cars of one-third the weight, and one-half the platform expense, but even with the existing cars wonders can be worked at a cost not exceeding two months' wages of the rear platform alone! In an age when needless manual labor is inexcusable, in an industry where ample power is always on tap and at a time when every dollar is needed, no electric railway manager can afford to make his utility less useful to the public. Let him screw up his courage to the sticking point, if need be, and arrange to give this increase in service before rather than after an increase in fare. Then, and then only, will he be able to rely upon the fairness and squareness of the American public which does not hate any public utility with half the fervor that it hates a quitter.

Safeguarding the Quality of Factory Product by Materials Testing

WHEN a failure occurs with some piece of electric railway equipment, the cause is immediately sought to determine whether it was poor material, bad workmanship, faulty design, improper use or insufficient maintenance. There is a natural tendency on the part of operators to shift the blame for failure from their own shoulders, and the manufacturer is usually the first one asked for a reason. It is thus important for the manufacturer to test thoroughly the materials and detail parts of his product and, at the same time, to have the design of each piece of apparatus as nearly perfect as possible. These specifications require an intimate knowledge of the properties of the materials employed in its construction. To bring out this phase of the manufacturer's work, J. S. Dean explains in this issue the way in which one manufacturer tests materials that enter into the construction of railway motors.

This article, among other things, brings out the large variety and number of materials which enter into the construction of a railway motor. In fact, there is a constant demand for new materials or new combinations of materials that will meet the service conditions encountered. Some of the remarkable advances in railway apparatus which have been made in recent years have been the result of new applications or the use of untried materials. For example, the necessity for using a steel of very high tensile strength and ability to resist shock and vibration in railway motor work has led to the use of alloy steels. Testing is an essential part of such development.

The necessity for determining the properties of materials is illustrated by the test outlined for the hardness of copper used in railway motors. Hard copper is required for commutators and soft copper for coil windings. It is not sufficient to say that copper is hard or

soft, but methods must be devised for determining relatively how hard or soft the material is. Further, in perfecting a motor design, magnetic flux, magnetic pull, permeability, heat dissipation, etc., must be taken into account. For example, the amount of heat that can be dissipated by the motor and its several windings varies with different methods of insulating the conductors, and this difference considerably affects the cost of our modern motors.

In any decision on the materials to be used, the question of price is most important. Sometimes a designer may be prevented from using the most desirable materials because the customer will not pay enough for the product to permit this. With sufficient data available from tests, the designer can select material that will be sufficiently reliable for the service within price limitations. Prices are largely determined by competition, and it requires more than a verbal statement to convince the buyer that the materials furnished will perform the service or that a higher price is warranted due to the better qualities of the materials. Accurate testing will furnish this.

Again, the manufacturer of apparatus finds testing necessary because the same processes and methods of manufacture do not always produce the same quality of material. Take, for illustration, the product of the steel foundry. Here all heats are not equally good, and one part of each ingot is inferior to the remainder. The inferior part that cannot be sold must remain as scrap or be worked over again, with increase in manufacturing cost of the marketable product. Hence the inducement to the steel man to force as much of his product as possible upon the purchaser, even though some of it may be slightly inferior. The testing department prevents this.

Is There Any Standard Track Sub-Construction?

WHAT is the best track sub-construction? Naturally the answer is, that which will remain in good condition the longest, at the least cost, require the least maintenance and maintain the smoothest and most serviceable pavement. But what will do this? There seems to be a difference of opinion.

Thus, at the recent meeting of the Illinois Electric Railways Association the author of a paper on track maintenance maintained that the expense of monolithic concrete construction was not warranted either by the improvement in the finished work or by the decreased maintenance, and during the discussion which followed all of those who participated agreed with this contention. It was also contended that the cheapest wood ties were the best for paved track and that a 7-ft. tie was just as good as one 8 ft. long. On the other hand, there are advocates of the solid concrete construction and steel ties as first choice. This is borne out in one instance by an article which appeared in the *ELECTRIC RAILWAY JOURNAL* on May 3 on the Chicago standards.

Another emphatic statement by the Illinois delegates was that manganese rails and crossings are absolutely useless. This is somewhat the same idea, stated more positively, as that outlined in an editorial in this paper on July 12. There are some, however, who consider manganese curves and special work well worth the additional cost.

A third subject is that of paving. The delegates at a recent convention of Iowa electric railway operators

were unanimous in their approval of brick for ordinary traffic, with granite block for exceptionally heavy service, and in their condemnation of wood block. At the Illinois meeting it was stated that service had demonstrated that a smoother pavement than either granite block or brick was necessary and that wood block and monolithic pavement were best for heavy traffic.

All of these facts simply illustrate the divergence of opinion. In some respects it is fortunate that all engineers do not think alike, else many commercial products would find no champions. Of course "old man Local Conditions" is the big factor which dictates the choice. Each property is anxious, however, to settle upon the best construction which will meet these local conditions, and we look forward to some further interesting papers and discussion on the subject of track construction at the Atlantic City Convention this fall.

Can City and Railway Be Good Partners?

THE deplorable traction situation of New York City brings up an interesting aspect of the question of partnership in electric railway enterprises between municipality and company. It is the essence of partnership agreements that the interests of the partners should be mutual. In the New York case it would seem that there is room for a perfectly legitimate divergence of view, although the result is unfair to the railway.

Without going into details, it may be stated that the Interborough Rapid Transit Company and the New York Municipal Railway Corporation are partners with the City of New York in the financial results obtained with the rapid transit lines built at the cost of the latter. When the agreements were made the Interborough Rapid Transit Company was granted a prior lien upon the net earnings for the purpose of paying an agreed-upon rate of return upon its investment in the pioneer rapid transit system which it had been operating under an earlier agreement. A very similar plan was followed in the Brooklyn case.

What looked like a good bargain at the time has now become an intolerable burden on the railways concerned, through the increases in costs and the continued increase in average length of ride. A situation has been reached where both the private and public partners in the enterprise are losing money at an alarming rate. Yet the present administration of the City of New York evinces no interest in any plan of continuing to make the rapid transit system self-sustaining. Its attitude appears to be that it can stand the losses at least as long as its partners.

Whether expressed or implied, this attitude brings out sharply the divergence of interests in a case of this kind. The railway as a private undertaking must stand on its own bottom. It cannot get new capital for better service unless it is giving a satisfactory return on the capital already invested. If it cannot sell its product—transportation—at a satisfactory price, it must be listed as a failure.

Contrariwise, the city partner may hold the view that the losses from transit operation are of less account than higher fares that might tend to discourage the spreading of the population, increase policing and sanitation charges, reduce the income from real city taxation, etc. In short, from the city's point of view, unrestricted transportation facilities are important enough to be paid for by others than the car riders alone.

whereas the private operator must not only depend absolutely upon the car riders for revenue but must actually turn over part of that revenue to the tax funds!

There is room for a wide difference of opinion as to the meaning of "good service" when one partner means as much service as the fare receipts permit and another partner means as much service as the municipal treasury can stand. So obvious a clash of interest brings out the weaknesses in public-private partnerships of the New York type. Justice is possible only in those service-at-cost contracts in which the operator is assured a certain return or at least the privilege of raising fares until that return is secured.

Massachusetts Wants a 5-Cent Fare Back

IS IT possible that the 5-cent fare is coming back? Is King Nickel Coin to regain his throne after having been banished in so many of his dominions and threatened with exile in other places? This is the thought that must come to mind when reading that the Massachusetts Senate has passed a bill fixing a 5-cent limit for fares on trolley lines in that State, the excess to be assessed upon the taxpayers.

If any state has had experiences with varying rates for car rides it is Massachusetts. That commonwealth was alive to the street railway situation and authorized fare increases before most of the other states woke up. It went farther than the others when the Boston trustee plan was approved. But the results under that measure have tended to irritate the car riders, more and more patrons having drifted away to "shank's mare" or the steam road competitors as the cost of rides mounted to 7, 8 and 10 cents. An additional wage burden estimated at \$2,500,000 having been imposed by the recent strike settlement, the question of where next to turn for revenue became another menacing problem.

It is perhaps too early to say seriously that the trustee plan of operation, as carried out in Boston, is a failure. On its face, the measure appeared to offer an ideal solution of the transportation question. It happened, unfortunately, that there was much deferred maintenance to be caught up with and other expenses increased so fast that frequent changes in rates of fare were necessary. The security holders, of course, were safe in the guarantee of their return, but to insure this the people who used the cars—a constantly decreasing number—had to be taxed higher and higher.

Apparently the time had come for seeking other remedies, and as the Legislature was in session when the railway strike pointed to still more complications, the 5-cent maximum fare bill was quickly approved. Supporters of this 5-cent fare law argued that the burden of an indispensable public utility should not fall wholly upon those who use it but should be borne in part by those who share in its benefits, directly or indirectly. It was pointed out that if the maintenance of a fire department justifies taxation, the people of a community should share also in the cost of maintaining an important transportation system.

In view of the extent to which some form of subsidy is being urged, though not by railway men, it would be quite worth while for the Federal Electric Railway Commission to consider it, even if only to outline when and where subsidies are desirable. Such a study, in our opinion, would show that the number of such places is extremely limited. What the industry as a whole

wants is to be given just a fair chance to stand on its own legs. That means relief from all of those imposts which arise out of no part of the production of the commodity, transportation, and a reasonable measure of freedom in collecting what, and only what, is the actual cost of that commodity, including the continuing cost of the money which made the service possible.

Divergent but Concurrent Views on Electric Railway Crisis

AFTER an interruption of two weeks the hearings before the Federal Electric Railway Commission were resumed on Monday, Aug. 11, with the Secretary of War on the stand. The fact that an official of Mr. Baker's responsibilities would take several hours from his crowded schedule for this purpose is an indication of the intimate association in the minds of public officials between the public welfare and electric railway prosperity. The earlier hearings were arranged by the American Electric Railway Association effectively to stress the predicament of the industry, with a view ultimately to suggesting possible remedies. The second group of witnesses were selected by the commission for the purpose of bringing out the public's point of view.

Taking a perspective view of the testimony to date, a remarkable unanimity is seen among the views expressed by men holding all sorts of ideas as to causes and remedies. Focussing on the essentials, they in the main agree that through the action of gradual as well as unexpected influences, a vital public agency is in danger of collapse before the ordinary time-consuming remedies can be applied. Further, the crisis is recognized as so acute that preconceived notions as to theories and practices must be set aside for the time to permit some remedy to be used in time to save the patient. The commission repeatedly brought the witnesses back from discursions into the general field of economics to reply to the pointed question: "What can be done for the railways now?"

In studying the evidence presented to the commission, therefore, it can be divided into two parts: namely, that relating to the ultimate solution or solutions of the problem, and that bearing on the immediate solution or solutions. The testimony will help, we trust, in finding both. For the present we are primarily interested in the latter. In this connection opinion seems unanimous that such fares should be permitted as will produce the greatest net income, regardless for the time of ordinary restrictions. Then, after all unjust imposts are eliminated, taxes should be reduced, thus throwing a part of the railway load upon the shoulders of the general public. Concurrently and essentially the public and the railways must get together as never before to save the business from destruction, leaving to a later decision the determination of which can, in a given case, give the desired service with best satisfaction to the local constituency.

At the hearings it was especially interesting and encouraging to note that the state commissioners and others in administrative positions expressed deep concern in regard to the crisis and showed a sincere desire for justice to a utility which has so greatly contributed to the welfare and general prosperity of the country and is continuing to do so in increasing measure in spite of jitneys, private automobiles and other means of transportation.

Insuring Adequate Coal Supply with the Least Expenditure

Of Several Plans Considered the Layout Adopted for Handling Coal Represented the Most Efficient Use of the Investment—Special Ways to Keep the Cost Down Are Described

BY GEORGE E. WOOD

Supervisor of Power Plants, The Connecticut Company, New Haven, Conn.

HAVING constructed a new power plant at New Haven, Conn., on a site adjacent to an old one, and having vividly in mind the experiences of the winter of 1918, this company realized from the points of view of continuity of service and efficiency, that new and larger coal storage and better transportation facilities, and more efficient handling equipment were necessary. All coal supplied to the old plant came by way of barges on the river. While there had frequently been a few days at a time during which the barge route was icebound, the situation in that respect did not become serious until the cold winter of 1918. With no railroad connections to the yard, it was difficult to get coal by that route, and anyway, the great shortage of cars which existed at that time made it prac-

tically hopeless, so that we had impressed upon us very forcibly our need for larger storage facilities.

With these requirements in mind, we set about to determine what plan could be worked out that would suffice and at the same time not entail too great an investment, for money was not readily available. The general plan of Fig. 1 shows the scheme which was finally decided upon.

The original coal-handling facilities consisted of an 85-ft. mast and gaff and steam hoisting engine, handling a 1½-yd. clamshell grab bucket. With this equipment, coal was unloaded from barges and transferred to an overhead receiving hopper from which it was discharged into 5-ton standard-gage coal cars operating on a wooden trestle 45 ft. high. These cars were hauled by

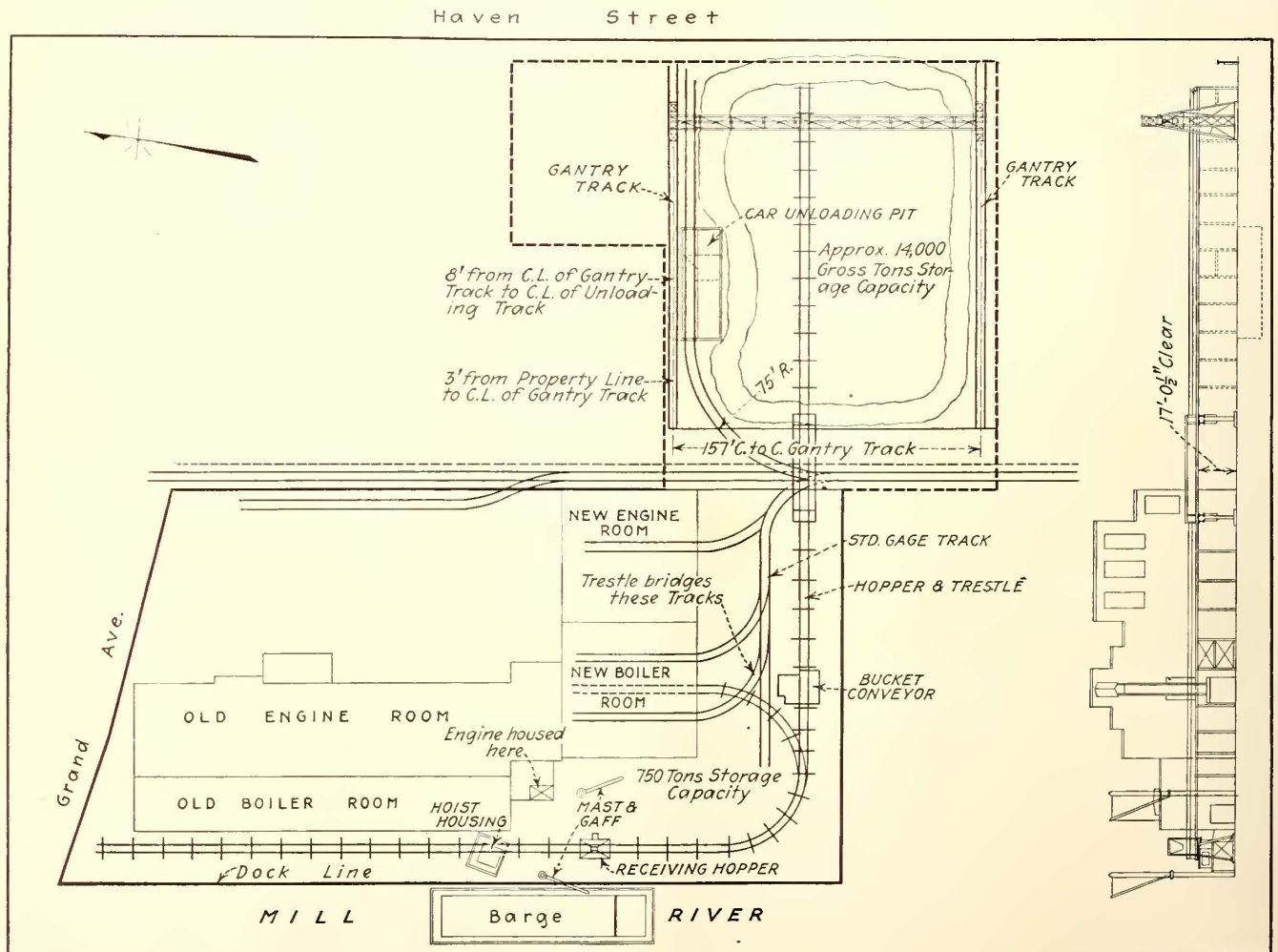


FIG. 1—GENERAL LAYOUT OF COAL HANDLING EQUIPMENT AND STORAGE FACILITIES AT NEW HAVEN, CONN.

an electric locomotive and their loads dumped into a conveyor hopper or into a storage pile underneath the trestle. All coal was reclaimed from storage by means of a traveling monorail crane operating on a track suspended from the cap timbers of the trestle bents. As there was but one conveyor supplying bunkers, the monorail track was extended into the boiler room and

the maximum service and at the same time involve the minimum cost.

Tentative plans were then drawn up, giving the overall dimensions for the structural steel bridge and towers and a contract for fabricating and erecting this part of the equipment was awarded the Berlin Construction Company. The span of the traveling transfer bridge from center line to center line of towers is 157 ft., with a clear height from railhead to lower chord of the bridge truss of 41 ft. 9 in. The monorail crane previously suspended from the cap timbers of the trestle bents along the river and used for reclaiming the coal from that storage pile, was later transferred to the steel pick-up bridge and suspended on the center line of its lower chord. A power rail supplies energy to its motor.

When the order for the traveling transfer bridge had been placed, the first work done in connection with the new storage area was to construct the footings and track for the traveling bridge. These footings were made of concrete set in the ground an average of 5 ft. apart where they rested on solid ground. These were then spanned by 8-in. x 12-in. yellow pine stringers, to which the 100-lb. T-rails were fastened with 6-in. screw spikes. At the same time work progressed on a concrete unloading pit 40 ft. long by 23 ft. wide and of sufficient capacity to contain three carloads of coal. This pit was located at one side of the storage area

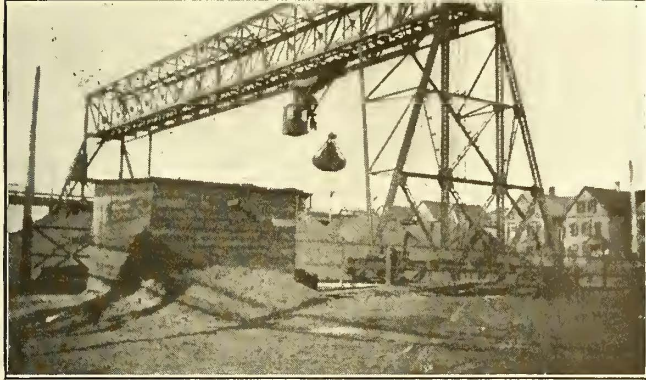


FIG. 2—TRAVELING TRANSFER AND PICK-UP BRIDGE CONSTRUCTION

down through the firing aisle, to permit getting coal onto the floor in the event of a failure in any of the conveyor machinery. The total available storage capacity in the layout was but 6000 gross tons, and this fact kept the fuel agents on the anxious seat during the winter when the barges would become weatherbound. There was also no possibility of securing rail connection for the plant, since there was insufficient space to install the necessary track and special work.

PLANNING ADDITIONAL FACILITIES

After a thorough investigation of the possibilities of utilizing any of the original property north of the plant for storage, it was decided that additional land would be necessary. Consequently, the piece of land

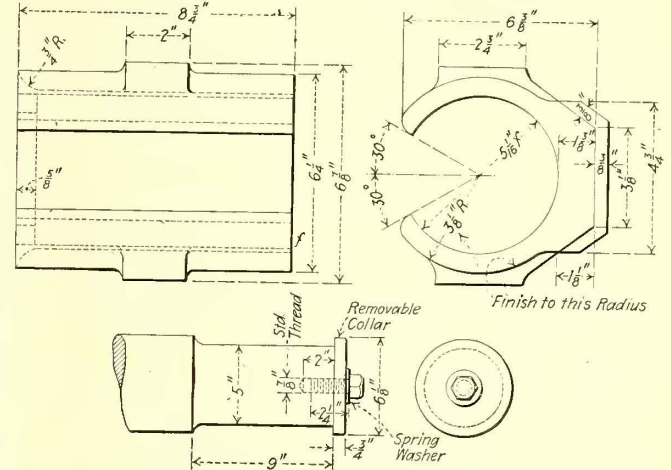


FIG. 4—SPECIAL AXLE BEARING BRASSES FOR TRAVELING TRANSFER BRIDGE

where the coal could be removed from it by the pick-up bridge, and so situated longitudinally that the length of track either side of the pit provided sufficient space for two cars. Three cars at a time could thus be set in the yard clear of the main industrial track of the Manufacturers' Railroad, and with the first car standing over the pit. The electric car which is used in hauling the ash cars from the plant to the dump is also used in shifting the standard coal cars.

One of the problems which came up in connection with the transfer from the old to the new layout was the lowering of the old trestle 23 ft. without interrupting the operation of the coal cars at the higher level. This was done by cutting off the posts in the bents, and framing in new caps and stringers in the section of the trestle between the unloading mast and the conveyor hopper. New rails were laid and when ready, the cars and the locomotive were lowered to the new level and were operated there while the upper section of the trestle was removed.

This trestle was also extended in a curve into the

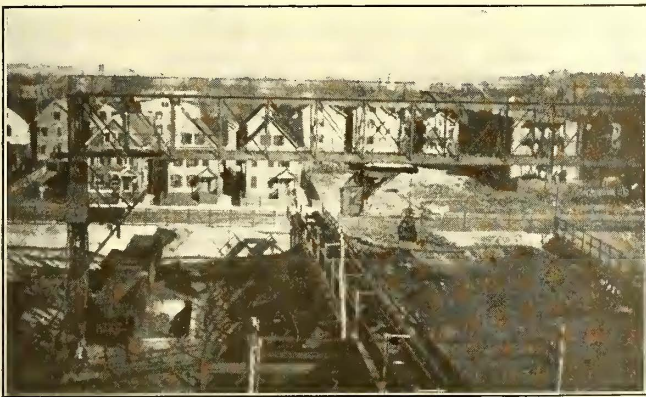


FIG. 3.—THE TRAVELING BRIDGE WITH TRESTLE CAR TRACK UNDERNEATH AND CAR DUMP PIT AT LEFT

inclosed by the dotted boundary line in Fig. 1 was purchased, it being the only property available.

The problem of getting coal from the water front to storage was next considered, and eight schemes were evolved, employing locomotive cranes, cable and automatic railways, belt conveyors, bucket conveyors, cable telfer, pivoted boom, and the traveling transfer and pick-up bridge. By the process of elimination, considering all the factors entering into each case, the traveling transfer and pick-up bridge shown in Fig. 2 was finally decided upon as the one which would be of

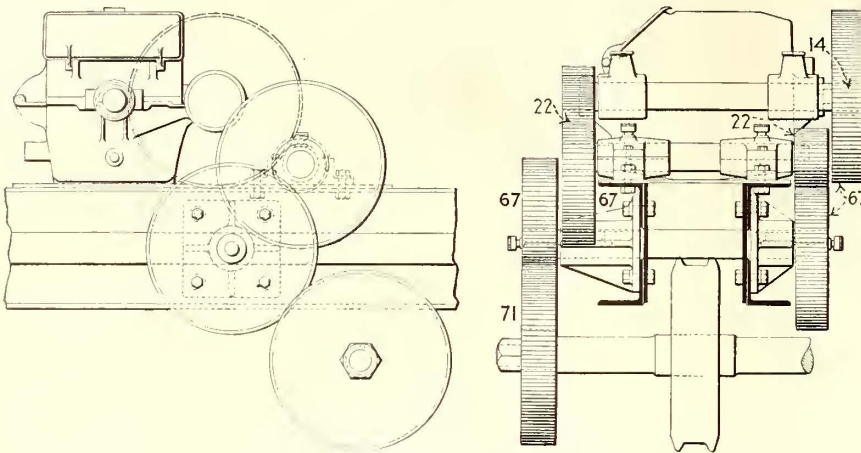


FIG. 5—GEAR TRAIN REQUIRED IN DRIVE MECHANISM OF TRAVELING BRIDGE

power house so that coal might be delivered, in case the conveyor broke down, on the boiler-room floor with end dump cars. In order to avoid having tracks for this purpose in the concrete floor of the boiler room, since it would be used only in emergency, use was made of some old tram rail. Iron thimbles were placed in the floor at proper intervals to receive steel dowels welded to the tram rail. Wooden dowels were placed in the floor at the proper spacing to receive screw spikes placed through the holes in the flat tram. By this means the rails can quickly be installed at any time they are needed, and yet the floor is kept clear of the obstruction for normal operation.

The section of the trestle between the conveyor and the Manufacturer's Railroad was next lowered and extended over the 34-ft. railway right-of-way and drive onto the new property. All old timber fit for further use was utilized in erecting the extension to the trestle across the new storage area. For the bridge members across the railroad, it so happened that the girder plates of one of the interurban line bridges had just been removed in order to strengthen that bridge, and these plates were made use of in the coal yard, although it took some figuring in order to utilize them. The bridge as built consisted of these steel plates with angle girders spaced 13 ft. 6 in. apart and supported at either end by box girder caps 14 ft. 6 in. long x 30 in. wide. These caps rest on a lattice column located on the center line of the track, the columns having a section 4 ft. x 15 in. This arrangement was necessary in order to provide clearance for the ash cars in going to and from the plant, since the curve is of such short radius as to

cause considerable overhang. In constructing the bridge no new materials other than the plates and lattice bars, were purchased.

Power for the locomotive in hauling cars over the trestle is taken from a third rail which extends along the entire length of the trestle.

Power for operating the bridge and monorail crane is collected through a standard trolley pole and wheel (as manufactured by The Connecticut Company) and trolley base mounted on a bracket on the north tower, from an overhead trolley wire.

The trucks and driving mechanism were designed, manufactured, and installed by The Connecticut Company, as the expenditure necessary, had they

been purchased from manufacturers, was prohibitive. The trucks consist of 24-in. double-flange steel wheels pressed onto 5-in. axles (turned out of old car axles) running in 5-in. x 9-in. standard MCB journal boxes of the freight-car type. These wheels are spaced in pairs 5 ft. 2 in. on centers, and 40 ft. from center to center of pairs, four on the north and four on the south tower.

The design of the trucks is somewhat similar to that of a car truck, the journal box being secured to the sills by two 1½-in. diameter bolts, and the bottom of the box being held rigid by an arch bar of 4-in. x 3-in. flat iron forged to shape. In order to prevent mutilation of the flange angles of the box and the sills, 1¼-in. plates were installed between the upper side of the journal boxes and the sills in such a manner as to throw all possible wear on these easily renewable filler plates. The wear due to thrust in the arch bars is cared for in a similar manner. Additional rigidity is secured by angle braces connecting the bottoms of each pair of journal boxes.

With this type of truck it is evident that other than the standard journal brass was required in the boxes containing the driving shaft or axle, in order to prevent the shaft from throwing out of line and thereby allowing the gears to be thrown out of mesh and the wheel flanges to bind on the rail head. This was taken care of at small expense as shown in Fig. 4, by making a brass provided with lugs at the center fitting against the side of the box, directly in line with the 1½-in. bolts which secure the box to the sill. The top of this brass is identical with standard design, thus rendering any



FIG. 6.—TRESTLE AND TRACK EXTENDING THROUGH MAIN STORAGE AREA



FIG. 7.—LOWERED TRESTLE THROUGH OLD PROPERTY AND THE CONVEYOR WHICH DELIVERS THE COAL

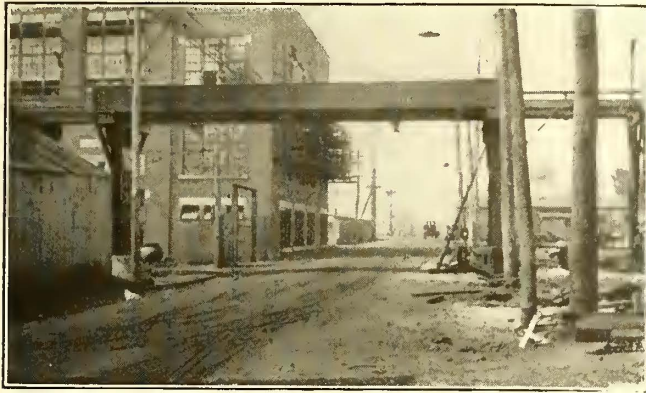


FIG. 8—BRIDGE OVER MANUFACTURERS' RAILROAD AND DRIVE

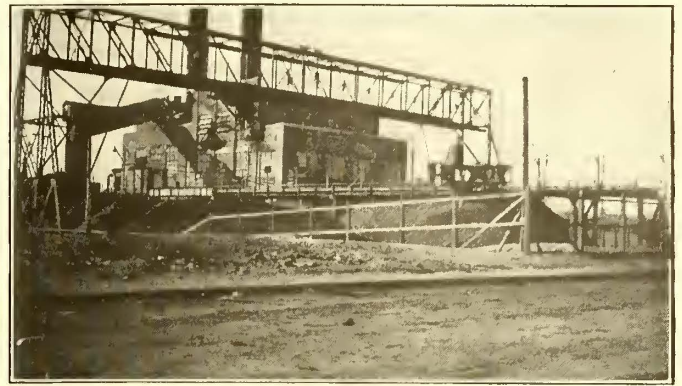


FIG. 10—POWER PLANT AND STORAGE AREA FROM HAVEN STREET

standard wedge of the proper size available for repairs. The sides are brought down around the journal and bored $\frac{1}{16}$ in. larger in diameter than the journal, the bottom being slotted to provide for lubrication. The brass is slipped in place from the end of the axle. This design successfully held the shaft in line.

Estimates were secured as to the cost of placing the driving motor for the traveling transfer up on the bridge with shafting and gears to connect it to a driving wheel on either leg. On account of the very long and heavy shafting and numerous bearings, and the beveled gears which would be required, the cost of this drive was very high and considered prohibitive. As a substitute, the scheme of placing a motor on the sill of each tower of the transfer and operating the two in series, was decided upon as an experiment. There was some misgiving as to whether this would work out satisfactorily on account of the difference in voltage which would be applied to the two motors even though they were connected in series. But the saving by such a scheme was so great that it was considered worth trying, and the nosing which it was feared would prevent satisfactory operation has been found to exist only in a very mild form.

The motors used were two GE-80 machines, installed one on the truck sill on either tower. These were connected through a train of gears and pinions of the type used on cars to the axles of two opposite wheels. The shafting used in mounting these gears was made from old car axles which were turned down and mounted in bearings specially designed for the purpose. The arrangement of the gears was complicated to a great extent by the difficulties of clearance and by the fact that it was impossible to cut a hole through the

truck frame for supporting the gear shaft, at a point sufficiently near the top of the girder to mesh the gear and motor pinion. This made it necessary to resort to the multiplicity of gears shown in Fig. 5, but even with this, the saving over the usual method of driving such a structure was very great.

SAFEGUARDS TO CONTINUITY OF SERVICE

By resorting to the various makeshifts which have been outlined above and utilizing old equipment wherever possible and doing practically all the work with its own forces, the company was able to provide the entire layout which has been described with an expenditure of approximately only \$40,000. But the operation of the New Haven power station is now surrounded with every reasonable safeguard which would seem necessary. For example if the barge shipments of coal fail, coal can be received by railroad, and also promptly unloaded so that there is no demurrage to pay. If the railroad situation should be bad the barge would likely be in operation, but if not the new storage area provides approximately 14,000 gross tons of storage capacity which would keep the plant running for some time. If the mast and gaff working with the barge should fail, coal can be hauled from the main storage area or incoming cars to the bucket conveyor until repairs are made. If the bucket conveyor should fail, the track which has been extended from the trestle into the boiler-room floor can be used in conjunction with end-dump cars to bring coal into the boiler-room floor from whence it can be supplied to the boilers by hand until the conveyor is repaired. If the traveling transfer should be disabled, coal can be supplied in the absence of a barge by using the auxiliary mast and gaff adjacent to the barge end of the trestle to take coal from the 750-ton storage pile located there and lifted into the receiving hopper. This storage pile of coal is kept up to capacity by lifting coal from the barge and dumping it into the receiving hopper on the trestle, from which it is released through a chute on the opposite side of the hopper, rather than through the bottom into the cars. Apparently the supply of coal to the power house is well surrounded with safeguards looking toward the absolute avoidance of any shutdown from this cause.

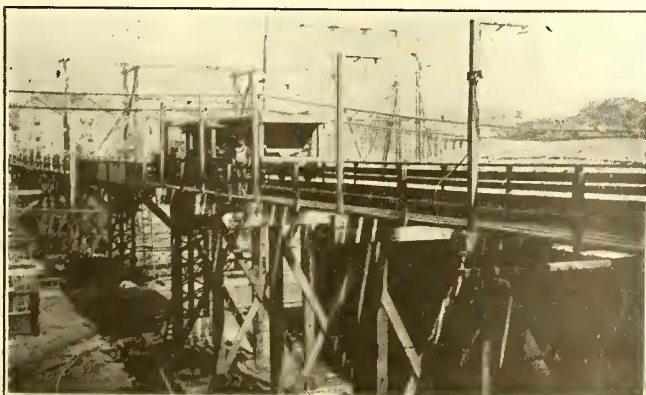


FIG. 9—LATTICED COLUMNS OF THE BRIDGE AND TRESTLE TIMBERING

A point of interest in connection with the recent strike of street railway employees of Chicago is the report that during the strike automobile thefts jumped from the usual average of ten per day to thirty, or an increase of 200 per cent.

Relaying Wood Block in Bridgeport, Conn.

By J. S. CRANDELL

Consulting Engineer, General Tarvia Department,
The Barrett Company

THE Connecticut Company has a large yardage of wood-block pavement in Bridgeport that has to be maintained. That portion laid in the area where T-rails are used has given much trouble from bulging and blowing up. The wood blocks were originally laid on a sand cushion over a concrete base, with sand filler. Since the joints were not waterproof, water found its way easily to the sand cushion; the sand shifted, shoving the blocks up in some cases, and forming depressions in others.

An accompanying illustration shows a section of pavement on State Street on a dry day. Wet weather causes severe bulging, so that it is no uncommon thing to have a dozen emergency calls in a day to have the bulges or "blow-ups" repaired.

After examining a number of failures it was decided to repave the worst areas. The blocks were removed carefully so as to save as many as possible. The sand cushion was shoveled out, and a 1 : 2 : 3 concrete was laid in its place. The crown between rails was reduced;



BUCKLED PAVEMENT ON STATE ST., BRIDGEPORT, CONN.

the crown in the dummy or devil strip was kept about the same, as it was not excessive. The concrete was floated to a smooth surface and allowed to set for twenty-four hours. A coat of hot coal tar paving pitch was then spread at 1/2 gal. per square yard. After the pitch had cooled the blocks were laid on it and the joints filled half-way to the top with paving pitch.

An innovation was tried on June 6. With plain rectangular blocks it is often difficult to get the filler to



VARIOUS OPERATIONS USED FOR REPAVING BETWEEN TRACKS

- 1—Placing Concrete on Base
- 2—Sand Cushion Removed, Concrete in Place

- 3—Pitch Paint Coat Over Smooth Concrete
- 4—Applying Joint Spacers

flow into the joints. Numerous devices have been tried, with varying degrees of success, to separate the rows of blocks so as to allow the filler to enter the joints, and also to permit the blocks to swell without causing buckling of the pavement. The spacer used here for the first time is the invention of the writer, who has applied for a patent on it. It is simply a strip of single-face corrugated cardboard about $1\frac{1}{4}$ in. wide by $\frac{3}{16}$ in. thick. This is placed between the rows, separating the blocks sufficiently to insure the entrance of the filler, allow expansion of the individual blocks,

and yet not permit the blocks to drag or move. The trial of this spacer was very successful, and the following week it was used on Thirty-fourth Street, New York City.

The pitch paint coat and the waterproofing of the joints with pitch filler will prevent further trouble from expansion of the blocks in Bridgeport.

The work of repaving is being done under the direction of Mr. M. E. Stark, roadmaster of the Connecticut Company at Bridgeport, with Mr. Foster superintending construction.

Building Special Work with an Oxygen-Acetylene Cutting and Welding Outfit

With Practically No Tools Other than the Cutting and Welding Outfit, Frogs, Switches, Switchmates and Other Special Work Jobs Were Completed

BY MONTELLE C. SMITH

Formerly Local Manager and Electrical Engineer, Brockton & Plymouth Street Railway, Plymouth, Mass.

EARLY in 1917 the Brockton & Plymouth Street Railway purchased an oxygen-acetylene cutting and welding outfit to reclaim and to prolong the life of installed special work. A few weeks of use showed that this outfit possessed possibilities far beyond all expectations, and we soon began to consider not only the repairing of installed special work, but also the building of new special work in our own shop with its aid. We have been building this special work at odd jobs as opportunity offered ever since, and feel entirely satisfied with the results achieved.

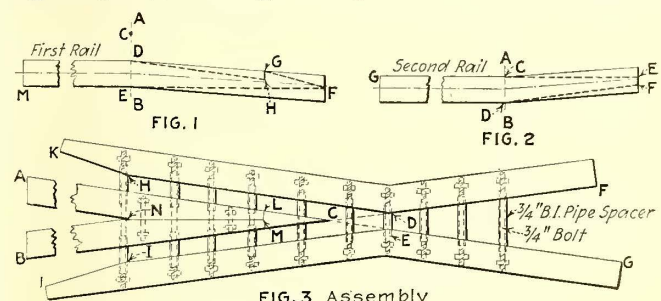
Since the major part of our badly worn special work consisted of frogs, these were the first pieces attempted, and more of these pieces have been built to date than of the others, though a few of the others have also been completed.

The first rail of the frog is shown in Fig. 1. To construct this two measurements only are necessary, the width of the through-rail head at the point *E* and the distance from this point to *F*, the end of the frog point. The rail is first heated to a red heat on the line *E D* in an ordinary blacksmith's forge; it is then bent by placing a "jim crow" with the head at *E* until the line *M E* produced falls on *F*. After this bend sets, the cuts necessary for shaping the frog are made with the cutting outfit. These are indicated by dash lines in the illustrations. In cutting, an iron straightedge is used as a guide for the cutting nozzle to insure the cuts being straight and smooth.

The construction for the second rail of the frog is shown in Fig. 2. The point *C* is located a distance from the end of the rail equal to *H D* in Fig. 1. The rail is then heated and bent so that the line *G C* projected will fall slightly outside the center line at *E*. The cut *E C* is then made and a distance *E F* equal to the *G H* in Fig. 1 is laid off and the cut *F D* is made. The two pieces can then be bolted together. Ordinarily, we fasten these with two $\frac{3}{8}$ -in. bolts and, to secure additional strength and rigidity, the rails

are welded along the line *L M N*, Fig. 3, to a depth of approximately $\frac{1}{2}$ in.

To shape the guard and leading-in rails of the frog, the outline of the frog point already made is laid out in chalk on the floor. The lines *A C* and *B C*, Fig. 3, are produced to *F* and *G*. At the points *D* and *E* where these lines are separated $1\frac{1}{2}$ in. (the usual width of a flangeway) will come the bend in the leading-in rails of the frog. The points *H* and *I* are located



FIGS. 1, 2 AND 3—CONSTRUCTION OF THE FROG

$1\frac{1}{2}$ in. out from the point rails. The lines *H D F* and *I E G* then show the shape of the leading-in rails and these are heated and bent as already described to conform to these shapes. Cuts made along *H K* and *J I* in the ball of the rail form the approach to the guide. The pieces are now ready for drilling and assembling.

To facilitate the drilling, the entire frog is spiked temporarily in close alignment and, so far as possible, it is drilled with one setting. This drilling is done with a $\frac{3}{8}$ -in. drill and $\frac{3}{8}$ -in. bolts are used for tying, so that a tight fit is secured between the tie bolts and the $\frac{3}{4}$ -in. pipe used for spacers. It is important that black-iron rather than galvanized-iron pipe be used for spacers, as molten iron will not lie close to the latter.

The pouring of the castings, which is done at a local

foundry, completes the frog. In pouring this casting the frog is laid right side up on a sand bed and fire clay and sand dams are made at the point where the castings are to be stopped. Also, a dam is made around the outside of the frog distant from the rails about 6 in. This space from the outside of the rails to the dam is filled first with molten iron and allowed to set until the entire frog is red hot, the advantage of this being that in this way the frog itself is expanded to the same degree as is the molten iron of the casting, and as the whole cools and contracts the fits between the rails and castings remain perfectly tight. When the frog is sufficiently heated, the inside casting is poured flush with the bottom of the ball of the rail

whole drilled and tied together in the same manner as the frog.

We find that two men can build a mate in practically three-quarters of a working day at an average cost of approximately \$25.

BUILDING A COMPLETE SWITCH

The first step in the making of a switch is to form the offsets in the main and guard rails shown at *A* and *B*, Fig. 7. After these have been made, the rails are bent to the shape of the switch pan. The old rails may be used as a pattern or the shape of the inside of the rail may be plotted on the floor in the same way as previously described. The rail *G* is cut at the end to conform to the shape of the heel of the switch tongue and the piece of guard *H* is fitted. The pieces can be temporarily spiked in position and the whole drilled and bolted up in the same way as were the previous pieces. In drilling we spaced the holes at such a distance from the top of the rail ball that, when the top of the switch tongue is flush with the top of the rail, $\frac{3}{8}$ in. of casting is allowed between the bottom of the tongue and the top of the pipe used as a spacer. After the switch is bolted up, we cut a piece of $\frac{3}{8}$ -in. steel plate to fit the space from the center of the bolt *J* to the center of bolt *I*, and spot-weld this to the spacers on these bolts. This brings the heel of the switch pan to the desired height with the advantage that at the heel of the switch where the greatest wear always comes, we have a steel rather than a cast-iron pan. The circle to accommodate the switch tongue pin is cut in this steel plate and on the under side a short piece of steel tubing is welded. The inside diameter of this is the same as the outside diameter of the switch-tongue pin. This tubing not only gives a tight fit between the pin and its socket with steel rather than cast iron to take the wear, but also obviates the necessity of coring out this pin hole in the casting, with the likelihood of having it somewhat out of place, and consequently getting a poor fit between the heel of the switch point and the rail *G*.

The switch is now ready for casting. The switch is first laid right side up and a wood flooring of $\frac{3}{8}$ -in. boards fitted from bolt *I* to the end of the guard rail at the switch point. Wood strips are also placed between the under side of the ball of the rail and the

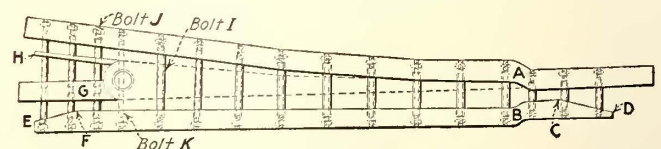


FIG. 7. CONSTRUCTION OF COMPLETE SWITCH

flooring. A long cope extending from bolt *J* to the end of the guard rail at the switch point is placed over the switch and thoroughly rammed. This cope is then removed and turned on its back on a previously prepared bed. The flooring is removed from the switch pan and the switch turned bottom side up on the cope. A dam for holding the preheating metal is made in the manner previously described. The switch is heated and the casting poured from the bottom. As soon as it has become sufficiently cooled to minimize the danger of bending, the switch was turned right side up and a casting poured from bolt *J* to the end of the guard at *E* from the top.

So far only one switch has been completed, and we

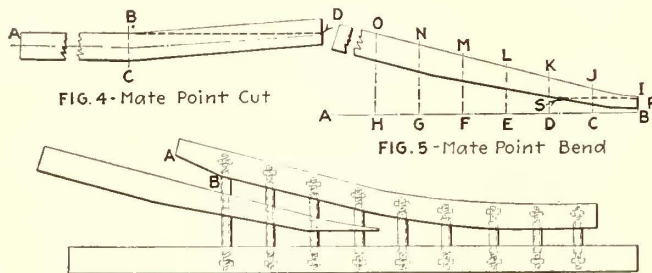


FIG. 6 - Assembly

FIGS. 4, 5 AND 6—CONSTRUCTION OF SWITCH MATE

or very slightly above it. The whole is then covered with sand and allowed to cool. When the frog is removed from its bed, the castings which have been poured on the outside for heating purposes break away, leaving only the casting between the rails.

We find that two men can build a frog of this kind complete, ready for the pouring of the castings, in an eight-hour working day after becoming familiar with the procedure. The average cost per frog complete, including the castings, has been \$28.25.

HOW THE SWITCH MATE IS CONSTRUCTED

To make the switch mate a piece of rail on which we proposed to make the mate point is first cut to the desired length, as shown in Fig. 4. This rail is then heated and bent at some point, *B*, which need not be any specific distance from the end, but ordinarily should not be less than 18 in. This is bent until the line *AB* projects just outside the center line. The cut *BD* on the head is then made. Where the old mate is available we bend the new rail to conform to the old one. Otherwise, the curve is determined by taking the running side of the main rail of the old mate as a base and erecting ordinates at intervals. The distance from the running side of the main rail to the running side of the mate rail is laid off on each ordinate. Points are thus located (Fig. 5.) and a curve drawn through these, as *IJK*, etc., gives the shape of the mate point desired. The rail is bent to conform to this line. After bending, the cut *SP* is made, the point *S* being that point on the mate rail where the mate rail is separated from the running rail by a distance of $1\frac{1}{2}$ in. After cutting the running rail to the desired length, this, together with the mate point, is placed temporarily in alignment (Fig. 6). For the guards we use scrap rail with an entrance cut, *AB*. This is bent to conform to the curve of the mate point and joins smoothly to the running rail. The guard rail is next temporarily spiked in position and the

cannot therefore give any very accurate data as to the time required for building or as to cost. The labor of two men for one and one-half days was required to build this first switch, and the entire cost of it, exclusive of the cost of the switch point, was approximately \$39. Undoubtedly, this figure can be bettered as the men become more familiar with the work.

It is, of course, too early as yet to form an opinion as to the wearing qualities of this home-made special work compared to the all-rail special work that is made by the factory. We have had, however, two frogs in service for slightly over two years, one of these under

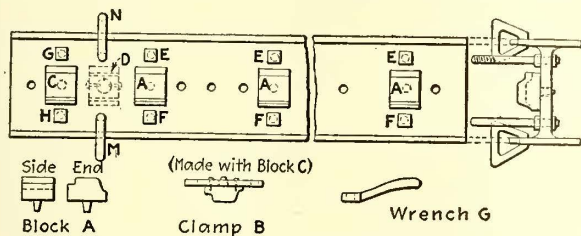


FIG. 8—DEVICE FOR MAKING OFF-SET BEND

fifteen-minute headway for eighteen hours per day, and the other between the main line and carhouse tracks under approximately seven-and-one-half-minute headway. On the first of these no noticeable cupping has as yet taken place. On the second, however, slight cups approximately $\frac{3}{16}$ in. deep have formed at the point where the wheels leave the leading-in rails and start onto the frog point.

DEVICE FOR MAKING THE OFFSET BEND IN THE SIDE RAILS

In shaping side rails for switches, considerable difficulty was experienced in making the offset bend at the end of the switch point as shown at A and B, Fig. 7. Several ways of using two "jim crows" to make this bend were tried, but we found in every case that while we could get the bend it was always longer than desired, and there was always some twist to the rail. Finally, we built the device shown in Fig. 8. The base of this is made of an 18-in. I-beam which we happened to have available, the length required being about 10 ft. Through the center of this 1-in. holes were drilled every 6 in. to take the pins at the bottom of the block A. At M and N the sides were drilled and three-cornered links were put in of sufficient width to accommodate the hooks of the "jim crow." In the holes H, G, E and F, $\frac{3}{8}$ -in. upright iron rods were fastened with nuts on each side of the web of the I-beam. These rods were about 10 in. long and were threaded on the upper end to take the wrenches G. The two blocks A and C were cast from steel and were identical except that block A is 1 in. deeper than block C. Block D for the "jim crow" head was made by cutting the pir from one of the blocks A and drilling the block to fit the end of the "jim crow" screw.

Clamp B is made by fastening a piece of 3-in. x $\frac{1}{2}$ -in. iron to the back of block C and drilling this flat piece to fit over block G H or E F. The distance between the edges of blocks D and A determine the length of the offset bend.

The method of using this device consists, first, in removing the "jim crow" and all of the clamps B. The rail is then heated at the point where the bend is desired and laid on blocks A so that the heated portion will come between blocks A and B, block B

being of course out when the rail is put in. In this position the rail lies flat on its side and on all the blocks A, but is 1 in. above block C. Clamps B are placed over both E and F and fastened tightly with wrenches G. The "jim crow" carrying-block D is then hooked under links M and N and pressure is applied. As this pressure comes on, the rail makes first a single bend until it touches block C. This bend is closely followed with another clamp B on studs G and H, which prevents the end of the rail from springing up again. As this continued pressure is applied the rail gradually takes the offset bend and at its completion lies flat on both blocks A and C.

British Diesel Engine Development

BRITISH engineers in recent years have taken an active interest in the development of the Diesel engine, which was formerly promoted principally on the continent. For example in Britain, there has been a departure from the normal design of the Diesel engine whereby use is made of a system of injecting the fuel into the combustion chamber by means of a high pressure placed upon the fuel alone. This system has been used in contrast to the air injection system of supplying the fuel to the combustion chambers. The newer scheme has been very successful in providing a sufficiently finely divided state of the oil for satisfactory combustion.

The advantages claimed for this system are that lower compression pressures are required than for air injection engines. Two reasons are given for this. First, because of the relatively slow manner in which combustion starts with the "solid" supply system, fuel injection can be begun many degrees before the dead center, and this pre-injection gives heat to the gases and air within the combustion chamber and assists in the ignition and combustion of the ensuing charge of fuel.

The second advantage is that the cooling effect of the expanding fuel injection air is absent with the solid or mechanical injection engine. This cooling effect of the air in air injection engines must be counteracted by carrying the compression to a higher pressure and hence higher temperature than otherwise would be required.

Opportunities of a Foreman

In its "executive series" the National Safety Council urges the co-operation of foremen in reducing accident risks by gaining the confidence of their men. Among other things a recent circular says: "If you are not a leader you are not a good foreman. What the men think of you is what they think of the company. The contentedness of the workers is determined by you. Know the job yourself and then show your workmen how to do it. You are responsible for the protection of your men and you can determine their attitude toward safety. If you are careless they will become so—and the careless man is a dangerous man."

Speaking editorially regarding certain transportation projects in Great Britain, the *Electrician*, London, makes the following statement as to the economies of the situation: "For the state to develop enterprises which are not sufficiently good to tempt private capital is, generally speaking, a proposition that is not sound."

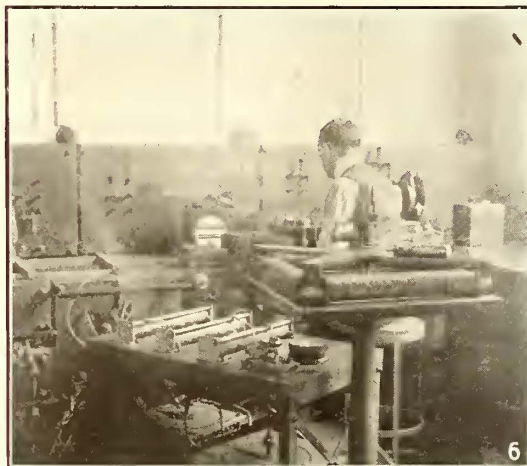
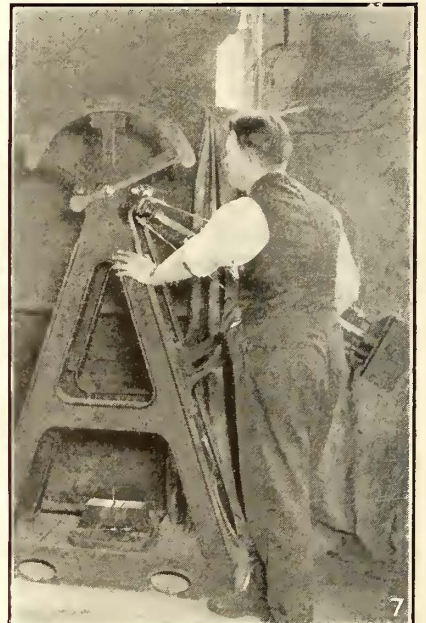
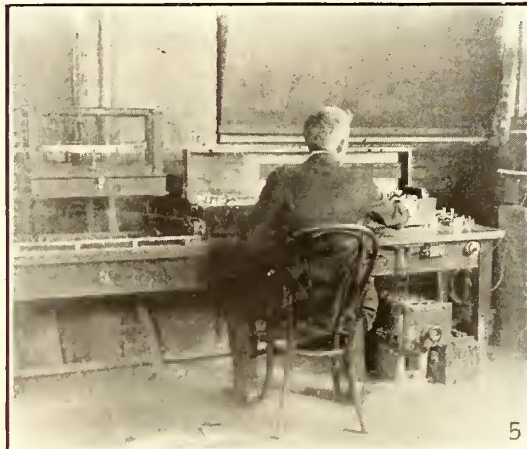
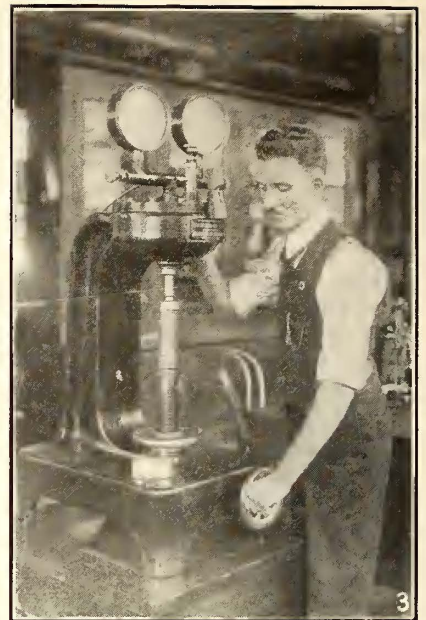
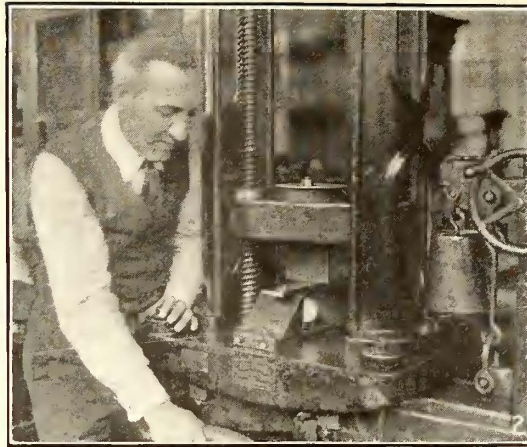
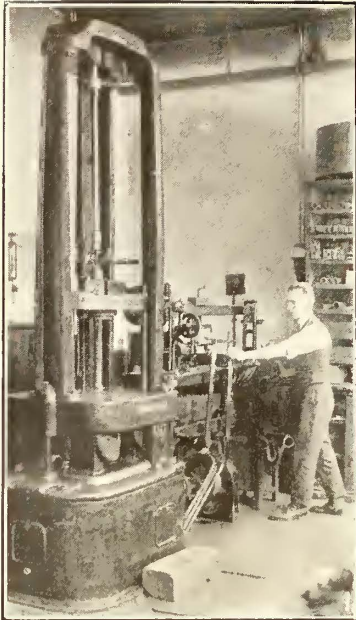


Fig. 1—Making a Tension Test.
 Fig. 2—Making a Transverse Test on a Sample of Cast Iron.
 Fig. 3—Subjecting a Sample to the Brinell Hardness Test.
 Fig. 4—Drop Test on a Rough Turned Shaft.
 Fig. 5—Measuring Conductivity with a Hoop's Bridge.

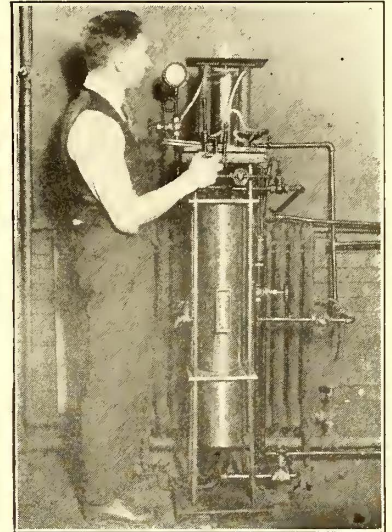
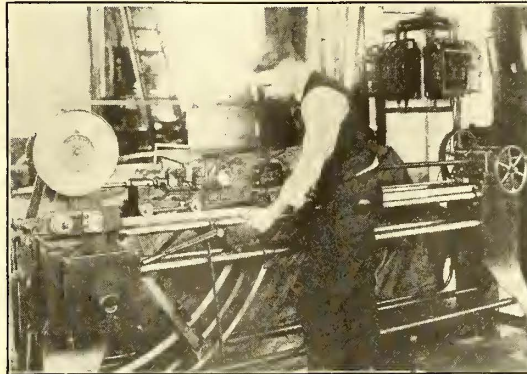
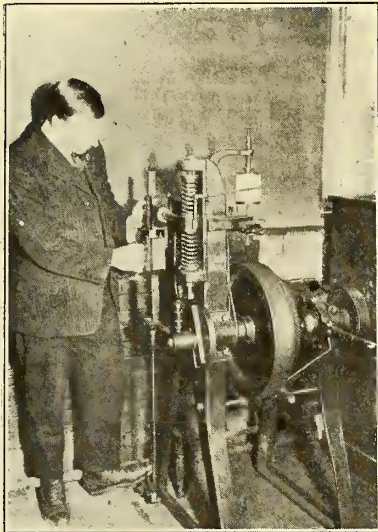
Fig. 6—Making a Core Loss Test.
 Fig. 7—An Impact Test on a Small Sample.
 Fig. 8—Subjecting a Sample to a Hammer Test.
 Fig. 9—Testing a Sample of Sheet Steel for Permeability.
 Fig. 10—The Draw Test of a Sample of Sheet Steel.

Manufacturers' Tests of Materials for Railway Motors

The Writer Describes Various Tests, the Apparatus Used and the Results Obtained for Determining the Physical and Electrical Properties of Material Entering Into the Construction of Railway Motors

By J. S. DEAN

Railway Engineer Westinghouse Electric & Manufacturing Company



MAKING TESTS ON SAMPLES OF MATERIALS

Fig. 11—Left—A Fatigue Test on a Specimen of Metal.

Fig. 12—Center—Measuring the Tensile Strength of Wire.

Fig. 13—Right—Measuring the Coefficient of Expansion of a Test Piece.

OWING to the severe operating conditions that railway motors must withstand in service, it is essential that all materials should have a large factor of safety, that they should be of uniform texture and strength and free from flaws and defects. Otherwise failures and breakdowns in service may occur, possibly causing serious accident and congestion of traffic.

In order to insure a reliable supply of raw materials to fulfill the above conditions, in the works of this company, materials are covered by a "P. D." (purchasing department) specification or an "M" (material) number, setting forth the requisite physical properties that materials must have in order to meet the desired requirements, as a guide to the inspection department in the acceptance of this material. To a very large extent, the percentage of material subjected to a rigid inspection and test is governed by common sense, past experience, source of supply and amount of trouble reported by the shop. To give every piece of raw material a careful inspection and a series of physical tests would be an unnecessary waste of time, money and material, which would not only handicap production, but enormously increase the cost of manufacture. The price factor in design is most important and is continually being impressed in designers to keep costs low.

In general, materials are given a careful inspection and are selected under the supervision of the research division of the engineering department. Some of the tests are made at the mills of the supplier, either by our own inspectors or by the manufacturer's testing experts, witnessed and approved by our representatives, and others are tested and inspected at our own plant. Some of the most essential of these tests of metals and

alloys will be briefly outlined and illustrated to give the railway operating men a better working knowledge of this very important subject.

From the railway motor material chart as given in the article which appeared in the April 17, 1919, issue

		<ul style="list-style-type: none"> Cast Forged Hot rolled Cold rolled Axle Special alloy Electrical sheet Sheet Plate Spring Wire
Metals.....	Steel	
	Iron	Malleable
	Copper	<ul style="list-style-type: none"> Wire Ribbon Strap Cable Braided Hard drawn bars
	Tin.....	<ul style="list-style-type: none"> Strip Sheet (tin plate)
Alloys		<ul style="list-style-type: none"> Brass Bronze Babbitt Solder

of the ELECTRIC RAILWAY JOURNAL, we have prepared the summary shown above of the metals and alloys used in the manufacture of a railway motor.

In general, the various tests given to metals and alloys depend largely upon the application which is to be made of the materials, the method of manufacture.

shape, size and characteristics of material and are classified as follows:

Mechanical	Tension.....	Iron.....	Malleable
		Steel.....	Cast
			Forged
			Hot-rolled
			Cold-rolled
	Axle		
	Copper.....	Special alloy	
		Sheet	
		Plate	
		Wire	
Alloys.....		Brass	
Compression	Iron.....	Malleable	
		Alloy.....	Brass
		Steel.....	Cast
		Forged	
		Alloys.....	Brass
Transverse...	Steel.....	Axle	
		Spring	
		Iron.....	Malleable
		Copper.....	Hard-drawn bars
		Alloys.....	Brass
Hardness.....	Steel.....	Forged	
		Copper.....	Hard-drawn
		Alloys.....	Brass
		Bronze	
		Babbitt	
Electrical.	Conductivity	Copper.....	Wire
		Ribbon	
		Strap	
		Alloy.....	Brass
		Core Loss	Steel.....
Permeability	Steel.....	Electrical sheet	
		Cast	

Special Mechanical Tests

Drop tests	Alloy steel—shafts
Hammer tests	Babbitt and bronze bearings
Impact tests	Metals and alloys
Fatigue tests	Metals and alloys
Draw tests	Sheet steel
Pulling tests	Wire
Coefficient of expansion	Metals and alloys

CHEMICAL TESTS MADE ON STEEL AND NON-FERROUS ALLOYS

In connection with the mechanical and electrical tests made on metals and alloys, a chemical analysis of certain of the materials is also frequently made, to determine their chemical properties. This is especially applicable to the various grades of steel and non-ferrous alloys such as bronze for bearing shells, babbitt for bearing lining and the various solders, as the amount of metals combined must be of a definite percentage to produce a satisfactory alloy to meet the required service conditions. Facilities for making these tests are provided by a well-equipped chemical laboratory in charge of expert chemists and metallurgists directly under the supervision of the research division of the engineering department.

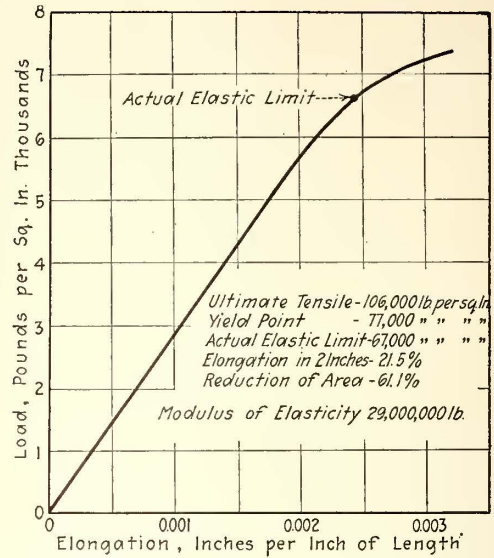


FIG. 14—GRAPH OF TENSILE TEST ON SPECIMEN OF HEAT TREATED AXLE STEEL

The contour and preparation of test specimens depend upon the shape of the material, the method of manufacture, the nature of tests to be made and design of testing machine. A group of test specimens used in connection with the various tests herein described is shown in Fig. 20. These specimens conform to the requirements of the American Society for Testing Materials.

In the case of alloy castings special sample pieces are cast from the same heat of metal from which the regular castings are poured, as shown in a second illustration, Fig. 18. The standard test specimens are machined from these sample castings. When the material is rolled or drawn stock, a section of the bar is taken and machined to the proper shape. Sheet metal is cut up to size to conform to the specified test dimensions. The required length of wire or cable for test specimens is cut from the end of the coils or reels and requires no further preparation or machining. Special alloy steel for shafts and large forgings have the test specimens removed by means of a hollow drill, after which they are machined to the standard size as shown in Fig. 19.

The physical testing machine shown in Fig. 1 has a capacity of 150,000 lb. It is used for tension tests on various samples.

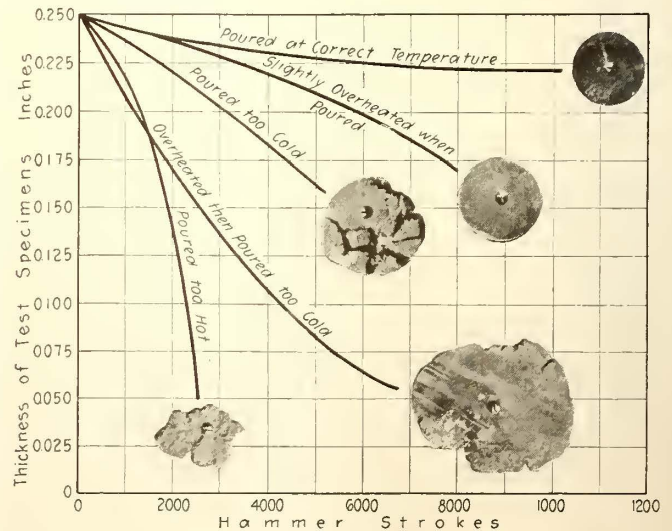


FIG. 15—RESULTS OF HAMMER TESTS ON BABBITT METAL

The most common test piece used with this machine is 4½ in. long (with 2-in. gage length) and 0.505 in. in diameter. Other pieces 0.357 in. in diameter by 1½ in. long, and 0.798 in. in diameter by ¾ in. long are sometimes used. In the case of sheet metal, pieces are cut 1 in. wide and 10 in. to 14 in. long. (See Fig. 20 on page 325.)

In testing samples the pieces are screwed into a bar held in the machine or gripped in the jaws of the machine and power is then applied. The ultimate tensile strength is automatically recorded on the scale. The yield point and actual elastic limit are determined by the divider method or by means of the extensometer.

The following set of readings shows the results of a test made on a specimen of heat-treated axle steel.

Description	Results
Ultimate tensile strength.....	106,700 lb. per sq.in.
Yield point.....	77,000 lb. per sq.in.
Actual elastic limit.....	67,000 lb. per sq.in.
Elongation in 2 in.....	21.5 per cent
Reduction of area.....	61.1 per cent

These results are further shown graphically in Fig.14. The apparatus used for making compression tests consists of the 150,000-lb. testing machine already re-

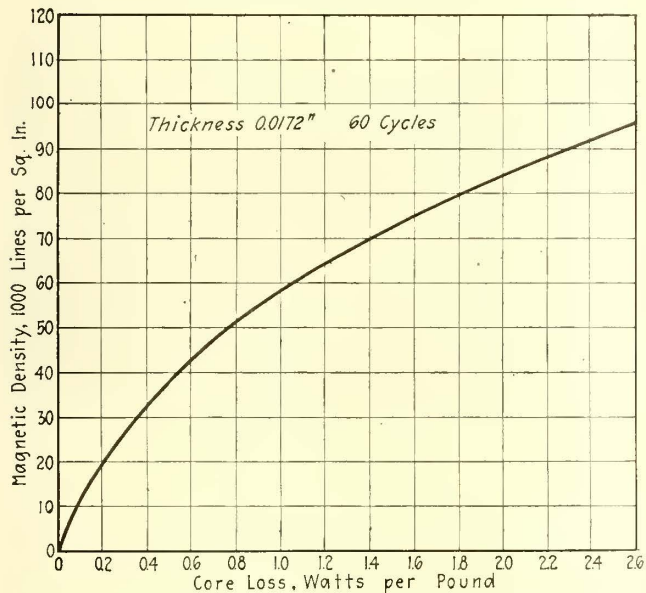


FIG. 16—GRAPH FOR CORE LOSS OF ELECTRIC SHEET STEEL WITH 60 CYCLES

ferred to. The test specimen used is 2½ in. long and 0.798 in. in diameter. (See Fig. 20 C.)

It is placed between the plates or heads of the machine and power is applied until the piece fails by either bending or breaking. In the case of soft metal, it is compressed ¼ in. and maximum readings are then taken as the ultimate strength which is automatically recorded on the scale. The elastic limit is determined by means of the extensometer.

The following results were obtained from tests on a piece of brass used for brushholder castings. This sample was compressed ¼ in.

Description	Results
Ultimate compression.....	29,340 lb. per sq.in.
Elastic limit.....	9,400 lb. per sq.in.

The physical testing machine of 5000 lb. capacity shown in Fig. 2 is used for making transverse tests. The test specimen for cast iron is made 12 in. long and

1 in. square in section. Other sizes may be used depending upon the available material to be tested. Standard commutator bars of a tapered section are used for the test specimen of hard drawn copper bars. (See Fig. 20 R). The method of making a test consists of placing the test piece on supports 1 in. apart, with dial gage under the middle to indicate the deflection. The load is applied at the center of the bar until 0.001 in. permanent deflection is obtained. The stress is then figured from the following formula.

$$\text{Where } S = \frac{3 PL}{2 B D^2}$$

S = Fiber stress in pounds per square inch.

P = Load in pounds.

L = Distance between supports in inches.

B = Width of piece in inches.

D = Thickness of piece in inches.

The results obtained from a sample section of a commutator bar showed a fiber stress of 21,350 lb. necessary to produce 0.001 in. deflection.

A Brinell hardness tester is shown in Fig. 3. The hardness test can be made on almost any section and shape of test specimen not too large to be placed in the jaws of the testing machine. In case of gears and pin-

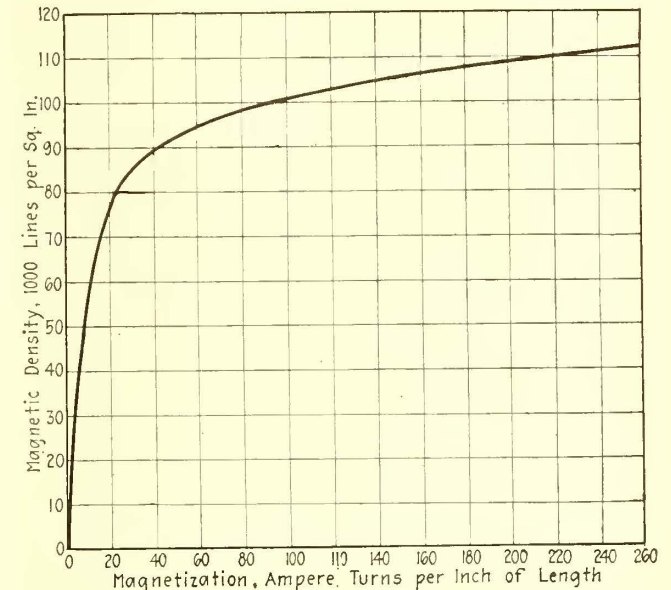


FIG. 17—MAGNETIZATION CURVE FOR CAST STEEL SAMPLE

ions, the test is made on the finished product. When special test pieces are made up, they are ¾ in. thick and taper from 1⅜ in. to 2 in. in diameter, as per sample H, Fig. 20.

HOW TO OBTAIN BRINELL HARDNESS

To carry out this test a 10-mm. hardened steel ball is pressed into the test specimen by a force of 500 or 3000 kg. (depending upon the metals being tested), by hydraulic pressure. The spherical impression of indentation indicates the hardness of the material. The Brinell number is obtained by dividing the applied load by the curved area of the impression, which is obtained by calculation from the diameter of the impression.

Some results which were obtained from actual tests on metals are given below.

Material	Brinell Hardness Number
Babbitt bearings.....	30
B.P. forged-steel pinions.....	512

Hoope's conductivity bridge with the necessary accessory apparatus shown in Fig. 5 is used in making conductivity tests. For this purpose samples of wire are cut 38 in. long. In testing conductivity of various alloys machined specimens are made 0.25 in. in diameter and 10 in. long. (See Fig. 20, N.)

The test piece of wire is weighed in a sensitive balance and its diameter is determined by calculations. It is then clamped in the bridge terminals and the sliding contacts are adjusted until an electric balance of voltage is obtained which is indicated by the absence of deflection on the galvanometer. Conductivity is read directly from the scale on the bridge. Results of tests on copper wire used in making railway motor armature and field coils show average conductivity of 99½ per cent.

The apparatus used for making core loss tests on samples of sheet steel consists of an Epstein core-loss testing machine with the necessary accessory apparatus as shown in Fig. 6.

Sample pieces of sheet steel are cut 3 cm. (1⅓ in.) wide and 50 cm. (19⅛ in.) long from the test sheets and made up into four bundles approximately ½ in.

thick (5 kg. or 11 lb.) and taped together as shown in the accompanying Fig. 20 K.

To make the test samples are placed in the four hollow coils which are set at right angles and the ends of the samples are clamped together to get a complete magnetic circuit through the iron. Voltage is then applied to the coils surrounding the samples to give standard induction in the iron, and the losses are measured by a wattmeter in the circuit. The results of a core-loss test made on a sample of electric sheet steel, such as is used in railway motor armatures and field pole punchings, is shown graphically on page 323 in the illustration Fig. 16.

A modified Burrough's permeameter with the necessary accessory apparatus as shown in Fig. 9 is used for making permeability tests. Sample pieces of sheet steel are cut 3 cm. (1⅓ in.) wide and 50 cm. (19⅛ in.) long from the test sheets and made up into two bundles of approximately ¼ in. thick (1 kg. or 2.2 lb.) and taped together, as shown in Fig. 20 P.

The test samples are inserted in the two hollow coils which are placed side by side and both ends of the test pieces are joined together by iron yokes to complete the magnetic circuit. Adjustments are made and checked by means of a galvanometer, to get a uniform flux distribution of a known value around the test specimen. Current readings are then taken by reading an ammeter connected in the circuit.

The results of a permeability test made on a sample of cast steel used in railway motor frames are shown graphically in Fig. 17.

A special drop testing machine built by the Westinghouse Electric & Manufacturing Company is shown in Fig. 4. This machine is used for making drop tests of various materials. For the test illustrated a rough turned shaft is used as the test specimen.

The shaft after being rough-turned is placed on the half-round supports near the ends, and a tup (heavy weight) which is released by a latch, strikes the shaft a blow half way between the supports. The tone of the sound of the impact is an indication of the condition (presence of absence of flaws and cracks) of the metal in the shaft. When the shaft is hit by the tup, a clear ringing sound indicates that the metal is "O.K.," while a dull, dead sound indicates a defective shaft.

A special machine, built by the Westinghouse Electric & Manufacturing Company, shown in Fig 8, is used for obtaining regular hammer blows of constant intensity. Test pieces are machined to 1 in. in diameter by ¼ in. thick as shown in Fig. 20 M. To carry out a test the pieces are placed on the anvil of the machine and subjected to a series of regular hammer blows of constant foot-pounds stroke.

FIG. 18—TEST SAMPLES OF ALLOY CASTINGS POURED FROM SAME HEAT AS METAL USED

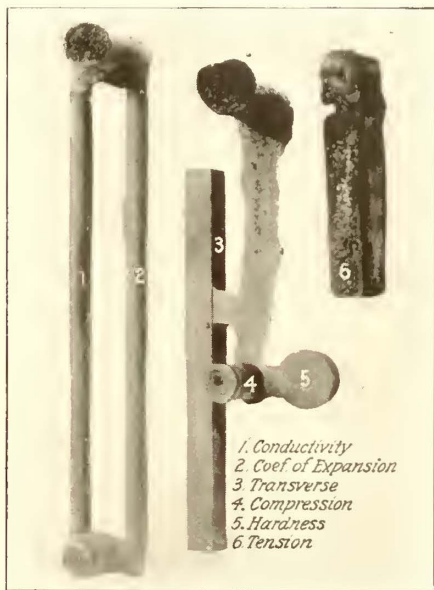


FIG. 18—TEST SAMPLES OF ALLOY CASTINGS POURED FROM SAME HEAT AS METAL USED

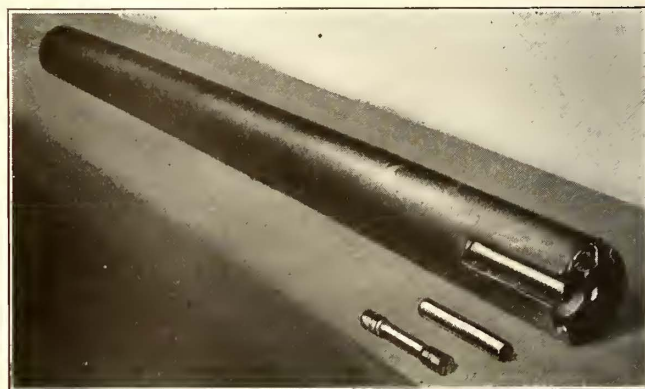


FIG. 19—TEST SPECIMENS REMOVED FROM SPECIAL ALLOY STEEL FOR SHAFTS

The results of a series of tests made on babbitt metal used on railway motor bearings are shown graphically in Fig. 15. This test indicates that 460 deg. to 485 deg. Cent. is the best pouring temperature and that the metal should not be permitted at any time to become hotter than 490 deg.

An Izod impact testing machine of 120 ft.-lb. capacity is shown in Fig. 7. It is used for the impact test. The best specimen is machined 10 mm. (0.393 in.) square and 75 mm. (2.95 in.) long with a deep groove 2 mm. (0.078 in.) on one side, 28 mm. (1.10 in.) from one end as shown in Fig. 20 I.

The test piece is clamped between the steel jaws of the machine with the grooved side toward the hammer head on the pendulum, which is released by means of a latch and swings down, striking the test piece. The force of the blow or impact is obtained from the scale attached to the machine by subtracting the registered swing of pendulum when test piece is in place, from the initial free swing of the pendulum.

Results of tests made on samples of material are as shown in the following table:

Cold-rolled bar steel as rolled.....	2.5 ft.-lb
Cold-rolled bar steel annealed.....	77 ft.-lb
Hot-rolled open-hearth steel as rolled.....	58 ft.-lb

The Upton-Lewis fatigue machine shown in Fig. 11 is used for fatigue tests of various materials. The test specimen of metal cut from the strap or bar, is about 8 in. long, as shown in Fig 20 F. The test piece is clamped between the jaws of the machine and power is applied. This bends the material forward and backward through a distance that can be regulated by adjusting the length of the stroke of the machine. Pieces are thus vibrated until they break or until a large number of vibrations have been withstood. The number of vibrations is recorded automatically by a cyclometer attached to the machine.

The results of a test on a piece of treated, hot-rolled steel 0.196 in. thick and 1 in. wide are as follows:

Duration of test.....	Six hours, twenty-five minutes
Number of vibrations to break.....	111,085
Length of throw.....	$\frac{1}{2}$ in.

A draw test of material is made with the Erichsen-type draw-test machine as shown in Fig. 10. The test pieces of sheet steel are cut 3 in. square as shown in

test piece of wire is clamped in the jaws of the machine and power is applied. The ultimate tensile strength is automatically recorded on a chart. The elastic limit is determined by observing the chart and noting the sharp bend in the curve.

Results obtained from a test on 0.0808 in. soft copper wire used in railway motor armature coils are given below.

Description	Results
Ultimate tensile strength.....	38,000 lb. per sq in.
Elastic limit.....	4,000 lb. per sq.in.
Elongation in 10 in.....	32 per cent

Special apparatus built by the Westinghouse Company and shown in Fig. 13 is used for determining the coefficient of expansion. To make such a test, the test piece is machined to $\frac{1}{2}$ in. in diameter and 10 in. long, as shown in Fig. 20 E. The test piece is placed in a bath of circulating cold water, and readings of temperature and length are taken. Live steam is then substituted for the cold water and another set of readings of temperature and length is taken. From these readings, the coefficient of expansion, which is the expansion per degree of temperature for each inch of material, is calculated.

Tests on a sample specimen of brass used in the manufacture of railway motor brushholders shown 0.0000189 in. expansion for each inch of material for an increase of one degree Centigrade in temperature.

Keeping the High-Tension Line in Good Repair

After the Line Has Been Well Built Careful Patrolling and Prompt Repair Will Conduce to Reliability in Operation

BY JOHN M. DRABELLE

Mechanical and Electrical Engineer, Iowa Railway & Light Company, Cedar Rapids, Iowa.

PROPER maintenance of high-tension lines is one of the most serious problems that confronts the power transmission companies to-day, that is to accomplish it economically and efficiently. The public and the public service commissions are continually increasing the rigidity of the requirements for continuity of service. To render with this characteristic service requires both the highest technical skill and the closest co-operation among the men upon whose shoulders rests the responsibility of producing it.

The maintenance problem on high-tension lines really begins with the original design of the line itself and its routing. A poorly-designed and poorly-built line will always be a line expensive to maintain. Here as elsewhere we get only what we pay for, and if second and third-rate material enters into the construction, and if careless workmanship is tolerated, trouble is always sure to result.

The lower the voltage, generally speaking, the easier is the problem of maintenance, for at high voltages and extra high voltages many electrical effects manifest themselves that would not appear and need not be taken into account on the short, lower voltage line. The selection of insulators is of prime importance. Insulators should be selected on the basis of competitive tests and upon operating information from other companies, rather than upon a price basis. A cheap insulator is a very expensive piece of porcelain. For example, on one large

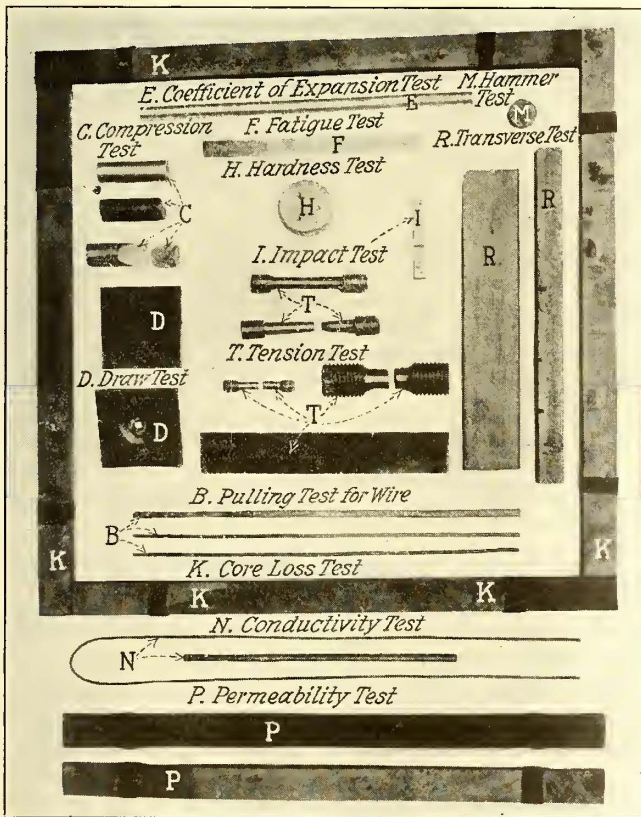


FIG. 20—GROUP OF SPECIMENS USED FOR VARIOUS TESTS

Fig. 20 D, and are placed in the machine and a blunt cone-shaped steel plunger is forced against the metal. Pressure is applied by means of the hand wheel, drawing a portion of the metal into the small cup-shaped projection until it shows signs of destruction. The depth of the cup is automatically registered on a scale attached to the machine.

The results on a test piece of cold rolled sheet steel $\frac{1}{16}$ in. thick show a depression of 13 mm. (0.507 in.).

PULLING TEST FOR WIRE

A horizontal testing machine of 1000 lb. capacity, shown in Fig. 12 is used for determining the tensile strength of wire. To make this test a section of wire is cut at least 12 in. long as shown in Fig. 20 B. The

Iowa property the average cost of replacing an insulator is around \$10.50, not including the loss of revenue while the line is out of service.

The maintenance of the high-tension line begins properly with the patrolling, and the patrolmen should be selected with great care. A man who is quick to observe, quick to think, and careful in all details of his work, is the man who will make the best patrolman.

All poles and structures should be numbered, in order that a definite reference may be given to the men who are to make repairs. Trees should be kept carefully trimmed back from the line to such a distance that under the most severe wind conditions they cannot whip into the circuits, thus causing grounds and probable interruptions of service. On a wood pole line, the guys should all be kept pulled up tight, as the guying of the line is its real strength. With transmission lines that follow railway right-of-way, trouble may result in the summer and fall due to poles being burned down by railway sectionmen burning the right-of-way. It is at this time of the year that particular vigilance must be exercised by the patrolman.

A small supply of maintenance material should be kept available at points not to exceed 7 to 10 miles apart. Insulators, pins, transmission-line conductor, splicing sleeves, tie wire and guy material, consisting of messenger, anchors and three-pole clamps, should be available. Thus long trips back to the storeroom can be avoided and considerable time saved, especially if an insulator has been partially shot away by hunters, or if there has been a severe wind storm.

PROVISION FOR EMERGENCY REPAIR IS ESPECIALLY IMPORTANT

In times of severe electrical or sleet storms, the regular line crews at different substations or generating points should keep in touch with the substation operator, or the system operator, as the case might be, so that they can be readily available in case of major trouble. It is well to set aside in each large storeroom maintained by the operating company a supply of emergency line material, the stock of which should not be altered or changed by anyone except the line foreman. If any material is used it should be promptly replaced by the storekeeper in order that the supply may be "100 per cent available" at all times. In this way delays can be eliminated due to waiting for material out of the general store.

Each patrolman should be provided with some means of transportation. For the average conditions the Ford automobile is the most satisfactory of all. It will go in any kind of weather and over roads that are impassable to larger and heavier cars. The patrolman should always carry his belt, spurs and ordinary belt tools, and in addition, should be provided with a chain for short-circuiting and grounding the high-tension line. For transmission lines provided with telephone circuits, the Western Electric Code No. 1375-B telephone set provides an easy portable telephone, light in weight and quite efficient in transmission. The only difficulty with this set is that rather small batteries are employed to operate it, and these must be renewed at regular intervals even though they are apparently in operating condition.

The problem of maintaining the larger circuits constructed upon steel towers becomes one of distance, sectionalizing switches and insulators. The suspension insulator problem has not as yet been solved by any of the manufacturers, and apparently none of the operating

companies have as yet devised any form of testing that can be said to be most satisfactory and reliable. The "megger," the high-frequency oscillator, the induction coil with telephone receiver, and the "buzz stick" all have their several advocates, but as yet no one method apparently answers all requirements. The suspension insulator apparently deteriorates in the storeroom as readily as on the line; but whatever method is employed for testing maintenance insulators before they are sent out from the storeroom, the tests should be of such nature as not to overstrain and ruin the insulators before they go upon the line.

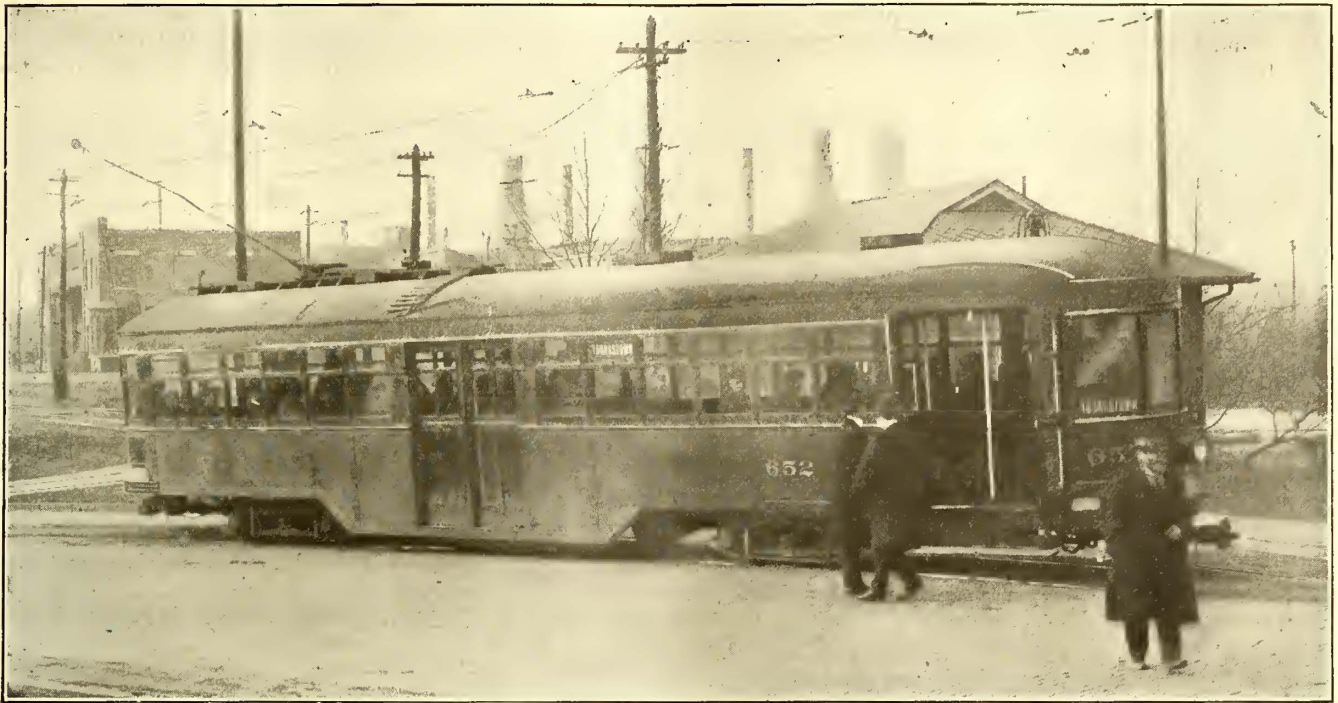
MALICIOUS MISCHIEF IS A FRUITFUL SOURCE OF TROUBLE

Outside of lightning disturbances, frequently surges set up by switching and damage by wind storms the most fruitful source of trouble comes from malicious nuisance. This takes the form of the shooting at insulators by hunters and the throwing of pieces of hay or telephone wire into the transmission line. This form of trouble can only be eliminated by proper laws on the statute books of every state, making the penalty severe enough so that there will be respect for the transmission line. If the penalty made is too severe it would be too difficult to secure conviction before any jury, as corporations never receive kindly consideration. Then, further, a suitable reward must be offered for information leading to the arrest and conviction of the party or parties causing the damage.

Finally, a complete set of rules and instructions should be laid out by each company. The problems are so different and diversified that no detailed statement of them can be made, but in general, they should consist of the following instructions: (a) For patrolling and inspecting, (b) for the reporting of trouble, (c) for the distribution of material and scheduled points along the line, (d) for the protection of the men making the repairs, (e) for assembling of the line crews in case of emergency, (f) for proper accounting for time and material.

British Tramways Also Raise Fares

IN A REPORT of the address of the chairman of the British Electric Traction Company given in the *London Electrician* for Aug. 2, a very good idea is given of the difficulties under which private traction undertakings are carried on in Great Britain at the present time. The chairman, Emile Garcke, pointed out that any possible economies would only inadequately compensate for the depreciation in the purchasing value of the penny when applied to the payment of wages and the purchase of materials. Since the war the costs of labor and materials have on the average more than doubled, but it has not been possible to make a proportionate increase in the fares. He complained that under the statutory charges act of last year, private undertakings are not permitted to make such increase as to enable the same return to be obtained on capital as was obtainable before the war; yet local authorities may obtain power to increase fares to an extent sufficient to meet their interest and sinking fund charges. It is, therefore, only natural that the average return on the whole of the capital invested in tramway enterprises is only about 3½ per cent, and on the ordinary stock the return is only about 1½ per cent. Such a position renders it impossible to attract fresh capital, yet there are many complaints at the present time that fares are too high.



FRONT-ENTRANCE CENTER-EXIT INTERURBAN CAR OF MAHONING & SHENANGO RAILWAY & LIGHT COMPANY

Zone Fare Collection on Front-Entrance Center-Exit Cars

On Interurban Line Between Youngstown and Warren, Ohio, Mahoning & Shenango Railway & Light Company Uses Plan Involving Two Types of Identification Checks

AN IMPORTANT interurban line of the Mahoning & Shenango Railway & Light Company connects Youngstown and Warren, 15 miles apart, passing through Girard and Niles. The line is divided into three overlapping 5-cent zones, as shown in an accompanying diagram, the overlaps being so arranged as to include Girard and Niles, respectively. On this line the cars of the "Peter Witt," or front-entrance, center-exit type, are used, the distinguishing feature of which is that the passengers pay their fares as they pass the conductor. This functionary on the M. & S. cars is stationed opposite the center of the exit door, instead of to the forward side of it as is usual in this type of car.

A COMBINATION FARE-COLLECTION SCHEME WAS EMPLOYED

The system of zones on the Youngstown-Warren line was designed to permit passengers to ride between points in Youngstown west of the Civic Center and Girard, Girard and Niles, or Niles and Warren for 5 cents. The fare-collection plan was designed to permit quick loading at terminals, provide simplicity in identifying passengers as to boarding points, and utilize the Witt scheme of car layout to minimize boarding time. A combination of "pay-leave" and "pay-on-passing-fare-box" collection was therefore devised, and

on Feb. 1, 1919, was put into full operation with an equipment of Cleveland fare boxes.

To accomplish the above purposes, first at the line terminals and in the terminal cities, all doors are opened and no attempt is made to collect fares. In fact the conductor covers the fare box to prevent the passengers from dropping fares into the box. No identification checks are given to the passengers in these districts.

Second, passengers boarding in the second and third zones from either end of the line are handed identification slips by the motorman, a pink slip (No. 1) in the second zone or a blue slip (No. 2) in the third zone. Ingress is only by the front doors away from the terminals.

Third, if a passenger who has boarded in the second or third zone desires to pass to the rear of the car he pays a fare of 5 cents or 10 cents, depending upon his boarding point and destination, surrendering the check given him by the motorman and receiving a white slip if he is to alight in the same zone as that in which he boarded or a yellow slip if he is to ride in two zones.

Fourth, on alighting, passengers from the terminal cities, who have no slips, pay the fare corresponding to the alighting zone; those surrendering white slips in the second zone or yellow slips in the third zone pay nothing and those who surrender white slips in

the third zone pay 5 cents extra (as they have over- ridden the zone for which they paid).

PLAN HAS CONSIDERABLE FLEXIBILITY

There may thus be at any time in the front section of the car passengers without slips and those with motorman's slip No. 1 or No. 2. In the rear there may

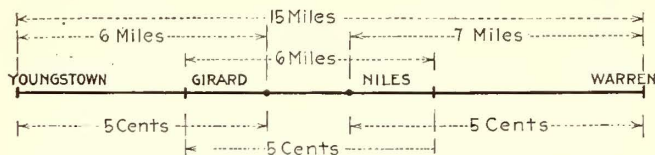


DIAGRAM OF FARE ZONES, M. & S. RY. & LT. CO., YOUNGSTOWN-WARREN LINE

be passengers with no slips or with conductor's white or yellow slips. There is, of course, some disadvantage in having passengers in the rear who have paid no fare but this is more than offset by the speedy terminal loading.

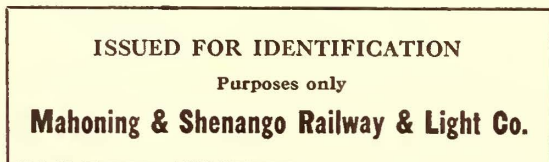
The above is the whole story in condensed form. A couple of examples will serve to illustrate the working of the plan.

A passenger boards in Warren and plans to ride to Girard. He enters the front end, receives no slip and sits down in the front of the car. A little later he finds it convenient to move to the rear, and passes the conductor without giving or receiving anything. Later he decides to go on to Youngstown. When he leaves he pays 15 cents. It is of no use for him to say that he boarded in the second or third zone or that he paid his fare as he passed the box, for if he had done so he would have had something to show for it. Again, a passenger boards in Girard, gets a pink slip and passes to the rear of the car. He tells the conductor that he is going to Niles, pays 5 cents, surrenders his pink slip and gets a white one. Later he decides to go on to Warren. When he alights he surrenders his white slip and pays 5 cents additional.

In the opinion of C. D. Smith, general superintendent of the company, the following advantages result from the use of the light-weight interurban car of the Peter Witt type, with a fare-collection scheme involving the use of a fare box: (1) Traffic congestion at heavy loading points, such as at



IDENTIFICATION CHECK ISSUED BY MOTORMAN



SAMPLE IDENTIFICATION CHECK ISSUED BY CONDUCTOR

the Youngstown terminal, is eliminated. (2) Rapid boarding movements along the line, entirely under the control of the motorman, are provided. This tends to eliminate accidents. (3) The auditing operations are simple. (4) The conductor has full control of the discharge of passengers, tending to reduce the duration of the stop and to eliminate accidents. (5) Efficient fare collection, with minimizing of the danger

of missing fares. (6) Plan is adaptable to use of two-car trains between Youngstown and Niles, which is contemplated.

Iowa Association Will Hold Operating Men's Mid-Year Meeting

Special Committee Reports Its Plans to Intensify Interest in the Association and Attendance at Meetings

IT WAS BRIEFLY announced in the report of the annual meeting of the Iowa Electric Railway Association, on page 1271 of the June 28 issue of the ELECTRIC RAILWAY JOURNAL, that a committee had been appointed to draft a plan to increase attendance at, and interest in the meetings of the association. This committee met in Chicago on July 15 and after a discussion of various plans to accomplish the desired purpose decided to hold a mid-year meeting of operating men of the territory at Davenport, Iowa, on Sept. 17 and 18 next.

To create a greater interest in this meeting it is proposed to divide the representatives into four distinct classes, namely, those interested in way and structures, shops and equipment, transportation and power and distribution. On the morning of the first day one paper of interest to each of these sections will be delivered and followed by discussion from previously assigned individuals. In the afternoon a visit will be made by the various sections to the respective departments of the Tri-City Railway Company.

On the morning of the second day a final discussion of the previously presented papers together with a more detailed discussion of the inspection trips will take place. In the afternoon permanent committees will be appointed to represent each of the four sections, and these committees will immediately meet and later make recommendations for future work. In the evening, after the work is all accomplished, a banquet will be held.

In an effort to secure a large attendance at this mid-year meeting personal letters will be sent by the president of the association to all managers urging them to permit the attendance of their operating men. These letters will be supplemented by personal visits from members of the committee on increased interest.

It was noted in the report of the last annual meeting of the Wisconsin Association, page 688, issue of this paper for April 5, that a similar committee had been appointed by that association. This committee together with the secretary of the association, has been invited to attend the mid-year meeting of the Iowa Association. Both associations are striving for the same result and it is believed that co-operation will be mutually beneficial. A complete program of the Iowa meeting will appear later.

As a result of an accident on the lines of the Roman Tramway Company, Italy, on June 5, in which three persons were killed and many were injured, the prefect of the province of Rome has ordered an official inspection of all the company's rolling stock by government engineers and representatives of the company's employees. The cars and other equipment are largely obsolete in type. During the recent general strike in Naples the tramway employees were the only ones who remained at work.

Federal Hearings Continue

Secretary of War Newton D. Baker, Public Utility Commissioners and Others Conversant with Electric Railway Situation Show Why This Utility Needs Speedy Relief

THE hearings before the Federal Electric Railways Commission on the many aspects of the electric railway situation was resumed on Monday morning, Aug. 11, in the Interstate Commerce Building, Washington, with about fifty men in attendance.

Monday Morning Session

The first witness to be heard was Hon. Newton D. Baker, Secretary of War, who, because of his intimate association with the working out and putting into effect of the Tayler plan in Cleveland, while he was city solicitor and Mayor, was invited to present to the commission some of the history of that situation.

Mr. Baker dwelt at length upon the successive steps which were taken leading up to the adoption of the present franchise in Cleveland, endeavoring especially to bring out the fact that the final arrangement was a popular one. The people understood the plan and were agreed that it was the proper solution of the problem, the whole theory behind the Cleveland plan being worked up on the basis that the public should understand, and that machinery should be created so that its understanding might be continued and kept up to date. Every month a statement is printed in the Cleveland papers showing the state of the interest fund, so that the people can watch this and know in advance that a change in fare will soon be warranted. Having this understanding, they consequently offer no remonstrance when an increase has been made. The Secretary laid great stress upon the absolute necessity of bringing about an understanding by the people of any such plan if it was to be successful and endure.

Looking back upon the Tayler franchise, the Secretary said that it had two principal defects, both of which had been realized to a certain extent at the time the ordinance was drawn, but for which no satisfactory solution was then determined. The first was the absence of any stimulus to the management for efficient and economical operation. Instead of providing for a flat rate of return on the investment, he said there should have been some provision whereby the company would have realized something over the 6 per cent allowed so long as the rate of fare remained at 3 cents,

and that this rate of return should then have decreased as the fare increased. Questioned by one of the commissioners as to what would be the effect of such times as the present when the costs of operation had risen so exceedingly high, despite the most careful management, and which would thus defeat the manner of award which Mr. Baker had suggested, the witness replied that these times were abnormal and that the situation would necessarily have to be taken care of through some such steps as had been actually resorted to in Cleveland, namely, that the company had asked for an increased rate of return on the investment and this was being arbitrated.

The second defect pointed out by the witness was that not sufficient allowance had been made for replacements. It was believed that replacements should be made out of the maintenance fund, but experience had shown that this did not provide a proper apportionment of the replacement to the capital account. In endeavoring to pay the full replacement costs out of the maintenance fund, the amount available for maintenance was so seriously depleted that arbitration had been resorted to in order to secure a sufficient maintenance allowance.

Questioned as to whether he thought it would be possible for the commission to recommend a general adoption of the service-at-cost plan such as is operating in Cleveland, the Secretary said that the street railway problem seemed to him to be a strictly local one. What would be medicine for one community would be poison for another. He did not favor municipal ownership. He said he believed the degree of development of a community was measured by its capacity for co-operation with its utilities. This, he reiterated, was essentially a question of popular education. He believed that the Cleveland plan was the best street railway plan which had been worked out in the country, and believed this chiefly for the reason that it had been so thoroughly understood by the public. He cited as a proof of its excellence the fact that the stock of the company had had a practically uniform value for years despite all of the fluctuating conditions in the industry.

Asked by the commission how it was that to-day the Cleveland railway was able to operate on a satisfactory

The witnesses on Monday and the respective themes of their testimony were as follows:

Newton D. Baker

Secretary of War

who discussed principally the history of the Cleveland low fare agitation leading up to the Tayler ordinance.

Lieut.-Col. Charles W. Kutz

Engineer-Commissioner of the District of Columbia

who urged the desirability of ownership of electric railway roadbed by the municipalities.

Roger W. Babson

Utility Security Expert, Boston, Mass.

who recommended removal of limitation of railway fare because competition is now a sufficient corrective.

John P. Fox

Transportation Engineer, New York City

who advocated low fares for short hauls.

basis with a 5-cent fare, while practically every other company in the country was facing bankruptcy at that rate of fare, Secretary Baker answered that the reason was that in Cleveland the capitalization had been reduced to an absolutely sound basis, there being practically no capitalization of franchise value in the present valuation, and also because Cleveland had grown very rapidly. Further, lines had been extended solely in the interest of service; in other words, there had been no building of lines for speculative purposes. No railway line had been used as a feeder to a real estate venture, a thing which has happened in many cities if not in Cleveland. He also remarked that the equipment used in Cleveland was of the most admirable type and he thought that undoubtedly the operating costs were lower in Cleveland than in most cities due to the comparatively level topography of the city and the operating economies which had been worked out.

Other questions from the commissioners brought out Mr. Baker's opinion that a true valuation of a property was the first requisite in formulating any plan of agreement between the city and the company. In Cleveland this valuation had been made by the city. As to whether this was more, or less, desirable than a valuation by a state commission, the witness said that that was a matter that could not be generalized upon, but he thought the street railway gave such an intimate public service that the public would have more confidence in the results if the city itself made the appraisal. He said that some commissions would have the confidence of the people, while the results of others would be looked upon with skepticism, and still others would be so slow in making a report that they would lose the co-operation of the people. He said he had once made a calculation of how long it would take the Ohio commission to reach a decision on a case which he had presented to it and he had found that it would take 140 years. As to what the differences were between the Cleveland plan and municipal ownership, and what further advantages the public might derive from municipal ownership, the witness thought that there were no substantial differences and that the public derived practically all of the advantages of municipal ownership under the Tayler plan. It was pointed out, however, that the Cleveland plan has no provision for paying any deficit from operation out of taxation.

VALUE OF CENTRALIZED RESPONSIBILITY

After Secretary Baker had stated his opinion that local control of a street railway was far superior to state control because of the intimacy of the service to the people of the community, one of the commissioners called attention to the complications which arise where a single utility company is serving a number of separately incorporated communities, and asked if under those circumstances it might not be desirable to have a combination of local and state commission control, whereby a company could appeal to the state commission—a higher technical body—from a decision of a local commission. To this Mr. Baker replied that it was his observation that the responsibility for the management of a street railroad made a stronger and more virile people, and that to have the right of appeal to a higher commission would take away this responsibility and it was therefore undesirable.

Questioned on the advisability or desirability of giving labor representation in the management of a utility, the Secretary said that he could imagine that this might

be a wise addition to the present Cleveland plan. Later, when asked if he would advise the commission to make any recommendation on that point, he said that he could comment only on the general principle, but he felt that the intelligent co-operation of the workers with the management and the public would bring about better results than the co-operation of any two of these with the third left out. He thought, however, that in this triangle, the vote of the public's representatives ought to be powerful enough to offset the votes of the other two.

Questioned whether he, as a federal official interested in the welfare of the large industries, did not have some suggestion as to a general plan of relief which might be applied to the electric railway field, Mr. Baker replied that there was only one plan which might be permanently helpful, and that was one which cities could work out for themselves. Get the City Council and the board of directors of the railway company in the same room together, with the latter prepared to lay its cards on the table face up. This should be the first step in ascertaining the facts, to be followed by every other possible means of publicity to bring the people to realize that nothing was being withheld. He believed that any community in America would be willing to pay the cost of the transportation as soon as it was convinced that the situation as presented was the true one.

Mr. Baker thought that the companies ought not to be required to pay paving taxes and he thought that the Federal Commission could wisely bring about a public awakening on this matter. He did not believe the people realized generally that this was handed out to the car rider and appeared as a part of the cost of the ride. In this connection, he also stated that the public should be educated to an understanding of the fact that unnecessary rehabilitation, extensions and replacements demanded by it simply resulted in a higher cost of service which the rider must ultimately pay. In connection with all of these items, the value of the referendum vote was referred to, and it was believed by the witness to be not always necessary, and in fact not always possible legally, but was very desirable because of its educational and moral value.

Secretary Baker expressed his belief in a zone plan of fare collection and pointed out that Tom Johnson's principal objection to the plan at the time the Tayler franchise was drawn was that, as he put it, "You would have to have a bookkeeper for each conductor." Mr. Baker did not see any reason why some such plan could not be worked out so that there would be a more nearly equitable basis of payment for the length of ride taken. He pointed out that while there might result, as a first effect of the installation of a zone plan, some tendency on the part of a great many people to move toward the center of the city and thereby increase the congestion slightly, that this would cause the second effect which would follow, namely, a lowering of the rents in the other sections, which would largely correct the first trend. He also pointed out that the experience of the European countries in connection with zone fares was not a reliable example to follow, since the habits of the two peoples are so very different.

Asked if he favored making up operating deficits out of taxation, provided sufficient income were not obtainable to pay the operating expenses and fixed charges, the secretary replied negatively. He did not believe in taxing the people generally to pay for service

to those who ride. Asked if he would favor a general fare increase in the interim while a permanent settlement is being worked out, he said that he would if the company showed no returns whatever on its real value, but that he would not favor an increase if the company merely showed insufficient return on its apparent capitalization. He said there were undoubtedly many lines being operated which were a great financial burden and which could better be done away with, giving as an example two lines fairly close together and of a competitive nature, one of which might be done away with to make the other one prosper and to remove the burden of the dual investment. The Secretary then emphasized the point that whether or not a temporary flat increase in fares should be granted must be determined by the people affected, for if the municipal or federal authorities were to install such an increase, it would only act to postpone the permanent settlement.

Speaking of fares higher than 5 cents the Secretary was very doubtful about any increase in revenue to be derived from a fare higher than 5 cents. He thought that a great deal of the short-haul riding, which is the most profitable business (like the ride taken by the man who rides from his office to the bank) would be lost if the fare were 6 cents, regardless of how wealthy the man was. He said it was simply a matter of psychology, that people had been accustomed to thinking in terms of a nickel and when a dime must be broken they preferred to walk. If the fare becomes higher than 5 cents, there will be a strong tendency on the part of a great many people to move to such a locality of the city that they can avoid riding at the higher rate.

Asked his opinion as to what was the most desirable term of a franchise, Mr. Baker replied that the indeterminate franchise with reservation of the right of the city to purchase was very satisfactory and much better than any fixed-term franchise.

Upon the conclusion of the testimony of the Secretary of War, Charlton Ogburn, executive secretary of the Federal Commission, told the commission that there were a number of public service commissioners present who were desirous to be heard on pertinent limited phases of the question, but who desired to be excused from expressing opinion on matters which were now pending their decisions. The first of these the commissioners called to the stand was Lieut.-Col. Charles W. Kutz, chairman of the District of Columbia public utilities commission.

COMPETING COMPANIES MAKE RELIEF PROBLEM DIFFICULT

Colonel Kutz, in his direct testimony, addressed the commission on the rather involved situation which his commission is now endeavoring to solve in connection with the traction facilities of the national capital. The

difficulties here arise from the fact that there are two competing companies, one of which is in difficult straits, while the other is prospering. Both companies are carrying about equal numbers of passengers but one of them, the Capital Traction Company, is doing this on about half the mileage maintained by the Washington Railway & Electric Company. The latter company has a great deal of long suburban haul, and the most logical remedy has seemed to be a zone fare system, but this has met with very violent opposition from the public.

Colonel Kutz pointed out in reply to a previous testimony indicating that the maintenance of paving along street car lines was more logically a charge against general taxation rather than the street car riders, that this might involve a division of responsibility which would result in a great deal of friction. He said that if the company were responsible for the maintenance of the track foundations, which must also form the foundation for the pavement and in large measure be responsible for the condition of the pavement, that it would be extremely difficult to get the necessary co-operation between the city and the company in order properly to maintain the pavement. In view of this, he suggested that it would be better to let the city

Secretary Baker Thinks Each Community Must Solve Its Own Transportation Problem

In his testimony on Monday, Hon. Newton D. Baker, Secretary of War, said in commenting on the general applicability of the Cleveland plan of conducting its railway business:

The street railway problem is essentially a local problem. The fact is that medicine for one community might be poison for another. It would be a very great mistake to go to public ownership or public control in a community that doesn't want it or understand it.

If the public takes over the street railways because it is mad at them, and then gets mad because it took them over, it has not been a success. The solution of the street railway problem is essentially a problem of education.

acquire title to the roadbed and lease its use to the company.

At this point Colonel Kutz' testimony was interrupted for the noon recess. He continued Monday afternoon with the following statements:

Monday Afternoon Session

Elaborating his ideas regarding the ownership of the electric railway roadbed by the municipality, Colonel Kutz stated that he favored the relief of the railway from unjust municipal taxes and in general thought that the zone system is a good thing. On account of local conditions, however, it would not be favored in Washington. In answer to a question he said that he could not instance any city in which the roadbed is owned by the municipality, but that to a limited extent the principle is illustrated in the case of the New York subways.

Colonel Kutz gave as two reasons for favoring the plan which he advocated the following: (1) Public ownership of the roadbed would simplify the paving question. Where responsibility for the paving is divided between city and company there is opportunity for constant friction. For example, a city might decide to pave or repave a street in which there existed electric railway track with considerable remaining life. In the interest of ultimate economy it might be best to relay the track, throwing away or scrapping ties, rails, etc. This would be a considerable loss to the railway, but if the city owned the roadbed there would be no injustice done if the track were replaced. (2) Such

ownership would permit extensions to be made as required in the interest of service without reference to the practicability of operating over these extensions at a profit. Colonel Kutz considered that this would not entail an undue charge upon the city, and the fact that the roadbed was being rented to the railway would give the city an opportunity to extend financial assistance to it in case it is desired to hold the fare down to a figure below that at which the railway can operate at a profit. The principle, however, should not be applied to the equipment, in Colonel Kutz' opinion. He did not believe that public operation would be desirable, hence favored the private ownership of rolling stock, power distribution system, etc.

In answer to a question from Commissioner Sweet as to the possibility of securing the same result as he desired by existing means Colonel Kutz said that cities cannot exercise satisfactory control of their railways in regard to extensions, for they cannot order extensions which will not be compensatory. He said that he regards the roadbed of the railway as a special form of roadway, in fact it is the poor man's roadway. Just as the city builds boulevards for the automobile owner it might build car tracks for the man who cannot own an automobile. This he thought to be different from governmental paternalism, which he does not favor. It would permit improvement of service under conditions where a railway extension might not promise any increase in revenue.

PUBLIC DOES NOT REALIZE THE SERIOUSNESS OF THE SITUATION

Commissioner Sweet said at this point that Colonel Kutz' testimony emphasized the fact that there is great need for co-operation between the public and the railway. The needs of both the public and the utility must be recognized. To this the witness agreed, stating that the difficulty is to give the public a realization of the situation. He said that if this were understood the people would be willing to pay a fair price for the service. In this connection, however, he reiterated his belief that it is more economical for the city to own its own tracks rather than allow a rate of return on investment which is sufficient to attract capital, as the city can borrow the money more cheaply. This might not help in the present acute crisis but there is no reason why future track construction cannot be taken care of in this way. Existing track might be appraised and bought by means of bonds at a fair price.

In response to a suggestion from Commissioner Sweet, Colonel Kutz agreed that immediate relief could be secured by amelioration of the present paving tax which throws this cost upon the poor man. Other questions related to the proper line of demarcation between public and private ownership under the plan outlined by Colonel Kutz. He said that in the case of a conduit road the city should own up to and including the contact bar, but not the feeders; nor should it own the overhead in the case of a trolley line. Doing away with divided responsibility, as suggested, would also simplify the accident problem as related to accidents caused by track or paving. The liability in this case would lie with the city.

Finally, Colonel Kutz gave in more detail his ideas on relief of the railway from unjust taxation. Car riders ought not to be taxed indirectly, as for example in paying a share of the cost for traffic-officer service.

The District commission, he said, opposes all free railway service on this ground.

Following Colonel Kutz, Roger W. Babson, Boston, Mass., specialist on utility securities, discussed the financial situation of this industry. By way of introduction he said that there are three ways of conducting the electric railway business: (1) The present method of private ownership with public regulation, which has not been able to save the industry from the present catastrophe; (2) municipal ownership, or a service-at-cost plan with a guaranteed return supplied if necessary from the public treasury; (3) private operation, with relief from unjust taxation and permission to charge what the operators deem wise, but with equitable competition with motor buses.

MR. BABSON ADVOCATES A FAIR SHOW FOR THE RAILWAYS

In the end Mr. Babson considered that both the railways and the public would be better off if competitors in transportation service could work out their salvation on a competitive service basis, charging what they can for this service. The mode of transportation which survived in a given case would be the one best fitted for the particular service. If the railways had been obliged to struggle for existence on the basis of giving service, with permission to charge what they thought best, the business would be in better condition to-day. In Massachusetts trouble began when the State stepped in and began to "father" the business. He saw no reason why the service should not determine the fare to be charged. Take the case, he said, of the lines running from Brookline, one of the suburbs of Boston, into the city. These give better service than taxicabs could do and they might therefore very properly be allowed to charge taxicab fares.

Elaborating his idea as to the change in the need for regulation Mr. Babson said that when the electric railway had the monopoly of transportation service in its field, which it did a few years ago, regulation was necessary. As long, however, as there is more than one means for furnishing the same transportation the case is different. Railway difficulties began with the popularization of the automobile. How the matter stands to-day can be realized from the fact that there are now in Massachusetts more than 186,000 automobiles as compared with fewer than 5000 electric cars.

The problem of the railways now, however, said Mr. Babson, is how to get out of the difficulties in which they find themselves. There is no doubt of the nature of these. The first requisite is that the hands of the railways shall not be tied as now. The railways should either sell out or be given a free rein to win out on a service basis. In many places they can do this; in some probably not. But in many cases relief from the paving burden is necessary.

Mr. Babson dwelt at length on the case of the Boston Elevated Railway which, he thought, would have been charging a lower fare to-day if it had had the opportunity to give good service and to charge a reasonable fare for it earlier. He believed this because under the present plan he sees little incentive to interest in the property, on the part either of stockholders or employees. At a recent stockholders' meeting only three out of 3000 attended.

Summing up his line of thought Mr. Babson said that the prosperity of the electric railway system is vital to a community, and any bargain entered into between

the two should be profitable to both sides. It may be necessary in some cases to go to extreme measures to conserve the railway service, but before doing so the shackles should be removed from the railway so that it can have a fair chance.

Commissioner Elmquist asked as to Mr. Babson's further views on the jitney problem, and the latter said that there are some places in which the bus affords the most economical and serviceable means of transportation. For example on more than 250 miles of track of the "Bay State" system this is true. Commissioner Sweet also asked as to the extent to which the jitney problem is general, and Mr. Babson said that it is very general. Jitney service, he thought, should be properly regulated to render competition with the electric railways a fair one, but artificial throttling of the jitney is not wise. In the end all forms of transportation will thrive best when they are on a co-operative basis, each giving the service that it is best fitted to give. The emphasis in all cases, he said, should be placed upon the service.

As to the future of electric railway transportation Mr. Babson expressed the conviction that in many communities it will survive and on a substantial footing, especially in conjunction with elevated and subway lines. He felt that, while the war had aggravated conditions, even if there had been no war the conditions would have been substantially the same, although, to be sure the war "broke the camel's back," it hastened the downfall of the railways. Even if the costs of labor and materials should come down the problem would not be solved.

In reply to another question Mr. Babson expressed his approval of the Cleveland plan of operation, with an addition giving more incentive to efficient management. He also agreed with Bentley W. Warren in the contention that the reason for the indifference noted in Boston is the guaranteed return regardless of earnings, which does not obtain in Cleveland. He did not see why the Cleveland plan in its essentials should not work out well in other cities. He also agreed with Commissioner Sweet's suggestion that the abnormal conditions under which the railways are operating now have made this operation extremely difficult.

Commissioner Gadsden asked Mr. Babson to summarize the situation regarding electric railway securities. To this request the latter replied that during ten years, and mostly during the past five years or less, traction bonds have shrunk 25 per cent in value and traction stocks 75 per cent. Some ten years ago in Massachusetts, where great care is exercised in such matters, traction securities were approved as invest-

ments for savings banks, thus indicating the esteem in which they were held at the time. Of late there have been many losses of trust funds and savings bank investments due to the shrinkage in value of these securities.

Upon Commissioner Sweet and Mr. Warren pointing out that some of the plans suggested by Mr. Babson would require legislation and so could not be made effective at once, he said that as an immediate step he would urge the removal of fare limitations, although first in ultimate importance he placed relief from unjust burdens. As to the zone system he considered it a good money-making proposition for the railways, but he opposed it on social and economic grounds.

The last witness heard on Monday afternoon was John P. Fox, New York City, who has acted in an advisory capacity in connection with traction matters for many years. He stated that he had visited Europe several times to study electric railway operation there. In Europe, although large fare increases have been made the railway situation is not as bad as in this country. He said that reports which have just reached this country show phenomenal increases in business and net income for the lines in Berlin. One reason for the better situation abroad he believed to be the lower fixed charges which he understood prevail there. In this country some railways are suffering from the high "overhead," others from difficulty in introducing operating economies.

Referring to the fare question Mr. Fox said that increasing of fares has not proved a success. He thought that lower fares for short hauls would bring in business during the non-rush hours, and advocated a 5-cent fare as a normal charge with, say, a 3-cent fare for short hauls. As examples of special cases where low fares have brought large business on very short hauls, Mr. Fox cited the Williamsburgh Bridge line in New York City, on which 9,000,000 passengers per annum per mile of track are carried, at a fare of 5 cents for three single trips. He also gave some details of the experience of the railway lines in Shanghai, China, where an enormous and profitable business is done at a very low rate of fare. In that city the present management took over the system at a time when it was very difficult to make ends meet, but by the application of merchandising methods has made the property very profitable.

The point which Mr. Fox emphasized particularly was the importance of improving the "load factor," filling in the depressions in the load line. The high flat fare, he said, makes the load factor worse, largely cutting out the slack-hour traffic.

The speakers who completed their testimony at the Tuesday sessions included the following:

Carl H. Mote

Secretary Indiana Public Service Commission

He showed by the experience of the Indiana Commission that a spirit of co-operation between utilities and commission will go far in meeting adverse conditions.

Richard T. Higgins

Chairman Connecticut Public Utilities Commission

His testimony consisted largely of an analysis of the electric railway situation in his state.

F. F. Ingram

Manufacturer, Detroit, Mich.

He favored local municipal ownership of the street railway with a nominal fare supplemented by allowances from the public treasury.

James H. Couzens

Mayor of Detroit

Mr. Couzens strongly urged municipal ownership and operation and explained why, in his opinion, it would be economical and pleasing to the public.

Tuesday Morning Session

Carl H. Mote, secretary of the Indiana Public Service Commission, opened the testimony on Aug. 12 with a written statement regarding the electric railway situation in its jurisdiction, covering slightly less than 2500 miles of track. In this he stated that conditions in Indiana are not identical with those in some of the Eastern states because overhead charges are not excessive, the roads having mostly not been overcapitalized. Formerly the steam roads of the State operated under a limitation of 2 cents a mile, but the electric railways were decided to be utilities and hence were not limited to that rate. The interurban fare was first raised to 2½ cents and later to 2¾ cents, thus keeping a differential of ¼ cent as compared with the present steam road rate. This was maintained to retain a fair share of business for the electric lines.

Mr. Mote stated that the commission makes no rate increases without a tentative valuation, and suggests financial reorganization where such seems necessary to put a road on a substantial basis. In this way the commission has reduced fixed charges by \$400,000 per annum, with corresponding reduction in outstanding securities. In making these financial readjustments bond and shareholders are asked to accept new securities of lower face value. The purpose in so doing is to reduce the amount of securities to nearly the actual value of the properties. Other financial changes have been the removal of unreasonable sinking fund charges and stopping the payment of interest on sinking fund accumulations.

By the means outlined Mr. Mote said that it has been possible to keep the Indiana companies solvent and to maintain fair standards of service. As for the Federal Electric Railways Commission, while the Indiana commission will co-operate in every way, there is little locally that a federal commission can do, as the State has the situation well in hand. The Indiana commission, he said, proceeds on the theory that it is an administrative body and that its work to be effective must be done promptly. The endeavor is to act upon petitions within a month.

Mr. Mote said that the commission does not feel called upon to protect securities that have no real value, and he felt that electric railways as a whole had been a disappointment to their promoters. Competition is very severe and the future of the business is far from promising. It is, however, the intention of the Indiana commission to increase fares as needed up to the point where a further increase will not produce a greater income. In the Indiana cities the fare is now on a 5-cent basis and the commission hesitates to go higher at present. The commission has investigated operating conditions on the local properties and found that some could be greatly improved. The companies have suffered financially from claims growing out of accidents, some of which might have been avoided.

In reply to a question by Commissioner Elmquist, Mr. Mote said that the commission has found it desirable and in the public interest to inspect the properties with a view to suggesting improvements, and instanced a recent survey of the power situation on the Union Traction system, where the power supply was found to be inadequate. On other roads improvements in the signals have been found necessary in the same way. The companies have cheerfully co-operated in making the recommended improvements.

The situation in Indiana as regards labor conditions appears to be fairly satisfactory, as there are no strikes and no indications that the workers are dissatisfied.

As to relief for the railways the commission would approve the waiving of paving and other municipal requirements and reduction in taxes, but has taken no steps in this direction as yet. It was felt, however, that the public would resent the relieving of the companies from municipal requirements unless absolutely necessary.

Mr. Mote then went into the matter of franchises and explained that under the law of 1913 the utilities had the right to surrender their old franchises, receiving in return new indeterminate franchises, and leaving the details in the hands of the commission. Provision was also made for emergency relief for the railways. A number of franchises have been surrendered under this law. In administering its work the commission is endeavoring to follow the service-at-cost principle, basing the cost upon a fair tentative valuation. The situation has been complicated somewhat by a recent law which provides that where a company has surrendered its franchise any free service or service at special rates prescribed in the original franchise shall hold. In reply to a question by Mr. Warren, Mr. Mote said that this refers to special service for the municipality or its employees.

Concluding his formal testimony Mr. Mote said that while the Indiana situation may get beyond the control of the commission in the sense that it cannot find a way to increase the incomes of the companies, he felt that the Indiana companies would be among the last to "go upon the rocks."

SOME INFORMAL COMMENT BY MR. MOTE

Mr. Gadsden asked Mr. Mote if on the whole increasing the rate of fare in Indiana had produced a beneficial effect, to which the latter replied in the affirmative. Asked by Mr. Elmquist as to over-capitalization in that State he estimated this at from 15 to 20 per cent. Also he said that the present 5-cent fare represents an actual increase in fare from the fare previously in vogue. The commissioners endeavored to bring out the reasons for the better operating conditions in Indiana than in some other places, and Mr. Mote thought that these were partly due to the reasonable prices for fuel and labor. There is little complication due to the extension of city systems into other communities, as exists in some states.

Mr. Mote stated his belief that the commission form of control is best, but favored municipal control in some respects, such as speed of operation, stops, extensions, etc. Cities and villages have such control in Indiana. He finds that there is little resulting conflict between the State and municipal authority. Asked as to the length of time needed for a tentative valuation such as those mentioned, he stated that ordinarily two weeks would be sufficient after the filing of an inventory, although in one case three months had been required.

Commissioners Sweet and Gadsden asked as to Mr. Mote's ideas on the zone system, to which he replied that the commission had denied petitions for the installation of this plan in Indiana in the belief that it would cause congestion. He believed, however, that it is inevitable in many cities. In addition, the commission thought that the zone plan would be unfair to residents who had invested in suburban homes on the supposition that the flat fare would be permanent.

However, in the event that the zone plan offered the only solution to the electric railway problem as a basis of self-support, the commission in refusing to permit its use would undoubtedly make other provision for the railway income.

At this point Counselor Warren introduced some data as to the effects of wage increases as bearing upon the zone system, and Mr. Mote said that the application of the same costs to the Indianapolis situation might make a zone system necessary. The data related to the census figures which showed that in 1917, with a maximum labor rate of 31½ cents per hour, the labor cost per passenger was 2.36 cents, whereas at the 60-cent rate which now is paid in some cities the cost would have been 4½ cents. In 1918 with a 34-cent maximum the cost was 2.82 cents per passenger, while at the 60-cent rate it would have been 4.98 cents. These amounts check with the experience on the Boston Elevated Railway on which in December, 1917, the rate was 2.20 cents per passenger and in May, 1919, 4.39 cents.

In concluding his informal testimony Mr. Mote explained what the commission has done to enlist and hold the co-operation of the public. The public has been told the full circumstances in all cases and the reasons for the decisions reached. As a result the public has confidence in the commission. Asked as to the transfer situation he said that transfers are not charged for, and the public did not take kindly to the plan of collecting and rebating for transfers. Again he said that the commission has no jurisdiction over jitneys, that the municipalities are waking up to the necessity for controlling the jitney situation, and that he did not believe the motor bus to be a possible substitute for the electric railway. Regulating rates and improving service are equally important functions of the commissions, and he looked forward to the time when it will be practicable to insist upon higher service standards.

CONNECTICUT COMMISSION HEARD FROM

Richard T. Higgins, chairman of the Connecticut Public Utilities Commission, followed Mr. Mote. He read a brief statistical statement of the electric lines under the jurisdiction of his commission. There are ten operating companies in the State, of which two operate seven-eighths of the 828.7 miles of single track. The fare charged by the Connecticut Company is 6 cents for a single zone, while the Shore Line charges 5 cents in New London and Norwich (being held to this amount by State charter), and 2½ cents per mile outside of the cities.

Mr. Higgins told of the report of the special committee of the State Legislature presented in April, 1919, recommending speedy relief for the railways, but

in vain. He said also that the railways serve so many municipalities and the lines are so interconnected that it would be very difficult to administer the requirements of the railways by means of municipal ownership or control. In the early days many lines were extended outside the city limits and these now cannot possibly earn their expenses. Furthermore, the unregulated jitney competition in Connecticut is a very serious matter.

On the general situation Mr. Higgins said that the seriousness of the railway difficulty is now everywhere conceded. The future looks dark unless the states and cities will aid by increasing fares, reducing taxes, reducing municipal requirements, and exerting proper control over competing transportation agencies. He thought that municipal ownership and operation should be avoided. In regard to relief from taxes he thought that there is a good reason for relieving the railways as privately endowed educational institutions. It is very important that commissions should render their decisions promptly and that cordial relations between utilities and the public should be fostered. For some reason the nickel seems to be the favorite rate of fare, and it would be better if possible to retain and give a shorter ride

Mayor James H. Couzens Wants Municipal Ownership

In his testimony on Tuesday, Mayor Couzens said: While the main burden of paying for street-car service should be placed on the street-car rider, he did not believe that it all should rest there, but that some of it should be transferred to the shoulders of the manufacturer, the office building owner and others who should help bear the burden of getting the worker to his job. He said municipal ownership would produce this distribution of the burden. He said he believed in putting the responsibility for public service of this kind on public and not on private officials, and that just as cities control and operate their water supplies, their systems of education, their collection of garbage and matters of health, they should have full control of their transportation systems, which he declared are just as essentially a municipal concern.

for this sum. Mr. Higgins believed that electric railways under the conditions which he outlined could be self-supporting. The present emergency will not be taken care of, however, by the service-at-cost plan, for if rates were set to give a fair return on investment without other means of relief, such fare would be prohibitive with unlimited and unregulated competition. While the future of the auto bus cannot be predicted, it is true at present that the electric railways are essential. They should, therefore, be protected during the period of transition. If the bus is the coming means of transportation, railway franchises should be amended so that the companies can go into this business and so conserve the investment which has been made in them.

In Connecticut, Mr. Higgins reminded the commission, the companies have the right to set their rates, subject to revision by public appeal on petition, except that the companies cannot change a commission-made rate. All rates now in effect are company-made rates.

Asked by Commissioner Elmquist for more detail as to the procedure in valuations, Mr. Higgins said that the properties had not been appraised in detail, but a tentative valuation of the Connecticut Company's property showed property in excess of outstanding obligations. He said also that one small road had gone to a receivership without raising the fare above 5 cents for the reason that it did not believe the community sentiment would permit the increase. Questioned further as to the jurisdiction of the commission, he said that it controls service but not the issuing of securi-

ties, although he thought it should do so. There is some sentiment in favor of giving the commission this power. As to applying the Cleveland plan in Connecticut Mr. Higgins saw some difficulty in this because the railway lines run through so many communities. Thus it would be hard to allocate expenses among them.

Concluding his testimony Mr. Higgins said that the public in Connecticut appears to be satisfied with the commission regulation as a whole, although one city seems to favor taking over the local lines itself. After analyzing briefly the labor and other local conditions, he stated that while it might be practicable to raise the fare to 7 cents and still produce more income, this would be accompanied by increasing competition. The jitney competition is still on the increase, although a law requiring jitney operators to be bonded will go into effect in a few months and may change the situation. At the same time riding on the railways is on the increase. The commission has given some attention to possible economies, and feels especially the need for some plan for insuring that the companies shall get all of the fares to which they are entitled. The one-man car is promising, he said. The public likes it and it produces substantial savings. In response to a suggestion from Mr. Warren, he said that the Connecticut Company, for example, has endeavored to introduce operating economies, and he considers that the personnel of the local utilities compares favorably with that of similar companies elsewhere. Moreover, very cordial relations obtain between the commission and the utilities. Asked by Commissioner Sweet as to the attitude of the public toward the railways, Mr. Higgins said that public sentiment is improving. The people seem to be coming to a realization of their dependence upon transportation facilities. Replying to a question by Commissioner Elmquist he said that relief from tax burdens should be a temporary expedient. The commission has no power to grant such relief. It must come from the Legislature, which in Connecticut grants all franchises.

At this point Mr. Mote was recalled to the stand on request of Counsellor Warren, who desired to ask as to the experience in Indiana with the one-man car. Mr. Mote said that the results there have been very satisfactory, also that the pay-as-you-enter car had helped greatly in preventing loss of fares. The increase in fares previously referred to, combined with a large use of cars of this type, had produced a more than proportional increase in receipts. Mr. Ogburn then reported that there had been expressed a desire to have spread on the record a minute regarding the decision of the New Jersey Board of Public Utility Commissioners to permit the Public Service Railway to inaugurate a zone system in which the initial fare will be 3 cents, and 2 cents a zone thereafter. This action has been taken since Dr. Thomas Conway, Jr., had testified before this commission. The plan for collecting fares for the present is of interest. When the passenger boards the car, which he will do at the front, the motorman will hand him a slip identifying him as to the boarding the zone, and he will pay the conductor the appropriate fare on leaving the car at the rear.

DETROIT SITUATION EXPLAINED BY CITIZEN

F. F. Ingram, a business man and manufacturer of Detroit, Mich., appeared before the commission to give the point of view of the general citizen toward the railway problem. He had held a number of positions quali-

fying him for this purpose, including membership in the State constitutional convention which provided for municipal ownership of utilities for Detroit, as well as home rule. These changes were favored by him. Mr. Ingram questioned the necessity for electric railways in Detroit and said that during the recent strike there was a demonstration of the possibility of getting along without them. By the provision of free bus service by employers the workers were able to get to work without great difficulty.

In reply to a question by Commissioner Elmquist as to the effect of the good weather which prevailed and the fact that the bus service was free, Mr. Ingram said that undoubtedly these things were factors in producing the unexpected result. Other factors were the presence in Detroit of the Ford factory and particularly the statement by Mr. Sorensen, of the Ford Company, that gasoline-propelled vehicles could supplant the street car, which prejudiced the people against the railway. He said that he could not explain the sentiment of the people of Detroit on the traction matter.

Commissioner Beall asked if the low fares which Detroit had enjoyed were not made possible by taking profit from the company's interurban lines, and Mr. Ingram said that some citizen considered that they were, although others believed the contrary. The commissioner pointed out that the facts were available though the company's reports. Mr. Ingram also said that the use of the city streets by the company's freight cars was objected to, but he admitted also that it would be a great deprivation to the city if the freight service were discontinued.

Tuesday Afternoon Session

Resuming his testimony after the noon recess, Mr. Ingram stated that his suggestion for a solution of the situation in Detroit was to charge a nominal fare of 3 or 4 cents with free transfer, without making any pretense of covering expenses. The deficit would be made up from taxation levied against the land which appreciated in value due to the presence of the railway lines. He could see no reason why the property holder who had thus materially benefited from the street railway should not share some of the burden with the car rider. Questioned if this might not involve a deficit which would be a very heavy burden and thereby prove very unpopular with the voters, he replied that he did not think it would. He cited the plan of assessing the cost of irrigation in California against the property affected as analogous, and said that there had been no objection to this plan out there. He admitted, however, that he did not know how the property owners of Detroit would look upon his plan.

Counsellor Warren questioned the witness as to whether there would not be strenuous objection to a tax for the purpose of keeping up the street railways if they were looked upon by the people as unnecessary, an earlier statement to this effect having been made by Mr. Ingram. As far as the working classes were concerned Mr. Ingram did not think that there would be objection, but he did not know how other classes would feel in regard to the matter. Mr. Warren also questioned about the relative congestion upon the streets during the recent strike while the street cars were not operating as compared with normal conditions, wondering if the congestion might not overcome the advantage of the automobile transportation if street cars were done away with. The witness said that in

the downtown section the congestion had been less than normal because the jitneys turned back short of this section in order to avoid the congestion and make better time. In the outer districts of the city, however, the congestion had been noticeably increased, but he did not believe that this would work against the rubber-tired vehicle because it was so much more mobile than the street car and could make use of adjacent parallel streets when too much traffic was concentrated along any one street.

Concluding, Mr. Ingram reiterated that he believed the people of Detroit wanted municipal ownership and he did not see how it was going to be prevented from ultimately being consummated. The principal difficulty seemed to be with the manner of bringing it about.

At this point Mr. Ogburn read into the record a letter by Ole Hanson, Mayor of Seattle, Wash., endeavoring to give the circumstances leading up to the purchase of the street railway system in his city and to show the results which have been obtained during three months of municipal operation. This letter contains tables and will be published next week.

DETROIT MAYOR UNALTERABLY FOR M. O.

Mayor James H. Couzens, of Detroit, former general manager of the Ford Motor Company, followed Mr. Ingram, appearing at the invitation of the commission, and began his testimony by a statement that he was unalterably in favor of municipal ownership of the street railways because this was purely a social problem. As proof that it is a social problem he cited the great pressure which had been brought to bear upon the administration at the time of the local strike in Detroit recently by merchants and manufacturers who have no occasion personally to use the street cars. These business men wanted to have the strike settled in any manner which would bring about a resumption of service and enable the people to get to their work and to the stores. He said that unless the street car question were speedily solved in a manner satisfactory to the people the employer would be obliged to provide transportation for his employees as a permanent proposition.

Mr. Couzens then pointed out some of the difficulties of solving any problem which must be put up to a referendum vote. In Detroit, the people voted down by very large majorities two propositions, to which the Detroit United Railway had agreed in advance, which were so favorable to the interests of the public that the Mayor said they would have carried the company into bankruptcy. Then the city voted five to one for the general principle of municipal ownership and operation in contrast to private ownership and operation of the street railways, and followed this action by rejecting a proposition to purchase the city lines upon a valuation to be made by the six circuit judges, and again voted down a proposition which would have made municipal ownership possible based on a value agreed to in advance.

In trying to explain these various contradictory decisions of the people Mayor Couzens said that it was his opinion that they wanted municipal ownership but did not want to be loaded up with the assets of the old company now on the streets. They also apparently had serious misgivings of the expediency of the steps which were contemplated to bring about municipal ownership and perhaps even distrust of the public officials.

Questioned by the commissioners as to what solution there was for the Detroit situation, the Mayor replied that he knew of only two solutions, both of which involved many difficulties. The first was to proceed to secure the property by condemnation, provision for which had been made by the last State Legislature, but this would require a three-fifths vote of the people and he doubted that it would succeed. The second means was for the city to order the company off the streets on all those lines on which the franchises had expired, and for the city then to proceed to install and operate a system of its own. Under such an action the tracks of the company would have only junk value and the city might then be able to purchase them at very much less than their capital value. Asked if this would not be confiscation he replied that he did not think it would for the company had accepted the franchise with a fixed-term provision and it should therefore have set aside a sinking fund to amortize that property in the life of the franchise. Further questioning brought out that he believed the company had been earning enough to provide for such amortization had it seen fit. One of the difficulties of carrying out this second plan of securing municipal ownership and operation is that it would take several years to complete the plan, during which time there would be competition by the remaining privately-owned lines. It was brought out by Counsellor Warren that the franchises have expired on about three-fourths of the lines in Detroit, so that these are now operating at the caprice and will of the people.

Later when questioned by Counsellor Warren as to whether he meant that the city might force the company to sell its tracks at their scrap value by ordering them off the street, the Mayor explained that he did not mean to do that, but that since such an order would reduce the value of the track to the company to its scrap value, the city and the company could then come to an agreement upon a price somewhere between the capital and the scrap value as a basis of purchase.

Mayor Couzens was of the opinion in connection with municipal ownership that the car rider should pay the cost of the ride up to a certain point, which he said probably was a nickel, beyond which any deficit in operating expenses should be made up from taxation of some kind. Perhaps this would take the form suggested by Mr. Ingram, of a tax upon the appreciated land value, or possibly it should fall upon the merchant and the manufacturer who benefit through the transportation of their customers and employees. As analogies, he cited the health and sanitation service of the city and public playgrounds, to which all persons contribute support although only part of them benefit directly. The street railway service is so intimately associated with the social life of a community that it seemed to him the community should provide this service for itself. While he was not yet ready to advocate free transportation, he did believe that the cost to the rider should not be beyond that figure which would make the utility of maximum service. As soon as the cost rose to the point that it began to drive away much patronage then the excess should be taken up through taxation.

In answer to questions by Commissioner Elmquist the Mayor said he was distinctly opposed to the payment of any street railway deficit out of taxes so long as the service was given by a private corporation. He

was opposed to a charge for transfers, believing that the necessity for changing cars was an inconvenience to the passenger who should not be penalized for having to use two lines to get home. As a temporary relief, pending municipal ownership, he thought that taxes upon the street railway might be abolished if it were certain beforehand that the people understood that these would be returned to them in the form of lower fares or better service. He did not think favorably of the service-at-cost franchise, because the incentive to efficient and economical management was either lacking, or if a reward were somehow incorporated then the incentive was realized by curtailing the service and cutting expenses unduly to increase the reward.

Asked if municipal operation would be as efficient and economical as private operation, the Mayor said that it would be so, absolutely. His basis for this contention was the manner in which the water system of the city had been managed. He could see no danger in the large number of employees engaged in the railway service becoming municipal workers, since they represented such a very small proportion of the total population, and also because the administration was likely to make as many enemies as friends among the employees. He said that municipal ownership was not analogous to the federal operation of the telephone and telegraph lines and the railroads, for these had been administered at long range from Washington, whereas the chief executive of a city would be in constant contact with the service being rendered by the railway department. Many of the aims of the federal authorities were lost through their lack of intimate contact with the service they were ultimately controlling.

Another advantage of municipal ownership which Mayor Couzens emphasized was that the city would be able to secure money at about 4½ per cent, whereas it would cost a private corporation about 7 per cent. Even granting a lesser efficiency through municipal operation, there was still a margin of 2½ per cent in the cost of financing which would certainly not be consumed from this cause. Pressed by Commissioner Beall on the point that the cost of money to a city would rise as its bonded indebtedness increased, the Mayor replied that even if the cost of the street car service were greater under municipal operation, it ought nevertheless to be brought about so that the eternal agitation might be stopped and the people be able to specify and get what they wanted in the way of service.

Wednesday's Sessions

W. C. Bliss, chairman, Rhode Island Public Service Commission, began his testimony before the commission near the close of the Tuesday afternoon sitting and continued Wednesday forenoon. He filed as a part of his evidence, the report of the special commission appointed by the Governor, consisting of himself, Zenas W. Bliss, chairman of the State tax commission, and George W. Newhall, chairman of the State bank commission. This commission was charged with the duty of investigating the conditions of the Rhode Island Company and recommending remedies. It presented its findings to the legislature in March, 1918. The contents of this report were frequently referred to and quoted by the witness who began his direct statement by reviewing the circumstances of the last few years, leading up to the present condition of the Rhode Island

Company which operates the principal electric railway system of the State.

He pointed out how the Rhode Island commission had encouraged the settlement of as many of the utility problems as possible with the local authorities, advising companies to go to the city first, recognizing the merit of the home-rule contention though the law gave the commission jurisdiction. This had resulted in much less antagonism on the part of the local communities. However, Mr. Bliss stated that there were difficulties in the endeavor to combine state and municipal control, such as the conflicting ordinances of neighboring towns served by the same company, the power of a city to route cars in a way detrimental to the service of suburban localities, etc. In such cases as that of the Rhode Island Company which operates in twenty-six municipalities, there were many problems arising which must be solved from the point of view of the welfare of all of them and not to meet the selfish interests of any one of them. Such problems obviously required State handling. He believed that the State commission should always have the power of revision and over-jurisdiction of local franchises or permits.

Mr. Bliss explained the manner in which it had been planned to secure for the Rhode Island Company the \$1,000,000 deficit which it faced as the result of a War Labor Board award. Previously, fares had been increased both on the flat-fare plan and then by several zone-plan rates and it had been found that it would be impossible to derive the whole deficit from fare increases. So the plan drawn up but which could not be carried out because of the failure of the Legislature to supply the enabling acts, was to provide a fare increase which would net \$300,000, to abolish exclusive franchise taxes which would save \$150,000, to abolish paving taxes thereby saving \$90,000, to introduce skip stops and other economies from which it was expected a \$200,000 saving would be realized, and finally to secure from direct taxation \$240,000, making a total of \$980,000.

Mr. Bliss said that the street car service deficit was entirely a matter between the rider and taxpayer, for the latter has an immediate interest in the trolley system represented by the value of his property. Business interests are likewise vitally interested in a car service costing little enough so that it will encourage and not discourage riding.

WAGES AS WELL AS RATES MUST BE REGULATED

Lacking the power to put any part of the burden of the street car service on anyone but the rider, the only recourse left is to increase the fares. Mr. Bliss expressed the opinion that it was utterly impossible to cope with the problem in this way, that liberal increases had been granted in Rhode Island and to increase further was simply suicidal, and there was nothing of consequence to be hoped for from more efficient management for the property had been very ably operated. He said the problem simply cannot be solved as long as there is no restriction on wages. It can never be solved until wages as well as rates are regulated. He thought every company should have the privilege of bidding in the open market for labor and secure it as cheaply as possible. It is now a matter purely at the mercy of the unions. The public is entitled to the transportation service with a rate of wage that is reasonable and it should be free to attract labor into its intimate serv-

ices on that basis, allowing the laws of supply and demand and conditions of work to determine what wage had to be paid.

RESULTS OF FARE INCREASES AND ZONING

The installation of the first zone plan in Rhode Island, comprising a 5-cent central zone at the traffic center of each municipality and 2-cent zones outside of that, the witness testified had resulted in a revenue increase of \$505,000 as compared to an estimated increase of \$540,000. The 5-7-9-cent fare had held the traffic and apparently had resulted in no harmful effects. When the central 5-cent zone was shortened and the outer zone increments increased to 5 cents, instead of producing the estimated revenue increase of \$2,162,000, it had produced \$1,250,000, falling short \$912,000. There was a distinct loss of travel in the outer zones. A 1-cent charge for transfers had produced \$150,000 a year increase, estimated to produce \$172,000, and the general use of transfers was reduced 15 per cent. This charge was received without complaint, Mr. Bliss thought, because the fare for the central zone had been retained at 5 cents.

On the line between Providence and Pawtucket, two cities close together, the effect of the 5-7-9-cent fare has been greatly to stimulate the business of the local merchants in Pawtucket and correspondingly to decrease that of the Providence merchants. Judging from this, Mr. Bliss thought that merchants of the big centers could very well afford to pay taxes to help support the railway, and even further to subsidize them in order to maintain low-fare frequent service. A commissioner suggested that this business of the merchants from out of town had been done at the expense of the trolley company during the last few years, or that this represents the contribution of the utility to the aid of the social problem. Questioned by Commissioner Meeker whether the people would not soon realize that it would pay them to trade with the larger merchant even with the high carfare involved, the witness thought that the fare increase was very plain while the savings from the larger merchant might not be so readily appreciated by the customer.

Asked if it were not possible to educate the public that even with a fare increase, the street car was still the most economical transportation available and it should not be influenced to walk by the slight increase, Mr. Bliss said he had always believed in the fairness of the public. But when it is impossible to get the essential facts clearly in the mind of the business men and professional men, he wondered how it could be expected that the public in general might be made to understand. He said this cannot be accomplished until the press and the public officials are willing to come out and truthfully and clearly state the problem and lead the people.

FUNDAMENTAL CAUSES OF CRITICAL CONDITION

Mr. Bliss then turned his direct testimony to a brief discussion of the causes fundamentally responsible for the plight of the electric railways. The first of these was the enormous increase in the cost of labor and materials. The cost of the latter, he believed, could be satisfactorily coped with by the companies. But he knew of no way to meet the labor costs until the people shall have risen up and educated their legislators to the necessity of providing a tribunal with power to

decide what is a fair wage and to punish strikers by law. With the present disorderly demands of labor and the absence of governmental agencies to deal with it, he could see no possible relief. He also pointed out that the street railway was not altogether necessary, since during the eighteen-day strike in Providence, it was possible to operate factories and carry on business in nearly the normal way.

The second cause related by the witness was the excessive franchise taxes and paving obligations. These should be removed by legislation the first thing, he thought, and this would go a long way toward meeting the emergency. The third cause cited was the competition of jitneys and private automobiles. He believed the jitney supplied a superior service in many cases and that therefore, it could not be abolished, but that it should be put under strict regulation and on a basis comparable with the street cars. Under this regulation, it might survive but it would be a less serious competitor.

The fourth cause assigned for the difficulty of the railways was the tremendous increase of federal taxes upon the utilities. From this burden they should be relieved, for the welfare of the country was dependent, he said, on transportation and the free movement of the people.

FEDERAL INTERVENTION IMPOSES HEAVY BURDEN

The chief reason for the situation the witness stated to be the awards of War Labor Board. It was this cause which, he said, had come very near making the sitting of the Federal Commission a coroners' inquest rather than a consultation of doctors. The War Labor Board had added \$1,250,000 to the annual operating costs of the Rhode Island Company, which the latter had not the money to pay, "with the beautiful words of explanation" that the Board was not concerned with the financial condition of companies, but that the award represented a living wage and it must be secured somehow. This decision had apparently been passed out without regard to its effect on the railways and it also put the public service commissioners in a very difficult position for they knew the effects of the award and their duty in behalf of the company and the ultimate benefit of the public but were powerless to act.

The conclusion of Mr. Bliss' testimony, together with that of Zenas W. Bliss, receiver The Rhode Island Company; Mayor Chas. B. Gillen, of Newark, N. J., and Dr. Delos F. Wilcox, New York City, will be given in next week's issue, together with abstracts of the testimony presented on Thursday and Friday.

Thursday's Sessions

At the three sittings of the commission on Thursday the witnesses who testified were Commissioner Nixon of New York, followed by William P. Burr, corporation counsel, New York City, Prof. Irving Fisher, Greenville S. MacFarland, Thos. L. Hall, chairman Nebraska State Railroad Commission, and Mayor Connell, of Scranton, Pa.

Mayor Thompson of Chicago telegraphed that he would be unable to appear as planned, and Otto Kahn wrote that it would be impossible for him to appear. Chairman William D. B. Ainey, of Pennsylvania Public Service Commission was present Thursday evening and was to be heard at 10 o'clock Friday.

from other sources in addition to the compressors to charge the batteries. The permanent handles on the cut-out cocks controlling the air to the governor and compressor switch were removed so that the air could not be shut off from these except by authorized inspectors provided with handles.

Value of Pawl Springs Demonstrated by Excessively Burned Controller Contacts

AN EPIDEMIC of burned contact fingers and contacts on controllers led to an investigation as to the cause of the trouble by the engineering department of a large railway property. It was at first thought that this might be due to improper adjustment of the contact fingers or to their operating with too weak tension. As the trouble was confined to two or three of the depots of the system this assumption appeared to be a reasonable one. Investigation, however, disclosed the fact that while in some cases the tension on the fingers had been decreased by excessive heating from the burning which took the temper out of the finger springs, that in a majority of cases the tension maintained was proper and the contact fingers were properly adjusted.

By operating the controllers on which the most severe cases of burning was found it was discovered that the tension of the pawl springs was very weak, so that the motorman could scarcely feel the controller notches, and the evident cause of the burning was due to the motorman stopping his controller drum movement between notches instead of on the proper contact positions. This led to an investigation of pawl springs. It was found that at the depots where the greatest trouble from burned contacts was experienced, there were also many broken pawl springs. The breaks in the pawl springs occurred at the end which hooks through the pawl, and at the bend where the loop leaves the first turn of the spring. At all of these shops it was found that the practice had been to open the loop of the spring with a pair of pliers or a screwdriver in order to hook the end of the spring to the pawl, and then to close this again slightly to keep it from unhooking after the spring was in place. As all springs were found to be broken at the end where the men had been in the habit of bending them in installing, it was evident that this bending was the cause of their breakage.

The remainder of the operation of installing a new pawl spring consisted of hooking the other end of the spring over a stationary post. Several different methods were used for this operation. Either a pair of gas pliers to grip around the spring, a pair of pliers to hold the loop, a screwdriver thrust between the turns of the spring, or a piece of wire or cord hooked through the loop of the spring was employed for the purpose. The last of these was found to be the best, as there was no danger of straining the spring. At one shop it was found that the men were cutting off the end of the loop so as to leave a space of about $\frac{1}{4}$ in. between the first turn and the open end of the loop. This gave sufficient space so that the spring could be easily hooked through the pawl, but there was danger of the spring becoming unhooked in service. In order to facilitate the installation of the springs at some shops it was found that a blow torch had been used to take the temper out of a few turns of the springs at the loop, so that the springs could be more easily stretched and installed. Another method which accomplished the same purpose

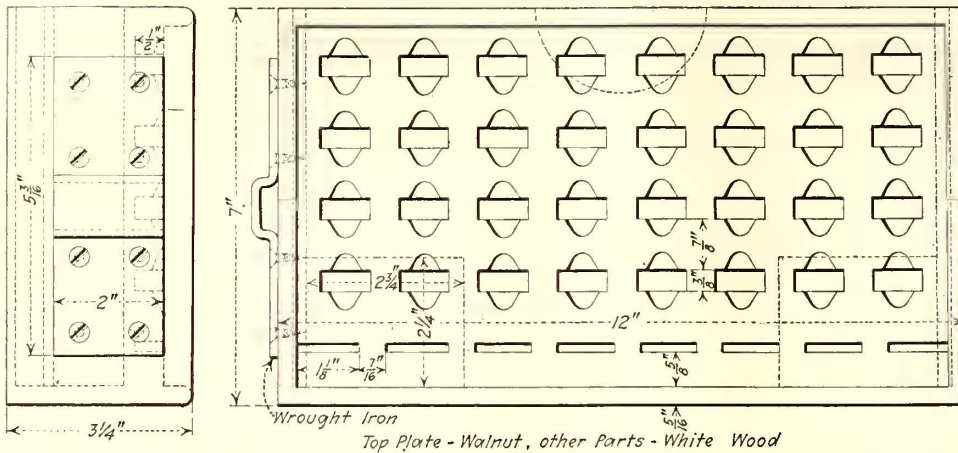
had been to force a screwdriver between the spirals of the spring and to elongate it so that the tension of the spring would be decreased. While these methods rendered the installing of the springs much easier and also undoubtedly reduced the number of broken springs, it certainly increased the amount of burning at the fingers and contacts, as any decrease in the pawl spring tension permitted the motorman to stop the controller drum between notches.

Another discovery was made which had led to difficulty in installing the pawl springs. This came from the indiscriminate use of two types of K-11 and K-28 pawl springs, which were of different design and dimensions. Some shops had but the one kind of spring which was used on both types of controllers and other shops had both sizes which were used for either type of controller without considering the type to which they rightfully belonged. To decrease the amount of trouble and prevent further irregularity the railway adopted one type of spring for use on the two types of controllers, which it had in service. This spring was made with a longer loop at one end, and with sufficient space at the end of the loop and the first turn of the spring to permit its being hooked into the pawl without bending or closing of the loop. The space between the end of the loop and the first turn of the spring was made $\frac{1}{4}$ in., and the entire length of the spring was so arranged as to provide sufficient contact after the spring was hooked into the pawl and to prevent its jarring out in service.

Instructions were issued to all shops as to the proper method of installing these springs. These instructions specified that all pawl springs should be installed by using a piece of wire or cord hooked through the end of the spring after the other end had been inserted in the pawl. By the use of this wire or cord the spring could be easily pulled into position and hooked over the stationary post. Definite instructions were also given to the controller inspectors to prevent the use of any methods which would decrease the tension of the spring after its installation.

Jerky Operation Does Not Improve Passengers' Tempers

AMOTORMAN ran his car into the car house and reported that it would not start with the master controller on the first point. The car would start on the second point but the acceleration was so rapid due to the excessive current that the passengers were forced into one end of the car and made very uncomplimentary remarks regarding an inefficient motorman who did not know how to operate the car properly. This car was equipped with electropneumatic switch-group-type control, and the electrician who was called in to locate the trouble found that the first resistor switch, R-1, did not operate. He tried several new valves, coils and contactors in this switch but still it would not pick up. The car was then turned over to the electrical department for more careful examination. An inspection of the relay in the control circuits showed that the upper disk did not come down far enough to make proper contact, and as it was in the operating circuit for the R-1 switch this poor contact was the cause of the improper action. The contacts were raised slightly so that proper connection was established, and the car operated satisfactorily.



DETAILS OF SAFETY-CAR CHANGE BOARD, AND VIEW SHOWING CHANGE BOARD IN PLACE

Change Boards on Safety Cars

Connecticut Company Is Using on Prepayment Cars An Original Device to Facilitate Fare Collection

THE Connecticut Company, on whose system a 6-cent fare is charged, has found very useful a "change board" designed by one of its employees, and now used on pay-as-you-enter cars and safety cars.

When the 6-cent fare became effective, William Landy, a conductor on the New Haven division of the company, noticed how much time was consumed in making change for passengers who would present a dime, or a quarter, or any other single coin of greater value than 6 cents. He gave the matter thought and finally offered to the company the model of a change board which is now in use on all safety cars and which will be used on all pay-as-you-enter cars.

The design used on safety cars consists of what looks like a shallow wooden box, one end of which is fastened by a keystone lock to the post that holds the fare box. There are thirty-two slots on this board, each slot $\frac{3}{8}$ in. wide and $\frac{7}{8}$ in. long, on each side of which small scallops have been cut out, so that the coins may be easily picked up.

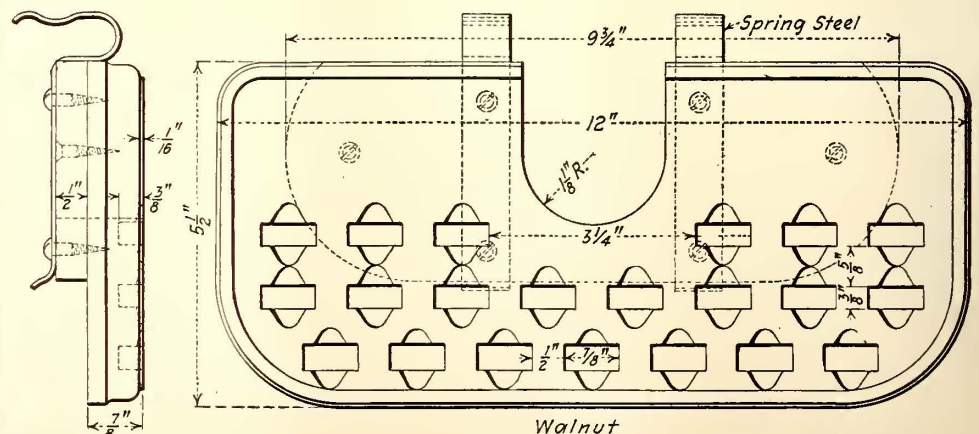
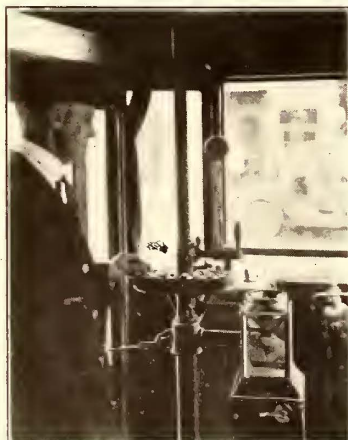
In these slots the operator puts change for 10 cents, usually a nickel and five pennies. At the farther edge of the board are eight slots for larger coins—like quarters or half dollars. When a passenger enters the car and gives the operator a dime, the operator merely picks the change for a dime off his change board and gives

it to the passenger who puts 6 cents in the fare box and keeps the change. Much time is saved because the operator does not have to take a handful of change out of his pocket and count out the necessary five pennies. Under the change board proper are two shallow compartments, in one of which the operator keeps his transfers and punch, and the other is large enough for his report slips. The board is 12 in. long, 7 in. wide and $\frac{3}{4}$ in. deep.

The change board used on the pay-as-you-enter cars has no compartments for transfers, etc., and the board has rounded corners. It is held to the crown piece of the door-mechanism standard by means of two pieces of spring steel. It is 12 in. long, $5\frac{1}{2}$ in. wide and $\frac{7}{8}$ in. thick. There are twenty-two slots for change on this board. The conductor stands directly in front of the board, and as passengers come in he gives them change and they drop the proper fare in the fare box, which is placed just to the left of the change board as the passengers enter.

These boards are being made by the company in its own shops for use in all prepayment cars. The top plate is made of walnut and the other parts are of white wood.

A well-written sketch of the one-man car by Floyd W. Parsons appears in the Aug. 16 issue of the *Saturday Evening Post*. Views are shown of cars in operation in Tampa, Fla., and in Bridgeport, Conn. The article also contains facts about the present financial condition of the electric railways.



CHANGE BOARD FOR TWO-MAN PREPAYMENT CAR, AND DETAILS OF TWO-MAN CAR CHANGE BOARD

Electric Arc Welding Methods

A Description of the Function and Practical Operation of Some Types of Equipment for Carbon and Metal Electrode Welding

By H. L. UNLAND

Power and Mining Engineering Department, General Electric Company, Schenectady, N. Y.

THE principal advantage of the electric arc welding process is that large amounts of energy are transformed into heat in a very small space. Heat is confined to the immediate locality of the weld and accordingly does not spread out over the adjacent space. This reduces materially the expansion and contraction troubles, and at the same time results in a high heat efficiency. A further result of the great concentration of heat is to produce a very high temperature which is sufficient immediately to fuse the metal which is desired to weld. It is not necessary in starting a weld on steel to preheat or to wait until the metal can be brought to the fusing temperature.

Practically all arc welding is accomplished by either the metallic or the carbon-electrode method. In the former, the electrode consists of a wire or rod held in a suitable holder. In addition to melting a small pool on the work, the heat of the arc melts the electrode away and the current causes the molten metal to be driven, in finely divided particles, against the work. In this manner additional metal is built on or used to join two pieces of metal. By this method metal can be deposited on vertical surfaces and overhead.

The carbon-electrode method is used for building up metal, plugging holes in castings, welding, and joining parts where strength and appearance are not essential, or where the surface is to be machined off. Since heavy currents can be used, metal can be built on with great rapidity, and where speed is desirable this method is applicable.

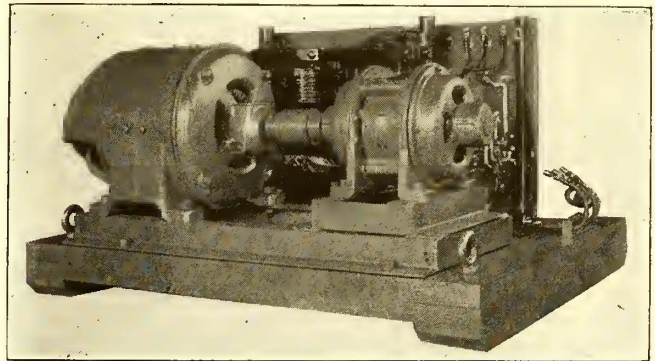
In the carbon-electrode method a carbon rod forms one electrode. The arc fuses the metal of the work and additional metal is built on by melting from a rod of filling material in a manner similar to soldering with an iron or welding with a gas torch. For cutting, or melting away excess stock, the carbon electrode is used. In cutting, the arc is held stationary at a point on the work where, when the metal is fused, it is free to flow or run off. As the molten metal runs away the arc is advanced, and in this way a cut is made through the piece.

Welds soft enough to be machined can be made by using either method if reasonable care is taken. The deposited metal should not be chilled and if the carbon electrode is used the arc should be kept long enough to prevent carbon being carried into the weld. From other than the above causes, hard welds are usually due to poor quality of electrode metal or filling metal. The deposited metal is obviously cast steel, since it is merely fused in place and is not ordinarily subjected to any mechanical working afterward. The metal has the coarse crystal structure found in unannealed cast steel and likewise has comparatively low values for reduction in area and elongation when specimens are tested in a tensile testing machine. In some cases the tensile strength of the metal in the weld may be as high as

55,000 to 60,000 lb. A safe figure is 35,000 lb. where the work is done by experienced welders.

The Wirt Jones tests of the research sub-committee on arc welding of the Emergency Fleet Corporation, as reported in a paper before the A. I. E. E., show a range in tensile strength of from 38,600 to 62,600 lb. per square inch in welds made by direct current bare electrode, arc welding. These welds were machined down to the thickness of the plate before the tests were made. The elongation found varied from 4 to 13 per cent.

Welding equipments may be classified as constant energy, constant potential and alternating-current types. Constant-energy equipments use a self-excited generator driven by either a direct or alternating-cur-



MOTOR-DRIVEN ARC WELDING GENERATOR WITH CONTROL PANELS

rent motor, or by gas, oil or steam engines. Constant-energy balancer sets are suitable when 110 to 125 volts direct current, is available. Constant-potential generators can be driven the same as constant-energy generators. Alternating-current welders may be used on 60-cycle circuits of 220, 440 or 550 volts maximum. The welder is single-phase but where several are in use on a polyphase system, they may be distributed among the phases to partially balance the load.

Any direct current can be used for welding, but the voltage must be reduced to from twenty to fifty. One method of doing this is by using a constant potential supply circuit and inserting resistance in series with the arc to absorb the excess voltage. With the ordinary supply circuits the voltage absorbed by the rheostats is a large part of the total energy. The amount of power required depends largely on the source of supply.

In order to avoid losses the General Electric Company has developed a line of special, low-voltage generators and a method of control. The generator is wound for a voltage of from 60 to 75 volts, and the control equipment consists of a main generator panel with or without a welding control circuit, with a separate auxiliary panel for each operator. In series with the arc is a grid

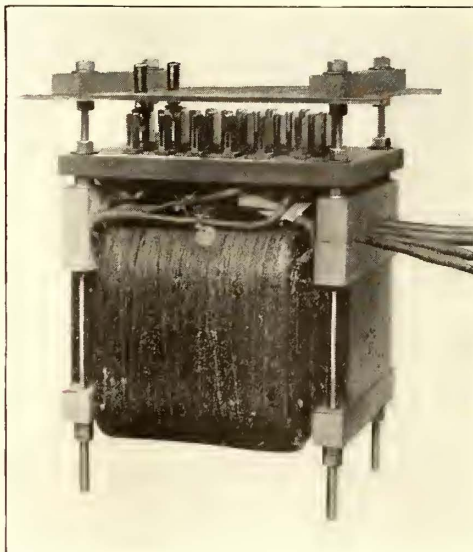
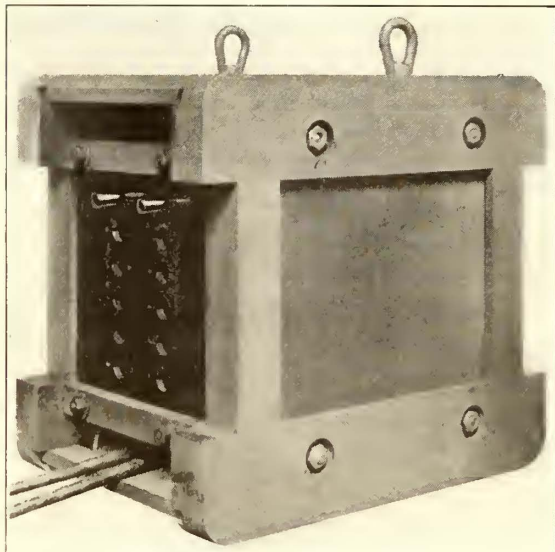
rheostat for varying the current by means of a dial switch connected to taps in the rheostat.

An automatic control equipment is provided to protect the generator without affecting other operators whose welding circuits may be connected to the same generator. It consists of a protective relay controlling a shunt contactor in the welding circuit. The relay is

done by the carbon arc the capacity of the set depends on the cutting speed required. For light metal and where speed is not important 300 amp. is sufficient, but where the metal is 2 in. thick or more, it is desirable to use heavier currents and for this purpose up to 1000 amp. can be used.

Another type of arc-welding equipment has been developed by the General Electric Company to use alternating current in the arc. It consists of a single-phase transformer provided with taps and connections for obtaining the various values of current and proper voltage required by the bare metallic electrode arc as used in welding. The equipment also operates on a 60-cycle circuit and with supply voltages of 550 or less.

The taps in the transformer winding are connected to terminals on a small



ARC WELDING TRANSFORMER, AND TRANSFORMER REMOVED FROM CASING

provided with an oil dashpot to prevent operation on momentary fluctuations of current.

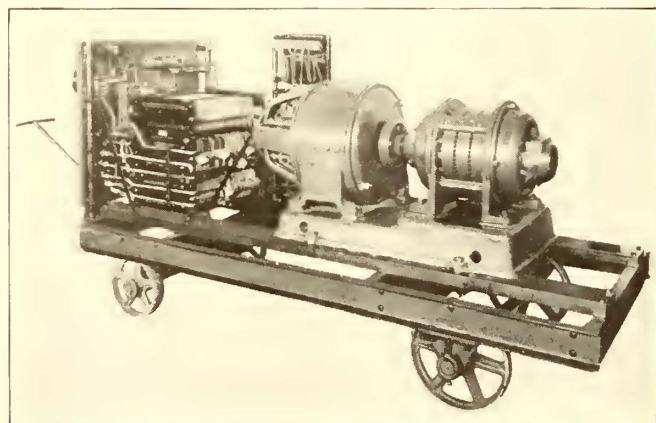
The setting of the dial switch on the welding panel determines the amount of resistance in series with the arc and therefore controls the current used. Before starting the arc the operator sets the dial switch for the amount of current required for the work.

If, however, the operator leaves the electrode in contact with the work too long, or takes too much current after having drawn the arc, the protective relay opens the exciting coil of the contactor which in turn

switching panel where the proper connections are made by means of a plug switch. Four leads are brought out of the case, two of which are for connection to the supply lines and two for the welding circuit.

The transformer with its panel is mounted in a woden box. The front panel of the box covers the switch panel and is provided with openings through which the plug switch can be inserted in making the connections.

This mounting of the equipment in the box is so arranged that definite air channels of suitable size are provided for the circulation of air by the draft due to the heating of the transformers. The box is approximately 24 in. long by 18 in. wide by 20 in. high over all and the total net weight is approximately 350 lb. I-bolts are provided for lifting by a crane. The box rests on heavy wooden skids so the equipment can be dragged about if required.



PORTABLE ARC WELDING SET

opens the welding circuit. In order to resume operations it is necessary only for the operator to lift the electrode, thereby breaking the circuit, whereupon the relay drops out, closing the contactor and restoring the circuits to the normal operating condition.

Where carbon electrode work is to be done light work can be welded by using 150 to 250 amp. Medium welding by this process requires from 250 to 350 amp. and heavy welding 400 to 600 amp. Where cutting is to be

Specifications for Concrete Work

IN THE *Canadian Engineer*, Prof. I. F. Morrison concludes an article on the subject of specifications for concrete by saying that these should call for concrete of a certain strength. This strength should be varied to suit the purposes to which the material will be put and an appropriate factor of safety should be used in the design. Available materials in the locality of the proposed work should be sampled and tested, and the designer should be informed as to the strength available from these materials. In almost any locality tests on 6-in. x 12-in. cylinders can be carried out. Where work is done by contract, the contractor should be required to present his proposed proportions to the inspector sufficiently early to permit a careful checking. The method of specifying concrete according to the strength or any other quality desired has not only become extremely practical but is advantageous from the standpoint of economy.

New Rolling Stock for District Railway, London

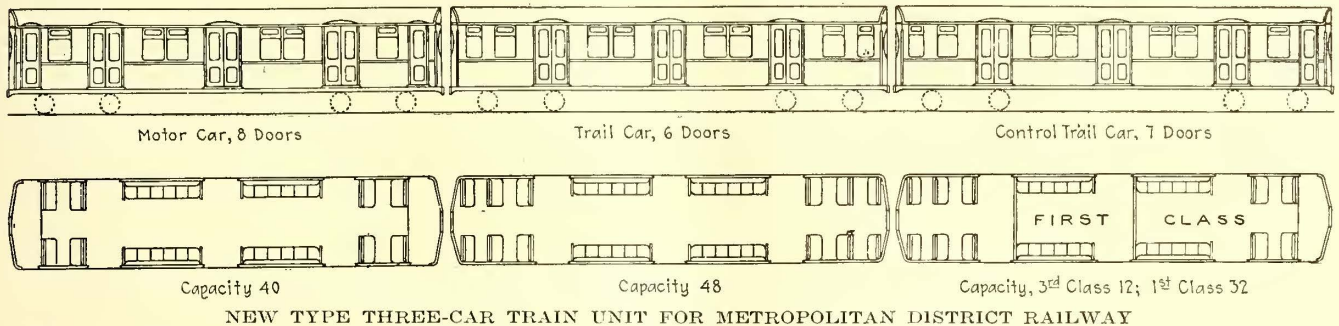
Larger Cars for Operation in Longer Trains With Rapid Rates of Acceleration and Retardation Are Needed to Better Conditions

THE Underground Railway authorities of London, England, have now under construction cars of a new type designed to relieve the present overcrowding and provide greater comfort for the passengers. The present needs of the District Railway will be taken care of by the putting into service of 100 cars as soon as these can be delivered. Already the headway in

side. Thus wherever in the car a passenger may be seated he will find an exit conveniently accessible.

In appearance the new trains will not differ very materially from the latest pattern District trains now running except that the sides of the coaches will be slightly curved instead of straight. The cars will be fitted with larger trucks and wheels and will be higher powered, which will materially improve the running as regards speed and comfort.

As to dimensions, the width will be 9 ft. 6 in., as compared with 8 ft. 6 in. at present, and the length 50 ft. against 49 ft. The new trains will be capable of speeds up to 45 m.p.h. when working on "non-stop" services. Improved acceleration has been brought about



NEW TYPE THREE-CAR TRAIN UNIT FOR METROPOLITAN DISTRICT RAILWAY

the tunnel section of the railway is so low that it is not practicable to increase the number of trains except to a small degree; hence the alternative adopted is to increase the length of each train to 400 ft., the maximum permitted by the station platforms.

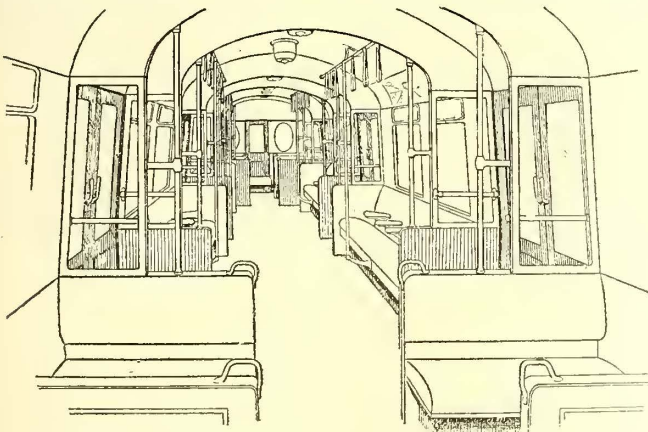
The new District trains will comprise eight cars in all. The cars will be wider than those now in use, the width being extended to about the limit of the present stepboard. The trail cars will be fitted with three double sliding doors, each wide enough to permit two passengers to board or alight at one time. On the motor cars and control trail cars there will in addition

by adding motors, and the braking apparatus has been selected to permit quicker stopping.

The eight-car trains will be made up of two self-contained sections with a view to operating five-car trains during the slack hours and eight-car trains during the rush hours. The three-car unit can be utilized during slack hours on certain of the local sections of the line.

As regards the interior arrangements and decorations, special attention has been paid to the design of the seats, to general "roominess" and to ventilation. The upholstery will be in moquette velvet in non-smoking compartments, and in "smokers" in a washable leather or some such material as "pegamoid." At each end of the car there will be large oval plate-glass windows, and the interior metal fittings and door handles will be of a non-oxidizing material. Convenient hand-rails and stanchions will be provided near doorways and in open spaces.

The car is to be constructed of steel throughout except for a small amount of woodwork chemically treated to render it fireproof.



INTERIOR OF NEW LONDON "UNDERGROUND" CAR

be single doors at the ends. These will be available for the use of passengers when not obstructed by the train crews. Thus on an eight-car train there will be the equivalent of fifty-two single doors for the use of passengers. This provision for speedy passenger transfer is expected materially to reduce the time taken in loading and unloading at stations and permit a greater number of trains to pass over the congested sections of the line during rush hours. The present type of end vestibule will be dispensed with in the new design and the doors will be equally spaced along the

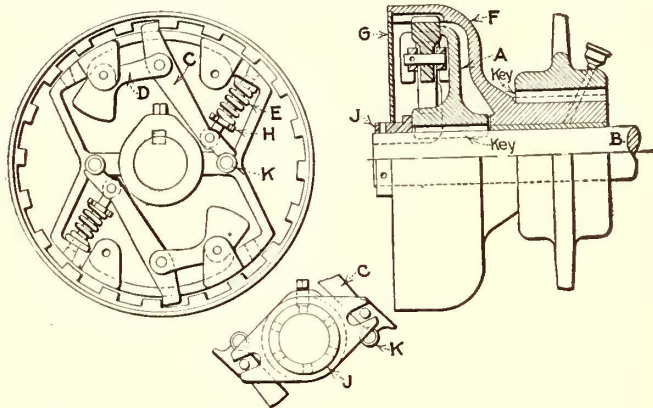
New Type of Bench Jointer

A new type of portable bench jointer has recently been placed on the market by J. T. Wallace & Company, Chicago, Ill. It is equipped with its own motor, lamp cord and plug ready for operating from an ordinary lighting circuit as required. The machine is equipped with a new type of fence that was developed particularly in connection with this machine. This fence is mounted on the motor and slides backward or forward on rods, which has an advantage in that adjustments can be made more quickly than with the ordinary type. To provide for the replacing of the cutter heads these have been specially constructed and the tables are arranged to slide backward to permit the use of these special heads or forward to work with the narrowest possible throat opening. Ball bearings are used throughout in the motor and cutterhead housings.

Mechanical Overload Release for Power-Driven Machines

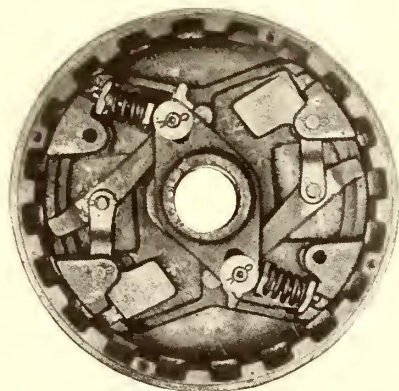
THE "Lettgo" release is a new device that will automatically disengage the driving power from driven machinery if the load exceeds a predetermined amount, thus allowing the driving motor or other source of power to run free without friction in the release. The device is designed to take care of an overload gradually as well as suddenly applied, and it can be set so as not to trip out from sudden jars or shocks.

The operating principle and details of construction of the device are indicated in the accompanying illustra-



DETAILS OF CONSTRUCTION OF OVERLOAD RELEASE

tions. Referring to the drawing it will be noted that a spider *A*, keyed to a shaft *B*, has trigger *C* pivotally mounted on links *D*, with the ends engaging inside notches in the rim of the drum *F* and roller *K*. Springs *E*, regulated to any desired pressure by adjusting nuts *H*, hold the ends of the triggers on rollers *K*, under normal conditions, but when the drive is overstrained the compression of the springs permits the ends of the trigger to drop into the position shown in the detail drawing, releasing connection with the rim *F* and allowing the driven machine to stop immediately.



DEVICE IN RELEASE POSITION

For use in resetting the driving triggers in the driving position the collar *J* is provided with fingers that engage the pins on the lower ends of triggers *C*. When this collar is turned by means of a spanner wrench, the triggers are moved to the original position and the outer ends at the same time enter notches in the drum *F*, thus renewing the transmission connection. A cover *G*, fits the end of drum *F* and incloses and protects the entire mechanism. The hub of drum *F* may be extended to receive a wheel or gear, with a bushing for running loose on the shaft, or it may be keyed directly to a separate shaft, thus forming a coupling device in which either element may be the driver according to the circumstances.

The release can be installed close to the driving machinery so that when it operates there is no inertia

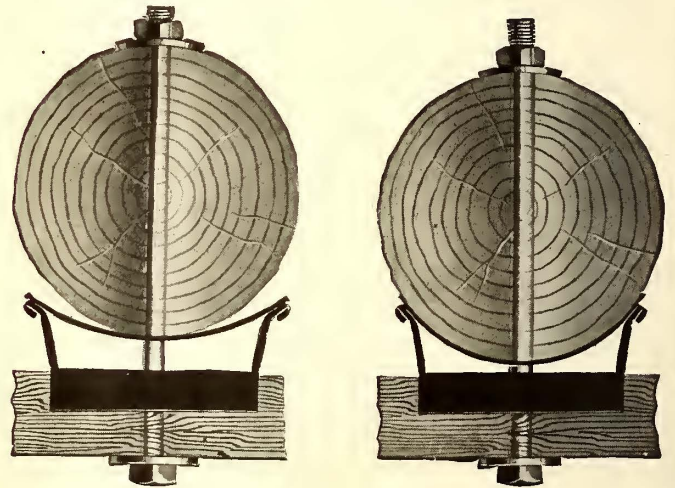
force from high-speed moving parts to be overcome. It is made symmetrical and can be assembled to operate in either direction. The springs are arranged to adjust the tension so that the release will operate at the proper load, and no matter how often it operates the proper factor of safety is said to be maintained. The mechanism is entirely inclosed so that it can be packed with grease to insure lubrication for all operating parts.

This device is said to be particularly useful on old conveying machinery which is weakened by long wear, and incapable of carrying any appreciable overload. Other forms have been developed for lighter high-speed service, one in particular being the single trigger release which has been developed for reversible operation and is arranged automatically to reset the driving trigger after being tripped out, if the direction of rotation is reversed.

The device in all its various forms has been patented by Frank E. Aurand, Oak Park, Ill., and is being manufactured in four sizes by the Link Belt Company of Chicago. It is now being made particularly for application to endless-chain conveyor machinery, but can be applied to many kinds of service.

New Steel Gain Saves Poles

THE Hallet improved steel gain has been designed to eliminate the necessity of cutting a gain in a pole for the installation of a crossarm. The steel gain consists of a pole plate with a radius larger than that of the pole and a gain plate of galvanized steel.



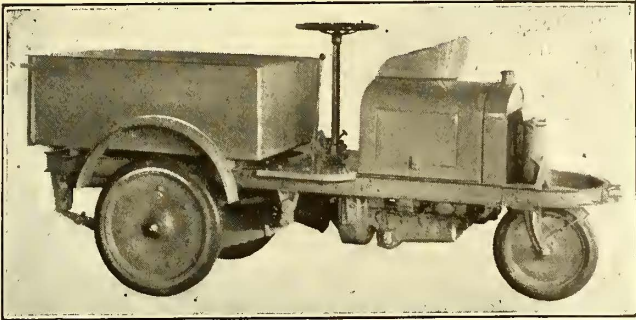
STEEL GAIN BEFORE AND AFTER TIGHTENING INTO POSITION

This gain is placed between the crossarm and the pole. Tightening up the nut on the bolt which passes through the crossarm, gain and pole causes the struts on the gain plate to press against the pole plate in such a manner as to cause the pole plate to shape itself about the pole. It is claimed that the gain grips the pole so firmly as to permit the weight of a lineman at the end of a 5-ft. crossarm without producing any visible sign of deflection in the arm.

The size of the gain depends upon the vertical dimension of the crossarm and the diameter of the pole. They are made in three sizes of pole plate—namely, for pole diameters of 6 to 8 in., 8 to 10 in. and over 10 in. Before the gain is applied the distance between pole plate and gain plate is $\frac{3}{4}$ in. This gain is manufactured by the Hallet Iron Works, Harvey, Ill.

A Combined Motor Truck and Tractor for Use Around the Shop and Freight House

AN EXHIBIT at the Atlantic City convention of the American Railroad Association, mechanical section, which attracted considerable attention, was that of the Motor Products Corporation, which has developed the Clark "Tructractor." Although on the market for but a short time, this machine has already proved to be

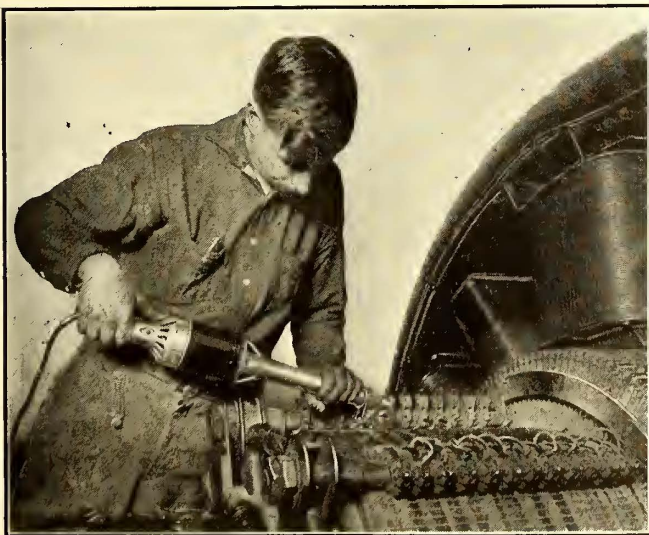


"TRUCTRACTOR" FOR HANDLING MATERIALS AND DRAWING TRAILERS

serviceable in many industrial plants. It has a carrying capacity of $1\frac{1}{2}$ tons and is supplied with either platform, cargo, or dump body, being provided with a drawbar attachment for convenient connection to the trailer. The speed can be varied from $\frac{1}{4}$ to 15 m.p.h., and in ordinary use the gasoline consumption is 3 gal. per working day. In a recent cross-country test a "Tructractor" made 143 miles in one day, including a number of demonstration stops.

New Portable Commutator Slotter Has Good Cutting Speed

THE practice of undercutting mica on the commutators of both large and small machines is more or less universal with both manufacturers and users. Conditions have led to the development of a portable motor-driven tool for undercutting the mica which in the case of large machines can be used without removing the brushes. The essential feature of this commutator slotter is a $1\frac{1}{2}$ -in. circular saw keyed to a hollow mandrel which in turn carries a worm gear. The hollow handle contains the steel driving shaft with worm



PORTABLE DEVICE FOR SLOTTING COMMUTATORS

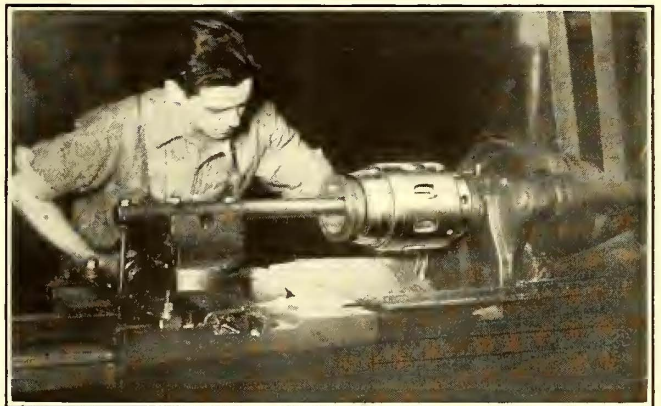
and a small universal motor. Immediately behind the saw is a thin metal guide shoe which slides in a slot insuring a straight cut. Adjustments are provided so that the machine is serviceable for any size commutator and will cut to any desired depth.

The rate of speed at which mica can be cut depends upon the length of commutator, the grade of mica and the operator but it is said that 20 in. to 30 in. per minute on large machines is easily accomplished. The life of the saw depends upon the condition of the mica but is said to average about 150 ft. After the commutator has been undercut the only smoothing operation necessary is to run a piece of fine worn sandpaper over the commutator lengthwise of the slot.

The total weight of the machine is approximately 10 lb. and is borne by the adjustable depth shoe on one side and a small roller on the other. The handle and motor casing are made of polished cast aluminum. The universal type motor is of the definite pole type, series wound and is furnished for either 110 or 220-volt service and will operate at either 25 or 60 cycles. This machine which is known as the Aurand commutator slotter is being placed on the market by J. H. Green & Company, Chicago.

Self-Centering Chuck Facilitates the Boring of Motor Bearings

THE accompanying illustration shows a form of automatic chuck used in the shops of the Third Avenue Railway, New York, for boring railway motor-armature and axle bearings. This chuck is the invention of Harry J. Krombach, assistant general foreman of that company. It is in use on the properties of other large railways.



TURNING AN ARMATURE BEARING

The development of this device has resulted from an effort to reduce the cost of finishing bearings. Various forms of holding devices are used for this work. Some are specially designed and constructed for this purpose, while others use the U-shaped jaws of the regular lathe chuck. Where the regular chuck is used considerable time is consumed in setting up for the boring operation, and as the jaws bear at four points on the circumference of the bearing, there is a tendency to force the bearing out of line if too large a cut is attempted and bearings can be distorted by excess pressure of the jaws. The chuck illustrated consists of two cast-steel parts, the body or jaws of the chuck and the sleeve nut which actuates the jaws. Its weight

is 45 lb. and it can be readily adapted to operate satisfactorily on any type of lathe.

In order to eliminate the possibility of an inaccurate fit the chuck is supplied with the spindle end of the body untapped. Experience has shown that sometimes in tapping the casting for the lathe spindle connection there is the liability of this being made "out of true." With the final cut made on the lathe with which the chuck is intended to operate, this risk is avoided.

The inside body or jaw of the chuck provides for a compression of about 5 per cent of the diameter. With a 5-in. maximum-capacity chuck, for instance, it is possible to hold rigidly any bearings having an outside diameter of not less than 4 3/4 in. and not exceeding 5 in. Where smaller bearings are to be held, it is necessary to introduce a reducing sleeve having slots which form jaws parallel with those in the body of the chuck. By the use of such sleeves small diameter bearings can be held rigidly.

Some of the advantages claimed for this chuck are a saving in time necessary to set up the work and its ready adaptability for use with a low grade of labor. The chuck is manufactured and supplied by J. E. Coonan, New York.

Insulating Varnish Solvent Chart

In order to prevent or assist in preventing the use of varnishes at wrong gravity, which affects the results obtained, the Dolph Manufacturing Corporation, New York, has just issued a copyrighted "Solvent

Observed Specific Gravity

DEC	0.903	0.897	0.892	0.886	0.881	0.875	0.870	0.864	0.859	0.854	0.849	0.844	0.838	0.833	0.826	0.823
DEC B	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
0.903	0															
0.897	3	0														
0.892	6 1/2	3 1/2	0													
0.886	10	7	3 1/2	0												
0.881	14	10 1/2	7	3 1/2	0											
0.875	18	14 1/2	11	8	4	0										
0.870	22	19	15	11 1/2	8	4	0									
0.864	27	23	19 1/2	15 1/2	11 1/2	8	4	0								
0.859	32	28	24	20	16	12	8	4	0							
0.854	37	33	29	25	21	17	12 1/2	8 1/2	4 1/2	0						
0.849	43	39	35	30	26	22	17 1/2	13 1/2	9	4 1/2	0					
0.844	50	46	41	36	32	27 1/2	23	18	14	9	5	0				
0.838	57	53	48	43	38	33	28 1/2	24	19	14 1/2	9 1/2	5	0			
0.833	65	60	55	50	45	40	35	30	25	20	15	10	5	0		
0.826	74	69	64	58	53	48	42	37	32	26	21	16	11	5 1/2	0	
0.823	84	78	73	67	61	56	50	44	39	34	28	22	17	12	6	0

Desired Specific Gravity

Dec = Decimal Scale
B = Beaumé Scale

With 54° Benzine use approx. 10% more
With 63° Gasoline use 15% less than shown.

SOLVENT CHART FOR INSULATING VARNISHES

Chart" showing the percentage of solvents which should be used with its insulating varnish to produce the right specific gravity. The specific gravity shown on the chart is that at which the varnish is shipped; it is given in both the decimal scale and the Beaumé scale. The most suitable gravity for any particular use should be established by trial and endeavor made to keep this constant. The solvent chart indicates the amount of solvent to be added to reduce the varnish to the desired gravity. Benzine is preferable to gasoline as a solvent, but gasoline can be used. The solvent and varnish should be approximately at the same tem-

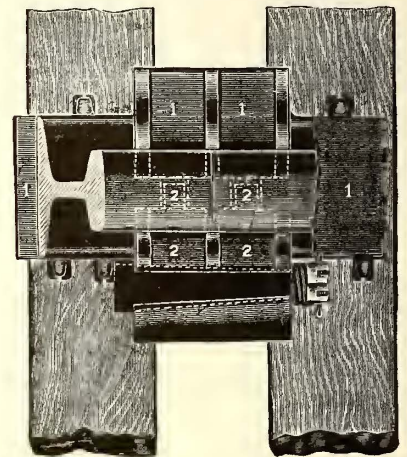
perature and neither under 60 deg. Fahr. The solvent should be added slowly and stirred thoroughly.

As an example of the use of the chart, if it is desired to reduce from 30 B. to 32 B., the chart shows that 8 gal. of 58-deg. benzine would be necessary for every 100 gal. of varnish. To reduce from 0.864 (decimal scale) to 0.843, 18 gal. of 58-deg. benzine is required.

Rail Joints Made Without Bolts

A NEW TYPE of joint for T-rails developed by the Boltless Self-Tightening Rail Joint Company, Fremont, Ohio, is shown in the accompanying illustration. It is intended to provide a tight joint, and eliminate the use of nuts, bolts and washers. The joint is made in two types, one for a two-tie joint and the other arranged to bear on a single tie.

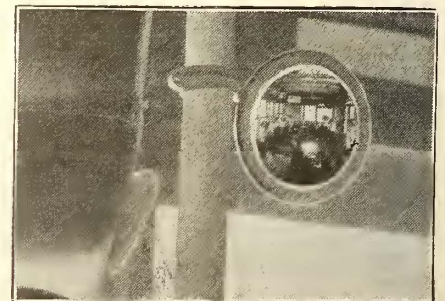
The two-tie joints in which the boltless joint is suspended between the ties consists of a malleable iron or steel rail chair which is spiked to the ties. The rail is held against one side of this rail chair by a reinforced fish-plate bearing on the opposite side of the rail. A tapered hardened steel wedge inserted between this fish-plate and the rail chair, and driven home with a sledgehammer, forces the fish-plate against and under the ball of the rail so as to provide a tight joint. The small end of the wedge is turned down, and a coiled spring provides tension for keeping it tight, and for taking up any wear occasioned by vibration. The spring is held in place by a nut which is slotted and held in place by a cotter pin.



BOLTLESS RAIL JOINT
1—Rail chair. 2—Fishplate.

One-Man Car Mirror for Interior View

THE Drew Electric & Manufacturing Company, Indianapolis, Ind., has added to its regular line of motor-men's safety mirrors a new one especially designed to give the operators of one man cars a clear view of the entire inside of the car. This mirror is round, beveled and incased in a substantial bronze frame having a two-way adjustable bracket which permits the device to be attached to each center post at both ends of the car. The diameter of this mirror is 5 1/2 in., and it can be adjusted to suit the particular height of any operator, giving him at all times a full view of the interior of the car.



MIRROR DESIGN FOR ONE-MAN CARS

Letters to the Editors

What Passenger Costs the Most?

BROOKLYN, N. Y., Aug. 11, 1919.

To the Editors:

In the early days of the electric railway industry, both the public and the operator believed that the rush-hour passenger was the most profitable. So far as the operator is concerned, that idea is long since exploded, but the old-time concessions are still in force in many communities. In one form or another, the workman's hours rate is still in use in many cities to plague conductor and auditor with tickets sold at less than the service costs to produce.

To-day we are seeing a curious reversal of this practice in that the person who rides during the off-peak hours is being asked to pay an extra charge unless he provides himself with tickets bought, say, to the number of six. In one instance, five tickets are sold for 30 cents while the individual cash fare is 10 cents. Now it is assumed that the rider who is asked to pay the difference between the cash and the ticket fare is either a local or outside casual who ought to pay a larger standby charge because he is not a regular customer. At the same time, we have the patent fact that most of these casuals board the cars when there are plenty of vacant seats. Is it worth while to charge this higher rate at the very time that it is cheapest to carry the passenger? Cannot we forget theory for a moment and see what can be done to get the largest amount of revenue through the carriage of the greatest number of passengers?

No doubt, the point will at once be made that it is so easy to purchase a mere half-dozen or even a dozen tickets in advance. True, but the greater proportion of the ticket purchasers are exactly the same ones who have had the workman's concession in the past. In other words, it is chiefly the person who must ride twice a day that provides himself with tickets and this riding is rush-hour riding. On the other hand, there are plenty of people who may ride on the cars just as often but at irregular intervals and at different hours of the day. These are the agents, plumbers, carpenters, painters, etc. traveling from one house job to another, shoppers, errand boys and so on. It is admitted that the average off-peak ride is shorter than the average home-factory, rush-hour ride. Since that is the case, it follows that the off-peak rider exercises more option as to whether he will ride or not. For this reason he is less likely to buy a supply of tickets in advance and more likely (because of his shorter rides) to resent a higher rate of fare.

There is, of course, the town visitor who certainly could not lay claim to special consideration on the foregoing grounds. Yet even he has to be considered. A great many people of this type come into the town to spend money for business or pleasure. It is a good thing to make them feel that they are wanted and welcome instead of asking them to pay a 10-cent fare. Many a merchant would prefer to pay the fares of such visitors than to have them stay away from town. The case of the visitor for pleasure stands out in the experi-

ence of a town which has always been a center from which summer vacationists made many tours without causing the railway any undue expense for special rolling stock and the like. When fares were increased, a 6-cent ticket rate was made for wholesale riders and a 10-cent cash rate for retail riders. The company, however, gave to the cash passenger a redemption coupon good for 4 cents if turned in the same day. This was not very satisfactory to the non-resident vacationist as the time connections of the day did not usually give him the opportunity to get his money back. He said: "Now isn't that a fine way to be made welcome?" and resolved to take his next vacation elsewhere. He could not understand the contradiction of getting specially low rates on the steam railroad on which he must ride and of paying specially high rates on the electric railway on which he does not have to ride.

The nub of the whole rate-of-fare question is not that of finding what each kind of passenger ought to pay but what he can be made to pay voluntarily. A parallel with the standby charges of gas and electric light companies leads to dangerous conclusions. The purchaser of gas or electricity must commit himself to paying something for a fixed connection, no matter how little gas or electricity he buys. If he has no pipe or wire leading into his house, he cannot get a cubic foot of gas or a kilowatt of energy at any price. But the street railway customer has no fixed connection for which to pay. He can take the service or leave it, whether he rides twice a day or twice a month. Attempts to make him pay a higher rate for fewer rides do not fail because they are unjust but because they are impracticable from the very nature of the street railway.

Having pointed out the disadvantages, immediate and remote, of charging a higher fare to certain classes of casual, short, off-peak riders, a constructive suggestion is in order. That suggestion is: "Secure off-peak riding from your present twice-a-day rush-hour riders by giving them all *extra* rides at a lower rate of fare than the standard one-ride fare." To do this, it would be necessary to sell a commutation ticket at a rate equivalent to say three full-price rides a day but good for four rides and possibly for an unlimited number of rides a day. As the holder would already be a rush-hour patron, his additional riding would necessarily be off-peak riding. It would not be necessary to limit the ticket to the buyer because it would not be practicable for him to give the ticket to anyone else except after his return from work in the evening. The tickets would be sold on a weekly or twice-a-month basis in accordance with the wage-paying practices of the principal factories. A monthly basis involves too large a sum for an article purchased a few cents at a time.

Merchants, also, would be delighted to co-operate in selling a ticket that would bring the shoppers downtown every day. This would mean more goods sold, a greater proportion of goods taken home, more satisfaction and therefore less returned goods than with telephone shopping and a better opportunity to learn on what kind of goods to stock up. That merchants would advertise and sell such tickets at cut prices would not harm the electric railway one bit.

In general, I believe that some form of limited or unlimited ride ticket will prove far more satisfactory than any form of reduced-rate ticket for special hours of the day. It reduces instead of increasing platform ac-

counting (mighty important on one-man cars) and gives the reduced rate only to those who are buying more transportation than they have to instead of to any casual who happens to board the car during the off-peak hours. We hope no one will arise to say it can't be done when it is being done abroad under conditions far more strenuous than the average American city. It involves more trouble than one or two rates of fare, but does the merchant shirk selling his goods at different prices according to quantity, quality and day of week just because it makes more work? Hardly. If we are to *merchandise* transportation, we must do all those things, whether troublesome or not, that will bring the greatest revenue through the greatest number of rides and riders. "TRANSPORTATION."

Why Does the Operating Engineer Frown Upon Theoretical Calculations?

NEW YORK CITY, July 26, 1919.

To the Editors:

I read, with much interest, the article by C. W. Squier on "Car Performance from the Engineer's Office to the Track" in the June 21 issue of the *ELECTRIC RAILWAY JOURNAL*.

Mr. Squier shows that it is possible to obtain a very close agreement between the results from engineer's calculations concerning new motors not yet built and the same motors after they are constructed. My natural deduction from this is that the differences between the plotted results of actual tests conducted on cars fully equipped and the speed-time curve which could be calculated from the characteristic curve of the existing equipment would show an even closer agreement. To show the perfect accord between theory and practice I believe a procedure opposite to that given by Mr. Squier should be followed. In other words, first make the equipment test and plot the results on a speed and current basis. Then calculate the speed-time curve, using the data and conditions found to exist. The reason that such a calculation would show an even closer agreement with the test results is that in any run there are so many variables to take care of that it is seldom possible to have the run performed as specified; on the other hand it is very easy to reproduce on paper any operation which has already been performed in service.

I have met a great many electric railway men who do not believe in speed-time curves, and even among the most progressive operators the tendency appears to resort to a large number of tests, which are frequently extensive and costly, instead of relying upon the work of an engineer which can be performed at a desk.

F. CASTIGLIONI.

[NOTE—Mr. Castiglioni's letter was referred to Mr. Squier, who explains that the fundamental point which was intended to be brought out in his article was the remarkable accuracy with which motors can be produced to perform a given service, and to conform to predetermined characteristics. Of course this emphasizes the close agreement of theory and practice in this case, but the formulas and data used in the calculations were obtained from tests and the logical method of presenting this discussion could seem to be to follow with the results obtained in the design, rather than to show how close a theoretical speed-time curve can be made to conform to one obtained in actual operation.

The closeness of any such calculation will depend entirely on the skill with which the calculator makes his assumptions. If an operating engineer wants to know how much power a certain car takes in a particular service, the simplest and most reliable way of obtaining this information is to put a meter on the car and measure the power consumption. If it is necessary to know how hot the motors become, the operating engineer usually takes some temperature readings.

The conditions which confront the manufacturing engineer are entirely different from those confronting the operating engineer. The operating engineer has the motors all constructed, and the car completely equipped to operate. He also has the service at hand and can make tests very quickly and can be sure that they represent actual conditions. For him this is the simplest and quickest way of securing reliable information. The manufacturers' engineer, however, has to rely almost entirely on theoretical assumptions as the equipment and point of operation are often far removed from his office. Manufacturers seldom find it necessary to carry out the elaborate calculations and tests which were outlined by Mr. Squier in order to decide on the design of the motor equipment. The usual and simplest course is to obtain temperature readings for motors of any type which are operating in the service. The suitability of new equipment is determined by comparison of the motor characteristics of the motors tested with those proposed.

The apparent disregard of theoretical graphs by operating engineers has resulted because such are not necessary in the majority of cases in order to obtain the information desired. Even if theoretical calculations are undertaken the operating engineer feels that it is necessary to make a series of tests in order to check up the accuracy of the calculations, which means doubling the work. The operating engineer, while capable of framing theories, insists that it is the test under actual conditions that influences his opinion and that all the data used are the result of practical tests.—EDS.]

Association News

ATLANTIC CITY CONVENTION, OCT. 6 TO 10

Addition to Convention Exhibits

Since the publication of the preliminary list of exhibitors at the Atlantic City convention, in the issue of this paper for Aug. 2, space has been assigned to the following:

American Association of Chilled Car Wheel Manufacturers	Liberty Steel Products Company
American Mason Safety Tread Company	Monroe Calculating Machine Company
American Steel & Wire Company	National Tube Company
Bemis Car Truck Company	National Railway Appliance Company
Cleveland Frog & Crossing Company	St. Louis Car Company
Clipper Belt Lacer Company	Texas Oil Company
Barron G. Collier	Thew Automatic Shovel Company
Economy Electric Devices Company	Tool Steel Gear & Pinion Company
Gurney Ball Bearing Company	M. Welte
Hcldeh & White	C. H. Wheeler Manufacturing Company
Jennison-Wright Company	Wilson Welder & Metals Company
Johnson Fare Box Company	Van Dorn Coupler Company

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Birmingham Men's Demands Eight-Hour Day and Almost 100 Per Cent Advance in Wages Are Asked

Increases in wages amounting in several cases to 100 per cent are demanded by its trainmen from the Birmingham Railway, Light & Power Company, Birmingham, Ala. The contract between the company and the union expires on Aug. 31. A copy of the demands to be made in the new contract were handed to the officials of the company on Aug. 5 by the committee of the men. The demands provide for a minimum of 60 cents an hour with a sliding scale extending as high as 70 cents an hour. The demands also include an eight-hour day with time and a half for all overtime, and provide that this shall apply to national holidays except Christmas, for which day the men shall be paid double time.

The present rate of pay of the men is a minimum of 31 cents an hour with a maximum of 38 cents an hour. The increases in several instances amount to 100 per cent.

NO STATEMENT FROM RECEIVER

No statement in regard to the demands has been made by the receiver or any of the other officials of the company. A conference will be held, it is stated, with a committee of the men some time next week. The date of this conference has not yet been fixed.

Section 22 of the proposed agreement relates to wages of men and provides that during their first year of service their rate of pay shall be 60 cents an hour, second year, 65 cents an hour; and third year, 70 cents an hour.

Carpenters under the proposed schedule would receive from 68 to 75 cents an hour. Machinists would receive 78 cents an hour. A raise every six months is provided for apprentice boys. Armature winders are rated at 78 cents an hour for first-class winders, 68 cents second class, and repair men 60 cents an hour, and apprentices 35 cents an hour with a 3-cent increase every four months until they become armature winders.

Other wages as proposed in the agreement are: Scrubbers, 42 to 48 cents an hour; painters' helpers, 48 to 55 cents an hour; painters, 68 to 75 cents an hour; truckmen's wages, first three months service, 50 cents an hour; second three months, 57½ cents; third three months, 60 cents; fourth three months, 63½ cents; and a scale of 65 cents thereafter; blacksmiths, 80 cents an hour; pipe fitters, 70 cents; helpers 50 cents with increase of 5 cents an

hour each year until they reach the scale.

The proposed agreement provides for recognition of the union and a continuation of the present closed shop policy. It further provides that trainmen shall handle no mail. The men also want extensive improvements carried out at the carhouses and seats on cars for both motorman and conductor.

Request for Eight-Hour Day

Milwaukee Men Advance This Plan— Company Lacking Revenue Appeals to Railroad Commission

On July 30 the transportation department labor adjustment committee of the Employees' Mutual Benefit Association sent to Mr. Keummerlein, superintendent of transportation of the Milwaukee Electric Railway & Light Company, a request that the company now consider the desirability of carrying out the provision of the general labor contract of April 10, 1918, providing for an eight-hour day. The committee also requested that the company place the association in a position to procure the services of sufficient trainmen by raising wages to a level that will accomplish this purpose.

On July 31 Superintendent Keummerlein advised that the company was unable to carry out the provision of the general labor contract of April 10, 1918, subject to the limitations therein provided, because it had not yet been provided with sufficient revenues therefor; it was accordingly unable to accede to the request for an eight-hour day in the transportation department and it was also unable to raise the wage levels to a sufficiently high plane to attract the necessary labor properly to man the cars.

WILL PETITION CONCILIATION COMMISSION

Mr. Keummerlein stated that the company would, within the next day or so, file a petition with the Board of Conciliation, recently created under the Wisconsin laws by Chapter 530 of the laws of 1919, and ask the Board of Conciliation to make a prompt determination of reasonable wages, hours and working conditions, etc. Under Chapter 530 of the laws of 1919, the Board of Conciliation is required to file its findings with the Railroad Commission of Wisconsin immediately and the Railroad Commission in turn is required to review such findings of the Board of Conciliation and change or approve such findings. The law requires the commission to fix such rates of fare, tariffs, etc., as will provide for the increase in wages, if any are ordered, and will also at the same time produce a reasonable return upon the fair value of the investment in utility property.

On Aug. 1 the company forwarded the petition to the Board of Conciliation at Madison. It is expected that hearings will be held very soon. The company on July 22 petitioned the Railroad Commission for adjustment in fares so as to permit it to meet current wage requirements and produce a reasonable return upon its railway utility capital.

Face the Facts!

We hear a good deal of talk about prices again becoming "normal." Such talk results from a lack of understanding of what constitutes a "normal" price of a commodity or a "normal" wage of labor. If by "normal" is meant the prices and wages of, say, 1914, I do not believe we shall ever again see such prices and wages, and we should at once begin squarely to face the facts. In my judgment the tendency is toward higher prices and wages.

As I view it, a "normal" price is a price based upon the cost of production, so that what was a fair price for a commodity in 1914 is not a fair price in 1919. The same is true of wages; for "normal" wages in 1919 must be based upon what it costs the worker to live according to American standards and allow a reasonable margin for the inevitable rainy day.

We are entering upon a new era. The future must bring a square deal for labor, a square deal for the public and a square deal for the public service companies, which are now being starved to death for lack of nourishment.

BRITTON I. BUDD

President
Chicago Elevated Lines
Chicago

New York Mayor Suggests City- Owned Bus Lines

The Hylan Administration in New York City has taken steps toward establishment of municipally controlled bus lines in all of the city's five boroughs. Acting upon a suggestion from Mayor Hylan the Board of Estimate has directed the Commissioner of Plant and Structures to make a comprehensive survey of existing transit facilities and to submit recommendations as to the operation of the proposed bus lines.

The city-owned lines, if established, would be run in competition not only with privately-owned bus companies but with the surface railways.

Brooklyn Strike Settled

Receiver Will Deal With Trainmen on Same Basis as He Treats With Railway Brotherhood

The strike of the trainmen of the Brooklyn (N. Y.) Rapid Transit Company was settled late on Saturday, Aug. 9. Service in full was resumed on Sunday morning. The strike was declared on Wednesday morning.

THE UNION THE ISSUE

While questions of wages, terms of service and other issues were involved in the controversy between the company and those of its trainmen who had become affiliated with the Amalgamated Association, the principal issue was the demand for recognition of the union. This matter, under the terms of the adjustment, is to be settled on the basis of the proportion of employees who were members of the Amalgamated Association at midnight on Friday, Aug. 8. If the union included a majority of the employees, the receiver is to recognize it. If it did not include in its membership more than 50 per cent of the employees at that hour, the receiver will not recognize the union. The stand of Mr. Garrison, the receiver of the company, was that he would not negotiate with the organization if it represented only a minority of his employees.

The settlement agreement was signed by Judge Mayer and was witnessed by Mayor Hylan, Corporation Counsel Burr, Public Service Commissioner Nixon, Mr. Rogers, Mr. Garrison, Organizer Shea and Union Counsel Fridiger. The agreement follows in full:

At a conference with Judge Mayer on Aug. 9, 1919, the following is herewith agreed:

That the pending strike be called off at once and the men return to work at once upon the following conditions:

1. That if it is established to the satisfaction of Judge Mayer and Public Service Commissioner Nixon that at midnight, Aug. 8, 1919, employees of the Brooklyn Rapid Transit system eligible to membership in the Amalgamated Association were enrolled members of said association to the extent of more than 50 per cent of such employees so eligible, then the receiver will entertain the grievances presented by the committee headed by E. D. Smith or such substitutes for such committeemen as may be properly substituted in place thereof, according such committee at least the same recognition as is now accorded the Brotherhood of Locomotive Engineers.

2. The receiver will receive the committee presenting the grievances and take the same up with such committee and with such advisers or counsel as such committee selects.

ARBITRATION AS A LAST RESORT

3. In the event that such grievances or any which may hereafter arise cannot be adjusted by and between the receiver and the committee, they will be arbitrated by a board to consist of P. J. Shea, or his nominee, and Lindley M. Garrison, or his nominee, and, if necessary, by a third member to be mutually agreed upon by said Shea and said Garrison; and in the event of said Shea and Garrison being unable to agree upon a third member, and so stating to Mayor Hylan and Commissioner Nixon, the two gentlemen last named shall thereupon designate arbitrators.

4. All parties agree to abide by the decision of the said arbitrators.

Public Service Commissioner Nixon played an important part in bringing about the settlement. It was he who first proposed a scheme of arbitration that won partial support from both sides. As soon as it was evident that

the commissioner's proposal contained the basis of a compromise or settlement, the leading factors in the situation adjourned to Judge Mayer's chambers, and after three hours of discussion finally arrived at the basis of settlement that was finally agreed to.

The strikers are asking an eight-hour day, 75 cents an hour and the reinstatement of men said to have been discharged because of their activities in behalf of the union. The question of the preponderance of union men once disposed of, conference over the matters just mentioned will follow with arbitration as the final resort.

For three days and sixteen hours service on the lines of the Brooklyn

Rapid Transit Company was practically at a standstill. Some few elevated trains were operated, but very few surface cars were sent out. The contention of the company was to the effect that it had sufficient men, but that surface car operation had not been resumed to any extent because of inadequate police protection. This the police denied. They pointed in turn to the very limited service on the elevated, where by the very nature of the operation of the lines the maximum of protection was afforded. There is undoubtedly a considerable element of truth in both contentions, but it does remain a fact that such service as was operated was wholly inadequate to the transportation needs, even considering the hundreds of thousands transported by private auto, by bus and by truck, a service which sprang up overnight in startling manner.

Tri-City Railway Strike Settled

Wage Dispute of Unusual Interest Because It Involved the Question of Fares

By paying a 60-cent maximum scale to its trainmen the Tri-City Railway, Davenport, Ia., on Aug. 7 ended a strike which for five days tied up all transportation on its lines. Service on all the company's lines in Iowa and Illinois was resumed at once with the exception of the Muscatine city system. Service there will only be resumed, company officials state, when the City Council has agreed to a satisfactory fare increase.

A GENTLEMEN'S AGREEMENT

The company agreed to the new wage scale when a majority of the City Council of Davenport had made a gentlemen's agreement to the effect that the same fare shall prevail in Davenport as the Public Utility Commission of Illinois may award in Illinois. The new wage contract, beginning on Aug. 6 and expiring on June 1, 1920, was signed on Aug. 6.

The Clifton, Davenport & Muscatine Interurban, also affected by the strike, resumed service at the same time as the city lines in Davenport and Bettendorf, Ia., Rock Island, Moline, East Moline, Silvis and Watertown, Ill.

Although the company granted the men a 54-57-60-cent wage scale no increase in fare has yet been given the traction interests. Final testimony in the petition for an increased fare was offered before Examiner H. M. Slater of the Public Utility Commission of Illinois at a hearing held in Moline, Ill., on Aug. 6.

ORDER PREVAILED

No violence occurred during the strike. Jitney bus lines sprang up like magic. Seventy-nine buses were given permits in Davenport and 150 in Rock Island and Moline. Factories organized truck lines to carry workmen to and from industrial plants. Many merchants opened a half hour later

in the morning and closed a half hour earlier in the evening. There was no paralysis of business. The comparative compactness of the communities prevented this.

The settlement of the strike by the granting of a 60-cent maximum scale marked a series of concessions by the Tri-City Railway. The full force of civic interests was brought to bear on the company at various times. Early in May the trainmen, then drawing a 40-cent maximum scale, filed notice of a demand for 62 cents an hour. They had been drawing 40 cents since the spring of 1918 when they were advanced from a 33-cent scale by the company without petition.

NINE-HOUR DAY WANTED

The men asked for a nine-hour day and a year's contract, beginning June 1, 1919. The wage question was discussed in the light of expected increases in fare, and an agreement was finally reached by which the men were given 50 cents an hour from June 1 to Aug. 1, with permission to open the wage question on Aug. 1 and the reservation that the scale would revert to 40 cents an hour on that date if the company were not granted a higher fare than 5 cents by the Illinois commission.

Before these negotiations had begun the company had petitioned the Illinois commission for a 7-cent fare.

Then the commission returned a decision turning the company down flat and holding the 5-cent fare to be fair and just. The men were notified that 40 cents an hour was all they could expect after Aug. 1. They passed a strike vote, the walk-out to become effective on that date.

Conferences between the men, the company and city officials were resumed. The company offered first 50 cents, then 55 cents, then 56 cents. The car men in the meantime had raised

their wage demands to 75 cents an hour.

A joint conference of men, company and city officials was then held in Chicago and the company offered a 60-cent scale for ten months in Illinois and 60 cents for thirty days in Iowa to run the remaining nine months if at the expiration of thirty days the Councils of Davenport and Muscatine voted a 7-cent fare.

The men turned this proposition down and walked out on Aug. 1. The City Council of Davenport then tied up the situation by passing a resolution referring a fare increase to a special election. The company refused to accept this long-drawn-out possibility of a solution. Then came an all-

night conference of trainmen, company heads and city officials in Moline on Aug. 5. Early the following morning a majority of the Council of Davenport agreed to give the company the same fare at Davenport as the Illinois commission may award. Then the company offered the 60-cent scale with no reservations. The men ratified the agreement almost unanimously.

The Rock Island and Moline city authorities fought a fare increase before the commission hearing later in the day. The hearing was adjourned on the afternoon of Aug. 6. Muscatine is still fighting. The Muscatine city lines have been a losing proposition for the local traction system for many years.

War Labor Board Dissolved

Since Armistice It Has Been Acting in Wage Disputes
by Special Request of President

The National War Labor Board, meeting in New York on Aug. 12, formally ended its existence after granting increases of 12 per cent in wages in ten different electric railway cases, affecting companies in territory extending from New England to the Pacific, and as far south as the Ohio River. Ex-President William H. Taft and Basil M. Manly, joint chairmen, announced the adoption of a resolution which terminated the board's activities.

The Eastern Massachusetts Street Railway, formerly the Bay State Street Railway, was one of the corporations ordered, on Aug. 12, to pay the increase. The question before the board was a proposed reopening of an award dated Dec. 3, 1918, in which 41 cents minimum and 45 cents maximum for motormen and conductors was made by the board for the period of the war. In June the employees had the case reopened and the company agreed to submit the question to the board. The high cost of living was given as the basis for this and all the other applications. The award dates back to June 3, and the employees will receive the increase as from that time. The awards in all cases were retroactive.

STATEMENT OF CASES SETTLED

Other cases decided were:

Cleveland, Painesville & Eastern Railway and the Cleveland, Painesville & Ashtabula Railway, as of June 12.

Cleveland & Chagrin Falls Railway and the Cleveland & Eastern Traction Company, as of June 12.

Pittsburgh Railway, in the hands of a receiver, as of May 1. This case first will have to be submitted to the court in which the receivership is vested.

Beaver Valley Traction Company and the Pittsburgh & Beaver Valley Street Railway, as of June 12.

Portland Railway, Light & Power Company, Portland, Ore., as of June 25.

East St. Louis, Columbus & Waterloo Railway, as of June 25.

Alton, Granite & St. Louis Traction

Company and East St. Louis & Suburban Railway, as of May 1.

East St. Louis Railway and East St. Louis & Suburban Railway, as of May 1.

The War Labor Board was created by an act of the President early in 1918. Since June 30 the board has been acting without compensation. After some correspondence with Secretary of Labor William B. Wilson it decided to dissolve, and a resolution to that effect was unanimously adopted on Aug. 12. The resolution read:

Whereas, On June 25 the National War Labor Board adopted the following resolution:

Whereas, Members of the National War Labor Board, realizing that the great national emergency which called the board into existence by Executive proclamation has practically terminated, the purpose of its organization has been substantially performed and no provision has been made for its maintenance; and

Whereas, Until final dissolution of the board by Executive proclamation the members of the board are ready at the call of the President to take any action that may be necessary to carry out the purposes for which the board was created. The board, therefore,

Resolves, That the secretary of the board give public notice that no new cases or applications will hereafter be received, and that when the board adjourns during the present week it adjourns indefinitely, subject only to the call of the chairman, pending final dissolution of the board.

It is further resolved that present controversies, jointly submitted, that cannot be considered and concluded prior to June 30 shall be assigned to the joint chairmen or a section of the board for disposition.

The board recommends that with the approval of the President all administrative duties in connection with any such cases, so far as may be, shall be transferred with all necessary formalities to the Department of Labor.

The board further resolves that all records and files of the board be transferred to the Department of Labor, with the request that they be separately stored so as to be convenient of access to all parties interested therein, as well as to the public, and the board takes this action assuming that the Department of Labor will retain for such time as may be necessary such members of the staff of the board as may be required in the administrative duties in connection with the business of the board.

The secretary of the board is hereby directed to do all things necessary and proper to carry into effect the foregoing resolution.

And whereas the board is in receipt of a communication from the Secretary of Labor on July 7, 1919, in which it is stated:

"As the activities of the National War Labor Board, which was created for the war emergency, practically terminated with the close of the fiscal year, I want to take this opportunity of conveying to you,

and through you to the members of the employers and the employees groups and to the other officials of the National War Labor Board, my sincere appreciation of the valuable and splendid work accomplished. I feel that the work of the War Labor Board contributed in large measure toward the solution of the economic and industrial problems with which the government was confronted during the world war."

Therefore, be it resolved, that the board receives and accepts this letter of the Secretary of Labor as action by the President dissolving this board, and that in accord therewith the board does now adjourn sine die.

During the fifteen months of its existence the board has handled and adjusted more than 1200 labor disputes. The board has been acting, at the special request of the President, during the period of reconstruction since the signing of the armistice.

Wage Increase in New York

The Interborough Rapid Transit Company on Aug. 13 announced that it had granted an increase in wages of 10 per cent to its operating employees. Job E. Hedges, receiver for the New York Railways, on the same day recommended a similar increase to surface car employees in a letter to Federal Judge Mayer, who took the matter under advisement.

The request for an increase was made to Vice-President Frank Hedley of the Interborough, by M. J. Mangan, president of the brotherhood of employees, which is not affiliated with outside organizations. The request on Receiver Hedges was made by the acting president of the organized employees.

The Interborough Rapid Transit Company in a paid advertisement in the papers of Aug. 10 had said that Manhattan and the Bronx were threatened "with the same transit chaos that exists in Brooklyn." It said that two things could be done by the public authorities to prevent the interruption of subway and elevated service:

1. Immediately authorize an increase in the rate of fare to 8 cents so that wages may be readjusted to the cost of living.

2. Take vigorous and prompt action to prevent disorder and the intimidation of loyal employees.

The company said that its "employees through collective bargaining are under contracts which last until the end of the year, and have declared their intention to live up to their agreements, but they should have more pay to meet the cost of living. We believe that this is the view of the fair and generous public."

Complete Arbitration Award Presented

The full report of the arbitration board which settled the recent strike on the Boston (Mass.) Elevated Railway was presented to a meeting of 2500 employees on July 31. In addition to the wage scale awarded platform men and published in the ELECTRIC RAILWAY JOURNAL of July 26, page 190, a full tabulation of the wage rates awarded so-called miscellaneous employees was submitted.

Des Moines Case Threatening

Court in Allowing Temporary Increase Calls Attention to Higher Fare Need

Although demands and conditions are changing almost daily, Des Moines on Aug. 7 seemed to have secured a respite of at least thirty days in the threatened strike of the union employees of the Des Moines City Railway. In an order of the court issued on Aug. 5 Judge Martin J. Wade, federal judge, made a settlement which will at least be temporary and give the participants in the dispute time to work out a permanent adjustment.

Judge Wade said:

Under existing conditions the court has no power to take funds already earned, which under the ordinance belong to the bondholders as interest, or held to pay taxes or depreciation and to apply the same in the payment of increased wages.

But under the present emergency, it is ordered and adjudged that the receivers advance from income properly and legally payable upon interest, taxes or depreciation, such amount as may be necessary to pay the wage scales fixed in the report of the arbitrators, for a period commencing Aug. 1, 1919, and up to and including Sept. 1, 1919, the same to be in the nature of a loan from one fund to another. This order is to terminate on Sept. 9, 1919, unless upon proper showing the court is then convinced that it is reasonably certain that provision will be made by advanced fares for reimbursement for such funds.

The receivers in the meantime shall cooperate with the employees and the citizens of Des Moines in bringing about, as early as possible, the passage of an ordinance providing adequate increased fares.

The receivers furthermore will, in the meantime, investigate the question of service, with the view of determining whether the increased wage may be met by an adjustment of service.

After Judge Wade's order it was thought that the strike had been averted, but the employees immediately announced and complained of the fact that the order took no notice of the retroactive wage increase between March 1 and Aug. 1. The men demand that this condition be recognized, and Ben Wiley, business agent of the union, threatened that unless the situation be worked out by Aug. 20 the men would go out. As Aug. 20 is the opening of the Iowa State Fair, which lasts ten days and brings several hundred thousand people to Des Moines who are dependent very largely on the Des Moines City Railway to get to the fair grounds, this threat looms big.

A committee of citizens and city officials is meeting almost daily in an effort to find a solution, but up to Aug. 7 no notice had been published of an election on the franchise to permit of increased fare.

12 Per Cent Advance Awarded Pittsburgh Men

An increase which is less than half what they struck for in the spring was granted the platform employees of the Pittsburgh (Pa.) Railways by the War Labor Board on Aug. 12. Immediately upon the announcement of the award, the leaders of the men expressed emphatic disapproval of the advance. A series of meetings of the men, at which they are expected to pass upon the

increase, has been called by the executive committee.

The men asked an increase of 12 cents an hour. They will receive instead, a 12 per cent increase. They are at present being paid 43 cents an hour for the first six months, 46 cents an hour for the next six months and 48 cents an hour after the first year. A 12 per cent increase upon these wages will mean an advance of 5.16 cents for the 43-cent men, 5.52 cents for the 46-cent men, and 5.76 cents for the 48-cent men.

The traction system, being in receivership, is a charge of the United States District Court, and at the time of the short strike last May the court refused to admit that it was bound by any award the War Labor Board might make. The men contested this point bitterly at the time, and it was one of the reasons for the strike. Now they are making ready to take advantage of it, claiming that they likewise are not bound by the award.

It was estimated recently by the receivers that every time the wages of their employees go up 1 cent an hour it costs the company \$160,000 a year. They base this on the fact that \$90,000 a year is required to give an increase of 1 cent an hour to the platform employees, and that another \$70,000 is needed to give a proportionate advance to other employees whose income must rise in company with that of the motormen and conductors.

The award in Pittsburgh is retroactive to May 1.

Radial Railways Urged

A meeting of municipal and board of trade representatives from a number of cities and towns of western Ontario was held at Galt on July 31 to urge the construction of a system of hydro-electric radial railways, of which Galt would be the center.

Sir Adam Beck, chairman of the Ontario Hydro-Electric Commission, outlined the policy of the commission, stating that in order to prevent unnecessary duplication of lines the commission proposed to secure leases on Grand Trunk lines, when they had been taken over by the government. The plan for the district represented at the meeting included the electrification of the Galt & Elmira branch of the Grand Trunk passing through Kitchener, and the line from Fergus to Guelph, and construction of new lines to Hamilton and Toronto.

Sir Adam defended the lack of activity in constructing hydro-electric radial lines during war time and stated that \$18,000 had been expended in surveys.

Resolutions were adopted requesting the commission to proceed at once with reports on the construction of an electric railway covering the district between Galt, Elmira, Hamilton and Guelph; setting forth that sixty-two municipalities had carried by-laws for the construction of hydro-electric railways; and urging that the Provincial government authorize the roads.

Massachusetts Increases

Worcester, Springfield and Allied Roads Hard Hit by Finding of Arbitration Board

The arbitration board sitting in the Worcester Consolidated Street Railway, Springfield Street Railway, Milford, Attleboro & Woonsocket Street Railway, Interstate Consolidated Street Railway, and Attleboro Branch Railroad wage and hours of service cases rendered a decision at Boston on Aug. 7 increasing the pay of platform men about 32½ per cent and accepting the eight-hour day as a basis of work.

NINE-HOUR DAY RETAINED

At meetings after the presentation of the award, the employees of both the Springfield and the Worcester companies repudiated the eight-hour day, which carried a provision of twelve hours outside time, and voted to retain the present nine-hour in eleven-hours arrangement. The demand of the eight-hour day appears to have been mere camouflage for a wage increase. The new scale yields a maximum of \$5.13 a day for nine hours work, the tabulated rates being:

	Rate Per Day		
	First Three Months	Next Nine Months	Thereafter
Springfield	\$3.76	\$4.16	\$4.56
Worcester and other companies	\$0.47	\$0.52	\$0.57

The wages of miscellaneous employees of the company are to be advanced 32½ per cent on all the roads covered by the award.

The award was signed by Henry B. Endicott, chairman, and James H. Vahey, representing the employees. Bentley W. Warren, representative of the companies, declined to sign the award on the ground that the wage increase allowed the men is so great that he feared certain of the companies involved would not be able to meet it out of their present revenues, and that as representative of these companies he did not feel justified in agreeing to anything which would commit them to an increased expense which can be met only by imposing further burdens upon the public.

COST TO ONE ROAD \$750,000 A YEAR

C. V. Wood, president of the Springfield Street Railway, called the attention of a representative of the ELECTRIC RAILWAY JOURNAL to the fact that the new wage schedule would cost this road alone \$750,000 a year more. Increased revenue, he declared, is an absolute necessity.

The Springfield Street Railway will apply to the Public Service Commission in the near future for permission to establish a new fare schedule. It may be necessary to modify the present zone system to secure the necessary revenue. A curtailment of service by the company may be necessary, also, on non-productive lines.

Power Plant Contract Awarded

The contract for a \$15,000,000 power plant at Cheswick, Pa., on the Allegheny River, 15 miles above Pittsburgh, Pa., was let on Aug. 8, by the Duquesne Light Company, to Dwight P. Robinson & Company, New York. The primary purpose of the new plant is to insure an adequate supply of power to the steel industries in and around Pittsburgh which are now beginning to develop a highly increased demand for electric current, but it is also intended to supply current for the operation of the Pittsburgh Railways. The Duquesne Light Company is owned by the same interests that control the railway, and its decision to build the plant was prompted partly by the necessity of securing more steady current supplies for the traction system.

It is expected that the new plant will be completed within a year. While the initial rating of the station will be 60,000 kw., the construction now under way is for 120,000 kw. and the ultimate rating of the plant will be 300,000 kw. The Cheswick plant is within a few miles of a coal mine owned by a subsidiary company, and fuel is transported over a privately operated railroad.

Compromise Ends Muskogee Tie-up

The board of arbitration which has been making an effort to settle the strike that has tied up the lines of the Muskogee (Okla.) Traction Company for several months, has at last come to an understanding with the men. Under the terms of the agreement submitted for ratification by the labor union and the company full seniority rights are granted to the members of the union. A wage scale is fixed from 36 cents to 40 cents an hour, the maximum wage to be paid after four months. All strikers are reinstated in their old jobs. Non-union men employed when the strike was called are to be retained. All differences except discharging employees for "knocking down" are to be settled by arbitration. The men are to be protected from the weather by properly equipped cars.

The men went on strike on May 30. The findings of the board of arbitration as handed down were in the nature of a compromise.

I. T. S. Men Present Demands

A committee representing trainmen of the Illinois Traction System waited upon C. F. Handshy, general manager, to present demands for a new wage scale and better working conditions. Recently, the trainmen voted to withdraw from membership in the Brotherhood of Interurban Trainmen and to become affiliated with the Amalgamated Association.

A demand for increases from 50 cents to 75 cents an hour for motormen and conductors and from 37½ cents to 62 cents an hour and recognition of

affiliation with the Amalgamated Association was the substance of the interview with Mr. Handshy, who referred the men to H. E. Chubbuck, vice-president executive of the system at Peoria. The present wage contract with the men does not expire until Dec. 1. The trainmen assert that the increased cost of living makes it impossible for the men to live comfortably on wages which they now receive.

No indication has been given as to when an answer to the demands might be expected from the officials.

Boston Attacks Its Railway

The city of Boston has filed amendment in the Supreme Court to the bill against State Treasurer Burrill and the trustees of the Boston Elevated Railway to prevent payment of \$4,000,000 by the State to the trustees. In the amendment, the city attacks the constitutionality of the statute authorizing payment and seeks to prevent the city from being required to pay its proportion of the assessment to the State. The city claims that it is entitled to hold and enjoy in its private or proprietary capacity its own property, all subways and tunnels constructed for the use of the Boston Elevated Railway and receive the rents, income and profit of all now existing leases or contracts without interference by the Commonwealth, except on payment of just compensation. It claims that the statute violates the constitution in that it impairs its contracts and also that the statute contemplates the taking of property without due process of law.

When the act was before the Senate, the judges of the Supreme Court sent an opinion upholding the constitutionality of its provisions. Each of the seven judges signed that opinion. Now the city seeks to have the court reverse its own opinion.

Urbana-Champaign Strike Settled

The strike of trainmen of the Urbana & Champaign Railway, Gas & Electric Company, included in the Illinois Traction System, came to an end on Aug. 8 after five weeks duration. Full normal service was established the morning of Aug. 7. During the five weeks only about one-half the usual number of cars was operated, the union men refusing to work. Members of the local brotherhood manned the cars. The striking employees, who are members of the Amalgamated Association, have been reinstated in their seniority rights and all men returned to their respective positions with the company. The questions of hours and reinstatement of discharged employees, the grievances which brought about the strike, were compromised in a manner satisfactory both to the men and the company. A new wage scale was agreed to which provides for an increase in the rate per hour to be paid to both conductors and motormen after Jan. 1, 1920. This

carries with it a maximum of 45 cents an hour, the same rate as that paid by the Bloomington & Normal Railway & Light Company, another subsidiary of the Illinois Traction System. The Urbana & Champaign Company employees have been receiving a wage of 42 cents an hour since Sept. 1, 1918. Otherwise, working conditions contained in the contract under which they were employed when the men left their places remain unchanged and the revised contract is extended over the unexpired term of the old contract. The company also announces that the same working conditions and wage scale agreed to with the Amalgamated Association will apply for members of the Brotherhood.

Holyoke Wage Increase

Henry B. Endicott, Boston, arbitrator in the wage negotiations between the employees of the Holyoke Street Railway and the company, has awarded the following rates of pay to motormen and conductors: First six months, 49 cents an hour; second six months, 50 cents; second year, 51 cents; third year, 53 cents; thereafter, 55 cents. An increase is also recommended for miscellaneous employees. The award also covers rates of pay from Oct. 1, 1918, to June 1, 1919, and specifies from 37 cents an hour for the first six months to a maximum of 43 cents for three-year men and over. The men at Holyoke asked for a wage of \$5 a day.

Berkshire Strike Unsettled

About 400 employees of the Berkshire Street Railway, Pittsfield, Mass., quit work on Aug. 8 owing to the failure of the company to increase their wages as demanded to \$5 for an eight-hour day. The entire system continues tied up from the New York-Vermont line to the Massachusetts-Connecticut boundary. The power plants of the company at Zylonite and Pittsfield have been shut down. It is expected that a receivership will be sought by the company. Chairman Charles G. Wood of the State Board of Conciliation and Arbitration, spent three days in Pittsfield soon after the strike was declared in an unsuccessful attempt to bring about a resumption of service. Manufacturing industries in the Housatonic Valley are hard hit by the suspension of service. The company's finances are in a precarious condition.

New St. Louis Manager Addresses Men

Col. Albert T. Perkins, general manager of the United Railways, St. Louis, Mo., held an informal conference during the week ended July 19 with division superintendents, supervisors and foremen of the company, soon after he took charge of the company management. More than 100 officers and employees of the company were present at the meeting.

Colonel Perkins was introduced by

Butler, acting superintendent of transportation. He discussed matters concerning the men and the company. Col. Perkins urged the men to insist on co-operation in their departments and declared the one essential for the future success of the company is to give the best possible service to the public. He emphasized courtesy and safety-first methods.

Colonel Perkins has stated as the initial plank of his platform a complete and amicable understanding with the employees of the company. He says he is ready and willing to listen to all demands of the carmen and will go as far as possible to see that all receive a living wage. A demand of the local branch of the union for increased wages is before the Missouri Public Service Commission, and both sides have agreed to abide by its decision.

News Notes

Strike in Olean.—About 150 employees of the Western New York & Pennsylvania Traction Company, Olean, N. Y., went on strike early on Aug. 12, resulting in a complete tie-up of the system. The men demanded recognition of the union and increased wages.

Will Arbitrate Discharge Cases.—Arbitrators have been chosen to hear the cases of the twenty-six conductors of the United Railways, St. Louis, Mo., accused of misappropriation of fares and then discharged. The arbitrators were named after officials of the local union demanded a hearing for the men. Rolla Wells, receiver of the company, assented.

Wage Increase in Harrisburg.—The Harrisburg, (Pa.) Railways has increased the wages of its motormen and conductors 3 cents an hour. The voluntary wage increase is effective from Aug. 15. Under the new wage scale, first-year men, now receiving 40 cents an hour, will get 43 cents; second-year men receiving 41 cents will get 44 cents and third-year men receiving 42 cents will get 45 cents.

Wage Increase in Homestead.—A flat advance in wages of 10 cents an hour has been made to all employees of the Homestead & Mifflin Street Railway, Homestead, Pa., under a plan announced by the company. The wages of the conductors and motormen at present are 48 cents an hour for the first three months and 50 cents an hour thereafter. The increase is the fourth in two years.

Chicago Suburban Strike Settled.—Employees of the Chicago & Joliet Electric Railway on Aug. 13 voted 184 to 6 to return to work. This followed a conference held with Robert Osborne of the State Industrial Board. A compromise offer providing for a 12 to 14-

cent increase was made to the men and accepted. Employees of the Aurora, Elgin & Chicago Railway were still out on Aug. 14. No service has been given on that road since July 13. Since the strike began the company has gone into the hands of a receiver.

Minneapolis Franchise Before Council.—It was announced that the amended franchise for the Minneapolis, (Minn.) Street Railway would go before the Council on Aug. 15 for first reading. Horace Lowry, president of the company, has formally waived any claim to guarantee by the city of the 7 per cent return on the value agreed to in the proposed cost-of-service franchise, nor will the company try to collect from the city the deficiency if any exists. Purchase periods will be yearly in the franchise as it is to be submitted to the Council by the committee after daily hearings for some time.

British Investments in Argentina.—Referring to news reports alleging friction between Great Britain and Argentina due to extensive English investments in the latter country, the National Bank of Commerce, New York, N. Y., says that \$2,000,000,000 has been considered a conservative estimate of the amount of such investments. The bank says that it is known that British capital in railways alone amounts to \$1,138,756,484. This represents about ten times the railway investments of any other foreign country in the Argentine. The amount of British money invested in the tramways alone is \$133,434,262.

Decides Against City in Jitney Case.—Supreme Court Justice Swayze has set aside a resolution of the City Commission of Jersey City, N. J., for a day fare of 5 cents and 10-cent night fare on jitneys on Bergen Avenue, Jersey City, from the Summit station of the Hudson & Manhattan Railroad to Seaview Avenue and the old Bergen road. The decision of the court indicated, however, that the situation might be different if the City Commission had fixed the 5-cent fare by ordinance. In consequence the Corporation Counsel promptly arranged to introduce an ordinance fixing the fare on Bergen Avenue at 5 cents.

Guelph Employees Request Wage Increase.—A deputation from the Guelph (Can.) Municipal Railway employees waited on Alderman Westoby, chairman of the railway and manufacturers' committee of the Council, and asked for an increase in wages and shorter hours of work at once. The men are at present receiving 32 cents an hour and working up to as much as seventy hours a week. They now want 44 cents an hour for first three months and 47 cents thereafter, with time and a half for all time over eight hours. Alderman Westoby informed the men that the matter would come up soon before the Council.

Legislative Committee Against M. O. Measure.—The committee on municipal government of the House of the Georgia Legislature has reported against the measure introduced in the

Legislature at the request of City Council of Atlanta under which the city of Atlanta would have been authorized to condemn the properties of the Georgia Railway & Power Company in order to acquire them for municipal ownership and operation. Mayor Key and City Attorney James L. Mayson were the only speakers who appeared in behalf of the measure. Those who opposed it included H. M. Atkinson, chairman of the board of directors, and P. S. Arkwright, president, representing the Georgia Railway & Power Company, and others, among them many representatives of Georgia cities.

Wages Before Twin City Directors.—A special meeting of the directors of the Twin City Rapid Transit Company, Minneapolis, Minn., will consider a request made by representatives of the trainmen on Aug. 8 for an increase in wages. Although Horace Lowry, president of the company, said no specific rate of wages had been made in the request, the men left it to Mr. Lowry's judgment for determination on a "live-and-let-live" basis. Trainmen say they want a maximum of 55 cents and a minimum of \$4 a day for extra men. The scale now is 40 cents for beginners, 45 for men less than a year in the employ and 45 cents for trainmen in the employ more than a year. The last increase, at the time of the strike last winter, was from 35, 38 and 40 cents.

Wage Scale Discussed at Covington.—The South Covington & Cincinnati Street Railway and the local union are negotiating for an adjustment of a wage scale for another year. The old agreement expired on Aug. 1. The conductors and motormen are seeking the same rate of pay as that received by similar employees of the Cincinnati Traction Company, which is 50 cents an hour. Last year the wage rate was increased from 30 cents to 48 cents an hour, the present scale. The company complied with the request of the War Labor Board in advancing the wages, and holds this fact as an argument to increase the rate of fare. There is an understanding between the men and the company that in the event higher fares are granted the men will be the first to receive the benefit.

Atlantic City Men Present Demands.—The employees of the Atlantic City & Shore Railroad, Atlantic City, N. J., have petitioned A. J. Purinton, receiver for the company, for substantial increases in their wages and a closed shop. The company has until Aug. 25 to sign the new agreement, the contract becoming operative on Sept. 1. Among the concessions demanded are that all employees join the local three days after employment and that no employee shall be discharged without a hearing. Should a discharged employee be reinstated he is to be paid full time for the period lost. The men ask that the schedule of a day's work shall conform as nearly as possible to an eight-hour day and not in any case to exceed ten consecutive hours. It is also demanded that time a half be paid for all overtime work.

Financial and Corporate

Changes in Holding Company

Properties Under Control of General Gas & Electric Company Are Realigned by Owners

Arrangements have been made for the acquisition by the New England Gas & Electric Company, New York, N. Y., of the Pennsylvania and New England properties formerly owned by the Eastern Power & Light Corporation. This acquisition is a result of plans worked out by the General Gas & Electric Company interests with the various protective committees of the Eastern Power & Light Corporation. They do not include, however, the West Virginia Traction & Electric Company, one of the former Eastern Power & Light Corporation subsidiaries which has just been placed in receiver's hands.

NEW ENGLAND PROPERTIES GROUPED

The New England properties of the Eastern Power & Light Corporation are to be combined with certain of the properties in New England now owned by the General Gas & Electric Company, making a strong power company which will make additional water power developments in Vermont and New Hampshire. Securities of this new company, to be known as the Vermont Hydro-Electric Corporation, have been underwritten by Boston banking houses and application has been made to the State Public Service Commissions of Vermont and New Hampshire for the necessary authority to complete the organization of the company.

The General Gas & Electric Company will acquire the \$3,000,000 common stock of the Metropolitan Edison Company, and will acquire \$3,100,000 common stock and \$1,300,000 of 6 per cent preferred stock of the Reading Transit & Light Company. The acquisition of the common stock of the Metropolitan Edison Company, which owns all the common stock of the Pennsylvania Utilities Company, a former subsidiary of the General Gas & Electric Company, will give the General Gas & Electric Company control of a very important power system in Pennsylvania with combined annual gross earnings of almost \$4,000,000.

INTERCONNECTED POWER SUPPLY

The power plants at Easton and Reading are to be connected with a power line which will be extended also to connect with the Dover plant of the New Jersey Power & Light Company. With these extensions completed, the power system controlled by the General Gas & Electric Company will extend from just east of Harrisburg up to the system of the Public Service Corporation of New Jersey with another line ex-

tending almost as far as Philadelphia.

Combined gross earnings of all companies to be controlled by the General Gas & Electric Company after this acquisition for twelve months ended May 31, 1919, were \$8,478,142. Combined operating income for the twelve months ended May 31, 1919, was \$2,361,789, an increase of more than \$712,000 over the twelve months preceding. More than 67 per cent of the gross earnings of the General Gas & Electric Company's subsidiaries are from electric light and power and gas.

The directors of the General Gas & Electric Company are to be increased in number to permit of the representation of additional banking interests which have become identified with the company in this transaction.

\$193,721 Short of Expenses Under Six-Cent Fare

Col. Albert T. Perkins, general manager of the United Railways, St. Louis, Mo., has issued a chart captioned "Where the 6-Cent Fare Goes." He will submit the chart to members of the Public Service Commission of Missouri, in session in St. Louis. The chart shows that revenue fell \$193,721 short of paying operating expenses and fixed charges of the company for the twelve months ended June 30, first year of operation under the 6-cent fare.

The statement lists the receipts and expenses as follows:

Gross operating revenue, \$14,811,876; wages, \$6,011,359; material and supplies, \$3,367,111; taxes, \$1,146,246; injuries and damages, \$888,712; other operating expenses, \$983,499; interest charges, \$2,608,669; total expenses, \$15,005,597; deficit, \$193,721.

This statement does not include back wages of \$233,212 paid in July and August for the months of April and May of last year.

The percentage chart lists expenditures of revenue as follows: Wages, 40.59 per cent; material and supplies, 22.73 per cent; taxes, 7.74 per cent; injuries and damages, 6 per cent; other operating expenses, 6.64 per cent; interest charges, 17.61 per cent; deficit, 1.31 per cent. Interest charges amounted really to 17.61 per cent of the gross revenue, but only 16.30 per cent was available. No dividends were paid.

The item of \$983,499 for "other operating expenses" includes \$750,312 for reserve depreciation and represents the difference between the amount set up for depreciation and the amount actually expended in material and wages for replacements. This reserve is intended to take care of the daily depreciation of cars, tracks and other equipment.

Disagree on Valuation

Board Which Has Been Inquiring Into Pittsburgh Case Will Report Soon

Three separate opinions, each reflecting the views peculiar to the interests from which it sprang, will probably be the outcome of the effort to arrive at an equitable valuation of the properties of the Pittsburgh (Pa.) Railways. For almost a year and a half the investigation had been going on, under the direction of the State Public Service Commission.

FINDINGS ALREADY FILED

The findings of the board were filed at the State Capitol at Harrisburg the first week of August. Nothing was made public by the commission as to the nature of the information tendered it by the valuation board, but reports from Harrisburg indicate a variance of opinion in the board.

The members of the board, it is said, are unanimous as to the value of the tangible assets of the company, but fail to agree on what elements should be included in the valuation in respect of such things as franchises. There is also a lack of unity as to the return security holders should be allowed to earn upon their investments. It is largely upon the basis of the latter that the commission is expected to make its recommendation as to a fair rate of fare, and the whole valuation investigation was designed primarily to determine that, once and for all.

The reports from Harrisburg say there will be one report by the two engineers representing the company, another by the engineers placed on the board to protect the interests of the city of Pittsburgh and the contiguous boroughs, and a third report by the representative of the Public Service Commission, who is the fifth and last man on the board.

This division of opinion puts the final decision upon the Public Service Commission. That body is to meet in Pittsburgh on Aug. 20 to receive the report of the board formally and to make public the engineers' views. At that time the commission will also hear the complaint of the city of Pittsburgh and the boroughs on the new fares—7½ cents when paid by tickets and 10 cents in cash—effective on Aug. 1.

VALUATION COST \$600,000

The valuation work in Pittsburgh is estimated to have cost about \$600,000. The city and the boroughs assume one-third of the cost.

The valuation board was composed of Dr. F. Herbert Snow, chief of the bureau of engineering of the Public Service Commission; J. A. Emery, New York, and Morris Knowles, Pittsburgh, representing the Pittsburgh Railways and the Philadelphia Company (the holding company), and Robert M. Feustel, Fort Wayne, Ind., and George W. Fuller, Boston, representing the municipalities.

Results at Montgomery

For Second Time the Receiver There Reviews Conditions on Property Entrusted to Him

Ray Rushton, receiver of the Montgomery Light & Traction Company, Montgomery, Ala., has reported to Judge Henry D. Clayton of the United States District Court for the Middle District of Alabama with respect to the affairs of the company. He recommends that the property of the railway be put in the very best condition; that the fare be increased to 7 cents; that the wages of the employees be increased, and that the receivership be continued until the end of 1920.

INCOME MUST BE INCREASED

Notwithstanding the breaking up of the various military camps the receipts of the company are in excess of receipts for any corresponding months of pre-war years, according to the report. While the railway has earned a little more than enough to pay operating expenses it has not earned enough to take care of the expensive improvements.

No hope is entertained by the receiver of selling the railway for anything like enough to pay its indebtedness in the near future. Therefore, it is recommended that the receivership be continued until the end of 1920.

According to Mr. Rushton, the income of the railway must be increased in order to meet the increased cost of material and labor. With this end in view, the receiver states that he expects to discontinue a few lines and give a better schedule on other lines in order that each car may carry more passengers per mile.

SEVEN-CENT FARE ASKED

The report recommends that the receiver be authorized to increase the fare to 7 cents, and later, if necessary, even to 8 cents. It further recommends that the wages of employees be increased from 35 to 40 cents an hour and the working hours of the men be reduced to nine hours a day.

Mr. Rushton asks that he be permitted to purchase ten additional safety cars and such other material as may be found necessary.

This is the second report to be made to the court by Mr. Rushton since his appointment. The first was made in February, 1919. It was reviewed very briefly in the *ELECTRIC RAILWAY JOURNAL* for Feb. 22, page 382.

Memphis Appraisers Confer

Ross W. Harris, expert for the city of Memphis, Tenn., in connection with the proposed appraisal of the property of the Memphis Street Railway, has arrived in Memphis to meet the engineers appointed by the State Public Utility Commission and the receivers of the Memphis Street Railway, for a preliminary conference. Albert S. Richey, Worcester, Mass., is also in

Memphis. He was named by the State Commission as its appraiser. J. H. Perkins, New York, named by the receivers of the railway, was expected to arrive from New Orleans in a few days. The three experts will make a physical valuation of the Memphis properties to assist the commission in a final determination of the rate controversy. The appraisers have four months for the work and may make a joint or separate report.

Receiver for West Virginia Company

At the request of the creditors of the West Virginia Traction & Electric Company, Wheeling, W. Va., Judge Dayton of the United States District Court, for the Northern District of West Virginia, on Aug. 4 appointed J. D. Whittemore equity receiver for the company to conserve its assets for the benefit of all concerned. Up to the time of his appointment as receiver Mr. Whittemore was general manager of the company's property, in active charge of operation.

A large proportion of the total income of the company is derived from traction lines and these lines have suffered from war conditions. The high operating cost, due to increased wages to employees and the constantly advancing cost of materials and supplies, in comparison with the increases in rates of fares which the company was able to obtain, has been a principal factor in the inability of the company to meet its obligations.

The officials of the company do not feel that it is possible, at the present time, to make any statement as to possible future plans for the adjustment of the company's affairs.

A protective committee representing the bond secured notes which matured on May 1, 1919, has issued a preliminary plan of reorganization and in the statement accompanying it the committee says it feels encouraged as a result of its investigation of the property. Accordingly the committee purposes:

1. To buy in the collateral for the notes (unless outbid by an outside purchaser) at the foreclosure sale which it is expected will take place in about a month. The securities pledged consist of \$2,500,000 of the company's twenty-five-year gold bonds of 1917 out of a total of \$2,584,000 of such bonds now outstanding.
2. Also similarly to buy at foreclosure of the bond mortgage the premises, or such portions thereof as the committee may deem desirable, in case they are not purchased by outside parties.
3. Organize a new company to acquire the purchased properties from the committee in exchange for the securities of a new company, of which securities those senior in lien would be exchanged for bonds represented by the committee.
4. It will be the policy of the committee to co-operate with the other claimholders and the stockholders, so far as may be consistent with the superior interests and lien represented by the committee.
5. To obtain any cash necessary for the acquisition of the pledged bonds and the property securing the same, by pledging therefor the notes and bonds now or hereafter held by it.

Later the committee will announce such amendments or extensions of this plan as may seem to it to be necessary.

New York Traction Report

Engineers Report to Holding Company on Needs of Rapid Transit and Surface Lines

In a preliminary report of their examination of the subway and elevated lines of the Interborough Rapid Transit Company, New York, N. Y., made to the chairman of the protective committee representing the holders of the 4½ per cent collateral trust bonds of the Interborough-Metropolitan Company, Stone & Webster state that nothing short of an 8-cent fare on both the elevated and subway lines will provide for fixed charges and the payments to the city and the company contemplated by the contracts between them. The Interborough-Metropolitan Company is the holding company for the subway and elevated lines and some of the surface roads.

Stone & Webster explain that they have not completed their examination of the surface lines of the New York Railways, but state that their examination has progressed far enough to enable them to ascertain that during the last year the company has been earning nothing toward interest on its first real estate and refunding bonds after paying underlying charges and rentals.

In the judgment of Stone & Webster, the lines cannot earn their fixed charges certainly for many years to come unless there is a substantial increase in the rate of fare.

The engineers say that in their opinion the recent granting by the Public Service Commission of the charge for transfers will not yield sufficient additional revenue materially to improve the security for the 4½ per cent Interborough-Metropolitan bonds. The investigation of Stone & Webster was made in co-operation with Price, Waterhouse & Company, certified public accountants.

Of the general traction situation the engineers say:

We find that the management of Interborough Rapid Transit Company is able and efficient. The condition of the properties is excellent. They have been thoroughly maintained and are in first-class operating condition, and there is practically no deferred maintenance. We should point out that while expenditures for current maintenance seem to be adequate, the reserves for depreciation and obsolescence heretofore accumulated have been exhausted, and no reserves for that account are being made and none are provided for in the estimates of earnings given below.

To enable it adequately to serve its territory and attain the estimated earnings, we believe it will be necessary for the company to make additional expenditures for capital purposes, chiefly equipment, amounting to approximately \$7,400,000 during the next five years. This may be reduced, possibly about \$3,000,000, by savings from the construction fund.

It is manifest that a 5-cent fare falls far short of providing the cost of furnishing a ride, and that a considerable increase in fares is necessary to provide for fixed charges and the payments to the city and the company contemplated by the contracts between them. In our opinion, nothing short of an 8-cent fare on both elevated and subway lines will accomplish this purpose.

The financial condition of this company is not unique. Traction properties throughout the country are faced by similar conditions, due to the great increase in the cost of labor and material as the result of the war.

Appeals to Commission for Financial Aid

The Santa Barbara & Suburban Railway, Santa Barbara, Cal., declares, in an application filed with the Railroad Commission, that it has long been sustaining a very heavy financial loss. It asks the commission to investigate the financial affairs of the company and determine what should be done to enable the company to pay legitimate operating expenses without increasing the fare or lowering the standard of service.

Figures submitted by the company show that in 1914 the railway ran behind \$28,034. In 1915 the loss was \$27,132; 1916, \$38,149; 1917, \$29,618; 1918, \$50,626. Four months of the present year show a total loss of \$8,759. The company, which operates buses and street cars, shows that in 1914 the cars carried 1,567,332 passengers. In 1918 it carried 1,471,063 car passengers and 368,194 bus passengers. The operating expense in 1914 was \$63,681. In 1918 it was \$107,531.

It is asserted by the company that in the last two years wages have increased 40 per cent and the cost of materials from 50 to 200 per cent. The petition says:

The company desires so to operate its system, if possible, that it will be unnecessary, in order to pay legitimate operating charges, to increase the existing rate of fare or lower the standard of service. The company is uncertain whether such a result can be attained. It is willing to co-operate in making the attempt. Certain economies in operation will be necessary. The company desires the benefit of such advice and recommendation as the Railroad Commission may give after a careful investigation and study by the commission.

12 Per Cent Revenue Increase in Memphis

The extra cent in fare is adding only 12 per cent to the revenue of the Memphis (Tenn.) Street Railway, according to the quarterly report of the corporation lately prepared. If as many persons had ridden on the cars at 6 cents as did at 5 cents, the increase in revenue would of course have been 20 per cent. In general, however, it may be said the public is returning to the cars again. In the nature of things, autumn travel is heavier than the summer travel in Memphis, and a constant improvement in passenger movement is looked for as the summer wanes.

The receivers soon must make a new working contract with the employees, but it is believed a settlement will be made without friction, as all conferences held thus far have been very friendly. Frank S. Elgin, one of the receivers, would make no prediction as to the probable wage under the new contract. T. H. Tutwiler, the other receiver, has been out of the city for several weeks, but is expected to return soon.

City Attorney Livingston seems to think that when the fare hearing is resumed in November by the Public Utilities Commission it can be shown that the need no longer exists for the continuation of the 6-cent fare.

Financial News Notes

Receiver for Chicago Interurban.—Federal Judge Evans on Aug. 9 appointed Joseph K. Choate receiver for the Aurora, Elgin & Chicago Railway, Wheaton, Ill., on petition of the creditors whose claims are said to aggregate \$50,000. The principal creditor named in the petition is the General Electric Company with a claim of \$3,215.

Receivership Is Denied.—Judge Wagner at Reading, Pa., handed down an opinion on Aug. 11 in which he refuses to grant the petition of John H. Passmore, Philadelphia, and other stockholders of the Kutztown & Fleetwood Street Railway for a receiver for the Allentown & Reading Traction Company, of which the Kutztown & Fleetwood Street Railway is a subsidiary.

Will Sell Mississippi Road.—George P. Money, special commissioner appointed by the Federal Court on July 2 to sell the properties of the Pascagoula Street Railway & Power Company, Pascagoula, Miss., in the mortgage foreclosure suit of the Columbia Finance & Trust Company, has fixed Aug. 18 as the day upon which he will make the sale in front of the courthouse at Pascagoula.

Receiver's Certificate Formally Authorized.—Federal Judge Mayer at New York on Aug. 12 signed a decree authorizing Lindley M. Garrison, receiver of the Brooklyn Rapid Transit Company, to sell \$18,000,000 of receiver's certificates at 95. The decree provides that they shall be dated Aug. 1, 1919, and shall mature in two years. The proceeds are to be used for the completion of the rapid transit lines.

Receiver Sells \$2,300,000 of Certificates.—Rolla Wells, receiver of the United Railways, St. Louis, Mo., announced on Aug. 4 that a syndicate of St. Louis bankers had purchased the issue of \$2,300,000 of receiver's certificates recently authorized by Special Master Lamm. This issue will enable the receiver to take up the loan of that amount made fourteen months ago by the War Finance Corporation. The certificates will bear interest at 6 per cent and will mature in one year.

Plan to Discontinue Reported.—The Walla Walla Valley Railway, Walla Walla, Wash., it is reported, will discontinue its city lines. The East Walla Walla line and the Prospect Heights line, the two lines making 6 miles of railway, will be discontinued on Dec. 1. The remainder of the city lines will be discontinued about the first of the year, or as soon as the rolling stock can be sold. The company has been losing money for five years. An increase in fares was announced recently, but that did not help.

New York City Companies Would Abandon Lines.—Commissioner Lewis Nixon of the Public Service Commission for the First District of New York has held a hearing in reference to the proposal of the Pelham Park & City Island Railway, Inc., operating from City Island Station through Pelham Park to City Island; the Mid-Crosstown Line, and the Third Avenue Bridge Company, whose line operates across the Queensboro Bridge, to cease operation forthwith. The companies state that the deficits through operation for the last fiscal year were for the Pelham Park & City Island Railway, \$17,740; for the Mid-Crosstown Railway, \$34,138; and for the Third Avenue Bridge Company, approximately \$25,000. The letter adds that whatever need may have existed in the past for the operation of these lines seems to have disappeared with shifting conditions of traffic. Commissioner Nixon has held he has no power to force the lines to continue operation. Sale of the roads to the city is suggested.

Consolidation Awaits Foreclosure Sale.—Until the future ownership of the Inland Empire Railroad is determined by court sale nothing can be done toward merging the city lines of the Washington Water Power Company and the Tacoma City lines of the Inland. The date of the sale has not yet been set. The validity and priority of claims is yet to be passed upon by the master in chancery and approved by the court, after which an upset price is fixed by the court preliminary to a sale. Officials of the Inland believe the property will be bought by the bondholders or the Hill interests. The bondholders have approximately \$4,250,000 invested while the Great Northern and Northern Pacific have invested in common stock or advanced for the operation of the system between \$8,000,000 and \$10,000,000. Representatives of the bondholders have indicated their approval of the proposed merger, but the attitude of the Hill interests is unknown.

Modification of Reorganization Plan Reported.—It was stated in San Francisco, Cal., on Aug. 1 that announcement of the details of the amended reorganization plan for the United Railroads was expected within a few days. In the meantime probable changes from the plan as originally proposed by the reorganization committee are being discussed in financial circles. The plan about to be announced, it is understood, proposes a different exchange arrangement for the United Railroads 4's than that reported at first. Instead of giving new securities to the extent of a little more than 70 per cent of the par value of these bonds, it is said that 100 per cent of par will be offered, but with a reduced proportion of Market Street Railway bonds—20 per cent being the amount quoted in these reports—and the balance made up in stock of all three issues, first preferred, second preferred, and common. The provision for the underlying bonds has also been changed. These issues have matured.

Traffic and Transportation

Jitneys Ruled Out of Portland

Maine Cities Conclude That Competition of Buses With Electric Railways Is Undesirable

The jitneys have been ruled off the streets of Portland, Saco and Old Orchard, Me., where the conclusion has recently been reached by the cities that buses that compete with the electric railway are a nuisance and should be restrained. These cities were introduced to the jitneys or the jitneys were introduced to the cities during the spread of the jitney idea following the unemployment period at the start of the war. Like most other cities, Portland and the other places mentioned hesitated at the start as to what was best to be done about regulation.

FIRST LEGISLATION IN 1915

In 1915 an ordinance was passed in Portland providing that all applications for licenses to operate motor vehicles as common carriers must be filed with the city clerk. Such applications were required to show the route and the schedule to be maintained, and also be accompanied by a bond depending upon the size of the car. Applications had to be filed with the city clerk, who in turn referred them to the Board of Aldermen and Mayor for final disposition. The bond requirements of the ordinance were \$3,000 for a five-passenger car and \$6,000 for cars of greater seating capacity. In addition a city license was necessary, this being \$20 a year for the smaller cars and \$30 a year for cars seating more than five passengers.

Soon after the Cumberland County Power & Light Company, operating the Portland Railroad, increased its fares to approximately 3 cents a mile, several buses were put into competition with the company between Portland and Saco, without securing the proper licenses. The drivers were arrested for not complying with the requirements of the city of Portland. In the State Supreme Court before Judge Wilson the jitney men got a temporary injunction for one week instead of two months, as asked for by the Council. They claimed the jitney regulatory ordinance was too drastic and made without authority of the State. Judge Wilson, however, after hearing the case, refused to continue the injunction.

LICENSES REFUSED

The Mayor and the Board of Alderman of Portland then refused to grant the licenses under the ordinance of 1915, claiming they would use their own discretion, in as much as the ordinance provided that they might grant the licenses if the requirements of the or-

dinance was fulfilled. The city had come to the conclusion that there was not room enough in Portland for two forms of transportation, and that inasmuch as the railway was already on the ground it should have the sole right to transport passengers.

In Saco a similar ordinance has been passed and became effective on Aug. 1, 1919. The town of Scarborough declared motor bus competition with the electric railways a nuisance and prohibited the buses from using the streets. As a result of all this no jitneys are running in Portland, Saco and Old Orchard.

The Cumberland Power & Light Company feels that this outcome is but one of the aftermaths of the several community meetings held in the territory throughout which it operates, when fares were recently increased, at which time every effort was made to put before its patrons the facts as to the financial status of the company.

Temporary Fare Increase at Lincoln

Following presentation of the report of Dean Raymond of the school of engineering of Iowa State University, named by the Federal Court to investigate the condition of the Lincoln (Neb.) Traction Company, the court has ordered an increase in fare to 6 cents in the city of Lincoln and to 7 cents to points in the suburbs. The company has also been granted a temporary injunction restraining the Railway Commission of Nebraska from enforcing rates heretofore existing.

The action of the court is temporary in its nature, the increased rates to apply until final determination occurs. The court order declares that "the parties will understand that we are not fixing a rate. We are merely, as a condition of the injunction issued, fixing the maximum charge that shall not be exceeded by the plaintiff during the pendency of further proceedings or until further orders herein."

The company is required to file a bond for \$50,000 to insure repayment of all amounts collected from car riders in excess of the rate ultimately fixed as equitable.

The company, more than two years ago, applied to the State Commission for permission to install emergency rates. The commission refused, whereupon the matter was presented to the Supreme Court of Nebraska, which remanded the case to the commission, which still refused an increase. The company then applied to the Federal Court for an injunction against enforcement of existing rates by the commission.

Michigan Interurban Fares Up

Rates Advanced Under New Law Permitting Charges of 2½ Cents Per Mile

The Detroit (Mich.) United Railway, on Aug. 2 filed a schedule of increased passenger rates on its interurban lines to be effective on Aug. 14. The schedule was presented to the Public Utilities Commission of the State, but that body has no power to prevent collection of the new rates, which are promulgated under the provisions of the Smith rate act passed by the 1919 Legislature.

MANY LINES AFFECTED

This act permits collection of 2½ cents a mile by interurban roads, but the new schedule is based on a general increase to a 2-cent rate. This makes the new fare 25 per cent more than the present fare from Detroit to Flint and 155 per cent more than the present fare from Detroit to Pontiac. Fares are computed from the Detroit city line.

Action of the company in establishing the new schedule has opened a controversy that will probably lead to a suit in the Supreme Court of the State to test the validity of the Smith law. The act is so burdened with provisos that its meaning is obscure.

One of the qualifying clauses that would seem to apply to the Detroit United Railway in so far as interurban fares are concerned is as follows:

Provided further, that these rates shall not apply to electric suburban or interurban railroads whose gross passenger earnings as reported to the Railway Commission of Michigan for 1918 exceeded \$8,000 per mile for each mile of road operated by said company, including all branch roads owned, leased, controlled or occupied by said company.

It now appears from a cursory examination of the record of the commission that the company's interurban income is so close to \$8,000 a mile that legal definition of the term "gross earnings" will be necessary in order to determine whether the lines fall within the terms of the proviso. If these lines receive less than \$8,000 a mile from passenger traffic, the Utilities Commission has no power to prevent collection of the 2-cent fare. Under the terms of the Smith act the company could go further and charge 2½ cents a mile, for this is the rate the law allows to interurban lines earning less than \$8,000 a mile.

COURT ACTION LIKELY

The commission has ruled that it will not consider the Smith act as abridging its right under the general railroad law to make an investigation into the propriety of the proposed rates. Inasmuch as the company filed its schedule ten days in advance, as required by the old law, the commission has assumed that it will be willing to proceed farther under the general railroad law, and permit the commission to suspend the rates, if application for suspension is made by the public, for forty-five days pending investigation.

Chicago Fares Go to Seven and Eight Cents

Commission Granted Seven-Cent Fare to Surface Lines and Eight Cents to Elevated, Waiving Customary Notice

After hearings of three days duration during the week ended Aug. 9, before the Public Utilities Commission of Illinois, the commission rendered its decision on Aug. 6, effective at midnight on Aug. 7, increasing the fares of the Chicago Surface Lines from 5 cents to 7 cents and of the Chicago Elevated Lines from 6 cents to 8 cents.

Assistant Corporation Counsel Cleveland demanded a subpoena for the companies to produce their books as far back as 1907. This demand was denied by the commission on the grounds that the petitions for increased fares sought emergency relief, and that such an examination would consume too much time and in effect deny the petition. The city also contended that the commission could not properly render a decision as it had acted as investigator and arbiter during the strike and had agreed to increase fares to cover the increase in wages. This was denied by the railways.

The decision of the commission affirmed that an emergency existed and therefore precluded the necessity of the usual thirty-day notice to the public of a change in rates. The commission said:

The city of Chicago has entered its appearance in this proceeding and denies the authority of the commission to make an order allowing fares in excess of those prescribed in the ordinances under which the companies derive their rights to use the city streets. The city also asserts that the commission should not permit increased rates to go into effect until there has been a complete hearing for the purpose of determining the value of the property used in the public service.

The question of the power of the commission to entertain this application was considered in a previous case and the decision was adverse to the contention of the city. We adhere to the conclusions there announced and overrule the motion for a dismissal of the proceedings for want of jurisdiction.

We think that the applicants have made a case which entitles them to an order allowing changes in rates without requiring the thirty days notice specified in Section 36 of the public utilities act.

In regard to the Chicago Surface Lines, the commission stated that at the time of the previous petition of the company for relief the commission found that the requirements of reasonable return upon the fair value of the property of the company actually used in the public service would be satisfied if the net earnings of the properties reached the sum of \$8,600,000. The evidence presented before the commission showed that the net earnings for the twelve-month period ended July 31, 1919, were approximately \$8,200,000. The companies have therefore fallen about \$400,000 short of the amount to which the commission found they were entitled.

It was estimated that to this must be added approximately \$7,800,000 increased expenses due to the wage advance, and at least another \$1,000,000 due to the enhanced cost of materials and supplies for maintenance, to probable increased taxes, and to the loss

sustained by the companies during the recent strike. The commission said, further:

The present rates of fare now charged by the petitioners are insufficient, and the rates hereinafter authorized are just and reasonable rates and are no more than are necessary to enable the company to earn a fair return upon the fair value of their property actually employed in the public service.

The following rates of fares on the surface lines were then authorized:

For a continuous trip in one general direction within the present or future limits of the city of Chicago over the street railways operated by the Chicago Railways Company, Chicago City Railway, Calumet & South Chicago Railway and the Southern Street Railway, operating under the designation of Chicago Surface Lines, a sum of 7 cents for each passenger twelve years of age or over and 4 cents for each passenger under twelve years of age: Provided that children under seven years of age accompanied by a person paying fare, shall be permitted to ride free. The provisions as to transfers as they now exist shall continue until the further order of the commission.

In referring to the Elevated Lines, the commission said:

Petitioners have shown good cause for allowing increases in their rates of fare without requiring the thirty days notice provided in Section 6 of the public utilities act. The operating expenses of the petitioners have been largely increased by advances in wages which are now effective and by increased cost of supplies and materials and they will be unable to obtain money with which to operate their lines unless prompt relief is granted.

The annual increase in operating expenses due to advanced wages and other causes shown by the evidence will amount to more than \$2,400,000. The rates of fare at present charged by the petitioners are insufficient, and the rates hereinafter authorized are just and reasonable rates and are no more than are necessary to enable the companies to earn a fair return upon the fair value of their property actually employed in the public service.

The commission then authorized the following rates on the Elevated Lines:

Adult fare between all points upon the lines of the several companies, namely, the Metropolitan West Side Elevated Railway, Northwestern Elevated Railway, South Side Elevated Railroad, and Chicago & Oak Park Elevated Railroad, where a 6-cent fare is now charged shall be 8 cents; for that portion of the Northwestern Elevated Railroad north of Howard Street, 6 cents. The above fares from points north of Howard Street to points in the city of Chicago shall be the sum of the two rates above mentioned.

Unless otherwise ordered by the commission the rates will be effective until and not after Feb. 1, 1920, but the commission reserves the right to extend the effective period of the rates beyond Feb. 1, 1920, or to order the discontinuance of the rates at any time prior to that date.

The commission also retains jurisdiction of the cases and reserves the right to investigate the rates authorized or the service rendered, make further findings and issue such further orders as may be justified by the facts determined at subsequent hearings as to the rates for railway service furnished by both the elevated and surface lines in the city of Chicago.

The application for hearing and investigation for the determination of the value of the property of both companies, and the establishment of permanent rates, was granted. The appeal of the

Chicago Surface Lines, in this connection, is set for hearing on Sept. 8, and that of the Chicago Elevated Railways for hearing on Sept. 17.

Mayor Thompson immediately announced that he would "fight to the last ditch" the increase in fares. He characterizes the award of the commission as a "vicious public hold-up," and states that the fares are the result of a "long contemplated and adroitly executed plan of the traction bosses." Last reports were that an application for a writ suspending the order of the Public Utilities Commission pending the city's appeal of the order was to be made in the near future to the Sangamon County Circuit Court. This announcement was made in the form of a letter to the clerk of the court. The court is not now in session, but is expected to convene on Sept. 2.

Seeks to Correct Abuse of Transfers

The Kansas City (Mo.) Railways has saved around \$200 a day during the past few weeks, through a change in its method of handling transfers. A new transfer put out by the company several months ago had been seriously abused. A passenger giving a transfer and wishing to use still another car on his trip, received a second transfer—and with this second transfer, was frequently able to double back to a point near the origin of his trip.

The company's order that the original transfer should be punched, and no new transfer given, has prevented the doubling back; and has also eliminated the practice of overstaying a reasonable time, since the time limit is punched on such original transfer, and there is no chance for a passenger to get a new transfer with later hour punched, or no hour punched.

The company has saved many dollars by the simple process of abolishing the transfer privilege at the Union Station. Hundreds of transfers were exchanged or given away—many sold for 1 or 2 cents apiece—at the Union Station, the traffic having developed for the benefit of passengers leaving town, or arriving, or going to and from work in the station district. The greatest abuse of the assumed stop-over privilege existed at the Union Station transfer point.

The company will soon issue a new transfer, with two coupons for each retransfer, and passengers may therefore ride on only two lines in addition to the one on which the trip was begun.

The City Council has passed an ordinance which if enforced will materially assist the Kansas City Railways in combating the abuse of transfer privileges. This measure carefully prescribes the conditions under which transfers shall be used, provides against traffic in transfers by barter or exchange, and fixes a penalty of not less than \$1, nor more than \$100 for violation of any provision of the ordinance.

Omaha Charging Seven Cents

Fares were advanced from 5 cents to 7 cents, on Aug. 10, on the lines of the Omaha & Council Bluffs Street Railway, Omaha, Neb., following conferences between officers of the company, a committee of the carmen's union and city officials.

Three weeks ago the union made a demand upon the company for an increase from the then existing scale of 41 cents to 45 cents an hour, to 65-75 cents. That demand was reduced to a maximum of 60 cents, and the final compromise was effected on the basis of a maximum of 55 cents. It is agreed that the matter may be reopened by the carmen ninety days from the date of the establishment of the 7-cent fare.

The new rate of fare carries with it the sale of four tickets for 25 cents, 3-cent tickets for children five to twelve years of age, and 5-cent tickets for school children. The company has installed a new type of pay-as-you-enter fare boxes which receive and register pennies.

The company applied last year to the State Railway Commission for a 7-cent rate. The commission denied the application, whereupon the company appealed to the State Supreme Court of Nebraska, which in a recent decision (ELECTRIC RAILWAY JOURNAL for July 26, page 199) directed the commission to order an increase of rates. The commission during the week ended Aug. 9, issued such an order. Representatives of the city and the company sent a stipulation, waiving the right of a rehearing before the Supreme Court.

In the temporary settlement of this controversy the men agreed to waive their demand for a "closed shop" and recognition of their union.

A Muss in Muskegon

The man who put the "mus" in Muskegon, Mich., builded better than he knew. No other word in the English language, perhaps, so fittingly describes the condition in which that city finds itself. Muskegon is in an awful muss. There was an electric railway in Muskegon, but there isn't any more. Muskegon kicked when it had service and now it kicks that it hasn't any service. As a matter of fact, Muskegon destroyed the service as a protest against a 7-cent fare and now, like all iconoclasts, having deliberately set about destruction, stands aghast amid the ruin that has followed.

The local railway at Muskegon, like other roads in other cities, needed more revenue. Unlike some others, however, it was unhampered by franchise provisions limiting the fare. Its franchise expired several years ago and has not been renewed. On Aug. 1 the company announced an increase in fare from 6 cents to 7 cents. This became a signal for a warm, if not gleeful, response on the part of the public, punctuated by riot and disorder.

Now the cars of the railway in Mus-

kegon are in the carhouse, there to remain until the town has returned to its sober senses. There is some evidence even now that common sense will again prevail, but until it does there will be nothing doing on railway service. On this the owners of the property, the American Light & Traction Company, are determined.

This is the price that Muskegon is paying for mob rule. Yes! mob rule. Just because it was disgruntled at a change in fares the hoodlum element in Muskegon rose up and not satisfied with orderly protest took things into its own hands and battered and banged the cars until they limped back to the carhouse, mere shadows of their former selves. In consequence service has been entirely suspended and the prospects are that the city itself may have to reimburse the company for damage done to railway property. Muskegon had a gala moment during the destruction. Now it has fallen upon sober days, with plenty of time to think things over while it walks to and from work.

Zones the Service, Not the Fares

The Kansas City (Mo.) Railways is installing short-line schedules, with cars serving congested and business districts turning back at convenient intermediate points on the lines, and stub lines operating to serve the more thinly-settled suburban districts. Two of these readjustments have been made, and others will follow.

While the outer and inner terminals of the readjusted routes have no direct relation with jitney routes as established by a pending city ordinance, in some instances the terminals of the electric railway and the jitney routes are about the same. After a week of service over the shortened routes for congested districts on two lines, the public, the company and the city officials seem satisfied to extend the readjustment.

There has been much discussion in Kansas City of the feasibility of zone fares, the suggestion being made frequently in connection with plans to overcome the competition of jitneys. The Kansas City Railways, however, has decided that zone fares are not practical or fair; but that zoning of service will meet both the jitney competition, and the problem of adequate service.

In stating its case for the zoning of service the company says in part:

The only solution possible is to reduce the suburban non-paying service and to give more cars and more car-miles to the portions of the city which are thickly populated and where they are needed. This means that new transfer points will have to be made and many lines which now have through service will have to be shortened and the outlying districts served by their own lines, on which will be given service adequate to the traffic possibilities and needs of these districts.

A system of turn-backs will have to be inaugurated by which cars during the rush hours will cover only a certain part of their route and be turned back and sent downtown to take care of the people waiting for transportation, instead of continuing on to the end of the line with no patronage.

Transportation News Notes

Cuts Operating Expenses.—Unable to obtain a higher fare the Louisville (Ky.) Railway has rerouted many of its cars as a means of curtailing operating expense. One new line has been opened.

Limited Service Planned.—Responding to a demand for quicker service between Los Angeles and San Bernardino, Cal., the Pacific Electric Railway is planning to run limited trains between the two cities. At present the cars make all local stops.

Metal Tokens in New Orleans.—Metal tokens worth 6 cents each will be used by the New Orleans Railway & Light Company, New Orleans, La., to obviate the need for great numbers of pennies in the hands of conductors, according to Nelson H. Brown, general manager.

Jitney operators of Kansas City have recently conceded all but one of the requirements in pending ordinances, this one being the bond of \$5,000. Difficulty has been encountered in securing such a bond and they may have to suspend operation.

Interurban Rate Increased.—The East St. Louis & Suburban Railway, East St. Louis, Ill., gave notice to the Public Service Commission of Illinois on Aug. 1 of an increase in fare between East St. Louis to Edwardsville, Ill., from 40 cents to 46 cents. The rate from Collinsville to Maryville is reduced 2 cents.

Homestead Company Increases Fare.—The Homestead & Mifflin Street Railway, Homestead, Pa., has announced an increase in fare to care for the wage raise, noted elsewhere in this issue. The fare will go up on Sept. 1. The present charge is 5 cents. The new rate will be 6½ cents by ticket and 7 cents when paid in cash.

Illinois Company Wants More.—Hearings on the petition of the Chicago & Joliet Railway for authority to increase fares within the corporate limits of Joliet, Rockdale and Lockport, Ill., have been begun before the Public Utilities Commission of Illinois. The company has applied for a fare increase to meet demands of its employees for higher wages.

Seven Cents Asked by Sedalia Company.—The City Light & Traction Company, Sedalia, Mo., has applied to the State Public Service Commission for a fare increase from the present 5-cent rate. The company asks that it be allowed to charge 7 cents for an adult ticket, and 5 cents for a child's half-fare ticket with six half-fare tickets for 25 cents. Hearings were to start on Aug. 11.

Reducing Accidents in Kansas City.—Co-operating with the local Traffic Safety League in its campaign to reduce the number of street accidents, the Kansas City (Mo.) Railways is collecting detailed information regarding all accidents in which its cars are involved. Daily reports are made to D. L. Fennell, superintendent of transportation, who publishes a daily bulletin summarizing the data.

Seven-Cent Fare for Illinois Interurban.—The Public Service Commission of Illinois on July 30 ordered a 7-cent cash fare for the Alton, Granite City & St. Louis Traction Company, Alton, Ill., and a 6-cent fare in East St. Louis, Ill. This schedule will continue effective until Oct. 31, 1919. The commission several months ago denied the company's application for an 8-cent fare on the Alton city line.

Trenton Hearings Sept. 16.—The State Board of Public Utility Commissioners has set Sept. 16 as the date for the hearing at the State House on the application of the Trenton & Mercer County Traction Corporation, Trenton, N. J., for another increase in fares in Trenton and suburban territory. The company wants to charge 1 cent for transfers and create four new zones on the suburban lines.

I. T. S. Sleeper Service.—The Illinois Traction System has announced a new schedule of parlor car and sleeper service out of St. Louis. The new parlor car limited leaves St. Louis at 8.30 a. m., arrives at Springfield at 12.01 p. m. and arrives at Peoria at 2.30 p. m. Another parlor car limited leaves St. Louis at 2.30 p. m. and the sleeper leaves St. Louis at 11.45 p. m. and arrives in Peoria at 6.45 a. m.

Jitney Men See Their Doom Sealed.—Owners of jitneys in Camden, N. J., announce that if the Public Service Railway zone system goes into effect they will not be able to compete with the company on its 3-cent city fares and will transfer their activities to the suburbs. The jitney men now charge a 7-cent fare in the city. The jitney men in Newark are said to be less pessimistic about the future.

Higher Fares on Suburban Road.—The Public Utilities Commission of Illinois has approved the application of the Chicago & West Towns Railway, operating lines in Oak Park and neighboring towns, for an increase in fares. Cash fares between the towns are raised from 7 cents to 10 cents. Within the towns the rate is 7 cents or four tickets for 25 cents. The commission's order is effective until June 1, 1920.

Eight Cents on Alabama Road.—The Public Service Commission of Alabama has issued an order permitting the Sheffield Company, which operates in Sheffield, Florence and Tusculumbia, to raise fares from 5 cents to 8 cents. The company had asked for a 10-cent fare. The company's application for a revision in fare zones was denied. When tickets are furnished in books of fifty a discount of 20 per cent is made, making the ticket rate 6.4 cents.

Rhode Island Company Asks More.—The receivers of the Rhode Island Company, Providence, R. I., on Aug. 7 filed a petition with the Public Utilities Commission of Rhode Island for authority to put into effect a new schedule of fares so designed as to increase the revenue to meet the requirements imposed upon the company by the advance in wages to its trainmen under the strike settlement terms outlined in the *ELECTRIC RAILWAY JOURNAL* for Aug. 9, page 295.

Detroit Fare Ordinance Re-enacted.—The Council of Detroit, Mich., has re-enacted the Kronk ordinance, passed by the aldermanic body a year ago, fixing 5 cents as the maximum rate of fare to be charged by the Detroit United Railway. Suit to test the validity of the measure was brought by the Detroit United Railway and carried to the United States Supreme Court, from which it has been sent back and is awaiting a rehearing before the Federal Court at Detroit.

Fare Ordinances Submitted in Portsmouth.—Another overture for increased fares has been made to the City Council of Portsmouth, Va., by the Virginia Railway & Power Company. The new proposition comes from W. H. Venable, who is the general attorney for the company. With Mr. Venable's letter were two ordinances, either of which may be adopted. One provides for a 6-cent fare within the city limits with a 2-cent charge for transfers. The other provides for a 7-cent fare within the city without charge for transfers.

New Jersey Hearing Put Over Until Sept. 17.—With the conclusion of the cross-examination of Charles K. Mohler, witness for the League of Municipalities in the zone fare hearing for the Public Service Railway at Newark, N. J., on Aug. 5 the Board of Public Utility Commissioners announced a recess until Sept. 17. Both Frank H. Sommer, counsel for the league, and Edmund W. Wakelee, vice-president of the Public Service Railway, agreed that the hearings could be more rapidly disposed of in the fall after the mass of evidence had been examined.

Six Cents in Lake Charles.—Fares in Lake Charles, La., were placed at 6 cents beginning Aug. 1, under the terms of an ordinance passed by the City Council granting an increase to the Lake Charles Railway, Light & Waterworks Company. The company was also permitted to make a 1-cent charge for transfers. Passage of the ordinance followed a compromise effected in the district court in the city's suit against the railway to restrain the latter from putting a 7-cent fare into effect. Some months ago the company established a 7-cent fare, whereupon the city secured a temporary injunction which was later dissolved.

Three-Cent Fare Will Stand.—The application of the Van Brunt Street & Erie Basin Railroad, Brooklyn, N. Y., for permission to increase its fares from 3 cents to 4 cents, has been denied by Deputy Public Service Commissioner Barrett of the First District on

the ground that there is no necessity for the change. The company's line is a little more than a mile long. Its power is furnished by the Brooklyn Rapid Transit Company, which also cares for the street between the tracks. Commissioner Barrett pointed out that the company's net corporate income has increased from \$8,248 for 1914 to \$12,012 for the year ended June 30, 1919.

Hearings Concluded in Mississippi Dispute.—Arguments in the hearings before Special Master Terrall, appointed by Judge Holmes of the Mississippi Federal Court to take evidence in the dispute between the city of Meridian, Miss., and the Meridian Light & Railway Company, were recently concluded. Mr. Terrall will present his report at the September term of the court. The controversy grew out of the increased railway rates from 5 cents to 7 cents. The city contends that charter provisions were violated, while the company asserts that under charter provision dating back to 1884 it has the right to increase fares to as much as 10 cents. The 7-cent fare was established more than a year ago.

Express Service Extended.—The Chicago, Ottawa & Peoria Railway, Ottawa, Ill., included in the Illinois Traction System, has installed express service between Chicago and stations on that line, insuring quick deliveries and low rates. Service will be routed via Chicago & Joliet Electric Railway and the Interurban Motor Despatch line. Pick up and delivery service will be furnished at Chicago on first-class express at 80 cents per hundredweight and on second-class express at 60 cents per hundredweight within the district bounded on the north by Chicago Street, on the west by Halstead Street, on the south by Eighteenth Street and on the east by Lake Michigan.

Fare Controversy Still on in Columbia.—The City Council of Columbia, S. C., has passed on its first reading an ordinance to amend the franchise of the Columbia Railway, Gas & Electric Company, so as to allow the city to fix rates of fare. The Council's action comes as the result of opposition to the 7-cent fare established by the company on July 1 to cover a 10 per cent wage increase to its men. Citizens attempted to secure an injunction restraining the company from putting the higher rates into effect, but their application was refused. The events leading up to the present situation were referred to at length in the issue of this paper for July 19, page 142.

City Holds Out for Five-Cent Fare.—The City Council of Spokane, Wash., by unanimous vote has reaffirmed its belief in 5-cent fares on the railway lines of the city and asked the State Public Service Commission to restore the old fare notwithstanding the order of the commission to continue the 6-cent fare for another period of sixty days. The resolution was presented by Commissioner John H. Tilsley and passed by the City Council. In consideration of returning to the 5-cent fare the City Council agrees to con-

tinue the policy of keeping jitneys in check as it has for the past three months. The resolution cites that the city opposed the increase of fares in the beginning and that results have shown that the companies would have done as well under a normal increase in business, if the 5-cent fare had been retained. A larger net revenue will be obtained by the companies at 5 cents, the resolution states, than by continuing the fare at 6 cents.

New Publications

Spacing and Depth of Laterals in Under-drainage Systems

By W. J. Schlick. Bulletin No. 52, Engineering Experiment Station, Iowa State College, Ames, Iowa.

This bulletin on the spacing and depth of laterals in Ohio under-drainage systems and the rate of runoff from them, with data from investigations, while primarily of interest in connection with farms, has reference value to railway men who have problems to solve in connection with the drainage of moist areas.

Government Ownership of Railroads—Vol. 2

Compiled by Edith M. Phelps. H. W. Wilson Company, New York. 200 pages. Price \$1.50.

This is one of the "Debater's Handbook Series" of the publisher. It should be explained at the outset that this volume is not a new edition of the former handbook on this subject, but is an entirely new publication, based on railroad conditions as they exist at the present time. Vol. 1, published originally in 1912, has been through three editions. As the publishers explain, the various arguments for and against government ownership of the railroads are brought out in the affirmative and negative discussions. A selected bibliography is included, limited chiefly to the literature of the last two years, although earlier standard works have been added, together with a list of bibliographies, which point the way to other material on the subject. The contents is divided into General Discussion, Affirmative Discussion, and Negative Discussion.

The volume deserves the careful attention of the student, the investor, and the operator. The proponents of government ownership should be acquainted with what the opponents are thinking and saying, and the opponents of government ownership of course should know what the proponents are thinking and saying. "Government Ownership of Railroads" make this comparatively simple. The publisher and the compiler are to be congratulated on the work they have done at this time in making reference easy to the best that is available on this subject.

Personal Mention

Edward Dana, Acting Manager

Well-Known Transportation Authority Selected to Head Boston Elevated Railway

Edward Dana, Belmont, Mass., has been appointed acting general manager of the Boston (Mass.) Elevated Railway, succeeding C. D. Emmons, who resigned recently to become president of the United Railways & Electric Company, Baltimore, Md. Mr. Dana is widely known in the electric railway field as a specialist in transportation practice. He was born in Bernardston, Mass., thirty-five years ago, and was graduated from Harvard College in 1907, completing the four-year course in three years.



EDWARD DANA

Mr. Dana entered the employ of the Boston company soon after receiving his degree. From a post as conductor he has advanced rapidly through various departments of the company to the position of manager of transportation, which he held at the time of his latest promotion. He became interested in the scientific aspects of traffic handling early in his career with the Boston company, and has written numerous articles for the *ELECTRIC RAILWAY JOURNAL* and other publications upon transportation matters. Among these have been extended analyses of schedule-making problems, the organization of snow-fighting forces, maintenance of service under adverse conditions, telephone adjuncts to electric railway operation, traffic counts and their interpretation, and many others.

Mr. Dana has been active for some years in the work of the American Electric Railway Traffic & Transportation Association, and has appeared as an expert in numerous commission proceedings. Since the establishment of public control on the Boston system, he

has been at the head of the transportation department, reporting to the general manager. In the affairs of his home town Mr. Dana is unusually prominent, being a member of the finance committee, treasurer of the War Chest, and active in the publicity work of the municipality during the war. He has traveled widely in the interest of electric transportation work. Mr. Dana is a member of the New England Street Railway Club and of the Boston City Club.

Organized for Separate Operation

The Eighth Avenue Railroad, New York, N. Y., segregated from the New York Railways and operated separately under W. B. Yereance as general manager and chief engineer, has announced in a general order the appointment as department heads of the company's organization developed for the direct operation of its railroad the following officers:

H. S. McGinness, supervisor of transportation.

J. D. Kent, supervisor of way and structures.

R. H. Waldo, acting supervisor of equipment.

E. T. Baker, auditor.

W. G. Wheeler, special (claim) agent.

E. M. Musier, paymaster.

S. L. Shuffleton, formerly chief of construction for Stone & Webster in the Seattle district, is now Western Manager for Stone & Webster at San Francisco.

Capt. James H. McLaughlin, formerly connected with the Baton Rouge (La.) Electric Company, has gone to Houston, Tex., as secretary to L. C. Bradley, vice-president of the Houston Electric Company.

Calvert Townley, president of the American Institute of Electrical Engineers, is the subject of an extended and sympathetic personal article by Lewis B. Stillwell in the July issue of the *Electric Journal*.

Melnotte McCants, who has been assistant to the general manager of the United Railroads, San Francisco, Cal., for the last twelve years, has been given the title of assistant general manager of the company.

G. A. Webb, who has been acting as superintendent of transportation of the Savannah (Ga.) Electric Company for several months, has been appointed to that position permanently. Mr. Webb was formerly traffic manager of the Tampa (Fla.) Electric Company.

E. J. McIlraith, formerly superintendent of ways and structures with the Puget Sound Traction, Light & Power Company, at Seattle, Wash., has been appointed to the position of engi-

neer in charge of maintenance with the Philadelphia (Pa.) Rapid Transit Company.

R. M. Read, superintendent of the Quebec Railway, Light, Heat & Power Company, Quebec, Que., and chairman of the outside industries committee of the Quebec Board of Trade, is the author of an article "For a Greater Quebec," in the bulletin of the Quebec Board for June 16.

John W. Greer, Edgewater, N. J., has been appointed superintendent of the Hudson River division of the Public Service Railway, Newark, N. J. Mr. Greer has been with the Hudson River line for many years and was connected with it before it was taken over by the Public Service Corporation.

C. B. Booth, for a number of years commercial manager and claim agent of the Vicksburg Light & Traction Company, Vicksburg, Miss., severed his connection with that company on Aug. 1 to become the business manager of a Mississippi electrical concern. Mr. Booth joined the traction company more than eighteen years ago.

H. F. Cameron of the Lake Charles Railway, Light & Power Company, Lake Charles, La. has been appointed vice-president and general manager of the Texas Gas & Electric Company, with headquarters in Houston, Tex., succeeding A. W. Houston, whose appointment to the Southern Utilities Company is noted elsewhere in this department.

A. W. Houston has resigned as vice-president and general manager of the Texas Gas & Electric Company, Houston, Tex., to accept a similar position with the Southern Utilities Company. Mr. Houston will have his headquarters in Palatka, Fla., and will have supervision of plants of the Southern Utilities Company, in the states of Florida and Georgia.

Charles S. Ruffner, vice-president of the Union Electric Light & Power Company, St. Louis, Mo., has been elected a vice-president of the North American Company, which owes the Union Company and whose common stock ownership in the United Railways, St. Louis, controls that company. Mr. Ruffner will spend half his time in St. Louis and half in New York.

I. M. Stover, for the last two and one-half years manager of the Baton Rouge (La.) Electric Company, a Stone & Webster property, has been transferred to the general office of the latter company in Boston, Mass. Before leaving Baton Rouge he was presented with a handsome silver water pitcher and tray by the company's employees. Mr. Stover was formerly connected with the Key West (Fla.) Electric Company as manager.

H. R. Sharpless has been appointed chief engineer for the Pensacola (Fla.) Electric Company. Mr. Sharpless was until recently chief engineer for the power station of the Baton Rouge (La.) Electric Company. At the same time E. L. Bancroft was appointed assistant chief engineer. L. P. Chaney, formerly

chief engineer of the power station of the Pensacola Electric Company, has been transferred to the Blackstone Valley Gas & Electric Company, Pawtucket, R. I.

F. C. Chamberlain, for the last six years district engineer of electric operation for the properties of Henry L. Doherty & Company in the Western District, has been appointed general manager of the Richland Public Service Company, Mansfield, Ohio, succeeding R. E. Burger. Prior to his connection with the Doherty organization, Mr. Chamberlain was with the American Gas & Electric Company at Wheeling, W. Va., and for about four years previous to that time he had been in the New York office.

Robert L. Warner, who was vice-president of the United Railways, St. Louis, Mo., severed his connection with that company on Aug. 1 and returned to New Hampshire. Mr. Warner was elected to the company at St. Louis last fall to represent Eastern interests and to attempt to save the United Railways from a receivership. He will return to St. Louis soon, he announced, as a representative of the North American Company, which controls the United Railways through ownership of practically all the common stock of the company.

Augustus E. Haar has been appointed master mechanic for the Trenton & Mercer County Traction Corporation, Trenton, N. J. Mr. Haar spent nineteen years in the employ of the Washington Railway & Electric Company, Washington, D. C., resigning a short time ago to join the Trenton company. Joining the Washington company in 1900 as an apprentice machinist he gradually worked himself up to the position of master mechanic. Mr. Haar was born in Philadelphia in 1883. In 1908 he was appointed foreman of the company's machine shop and in 1914 was promoted to the position of general shop foreman. Two years later he was made master mechanic.

Louis Resnick has resigned as general manager of the Associated Trade Press at St. Louis, Mo., to become director of publicity for the National Safety Council, which has a section operating in the electric railway industry. He will, however, continue with the press association in an advisory capacity as a member of the board. Mr. Resnick was formerly the resident news correspondent in St. Louis for the ELECTRIC RAILWAY JOURNAL. He received his preliminary newspaper training at the School of Journalism, University of Missouri. He has been engaged in newspaper work for nine years, four years of which he was with the Associated Press, and two years with the Associated Trade Press in St. Louis.

J. D. Whittemore, who has been appointed receiver of the West Virginia Traction & Electric Company, Wheeling, W. Va., is general manager of the company in active charge of operation. Before becoming connected with the

West Virginia Traction & Electric Company Mr. Whittemore was general manager of the Claremont Railway & Lighting Company, Claremont, N. H. He was at one time employed by the General Electric Company at Schenectady, N. Y., and later was transferred to Boston, working in the construction department. He subsequently entered the industrial engineering department of the Rochester Railway & Light Company, Rochester, N. Y. Prior to his connection with the Claremont Railway & Lighting Company, Mr. Whittemore was manager of the Gardner (Mass.) Electric Light Company.

Obituary

Patrick D. Fox, seventy-three years old, manager of the old Elizabeth, (N. J.) Horse Railway before it was absorbed by the North Jersey Street Railway, now the Public Service Railway, died recently at his home in Elizabeth. Mr. Fox was born in Ireland and lived in Elizabeth for fifty years.

John W. Marsh, superintendent of the Steubenville division of the Wheeling (W. Va.) Traction Company, died on Aug. 4 at Denver, Col., at the age of fifty-six years. Mr. Marsh entered railway work in July, 1888, as a motorman on the lines of the Wheeling Traction Company. In 1900 he was promoted to dispatcher and in 1902 he was made assistant superintendent of the Wheeling lines. When the Wheeling Traction Company took over the lines of the Steubenville, Mingo & Ohio Valley Traction Company in 1903, Mr. Marsh was appointed superintendent of that division which position he held until his death, being located in Steubenville.

George R. Webb, capitalist and organizer of electric railways and telephone companies, died at Baltimore, Md., on July 7 of heart disease at the age of sixty. Mr. Webb began his business career with the Baltimore & Ohio Railroad. Subsequently in connection with Harry Parr he constructed the Baltimore & Northern Railroad. Then with Alexander Brown & Sons, bankers, he consolidated the street railways of Baltimore, and for a short time he was the president of the amalgamated companies. Mr. Webb's activities rapidly broadened. He organized the Maryland Telephone Company, the Pittsburgh & Alleghany Telephone Company, Wilmington Light & Power Company and the Duquesne Light Company, Pittsburgh. At a later period, with Baltimore associates, he assisted in consolidating the electric railways of San Francisco, and with Pierre S. du Pont and Harry P. Scott he carried through to a successful conclusion the electric railways and light and telephone system of Wilmington, under the name of the Wilmington & Philadelphia Traction Company.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,

SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES

BUSINESS ANNOUNCEMENTS

Better Ordering of Rails For Fall Delivery

Traction Companies in the Market for Small Amounts—Government and Foreign Inquiries

Orders from traction companies for rails have been coming in in better volume recently. Truly, these orders have not been for normal amounts, but, although they are small in size, they are coming in from an increasing number of companies. Heavy T as well as girder rails are included in the ordering.

Fall demands are being considered, and at the present rate of shipments it is none too early, according to manufacturers, to place orders for delivery so the rails can be placed before winter. Inquiries too have been received in larger quantity for girder rails.

Some rail mills are not operating or operating on very small capacity. Depending on the section required, shipments run from sixty to ninety days. With the mill for a certain section of rail not running when the order for that rail is received, it is probable that the rolling will be held up maybe 60 days awaiting sufficient orders for that size to make a fair sized rolling. Orders coming in near the end of this waiting period could be shipped in rather quick time.

The Railroad Administration has asked for bids on 100,000 tons of heavy rails, and Uruguay has been inquiring for about 1800 tons of traction rails. Buying of light rails for mining and industrial work is also on the increase, and has a slight effect on shipments of traction rails.

Advance in Uniforms, Insignia and Equipment

Demands for Punches and Badges and Buttons Growing—Deliveries Reported to Be Lengthening

Orders for punches during the past month have been so large in volume that the demands cannot be supplied. The orders are constantly increasing and the sales are very heavy compared with previous months, regardless of the 10 per cent advance which has taken effect during the past six weeks. The rise in prices was necessary on account of wage increases that have been granted the punch makers. Although their demands for increases have been met and there has been no interruption owing to strikes, punch makers are from four to six weeks behind on orders.

The market is not strong in regard to uniform caps. Sales are only normal and deliveries are hard to make on account of labor difficulties. Caps are up approximately 25 per cent during the past month. Labor charges are higher, but leather visors, formerly quoted at \$14 per gross, have risen to \$20 per gross, and are chiefly the cause of the 25 per cent advance just announced. Uniforms have also advanced and one manufacturer advises that a new price list is out this week. The advance amounts to practically 5 per cent on both single and double breasted styles, which in the medium weight melton suits are quoted at \$25 to \$26. Further increases are dependent upon labor conditions. All demands are being supplied and deliveries range from two to three weeks.

Large Sales of High-Tension Insulators Made

Price Advance of 10 Per Cent in Effect—Export Business Growing But Competition Expected

Excellent sales are reported in the high-tension insulator market for the past week. One company received an order for 75,000 units for new construction work, and several large orders for stock or renewals approximating that number have been received. Still another manufacturer advises that an order for 60,000 units was just closed.

Foreign sales are increasing, the demand in Sweden being greater than in Spain and Italy, while those of South America remain normal. It is expected that with conditions becoming normal in England, competition may result in a decrease in exports of certain types of insulators, especially those of medium voltages. Ball-clay and China-clay, largely imported from England, are ingredients which American manufacturers must have. It is therefore necessary to import the raw material, manufacture the insulator and then compete with manufacturers in England who have the advantage of position relative to shipping, and also have the raw materials right at hand. During a recent interview with an English manufacturer's agent who was in the United States, the fact was brought out that the British are not now in a position to manufacture high-tension insulators.

The price advance which was predicted in last week's issue was made effective Aug. 11 and amounts to 10 per cent. Further increases depend upon the molders and the uncertain conditions in malleables which are now behind in deliveries.

Improvement Shown in Steam-Turbine Sales

Factory of One Large Company Working to Capacity on Units Up to 10,000 Kw.

With the resumption of peace conditions there has been a return of steam-turbine business which, according to one of the more prominent manufacturers, shows a healthy growth throughout the country. The Western, Middle Western and Southern sections, however, give evidence of quicker return to normal commercial conditions than the remainder of the country.

Steam turbines in sizes up to, say, 10,000 kw. are running in better volume than those of larger size, and orders are coming through in a satisfactory manner. The volume of ordering for units up through 10,000 kw. is such that a comfortable capacity is now being maintained in the shops, and the general growth of sales is continuing in a normal manner.

During the war many potential customers for these nominally smaller sizes were kept out of the market because they could not get priorities to enable them to increase their power-generating capacity. These orders are now being handled by the manufacturers. Customers who have need for units of larger sizes have been able to have their wants filled, and manufacturers are about cleaned up on these back orders.

SMALLER SIZES ACTIVE

Turbine prices are holding steady, and there is no evidence that there will be any downward revision. The industrials and central stations have come to realize this condition, and where the smaller sized units are required, as well as where their need can be anticipated in the near future, orders are being placed in good volume. Shipments for these sizes are in the neighborhood of six to eight months, and this is one determining factor in the decision to order.

As regards the larger sizes, it seems to take longer for customers to come to the realization that there is no downward tendency of prices and to get under way in their orders for turbines. Shipments are about ten months; so it would appear that in order to get into operation by next summer it is about time to consider the placing of orders. On these larger sizes over 10,000 kw. the factories are not working to capacity. There is, however, much proposition work on the boards. Foreign orders are being received in pretty fair shape.

A report from another prominent turbine manufacturing company is to the effect that its business in that line is less than before the war but that present prospects point to a large business in the near future.

Rolling Stock

Quebec Railway, Light, Heat & Power Company, Ltd., Quebec, Can., has ordered for the City Street Railway division ten new pay-as-you-enter cars. Five of these cars have been ordered from the Preston Car & Coach Company, Ltd., Preston, Ont., and five from the Ahearn & Soper Company, Ltd., Ottawa, Ont. Delivery is expected early in September. Prices were requested in these columns June 14. The following specifications apply to the new cars:

Number of cars	10
Type of car	Pay-as-you-enter
Seating capacity	42
Weight (total)	36,000 lb.
Length over bumpers	41 ft. 2 in.
Length of car body	29 ft. 8 in.
Width of roof	7 ft. 8 in.
Width at belt rail	8 ft. 0 in.
Length over all not to exceed	41 ft. 2 in.
Height, rail to trolley base	11 ft. 7 1/2 in.
Body (type)	Semi-convertible
Interior trim	Mahogany
Roof	Single arch
Air brakes	Westinghouse SME
Axles	Brill 4 1/2 in.
Bumpers	Channel iron bent to shape
Buzzers	Paraday System
Car trimmings	Car Builders
Conduits and junction boxes	Crouse-Hinds
Control (type)	Single-end West. K-35-D
Couplers and drawbars	Builders radial
Curtain fixtures	National Lock Washer Company
Curtain material	Fabrikoid
Destination signs	Craighead
Door-operating mechanism	Front only
National Pneumatic Company, hand operated.	

Fare boxes	Coleman No. 5 stationary
Fenders	H. B. Lifeguards
Gears and pinions	Nuttal B. P.
Hand brakes	Peacock
Heaters	Consolidated Car Heating Company
Headlights	Crouse-Hinds
Headlining	Agasote
Journal boxes	Brill
Motors	West, quadruple No. 533
Paint	Holland Varnish Company
Sanders	Brill "Dumpit"
Sash fixtures	National Lock Washer Company
Seats	Hale & Kilburn
Seating material	Rattan
Side and center bearings	Perry-Hartman
Track scrapers	Root
Trolley base	Nuttal No. 11
Trucks (type)	Brill 76-E-2
Ventilators	Utility "Honeycomb"
Wheels	Rolled steel
Miscellaneous	Conductors' and motormen's seats

Nipissing Central Railway, North Cobalt, Ont., has received two electric car bodies from the Preston Car & Coach Company.

The City of Saskatoon, Sask., has asked tenders to be sent in by Aug. 20 for five fully equipped one-man safety cars to be delivered before Dec. 1.

Montgomery Light & Traction Company, Montgomery, Ala., through its receiver R. Rushton, has asked the court for authorization to purchase ten additional safety cars.

Nova Scotia Tramway & Power Company, Halifax, N. S., according to a report of July 14, expects to buy shortly twelve or perhaps twenty new cars for its electric properties in Halifax.

Public Service Railway, Newark, N. J., on Aug. 13 lost eighteen cars in a fire which destroyed a carhouse at Camden, N. J. The loss is estimated at between \$100,000 and \$150,000. The cars, it is stated, must be replaced immediately.

Schuylkill Railways Company, Girardville, Pa., through its general manager, C. S. Bailey, has ordered three cars for this company instead of for the Morgantown-Wheeling Railway, Morgantown, W. Va., as was reported in these columns on Aug. 2. The equipment ordered for them was three Westinghouse 532-B. motors, five air-brake equipments and one 500-kw. rotary.

Track and Roadway

British Columbia Electric Railway, Vancouver, B. C.—Work has been begun by the British Columbia Electric Railway on the reconstruction of 5 miles of track in District 2, south of Tucks on Lulu Island. The work will cost about \$25,000.

Pacific Electric Railway, Los Angeles, Cal.—Standard girder rails will be laid by the Pacific Electric Railway on East Colorado Street, Los Angeles. The company will lay the new rails from Broadway to Lake Avenue this fall and next year will continue the improvement from Lake Avenue to Allen Avenue, the east city limits. The total cost of the proposed improvement will be about \$100,000.

Cripple Creek Short Line Railroad, Colorado Springs, Col.—It is expected that work will be begun early in September on the electrification of the Cripple Creek Short Line Railroad, which operates between Colorado Springs, and the gold mining camps in that section. Electric power for

NEW YORK METAL MARKET PRICES

	July 31	Aug. 12
Copper, ingots, cents per lb.	22.75 to 23.50	21.50
Copper wire base, cents per lb.	26.00	26.00
Lead, cents per lb.	6.00	6.00
Nickel, cents per lb.	40.00	40.00
Spelter, cents per lb.	7.90	7.65
Tin, cents per lb.	70.00 to 71.50	70.00
Aluminum, 98 to 99 per cent, cents per lb.	32.00 to 33.00	31.00 to 33.00

OLD METAL PRICES—NEW YORK

	July 31	Aug. 12
Heavy copper, cents per lb.	20.50 to 21.00	18.00 to 19.00
Light copper, cents per lb.	15.50 to 16.00	15.00 to 15.50
Heavy brass, cents per lb.	11.00 to 11.50	10.00 to 10.50
Zinc, cents per lb.	5.25 to 5.50	5.00 to 5.25
Yellow brass, cents per lb.	9.50 to 9.75	9.00 to 9.50
Lead, heavy, cents per lb.	5.50 to 5.62 1/2	5.12 1/2 to 5.25
Steel car axles, Chicago, per net ton.	\$28.00 to \$29.00	\$29.00 to \$30.00
Old carwheels, Chicago, per gross ton.	\$26.00 to \$27.00	\$26.00 to \$27.00
Steel rails (scrap), Chicago, per gross ton	\$25.00 to \$26.00	\$25.00 to \$26.00
Steel rails (relaying), Chicago, gross ton.	\$29.00 to \$30.00	\$29.00 to \$30.00
Machine shop turnings, Chicago, net ton	\$9.50 to \$10.50	\$10.00 to \$11.00

ELECTRIC RAILWAY MATERIAL PRICES

	July 31	Aug. 12
Rubber-covered wire base, New York, cents per lb.	28	30
Weatherproof wire (100 lb. lots), cents per lb., New York	30	33
Weatherproof wire (100 lb. lots), cents per lb., Chicago	30.75	30.75
T rails (A. S. C. E. standard), per gross ton	\$49.00 to \$51.00	49.00 to 51.00
T rails (A. S. C. E. standard), 20 to 500 ton lots, per gross ton	\$47.00 to \$49.00	47.00 to 49.00
T rails (A. S. C. E. standard), 500 ton lots, per gross ton	\$45.00 to \$47.00	45.00 to 47.00
T rail, high (Shanghai), cents per lb.	3	3
Rails, girder (grooved), cents per lb.	3	3
Wire nails, Pittsburgh, cents per lb.	3.25	3.25
Railroad spikes, drive, Pittsburgh base, cents per lb.	3.35	3.35
Railroad spikes, screw, Pittsburgh base, cents per lb.	8	8
Tie plates (flat type), cents per lb.	2.75	2.75
Tie plates (brace type), cents per lb.	2.75	2.75
Tie rods, Pittsburgh base, cents per lb.	7	7
Fish plates, cents per lb.	3	3
Angle plates, cents per lb.	3.90	3.90
Angle bars, cents per lb.	3.90	3.90
Rail bolts and nuts, Pittsburgh base, cents per lb.	4.35	4.35
Steel bars, Pittsburgh, cents per lb.	2.35	2.35
Sheet iron, black (24 gage), Pittsburgh, cents per lb.	4.20	4.20
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb.	5.25	5.25
Galvanized barbed wire, Pittsburgh, cents per lb.	4.10	4.10 to 4.20

	July 31	Aug. 12
Galvanized wire, ordinary, Pittsburgh, cents per lb.	3.70 to 3.80	3.70 to 3.80
Car window glass (single strength), first three brackets, A quality, New York, discount †	80%	80%
Car window glass (single strength, first three brackets, B quality), New York, discount	80%	80%
Car window glass (double strength, all sizes AA quality), New York discount	81%	81%
Waste, wool (according to grade), cents per lb.	14 to 17	14 to 17
Waste, cotton (100 lb. bale), cents per lb.	8 to 12 1/2	8 to 12 1/2
Asphalt, hot (150 tons minimum), per ton delivered		
Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. J.), per ton		
Asphalt filler, per ton	\$30.00	\$30.00
Cement (carload lots), New York, per bbl.	\$2.90	\$2.90
Cement (carload lots), Chicago, per bbl.	\$3.05	\$3.05
Cement (carload lots), Seattle, per bbl.	\$3.13	\$3.13
Linseed oil (raw, 5 bbl. lots), New York, per gal.	\$2.20	\$2.25
Linseed oil (boiled, 5 bbl. lots), New York, per gal.	\$2.22	\$2.27
White lead (100 lb. keg), New York, cents per lb.	13	13
Turpentine (bbl. lots), New York, cents per gal.	1.35	\$1.80

† These prices are f. o. b. works, with boxing charges extra.

the operation of the road will be purchased from two central station companies, one of which will be the Arkansas Valley Railway, Light & Power Company.

Chicago, North Shore & Milwaukee Traction Company, Highwood, Ill.—A new extension will be built by the Chicago North Shore & Milwaukee Traction Company down the Finer Road to the manufacturing region known as "the Flats" in order to accommodate the employees of the tannery of Johns-Manville Company, the Warden-Allen Company and other industries.

Baltimore & Ohio Railroad, Baltimore, Md.—It is reported that the Baltimore & Ohio Railroad is considering plans for the complete electrification of its system over the Seventeen-Mile Grade District.

Tampico, Mexico.—The Mexican Government has granted a concession to the National Norwegian Company for the construction of an interurban electric railway between Tampico and Tuxpam, about 120 miles, with branch lines to several smaller towns in the oil producing territory. The route of the proposed main line will closely follow the Tampico-Tuxpam intercoastal canal. The National Norwegian Company is composed of large banking interests in Copenhagen. It was organized under the laws of Mexico only a few months ago for the purpose of operating in the oil fields of the Gulf Coast region. It has established its principal office in Tampico.

Jersey Central Traction Company, Keyport, N. J.—The Board of Public Utility Commissioners of New Jersey has ordered the Jersey Central Traction Company to make improvements and extensions in its plant and system for general betterment in service. The work includes improvements on the Keyport-Perth Amboy Division, the Matawan-Keyport division and at Atlantic Highlands.

Brooklyn (N. Y.) Rapid Transit Company.—Bids will be received by J. H. Delaney, commissioner of transit construction, 49 Lafayette Street, New York City, until Aug. 19, for furnishing and installing tracks for a portion of the Culver Rapid Transit Railroad extending over and along Shell Road and West Sixth Street from a point near Avenue X to Sheepshead Bay Road.

Cincinnati (Ohio) Traction Company.—Street Railroad Director W. C. Culkins has ordered the Cincinnati Traction Company to extend the Sixth Street line over to Hopple Street viaduct to Beekman Street in order to relieve the congestion of the Clark Street and College Hill lines.

Sand Springs Railway, Tulsa, Okla.—A report from the Sand Springs Railway states that it is now building about 1 mile of sidings and industrial tracks.

Toronto (Ont.) Suburban Railway.—Plans are being made by the Dominion government for the extension of the Toronto Suburban Railway from Guelph to Kitchener, Stratford and London and perhaps on to Windsor or Sarnia, as

one of the links of the new Canadian National Railways system.

Portland & Southeastern Railway, Bend, Ore.—J. W. Foster, Portland, construction engineer for the Myler Construction Company, states that his concern will handle construction work for the newly incorporated Portland & Southeastern Railway Company, who will build from Mount Angel on the west side of the Cascades, to Bend, by way of Sisters. While no definite announcement has been made, it is authoritatively stated that the new road will employ electricity for its motive power. Leases have been obtained for power site purposes on Marion Lake in the Santiam National Forest in Curry County. This lake is said to have a capacity of 30,000 to 40,000 hp. The distance from the lake to Portland is approximately 100 miles. In regard to further surveys and construction after Bend is reached, Mr. Foster declared that construction from the summit of the Cascades to Bend by way of Sisters would be the first work to be undertaken.

Dallas (Tex.) Railway.—Improvements will be made within the next two to five years by the Dallas Railway under the Hobson-Strickland service-at-cost franchise that will represent an outlay of \$1,000,000 to \$1,500,000, according to Richard Meriweather, vice-president and general manager of the company. This expenditure will be absolutely necessary, Mr. Meriweather said, if the company is to continue to give the class of service now given and the kind of service demanded by the Dallas patrons.

Power Houses, Shops and Buildings

Los Angeles, (Cal.) Railway.—Plans have been prepared by the Los Angeles Railway for the construction of an office building on the northeast corner of Eleventh Street and Broadway. The structure will be 176 ft. x 65 ft., ten stories, and will be of reinforced concrete. The cost is estimated at \$400,000.

New Orleans Railway & Light Company, New Orleans, La.—A new carhouse will be erected by the New Orleans Railway & Light Company on Canal Street, New Orleans.

Cumberland County Power & Light Company, Portland, Me.—The Public Utilities Commission of Maine has issued an order that the Cumberland County Power & Light Company extend its transmission lines from the end of its present line near Gray Corner along the Poland Spring Road and through the Dry Mills settlement.

Public Service Railway, Newark, N. J.—The carhouse of the Public Service Railway at Newton Avenue near Haddon Avenue, Camden, together with twenty-one cars, was destroyed by fire on Aug. 12. The loss is estimated at \$150,000.

Trade Notes

Harry K. Hauck, formerly connected with the Bethlehem Steel Company, has been appointed general manager of the G. C. Kuhlman Car Company, Cleveland, Ohio, effective July 10.

Perley A. Thomas Car Works, High Point, N. C., announces that it is now moving its machinery into a new mill and is in position to give prompt attention to all new work and to repair work.

Harry G. Steele, director, vice-president and manager and one of the founders of the Pittsburgh (Pa.) Transformer Company, has sold his interests in and resigned from that concern. For twenty years Mr. Steele has been active in the electrical manufacturing industry, and it is understood that he will continue in the electrical manufacturing business.

French Insulator Factory Resumes.—Etablissement Charbonneaux et Cie., glass manufacturers at Rheims, on April 25 announced that they had restored to operation one oven for the manufacture of glass electrical insulators. This concern expected, if sufficient supplies of coal should be received, to be able to put a second oven in operation by Aug. 1 and a third about October.

M. B. Austin Company, Chicago, makes the following special announcement: "Trico renewable cartridge fuses have been regularly tested by the Underwriters' Laboratories and comply with all the necessary requirements up to and including 600 amp. in both the 250-volt and 600-volt classification."

Inquiry No. 30,051.—A general agency and eventually purchase of all articles for electricity, such as generators, motors, switches, commutators, small material such as wires and cables, insulating material for motors and generators, material for electric railways, rolling bridges, and measuring instruments of precision, are desired by a company in Belgium. Correspondence should be in French. Quotations should be given c. i. f. Antwerp. Payment, cash and credit.

New Advertising Literature

Black & Decker Manufacturing Company, 105-115 South Calvert Street, Baltimore, Md.: Attractively printed and illustrated catalog of its electric air compressors, portable electric drills and electrically driven valve grinders.

Bridgeport (Conn.) district salvage board, Ordnance Department: A weekly bulletin containing a list of all government property within the Bridgeport district available for sale. This property comprises buildings, building equipment, power equipment, materials, factory supplies, tools, machinery, etc. Communications should be mailed to chairman Bridgeport District Salvage Board, 945 Main Street, Bridgeport, Conn.