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THE PREVENTION OF STRIKES

In his message to Congress on Tuesday, President Wilson very clearly explained the difference between the action of an individual in doing a legal thing, as to stop work, and the concerted action of powerful bodies of men to do the same thing and so stop the industrial processes of the nation. The difference, in our opinion, is obvious; in fact, it is the basis of all anti-trust legislation. Society is undoubtedly justified in safeguarding itself in some way from conspiracies of this kind. As for the remedy, Mr. Wilson seems to incline toward legislation similar to that embodied in the Canadian industrial disputes act when he recommends an amendment of the existing federal statute by which, if the present methods for mediation provided by it fail, a full public investigation of the merits of the dispute shall be instituted and completed before a strike or lockout may lawfully be attempted. The occasion of the recommendation was, of course, the existing dispute between the railway trainmen and the steam railroad companies, but the principle would be the same when any community, to use the words of the President, finds "the necessary processes of its very life" imperiled. We do not consider the Canadian industrial disputes act a panacea for all labor problems. The final solution lies in a recognition by both capital and labor that their interests have far more objects in common than in opposition. But for the protection of the community until this fact is realized, the adoption of some plan like that suggested by the President is most important.

WEBB BILL SHOULD BE PASSED

With constructive railroad legislation imperative, it is apparent that other legislation must indeed be of vital interest to the nation to be accomplished during the present short session of Congress. In view of this fact, it is very significant that President Wilson in his message this week saw fit to include in a special group of desirable legislation the Webb bill, which embodies the principle of co-operation among exporters, with due safeguards against unreasonable restraint of domestic commerce. Yet it is not difficult to understand why the President considers this bill of capital importance. What his railroad program means to our domestic welfare, the Webb bill means to our influence and prosperity as a world trader. Present international conditions have opened the eyes of Americans to the possibilities of international trade, but if they are even to hold the trade that has been turned to them, to say nothing of expanding the foreign trade of this nation as they should, they must be allowed to adopt with full legal sanction those practices of fair combination that have made other nations so successful in foreign trade. The need is urgent, and the time is opportune. The Webb bill has already passed the House of Representatives. It should be enacted by the Senate without delay, unless its members wish to prove that their minds are of a provincial type.

PRACTISING THE ART OF PUBLICITY

Generalizing on the subject of publicity amounts to nothing. In the electric railway field there has been a great deal such generalization but comparatively little action. We learn to do by actually doing things, and each opportunity to practice the art of publicity must be embraced, for no theorizing will ever teach it. Such an opportunity was forced upon the Public Service Railway of New Jersey by the recent political campaign. The railway was introduced as one among a number of issues and certain candidates endeavored to gain political capital by attacking it. The answer to this was an announcement occupying half pages in New Jersey newspapers last week, of which the text was reproduced in the issue of the Electric Railway Journal for Dec. 2, page 1171. No one has told us who wrote this advertisement, but all who are acquainted with President Thomas N. McCarter, whose name is signed to it, will readily accept him as its author. Its wording is fearless, implying a conviction of correct dealing and, regardless of consequences, it hits straight from the shoulder. The occasion was one which fully justified this treatment. Many so-called replies to similar charges in the industry have temporized with the situation, or the replies have been so feeble as to be negligible.

SPIKING THE POLITICIANS' GUNS

We believe in the expression of personality in things corporate as well as in individual affairs, and any attempt to straddle the issues listed by the politicians in the case cited above or to issue a feeble reply would have been worse than no reply at all. If the story of the railway is being told fairly, fully and intelligently to the public, any attacks made by politicians and demagogs will fail of their purpose. The Public Service Railway has a strong publicity department which has done good work and could do more. This answer of Mr. McCarter's is the most powerful blow that it has yet struck. We welcome this advertisement as typical of the awakening interest of the electric railway industry to publicity and as a harbinger of the time when its standing with the public will be commensurate with its real strength. The

series of cartoons and talks on publicity now running in this paper is evidence of our convictions along this line. That the Public Service Corporation, of which the railway is a part, is aware of the possibilities of other phases of publicity is indicated by the splendid advertising copy which the Electric Company issued in connection with last Saturday's inauguration of flood-lighting of the Statue of Liberty in New York Harbor, for which the company furnishes power.

THE OUTLOOK FOR HIGHER NET RETURN

The reception which has been accorded to the plea of the Boston Elevated Railway for some relief from its present financial burdens is encouraging, we believe, not only to that company but to others which have felt the pinch of a constantly decreasing amount of net return. The Boston investigation, which is now being conducted before a special legislative commission, is undoubtedly the most important study of the kind ever conducted in search of remedial measures.

As might be expected, opinions in Boston differ somewhat as to the best means of putting the company on a more stable plane of development. Opposition to an increase of fare above the 5-cent unit and to any substantial curtailment of free transfer privileges is substantially greater than objection to plans involving the sharing of some of the company's burdens by the municipalities in its territory, through reduced taxation of the road itself or through a scaling down of fixed charges in Boston proper in connection with the rapid transit lines. At least there seems to be a growing sense of responsibility on the part of the public for rapid transit improvements which are ahead, and a very general appreciation that the company has been persuaded to "go the limit" in the past in assuming the continuing burdens of subway, elevated and tunnel construction charges which are so important a proportion of its yearly outlay. That some co-operative reduction in these burdens may be secured seems now quite possible in view of the attitude of the public so far in the case, if the commission in its thorough study of the company's situation comes to what seems to us the logical conclusion.

The company laid its cards face upward at the opening hearing, and there is no question that the thinking public has been greatly interested in the admirable brief summarizing the company's financial history and requirements which were printed and distributed at the outset of the proceedings. The general recognition of representatives of the public that the special commission itself must bear the brunt of the investigation is coupled with an equally general opinion that the exact working out of the problem of granting relief must also be left chiefly to that tribunal, assuming that the commission finds the company's plea valid. The question in the minds of the public, so far at least, seems to be one of ways and means, and the company is reaping the reward of its frank public relations policy in the attitude of the various improvement associations, boards of trade, etc., that have come to the hearings. Wholly apart from the question of details these proceedings are significant of a spirit of co-operation which ought to make the work of the commission easier and the solution of the company's problem free from the handicaps of a less friendly public opinion.

INSULATING THE TRANSMISSION LINE

The transmission line insulator problem seems to be a live one with interurban railways at present. This is true because of the increasing demand on the part of the public for continuity of service, the number of insulator replacements necessary each year and the increasing cost of new insulators. Many of the interurban transmission systems were built with the decade ending in 1907—the heyday period of electric railway promotion—and now the effects of the ravages of time are beginning to be apparent. When installed the insulators used on these lines were no doubt considered as of the first quality, but in both electrical and mechanical strength they were, as a rule, even when new, by no means the equals of carefully designed and manufactured modern insulators. In the early days the requirements of electrical porcelain were not as well known as they are at present, nor was as much attention given to the various ceramic processes involved in insulator manufacture.

Experience has shown that insulator deterioration has been caused largely either by the gradual absorption of water or by cracking due to mechanical stresses, the latter being the result of poor design and faulty manufacturing methods. In addition to these causes of failure within the insulators themselves, the decay and deformation of the supporting structures have further increased the mechanical stresses which the insulators have been called upon to withstand. Moreover, the increased power loads have tended to magnify the surge voltages which result from accidental grounds, insulator breakdowns and faulty switching, and therefore the electrical stresses imposed on the insulators. The present situation is that, on some roads at least, the matter of insulator replacements is assuming considerable importance.

The problem as it now confronts the railways presents two phases: the detection of defective insulators now in service, and the selection of a proper type of new insulator for replacement purposes. The continuity of service afforded by a line and the annual maintenance costs thereof reflect very closely the success with which the problem is being solved in a given instance. Both of these factors affect the net earnings of a railway, and the first named may be of some importance in its influence on relations with the public. It seems to us, therefore, that the insulator problem is one which well merits careful consideration by railway officials. In solving this problem they may well profit by the recent work of the technical societies which have been successful in bringing together the experts among the users and the manufacturers. These societies have proposed standard specifications which should prove a valuable guide in the selection of new insulators for a given service.

Getting the Employees to Help

Employees Who Do and Who Do Not Help Make the Company Popular

DISAFFECTED and disgruntled employees can tear down faster than any means of establishing good public relations can build up.

It is of no avail to insist that this should not be the case, because it IS the case.

And this being so, it is evident that good treatment of and being on good terms with platform men are very important factors in making publicity work effective.

If most of the public is "against the railroad" this feeling reacts on the employees.

They absorb the hostile virus, and, once infected, pass on the disease to those with whom they come in contact.

No one does much riding on electric railways without hearing passengers and conductors or motormen knocking the company to their mutual satisfaction.

This is a bad noise to hear in the machinery of any organization.

It is as easy as lying to fine and fire men for criticising the company; too easy to accomplish any good.

What is needed is the creation of such an attitude on the part of employees that they will stand up for the company instead of criticising it or agreeing with anyone else who does so.

Good treatment of employees is the only way to get good treatment from them.

The usual kinds of welfare work are admirable, but rest-rooms and pensions will not take the place of good wages and a voice—a chance for a man to get his grievances off his chest.

And, then, too low wages and too many long-swing runs or other grievances make an employer hardly less unpopular with the general public than with the employees immediately concerned.

When a company is giving its employees a square deal the public does not often know it, with the result that in case of trouble sympathy is all with the men.

Here is ANOTHER chance for the publicity man.

In one Eastern city where strikes had formerly been almost as regular as Washington's birthday an attempt by a small fraction to pull out the men recently fell flat, largely because the company has in later years done well by its men, and the people knew it.

Where a few years ago the men were almost incited to strike by popular opinion, this year they were told not to make fools of themselves and they didn't.

Late repentances and dashing into print just before and after a strike call has gone out cannot accomplish much.

Good relations with employees, like good relations with the public at large, are plants of careful cultivation and slow growth. The publicity man can make the plant grow faster and let people see it growing.

Remodeling a Small Railway Power Plant

Holyoke Street Railway Power Plant Lately Enlarged by Reconstruction of Boiler House and Replacement of Two Small Generating Units by Large Engine-Driven Set—Modernized Coal-Handling and Condensing Systems a Feature

Holyoke Power Plant—General Exterior View Showing Coal-Handling Crane, Coal Tower and Base of New Chimney

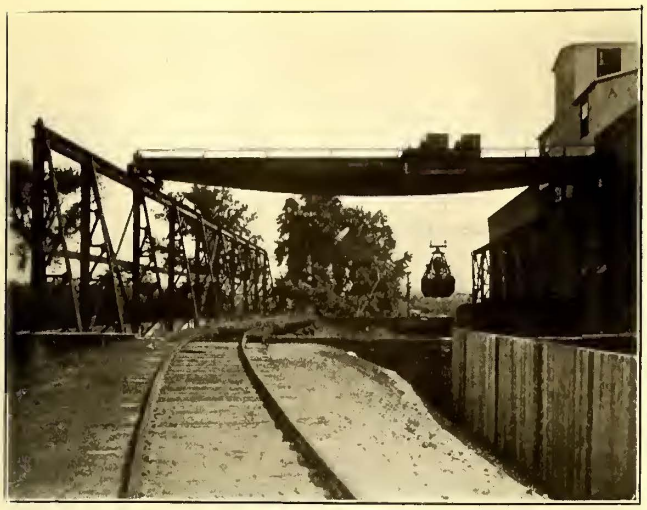
THE power plant of the Holyoke (Mass.) Street Railway has recently been reconstructed to meet increasing demands on the company's generating capacity, following a comprehensive study of the general power situation by the road's consulting engineer, G. E. Pellissier of Springfield, Mass., who drew the plans and supervised the installation of the equipment. The original plant had a rated capacity of 2650 kw. with five reciprocating engine-driven units, all generators being of the direct-current type with the exception of a motor-driven outfit of 75 kw. not included in the above and used in connection with the lighting of Mountain Park, a summer resort about 5 miles from the station. The plant now has a rating at the direct-current buses of 3550 kw., an increase of about 34 per cent in capacity having been secured by the removal of two 300-kw. units driven by 15-in. x 28-in. x 48-in. Greene tandem compound engines installed in 1895, and the substitution of a 1500-kw. generator of the interpole type, direct connected to a 30-in. x 60-in. x 54-in. Rice & Sargent horizontal cross-compound engine.

Besides the changes in prime movers above outlined, the boiler plant of the station has been remodeled, new and larger units replacing old equipment. A Taylor stoker installation and a Stephens-Adamson coal-handling system have been put in, a new chimney built, and improvements effected in the feed water supply and condensing systems. These are reviewed below, following an outline of the power problem of the company, based upon a report by its consulting engineer.

Reasons for Adhering to Direct-Current Generation

The street railway service of Northampton and Amherst is under the same management as the Holyoke company, and the power requirements at these points affected the development problem at the Holyoke station. The load of the Holyoke plant is nearly all located within about 4 miles of the station and the existence of other companies on the boundaries of the system offers little opportunity for expansion into the outlying country. From the distribution standpoint, the continued use of direct current appeared desirable. One of the plans considered was the installation of a 2000-kw. turbo-alternator at Holyoke for the supply of power to the Mountain Park and Amherst lines, with the erection of a substation at each point. It is a disadvantage, however, that the park is open only about four months in the year, and that for only a small part of that time is the power consumption large, while the fixed and operating charges would run the entire year with this arrangement. It was found to be undesirable, also, to transmit energy from Holyoke to Northampton, the existing cost at the steam plant of the Northampton Street Railway in that city not being enough higher than that at Holyoke to warrant the supply of a.c. power from the latter station.

Assuming that the Holyoke station was enlarged sufficiently to carry the Amherst and Mountain Park loads through substations, and that a 2000-kw. turbo-alternator was installed, it appeared upon analysis that in order to work the turbine at anywhere near full load it would be necessary to throw a part of the Holyoke load upon this unit. The maximum demand at Amherst and Mountain Park would probably not exceed 85 per cent of the output of this machine, and for the greater part of the year would not exceed 25 or 30 per cent of its capacity. To carry a part of the Holyoke load on the turbo set it would have been necessary to install transformers and either rotary converter or motor-generator equipment at Holyoke in order to obtain 550-volt direct current. The addition of these extra units would have made the floor space occupied at Holyoke about the same as though the extension of the plant were made along reciprocating engine lines. As regards efficiency under the best conditions, viz., constant full load, there appeared little to choose between turbine and engine sets, and in view of the losses in conversion and transformation, any possible increase in efficiency by the use of the turbine would have been more than offset.



HOLYOKE POWER PLANT—COAL POCKETS, TRACK HOPPER, RECLAIMING CRANE AND TOWER OF COAL-HANDLING SYSTEM

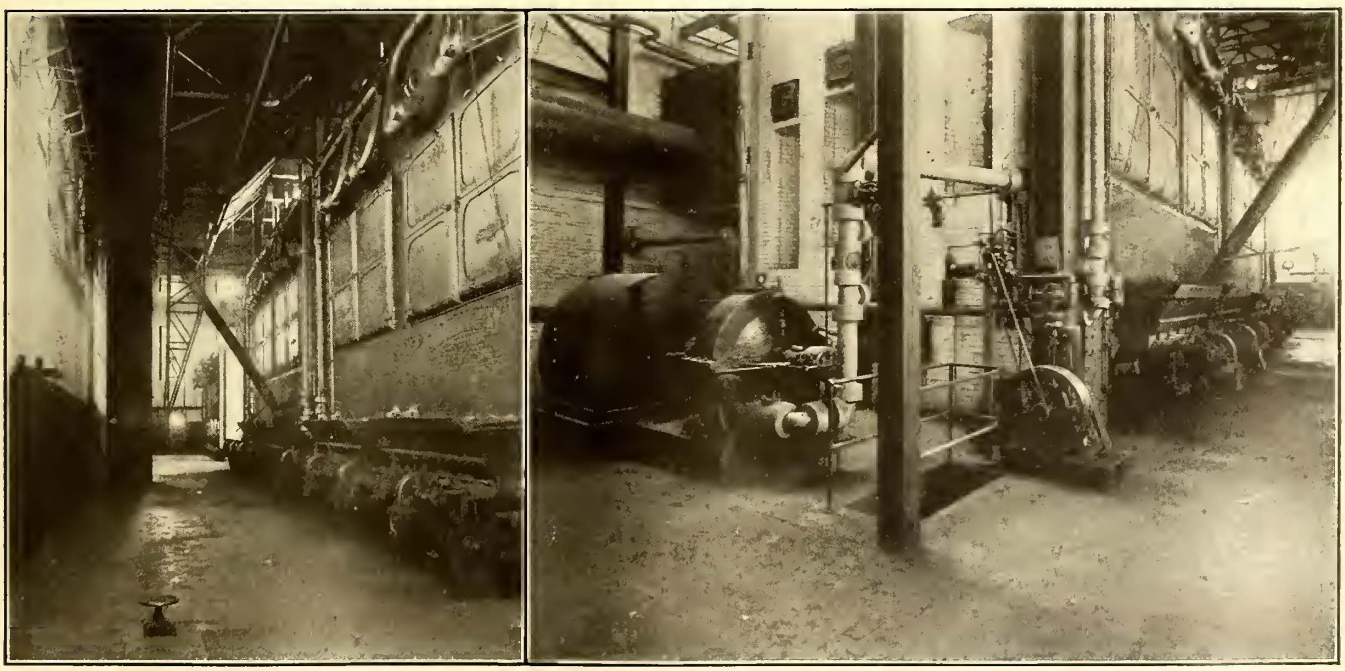
HOLYOKE POWER PLANT—FUEL ECONOMIZER, RESERVE BOILER FEED PUMP AND OTHER BOILER ROOM AUXILIARIES

With the use of a single turbine the reliability of service in the districts supplied by it would not be as high as on the lines supplied by the various engine-driven direct-current units, and the cost of duplicate a.c. units and transmission lines would have been prohibitive. Accordingly, it was decided to purchase power at Amherst from the Turners Falls Power & Electric Company, installing a motor-generator substation at that point, and the Holyoke station was reconstructed along purely direct-current lines, accompanied by a general overhauling of the feeder system.

FROM COAL PILE TO STOKER

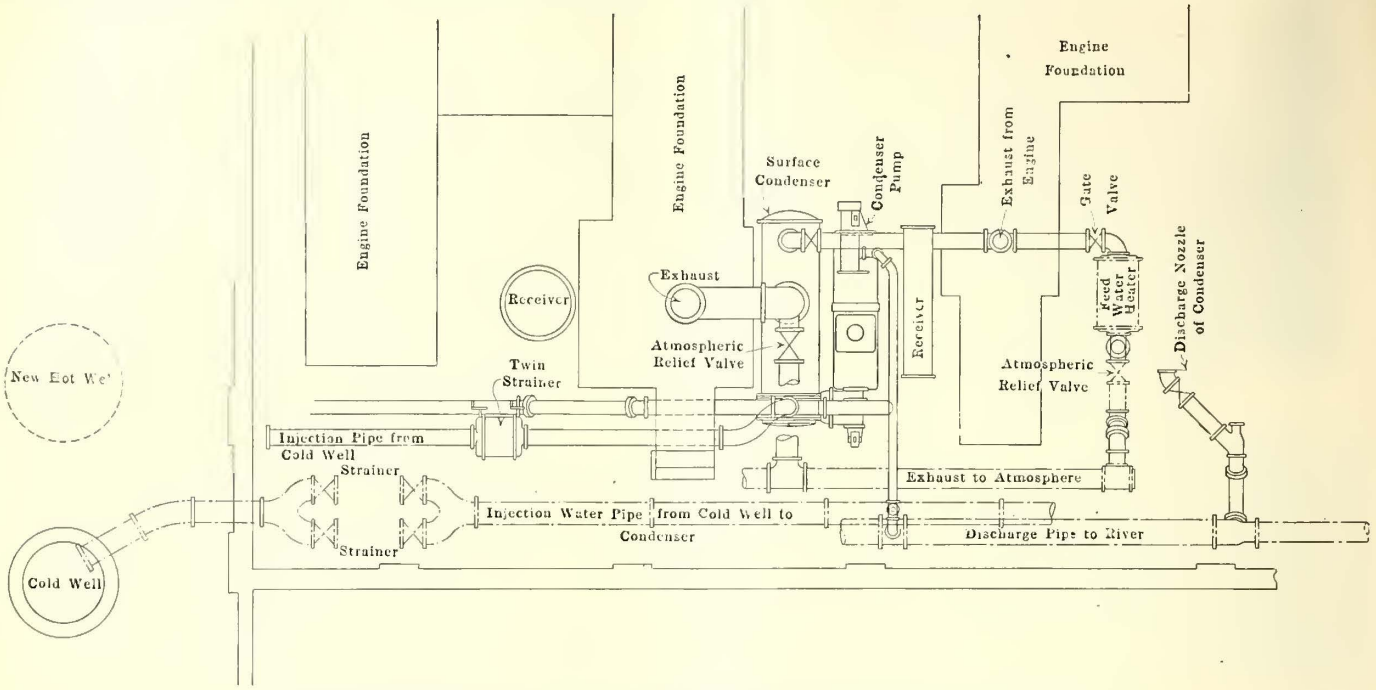
Run-of-mine bituminous coal is used at the Holyoke station. Fuel is either dumped or unloaded from coal cars outside the building for storage in the yard or deposited in a 12-ft. x 12-ft. steel track hopper, which is the beginning of the coal-handling system. A 5-ton Northern electric crane with a span of 60 ft. 6 in., equipped with a 1.5-cu. yd. grab bucket and operator's cage, facilitates handling fuel in the yard. From the track hopper the coal is drawn by an "S-A" reciprocating plate feeder, driven by a variable-throw eccentric which regulates the flow of coal. A 24-in. x 24-in. "S-A" double-roll coal crusher, driven by a 20-hp. motor, receives the fuel from the feeder, reducing it to 2-in. lumps and under, the crusher being driven by a 20-hp., 550-volt, direct-current motor. From the crusher coal is delivered to an "S-A" vertical bucket elevator, 53 ft. on centers, equipped with 14-in. x 18-in. buckets having a capacity of 40 tons per hour. The fuel is elevated to a sufficient height to permit the use of gravity in handling the coal in the remaining steps toward the stokers. From the discharge of the bucket elevator the coal is spouted through a bifurcated outlet to a suspension type bunker of 150 tons capacity. From the bunker the fuel falls through three "S-A" rack-and-pinion slide gates operated from the boiler room floor by hand chains. A powerful leverage is secured by the use of the rack and pinion design, and this, combined with the fact that the gate cuts into the fuel at right angles to the flow, makes operation unusually easy.

The connecting link between the storage bunker and the stokers is an "S-A" traveling weigh hopper. This



HOLYOKE POWER PLANT—FIRING AISLE IN BOILER ROOM; STOKERS, WITH ONE OF THE DUPLICATE STOKER ENGINES AND ONE OF THE DUPLICATE STEAM TURBINE BLOWERS FOR FORCED-DRAFT SYSTEM

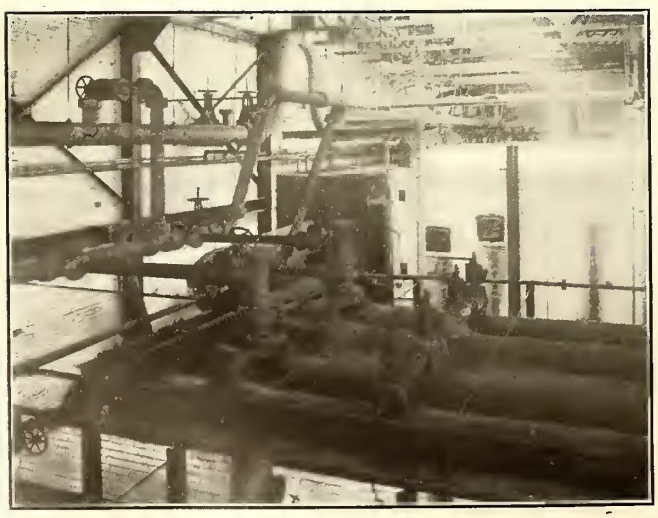
device serves to provide accurate operating records as well as to distribute the fuel. Thus the storage bunker did not require extending the length of the boiler room, being conveniently located so as to be filled by a single elevator and gravity chutes. In operation the desired quantity of coal is drawn from the bunkers, accurately weighed and recorded, and the hopper is moved and the coal discharged to any one of the stokers.



HOLYOKE POWER PLANT—PIPING CONNECTIONS IN ENGINE EXHAUST SYSTEM

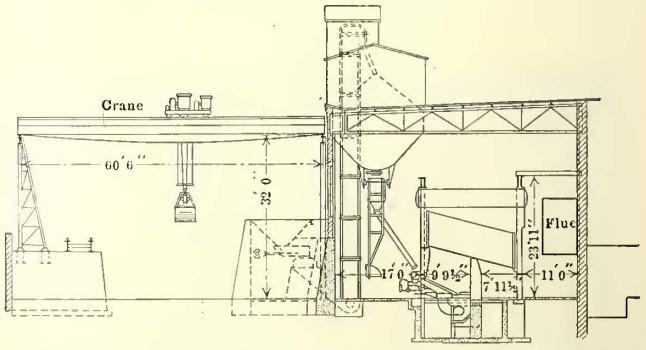
STEAM-GENERATING EQUIPMENT

Four new 500-hp. Babcock & Wilcox boilers equipped with six-retort Taylor stokers supply the present steam requirements of the plant. Three hand-fired Babcock & Wilcox boilers of 200-hp. rating each are held in reserve from the old steam-generating equipment. The new boilers replace one 307-hp. and two 342-hp. units of the hand-fired type, which were removed in the reconstruction work. A new brick stack of the Alphons Custodis type, 10 ft. in inside diameter and 175 ft. high, has been erected, and a new Greene fuel economizer, twelve tubes wide and fifty-two tubes long, with 12-ft. tubes, has been installed, replacing an economizer with 9-ft. tubes, six tubes wide and fifty-two long. Both stack and economizer are designed for a maximum boiler rating of 3000 hp.



HOLYOKE POWER PLANT—LIVE STEAM PIPING IN BOILER ROOM AS SEEN FROM CHIEF ENGINEER'S OFFICE

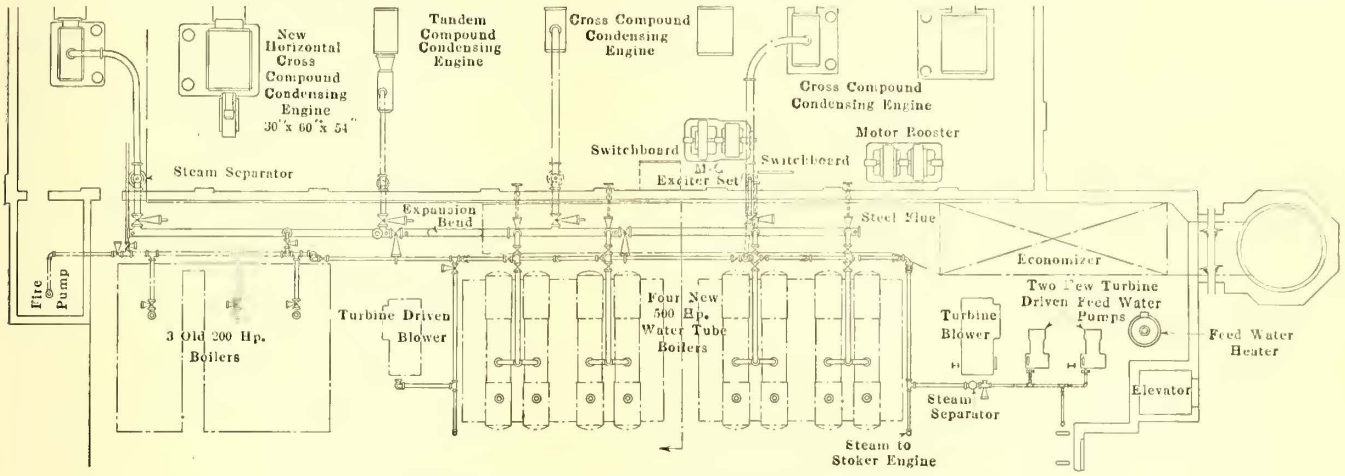
An air supply of 50,000 cu. ft. per minute for the furnaces is provided by two Sirocco blower sets, each direct driven by a 136-hp. Terry steam turbine running at 1640 r.p.m. normal speed. Either set is sufficient for the requirements. Two stoker engines, each 6 in. x 6 in., of the American Blower Company's make, are installed, and the speed of the blowers and engines is automatically controlled by a Mason regulator, which also governs the damper opening. Special care has been taken in the design of the air supply ducts to provide as short connections as possible between the main duct and the wind boxes, corners being rounded to reduce friction when feasible. The main duct is located behind the bridge wall, and the connections to each furnace are flared and cast-iron elbows employed, as shown in the accompanying illustration, the intakes making an angle in each case of about 40 deg. with the axis of the air duct. The economizer is by-passed by a duct carried under the floor from the end of the flue nearest the stack to an uptake discharging into the stack inlet at the north end of the boiler room, the usual dampers being provided.



HOLYOKE POWER PLANT—CROSS-SECTION OF BOILER ROOM AND OUTDOOR COAL STORAGE

Feed water is normally taken from a hot well outside the station, an auxiliary city connection being provided for emergencies. The new condensing installation is of the surface type, the circulating water discharge

being carried into this well and serving as a boiler supply. Water from the Connecticut River is used for the circulation supply, the latter being taken into a cold well outside the plant by gravity flow from the river. Three suction lines from this well lead to the condenser sets, strainers being installed in the leads in each case. The new condensing equipment was supplied by the C. H. Wheeler Manufacturing Company of Philadelphia, Pa. The feed water is normally handled by either of two 4-in. Jeansville three-stage horizontal centrifugal



HOLYOKE POWER PLANT—LIVE STEAM PIPING CONNECTIONS

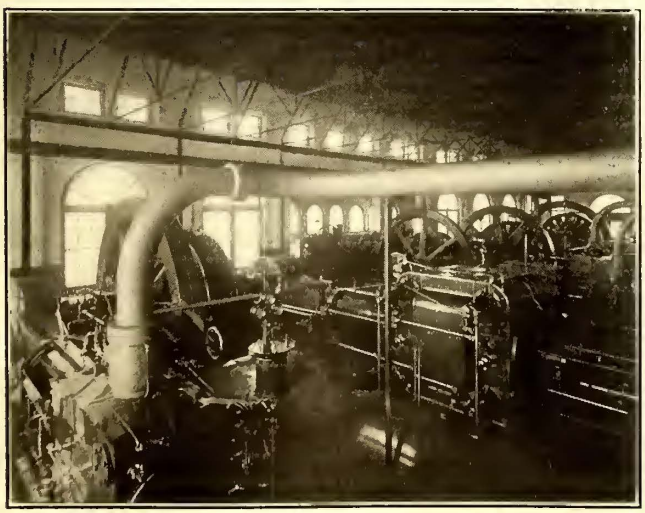
pumps, each direct-connected to a Terry steam turbine operating at 3000 r.p.m., and located in the boiler room basement. One Deane feed pump used with the former station equipment is held in reserve, and a Deane fire pump is in service, the latter being piped for feed-pump work in emergencies. Water taken from the hot well at 100 deg. Fahr. passes through a feed pump into a 2500-hp. National closed heater, through which steam from the auxiliaries is passed. Leaving the heater at 205-210 deg. Fahr., the water temperature is then raised to 270 deg. Fahr. in the economizer, thence entering the boilers. A 5-in. Venturi meter, with extra 2-in. throat to measure feed water during the night when the load is very light, is installed in the feed water main piping, with dials and recording mechanism in the office of the chief engineer, C. L. Sheldon.

Without the mechanical stoker installation it would be necessary in this plant to operate three or four boilers, whereas with the present installation two boilers are sufficient for all the steam requirements. About 25 tons of bituminous coal are burned per day in the plant under normal load conditions, but in the summer and winter peaks about 30 tons are burned. The use of stokers and of the automatic coal-handling system has enabled the operating force in the station to be reduced from a former total of eighteen men to a present total of fourteen. The various improvements have also reduced the fuel consumption from an average of about 3.5 lb. per kilowatt-hour before the changes were made to 2.3 lb. per kilowatt-hour at switchboard, which includes steam for auxiliaries.

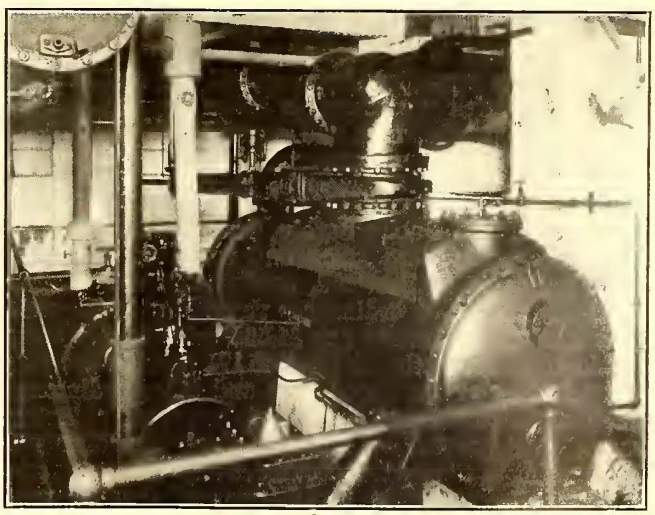
Ashes are at present dumped from the grates upon a concrete shelf in the boiler-room basement. A passageway is provided at one side of this shelf and equipped with a narrow-gage track upon which ash cars can be operated later to a hoist for yard delivery. About 12 per cent ash is obtained in the present fuel combustion, all ashes being weighed.

From Boiler to Hot Well or Switchboard

At the rear of the boilers and about their settings are carried two live steam headers, one 10 in. in diameter for prime movers and a 5-in. auxiliary line. The two headers are cross-connected at various points, and the steam delivery lines from the boilers are 6 in. in diameter in the cases of the new units and 5 in. in diameter in the older installation. Short connections with a gate valve in each are carried through a fire wall between boiler and engine rooms through separators to the corresponding engines, with the customary expansion bends. The steam connections to the auxiliaries are made as short as possible.



HOLYOKE POWER PLANT—ENGINE ROOM IN RECONSTRUCTED PLANT



HOLYOKE POWER PLANT—SURFACE CONDENSER WITH AIR AND CIRCULATING PUMPS

Besides the Rice & Sargent engine, the engine room contains a 15-in. x 28-in. x 48-in. Greene tandem compound engine direct connected to a 300-kw. generator; a 26-in. x 50-in. x 48-in. Hamilton cross-compound engine direct connected to an 850-kw. generator, and a 30-in. x 60-in. x 54-in. Pennsylvania Corliss cross-compound engine direct connected to a 1200-kw. generator. The Greene and Hamilton engines have been rebuilt to operate at 150 lb. pressure, these outfits formerly having been designed for 125 lb. The main generators are 550-volt General Electric multipolar railway type direct-current machine. The Greene and Hamilton engines operate at 100 r.p.m., the Pennsylvania Corliss at 90 r.p.m., which is the speed of the Rice & Sargent engine. The last named is designed with cylinder ratios which will permit its operation in connection with a low-pressure turbine if further expansion of the station becomes necessary along alternating current lines. The electrical equipment of the engine room includes the usual railway type direct-current switchboard, with General Electric equipment throughout and a 120-kw. General Electric booster with a maximum rating of 450 volts and 310 amp., used in feeding the Amherst line. The Mountain Park lighting service is handled by 2300-volt, 60-cycle energy supplied by a motor-generator of 75-kw. rating previously mentioned. Overhead feeders supply the distribution system.

As stated, C. H. Wheeler surface condensers are used in the remodeled station, these being installed in the engine room basement and so arranged that a pair of engines can be exhausted into each if desired, or two of the engines can be operated on surface condensers and the other two on the Deane jet condensers left over from the old installation. The Rice & Sargent engine exhausts into a surface condenser equipped with a 16-in. x 32-in. "Rotrex" air and vacuum pump, and a No. 10 centrifugal pump, direct driven by a 9-in. x 8-in. vertical engine. The Greene engine adjacent to this unit may be exhausted into the surface condenser or into a jet condenser. The Hamilton engine exhausts into a surface condenser with a "Rotrex" air and vacuum pump of the foregoing size, but provided with a No. 8 centrifugal pump and an 8-in. x 8-in. vertical engine. All of these units may be exhausted into the atmosphere if necessary. A 28-in. vacuum or better is readily obtained with this installation. All the condensate from the engines is discharged into the river below the plant through a discharge well piped to the channel and connected with the hot well by an overflow line leading from the latter. The utilization of circulating water after its passage through the condenser tubes is highly advantageous in connection with the feed water supply. A closed circuit oiling system with White Star filters in the basement is in service.

The station operating force consists of a chief engineer, three watch engineers, six boiler room attendants, three oilers, a repairman and a coal assistant.

According to a report compiled by Harry P. Coffin, chairman of the Public Safety Commission, Portland, Ore., two people were killed and forty-six injured in traffic accidents in Portland, during October. Failure to comply with city ordinances regarding traffic violations caused offenders to pay $1,562 into the city treasury during the month. A total of 171 people were fined for violations of the speed laws and other ordinances, ninety-eight were continued for sentences, nineteen warned, 116 paroled by captains, thirty-one dismissed and six sent to the juvenile court. Three men were sent to jail for breaking the speed laws and three escaped after they had been arrested by officers.

Some Phases of the One-Man Car Question*

The Author Discusses Design and Equipment, Operation at Steam Railroad Crossings and Methods of Introducing One-Man Operation

BY C. D. CASS
General Manager Waterloo, Cedar Falls & Northern Ry., Waterloo, Iowa.

IT is particularly to some of the variations in methods of operation and character of one-man cars that this paper is devoted. First, as to the character of the cars, it may be said that some lines have found it impossible to purchase new equipment and have been compelled to rebuild old equipment. The controlling idea in the designing of new equipment or the rebuilding of old, of course, is the entrance and exit of passengers through the front vestibule past the operator. On old equipment in some cases it has been found impossible to provide a large enough entrance to permit of entering and alighting at the same time. A large entrance is a desirable feature of one-man cars, and its absence causes complaints from the public.

In all cases it is necessary to provide a door-opening mechanism to be controlled by the operator, and a fare-collecting scheme also under the control of the operator. Very satisfactory results have been obtained with manual mechanical contrivances for door-opening mechanisms, and on our small road these have been put on at a nominal cost and have been fairly satisfactory.

The near-side stop, of course, is desirable. Rear doors are closed and locked in such a manner as they cannot be opened from the outside. Some state commissions have required companies to furnish emergency exits in the rear of the car controlled by the operator. In other states this has not been required, and it has been found sufficient to provide at the rear doors a locking device which can be operated readily in an emergency by the passenger. In building new equipment for one-man car operation perhaps the Illinois Traction Company has been the most successful in obtaining car designs that meet the fancies of the public most completely. New cars have been designed by the mechanical department of the Illinois Traction Company which operate the doors and steps by pneumatic engines and the cars are completely equipped with air brakes and sanders. In my opinion these one-man cars are the best designed for the purpose in the United States, and inasmuch as the Illinois Traction Company is represented on your membership, I suggest that further details of the design of these cars be obtained from that source.

Now concerning operating features: Probably the most discussed subject, and the one on which there has been the greatest variation of opinion, has been the method of operation over steam railroad grade crossings. I find almost as many methods in use at steam road grade crossings as there are companies operating one-man cars. Some companies provide flagmen at the crossings, the wages for such flagmen being paid either jointly by the steam and electric company or else wholly by the electric company. Other companies require the operator of the car to flag himself across steam road crossings, and various other methods are being used. This was the one subject in my particular case which required the most courage to handle. I contend that the flagging of a steam road crossing by a conductor on a two-men car has resulted in increasing the hazard of operation over steam road crossings. The theory

*Abstract of a paper presented before the Chicago meeting of the Illinois Electric Railway Association, Nov. 28, 1916.

on which this method was built was perhaps correct, but the element of human fallibility was not given sufficient weight in arriving at the solution of the problem. It is the old story of divided responsibility increasing the hazard. With this in mind when we started our one-man cars, the plan inaugurated was for the operator of the one-man car to bring his car to a full stop just in the clear of the steam road crossing, and then with the entire weight of responsibility upon him, if the crossing was clear, he could proceed in safety. He did not depend upon a conductor or anyone else; he knew the responsibility rested solely upon him, and with us it has proven itself safer than the old plan of the flagging of the crossing by the conductor.

I reached the conclusion of permitting operation in this manner after considering the operation of motor car traffic and team traffic over railroad crossings. It was apparent to me that there was no more reason why the operator of a street car could not cross a steam road crossing safely than the operator of an automobile could cross such crossing safely. And with the additional precaution of requiring a full stop, which is not required of automobiles, I felt that safety was completely secured. It has been contended that the electric railway should join the steam railway in providing safety signals, crossing gates, crossing flagmen or some other safety precaution. I take issue with anyone advocating this for the following reasons: First, all the courts in the land have held times without number that a street car is a part and parcel of the ordinary traffic of a city street, and this being true, there is no more reason why an electric street car line should be required to pay for protection at a steam road crossing than there is for an automobile owner or a taxicab owner or the owner of any other vehicle to be required to pay for such protection. I maintain that if means for protection are required at a steam road crossing to safeguard street car traffic, then means for protection are required to safeguard vehicle traffic of all kinds, and in that case it is the duty of the steam road that creates the hazard to protect the public against such hazard. In case the hazard is apparent to all, it must be equal in extent to all using the crossing, and the parties responsible for creating the hazard should be responsible for the elimination of it.

One more phase of this subject is the attitude of the public and the necessity of careful planning before the inauguration of one-man car service. In a city that has become accustomed to street cars manned by two men, the advancement of the one-man car idea is apt at first to be received by the public with intense hostility. This is perfectly natural, first, because of the habit of seeing two men on cars; second, on account of the sympathy of the public with the men displaced by one-man operation, and third, in our particular case, an issue was required for a municipal election just at that time, and the one-man car subject was immediately available and peculiarly popular.

Experience, despite the advancement of education, remains always the best teacher. It will be found that schedules must be slightly lengthened. The problem of transfers and trip reports must be carefully solved. For those companies that can afford it, new cars designed for one-man operation are to be recommended. More frequent service on thinly served lines will help in a large measure to pacify the public. If these things be kept in mind and the foundation for one-man service be built with a frank, open statement concerning its necessity, there should be no difficulty in obtaining in advance the sanction of a fair proportion of street car riders, and when the system has been installed and is working smoothly you will find that the traveling public will be entirely satisfied and that you have offset to a very large extent the unhealthy condition of your street car revenues.

Modern Requirements Fulfilled by One-Man Cars*

The Author Cites Operating Records for One-Man Cars on an Important Line in the City of Fort Worth, Tex.

BY C. H. BECK
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IN the following paragraphs, which deal with the operation of light-weight units controlled by one person, the name "safety car" has been adopted for such units. To those who have become closely associated with the operation of such cars, it has appeared important that the term "one-man car" should be discarded, for the reason that, in the first place, it does not especially distinguish the car, since the operation by one man is only, after all, one of a number of important features. Also, the term gives rise to the suggestion that a great number of men are to be turned out of work, and is, therefore, likely to prove unpopular.

It has been the writer's pleasure to have been associated with the introduction of ten cars of this type to service on an important residence line in the city of Fort Worth. The question of adaptability of such a car has never been seriously doubted, so far as its application to small lines is concerned, but the instance referred to is one in which such cars were placed in operation on a first-class line. The cars were of the double-end type and weighed 12,500 lb. They were so equipped that the brakes, as well as the doors and steps, were controlled from a single valve handle. Furthermore, a safety element was combined with the operation of the controller through a device similar to the well-known "dead man's handle."

Under this arrangement the braking positions are in no way complicated by the addition of door-operating ports, and the stop is accomplished in almost exactly the same manner as has been the standard practice. After the stop is made, a simple movement of the same handle is all that is required to open the door and step. When the work of unloading and loading has been accomplished, a movement of the same handle in the opposite direction, closes the door and step and releases the brake, and the car is ready to proceed.

The service previously given on this line was fifteen-minute headway in non-rush hours and seven and a half minutes in rush hours, the original type of car being a double-truck, double-end car, having a seating capacity of forty passengers. The physical characteristics of the line are such as would constitute a most difficult problem for making experiments, for the reason that the line is of single-track construction with a great number of switches and curves and with practically no level track. The length is 3.32 miles, making a round trip of 6.64 miles. The running time for round trip was forty-five minutes, thus making an average schedule speed of 8.8 m.p.h. The average number of passengers handled per day was 3860.

With the safety cars a non-rush-hour service of ten-minute headway and a rush-hour service of five-minute headway was installed, thus reducing the headway by one-third or, on the other hand, increasing the car service 50 per cent. The time for round trip was reduced to forty minutes, making an average schedule speed of 9.9 m.p.h., or an increase of 12.7 per cent. The

*Abstract of a paper presented before the Chicago meeting of the Illinois Electric Railway Association, Nov. 28, 1916.

number of passengers for the first fifteen days of operation of the safety cars averaged 4510, or an increase of 16.8 per cent. The increase in car mileage was practically 50 per cent and, as would be expected under the circumstances, the receipts per car-mile decreased.

By means of a meter at the substation, it was found that the old cars were operated on a basis of 2.4 kw.-hr. per car-mile, and by the same means it has been discovered that the new cars are being operated on the basis of 1 kw.-hr. per car-mile, with prospects of slightly reducing the cost of operation of the new cars after the men become familiar with the operating conditions. The figure on the power consumption, of course, includes line losses in each case. With respect to the question of power consumption generally, it has been found that the safety cars are being operated under a 25 per cent reduction in total kilowatt-hours per day, as compared with the old type of car, notwithstanding the improvement in service amounting to 50 per cent increase in car-miles per day.

The volume of patronage on this line is distributed in such a manner that a peak load is created in the morning and evening, with the greater peak, of course, coming in the evening. It has been observed in this connection that the peak is not an instantaneous affair, but is fairly well distributed over a period of twenty-five or thirty minutes. Under the five-minute headway the maximum loads were observed to have been less than was the case under the original seven-and-one-half-minute headway, as might have been expected, but were not of such great proportions as to fill the safety car uncomfortably, although it seats only twentyeight passengers.

The cars have been controlled by one operator from the beginning of the service, which was Nov. 1 of this year, and as may be inferred from the increase in average schedule speed, no difficulties have been encountered with respect to making change or issuing transfers. As a matter of fact, a study of the data given will reveal that the operation has been a complete success from every point of view, and has carried with it all that could be desired from an operating standpoint.

The time of boarding and alighting for any given number of passengers up to ten and twelve was carefully observed in connection with the operation of old cars. While the new operation has not been established for a sufficient length of time to assure that the majority of patrons are well familiar with its arrangement, at the same time such observations as have been made indicate that the time for boarding and alighting in this case will appear almost as favorable for, say, one or two passengers, and will appear more favorable for a greater number of passengers. A remarkable condition was found in checking the new car service, in that the traffic is more evenly distributed and, as might have been expected with the improvement in car service, the total number of passengers boarding and alighting at any point is much less than with the cars operating under the longer headway.

With respect to the car operators, these men were chosen from among the regular force, some having previously been conductors, some motormen and some both. It became apparent that those who had operated both ends of the car previously, and therefore were familiar with not only running the car but handling change and transfers, were able to attain a great degree of proficiency in the new operation very quickly. Those who had not enjoyed experience in both directions, however, readily adapted themselves, and within a remarkably short time all were able to make the schedule, and at this time, after twenty-four days of operation, they are apparently just as enthusiastic and well pleased with the new form of service as are the patrons and officials of the organization.

Since no loops are provided at the end of the line, it is necessary to change ends of the car, and arrangements are now under way to provide two trolleys per car, so that it will not be necessary for the operator to leave the car at any time.

Under the old system of operation, the fact developed that the northbound traffic (toward the center of the city) was only 85 per cent of the southbound traffic. This indicates a great possibility that a considerable number of patrons were being carried toward the city by other means of conveyance, probably by their friends who owned automobiles. Since the advent of the more frequent service, the ratio has increased considerably until it is now nearly equal as between the northbound and southbound traffic. This means that the prospective passenger is being provided with a service such that long waits on street corners are not necessary. As a matter of fact, under five-minute headway there is a car in sight nearly all the time. The line on which the safety car service was started had not previously been served by jitneys.

It is to be remembered that the cars are of single-truck type, but they have been found to ride as easily as double-truck cars. The only reason that can be assigned to this most desirable feature is that they are of extreme light weight and that the effect of momentum at low joints, switch points, etc., is not so great as with the old type of single-truck car. The acceleration is considerably greater than that experienced with the older type of car.

Government Operation Is Defective

Representatives of the Merchants' Association of New York City will appear before the Newlands investigating committee in Washington, D. C., to oppose Government ownership of public service corporations. The association has issued in pamphlet form the arguments which it has instructed its representatives to offer the committee. In this pamphlet the association says that the fundamental defects of Government operation are:

1. Dilatory, inconsistent, vacillating, and therefore ineffective and wasteful policy.
2. Unsuitable, inefficient, and frequently changed executive organization.
3. Hampering limitations upon executives.
4. Lack of self-interest as an incentive.
5. Lack of standards of efficiency.

Continuing, the association says:

"The fundamental assumption which underlies the argument for government ownership and operation of public utilities is that a profit equal to that now secured by private corporations through private operation can be secured for the public benefit by public operation; or that, as an alternative, by the elimination of profit, service may be increased or charges reduced. This implies that public management will be as economically, efficient and productive as private or corporate management. This assumption is unwarranted. On the contrary, it can be shown that government management is fundamentally defective in important particulars; that its defects are inherent in and inseparable from our system of government, and that these defects make relative inefficiency and lack of economy inevitable."

One of the first steps toward the centralization of work and departments in the Kansas City (Mo.) Railways is the reduction in districts for roadmasters from five to three.

$96,371,300 Expenditure by 1926 Recommended for Chicago Traction

Report of Chicago Traction & Subway Commission Includes Plans for Subway Construction for Rapid Transit and Surface Cars Through Central Business District, Conversion of Present Elevated System Into Completely High-Speed Express System and Extensive Rearrangement of Traffic in Loop District

[The report of the Traction & Subway Commission of Chicago, insofar as the general plan is concerned, has been given out to the press, although it will be three weeks or more before it will be ready in its entirety to submit to the City Council. This premature publicity of the general scheme in advance of the completion of the great mass of supporting data and information, and in advance of the financial plan, is precipitated through a so-called "scoop" of an unscrupulous Chicago daily newspaper. The engineering studies, which are most unique and exhaustive in nature and form the background for the conclusions in the general plan described herewith, will appear in these columns as rapidly as they take final form.—EDITORS.]

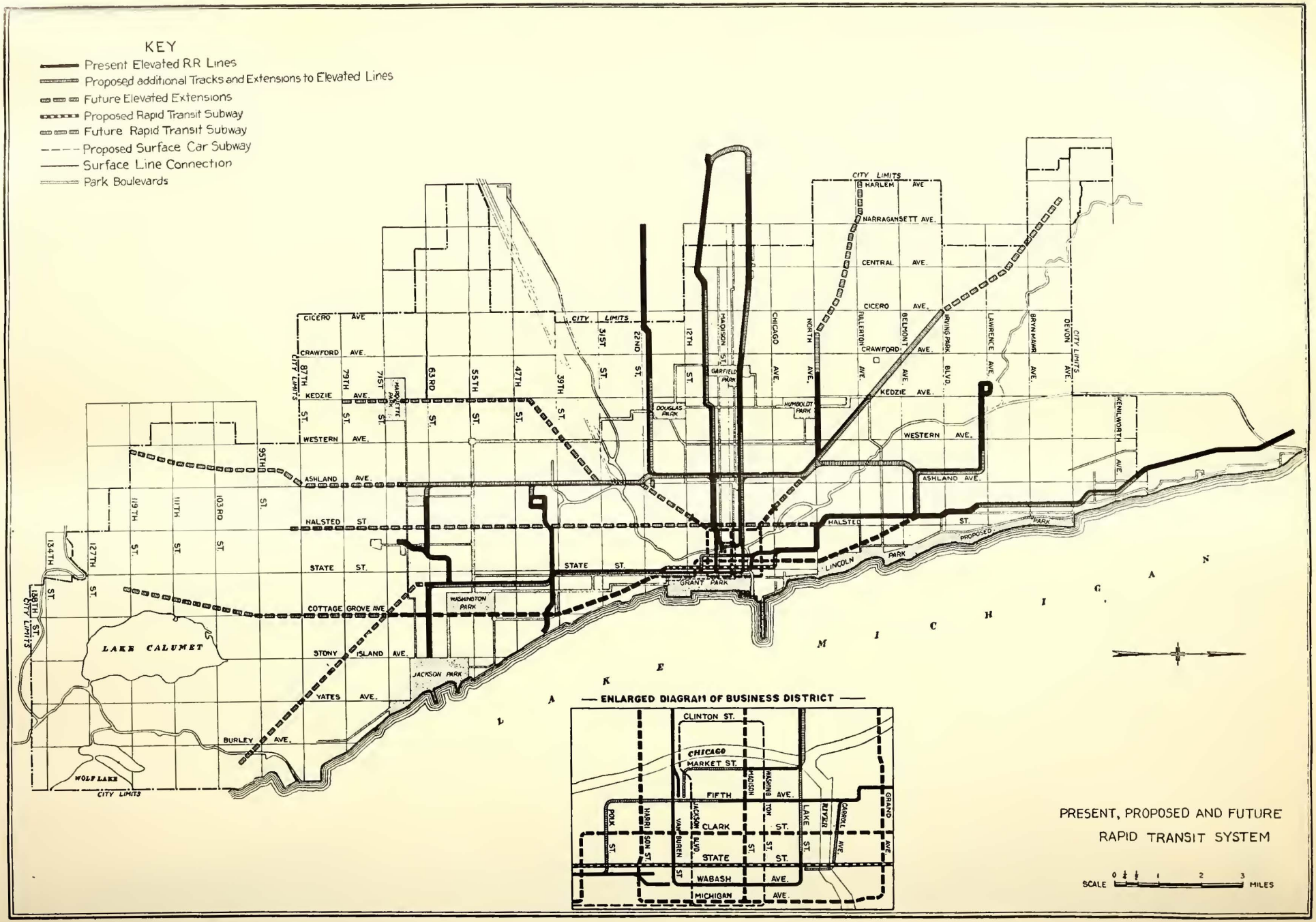
APPROXIMATELY $100,000,000 is the estimate of the cost of providing the city of Chicago with an adequate rapid transit system and relieving the congestion in the central business district, as developed in the report of the Chicago Traction and Subway Commission, of which William B. Parsons, Robert Ridgway and Bion J. Arnold are the commissioners, and H. M. Brinckerhoff is chief engineer. The expenditure of this sum is called for in the course of nine years, divided into three equal periods. The immediate construction program for the period 1917 to 1920 calls for an expenditure of $60,553,000, the second period $24,516,300, and the third period, principally for additions to rolling stock and extensions of the surface lines, $11,302,000. The ultimate investment to carry out the plans of the commission through the year 1950, with a Chicago of 5,000,000 inhabitants, is placed at a minimum of $260,000,000.

The general physical plan of the traction system is elaborate in its scope, and aims to provide main rapid transit lines that will serve all parts of the city, distribute traffic, relieve congestion and carry people to and from all the business districts of the city, whether central or outlying; to provide rapid transit routes outside of the loop district, enabling through passengers to travel direct without being unnecessarily diverted into or through this district, and to give direct facilities to outlying centers; to provide additional and better means of travel through the central district with a view to broadening its area; to relieve surface congestion wherever necessary and carry as many West Side cars to the lake front as practicable through subways in the loop district, and to provide express service on all parts of the present elevated system.

The conclusions and recommendations of the commissioners provide, briefly, for the unified operation under one management of all of Chicago's local transportation facilities with the control vested in the City Council, but giving to a board of supervision and control the broadest possible powers as to improvement and regulation of service, development of the property, extension of facilities and other administrative matters. The existing companies are to surrender their present franchises and receive in lieu thereof a franchise to the new corporation, terminable at any time by the city by purchase, by amortization, or by forfeiture if the corporation fails to comply with the provisions of the ordinance. The city's present traction fund will be used for the construction of the subways, which it is planned will be owned by the city from the start. The future divisible net receipts are to be shared by the city in such a way as to facilitate acquisition of the properties. A 2-cent charge for transfers between surface and rapid transit lines is tentatively planned to help carry the heavy capital expenditures of the construction period, but this charge is to be gradually eliminated after construction work is completed, if and as the earnings of the corporation permit. The present free transfer privileges between surface lines and between elevated lines are to be retained. The report also will provide a financial plan, not yet completed, whereby the city and the corporation owning and operating the consolidated companies will each receive the current rate of interest upon the traction fund and new capital as furnished by them from time to time to develop the system. The corporation will receive 6 per cent upon the total valuation of the existing properties at the time of consolidation. A suitable sinking fund (amortization) provision is to be made, and thereafter a division of net receipts on the present basis between the city and the corporation; that is, 55 per cent to the city and 45 per cent to the corporation, provided that the corporation shall receive for its share at least 1 per cent of the gross receipts. The initial nine-year construction program will increase the rapid transit facilities of the city two and one-half times the present rush-hour schedule and call for the construction of 11.1 single-track miles of double-track subway, of which 6 miles are for rapid transit and 5.1 miles for surface cars; 64.5 single-track miles of elevated lines; 150 miles of new surface lines, and 111 miles of rehabilitated surface track. The ultimate plan, which calls for the expenditure of $260,000,000, provides for the construction and equipment of 58.1 miles of subway, of which 53 miles are for rapid transit and 5.1 miles for surface cars, and 525 miles of surface lines.

DEVELOPMENT OF THE GENERAL PLAN

The general plan which the commissioners recommend has in view a development along the following broad lines, which as a primary basis will require the construction of four north and south rapid transit lines parallel with the greater dimension of the city. Two of these lines will pass through the present loop district and the other two will be located further west on Halsted Street and Ashland Avenue. The east and west rapid transit lines extending from the outer limits of the city to and through the greatly broadened central business district will intersect the above four lines, with transfer arrangements at points of intersection. This rapid transit system is to be extended, as may be necessitated by the city's growth from time to time, so as to serve the new and growing subcenters and residential districts. Elevated platforms are to be lengthened and, at convenient points throughout the


KEY
Present Elevated RR Lines
Proposed additional Tracks and Extensions to Elevated Lines
Future Elevated Extensions
Proposed Rapid Transit Subway
Future Rapid Transit Subway
Proposed Surface Car Subway
Surface Line Connection
Park Boulevards
CITY LIMITS
HARLEM AVE.
NARRAGANSETT AVE.
CENTRAL AVE.
CICERO AVE.
CRAWFORD AVE.
KEDZIE AVE.
WESTERN AVE.
ASHLAND AVE.
HALSTED ST.
STATE ST.
COTTAGE GROVE AVE.
STONY ISLAND AVE.
YATES AVE.
BURLEY AVE.
87TH ST.
79TH ST.
71ST ST.
63RD ST.
55TH ST.
47TH ST.
39TH ST.
31ST ST.
22ND ST.
12TH ST.
99TH ST.
119TH ST.
111TH ST.
103RD ST.
134TH ST.
127TH ST.
138TH ST.
MADISON ST.
CHICAGO AVE.
NORTH AVE.
FULLERTON AVE.
BELMONT AVE.
IRVING PARK BLVD.
LAWRENCE AVE.
BRYN MAWR AVE.
DEVON AVE.
KENILWORTH AVE.
GARFIELD PARK
DOUGLAS PARK
HUMBOLDT PARK
MARQUETTE PARK
WASHINGTON PARK
JACKSON PARK
GRANT PARK
LINCOLN PARK
PROPOSED PARK
LAKE CALUMET
WOLF LAKE
LAKE MICHIGAN
ENLARGED DIAGRAM OF BUSINESS DISTRICT
CLINTON ST.
CHICAGO
MARKET ST.
FIFTH AVE.
CLARK ST.
STATE ST.
WABASH AVE.
MICHIGAN AVE.
POLK ST.
HARRISON ST.
VAN BUREN ST.
JACKSON BLVD.
MADISON ST.
WASHINGTON ST.
LAKE ST.
RANDOLPH ST.
CARROLL AVE.
GRAND AVE.
PRESENT, PROPOSED AND FUTURE
RAPID TRANSIT SYSTEM
SCALE 0 1 2 3 MILES

city, transfer is to be provided from the surface lines to the rapid transit lines to give as complete an interchange of traffic as is consistent with the diversion of the long-haul traffic to the rapid transit lines and the short-haul traffic to the surface lines.

North and South Rapid Transit Lines

Considering the fully developed plan and describing the rapid transit lines in order of completion they are, for north and south travel, as follows:

1. A line is to be developed by four-tracking completely the Northwestern and South Side Elevated lines from Sixty-third Street on the south to Wilson Avenue on the north. The central portion of this four-track through line is to consist of a two-track subway extending from Eighteenth Street on the South Side Elevated north under State Street to Chicago Avenue, thence west to a junction with the Northwestern Elevated. The other two tracks of the central section of this through four-track line is to be secured by the utilization of the existing Fifth Avenue elevated tracks extended south to Polk Street, and east over Polk Street to the existing South Side Elevated structure. The through routes on these lines will spread the old loop district north and south by virtue of the subway mentioned above and the existing and extended tracks over Fifth Avenue, both subway and elevated giving two-way service on opposite sides of the loop instead of one-way service as at present.

In addition to these through lines, the existing elevated tracks over Wabash Avenue at Congress Street are to be utilized for South Side stub service. A corresponding North Side stub service is to be provided by the extension of the North Water Street tracks of the Northwestern Elevated east and south to a new elevated stub terminal at State and Lake Streets. Both these terminals will afford special rush-hour service north and south from the loop district similar to the West Side service of the Metropolitan Fifth Avenue stub terminal as well as transfer facilities from West Side lines in both directions.

2. A through north and south line to be established by constructing a two-track elevated railroad north from a terminal at Sixty-ninth Street and Ashland Avenue over or parallel to Ashland Avenue to Twentieth Street with connections to the Englewood and Stock Yards branches of the South Side Elevated Railroad. Thence from Twentieth Street north it will connect with the existing Metropolitan right-of-way with additional tracks constructed on it to Robey Street junction, with grade separation at Marshfield junction. From Robey Street junction a two-track elevated is to be constructed north over or parallel to Robey Street to a junction with the existing Ravenswood branch of the Northwestern Elevated in the vicinity of Roscoe Street, thence by additional tracks north over the existing Ravenswood right-of-way. This line will give direct transfer to the five existing elevated branch lines from the west and to five branch and main lines to the east.

3. A two-track subway is to be built extending from a transfer terminal at a point south of Sixty-third Street and at or east of Cottage Grove Avenue, northward under Cottage Grove Avenue or some adjacent north and south street to about Twenty-second Street, thence to Michigan Avenue, to Ninth Street, thence west, passing under the State Street subway to Clark Street, thence north under Clark Street, passing under and connecting with the State Street subway at Chicago Avenue. These two subways form a four-track subway extending north under Clark Street to a junction with the Northwestern Elevated in the Belmont-Wilson (Lake View) section. Two tracks may be needed northwesterly beyond this district to accommodate the outlying territory. At the termini of this subway, suitable and convenient transfer arrangements are to be provided for passengers from radiating surface lines, as well as facilities for through running of trains from rapid transit lines reaching out into the outlying districts.

4. A line over Halsted Street formed by a two-track elevated extension of the Northwestern Elevated south over Halsted Street from North Avenue to the vicinity of Seventy-ninth Street, with grade separations and transfer stations at intersections with the Oak Park Elevated, Metropolitan Elevated and Stock Yards and Englewood branches of the South Side Elevated, is to be constructed.

East and West Rapid Transit Lines

For the east and west rapid transit lines the fully developed plan contemplates additional tracks on the existing west side elevated lines to provide express service, extension of these lines into new territory, the construction of a new line into the southwestern portion of the city, amplification of the existing trunks leading into the central business district, the construction of an additional stub connection in the present loop district, and finally the construction of additional trunks leading from west side junction points by subway through the central business district to Michigan Avenue or Grant Park. These are shown on the accompanying map.

The traffic investigations of both surface and elevated lines, as well as the residential and occupational canvass, show clearly the desirability of direct service from the northwestern residential districts of the city into the manufacturing and office building district on the west side of the loop and west of the river north and south of Madison Street. For this purpose a physical connection is proposed from the Metropolitan system to the Oak Park Elevated at Lake and Paulina Streets. Some northwest branch trains can be operated to the Fifth Avenue terminal over their present route, and the others east over Lake Street, either to the Fifth Avenue terminal or through the Union Loop via Lake Street, Wabash Avenue and Van Buren Street. This diversion of part of the heavy traffic now hauled over the four-track Metropolitan trunk east of Marshfield Avenue station to Lake Street will relieve the Metropolitan main trunk, thus providing additional capacity for the west and southwest districts. Later a still more direct service will be secured by constructing the line parallel to Milwaukee Avenue south to a subway connection as above mentioned. Still later, when warranted, the Blue Island Avenue elevated connecting with the subway under Halsted Street will form a symmetrical southwest outlet similar to the Milwaukee Avenue diagonal line.

Surface Line Improvements

Street congestion in the central business district of Chicago has already reached the point where relief has become imperative. With the extremely limited possibilities of providing further street capacity there remains but the alternative of depressing surface lines beneath the streets. Hence surface line subways are recommended by the commissioners on the score of necessity even if they cannot fully justify their investment. As one element of the broad, general plan recommended such surface line subways should be constructed through the congested central business district to form the nucleus of a downtown terminal system of subways into which as many surface line cars as possible should

be diverted. As far as the needs of the future may be foreseen these surface line subways should be constructed in the following order:

1. A two-track subway should be built east under Washington Street at low level to Michigan Avenue for the much needed relief of the district north of Madison Street, passing beneath and transferring to the north and south rapid transit subways; thence at high level south under Michigan Avenue to Jackson Street, with loop or stub facilities under Grant Park or Michigan Avenue. This subway with its present west portal under the Northwestern Station can accommodate a number of important lines from the west and northwest territory which now are forced to use the congested surface terminal loops along State and Dearborn Streets.

2. Another east-west two-track subway should be built under Jackson Street from the east portal of the Van Buren Street tunnel (reconstructed for this purpose) east under Jackson Street at low level to a connection at Michigan Avenue with the previously mentioned Washington Street subway.

3. A north-south surface car subway should be built under Indiana Avenue from Fourteenth Street, connecting with the proposed Illinois Central station at Twelfth Street; thence under Michigan Avenue at high level to a connection with the above mentioned west side surface car subways. This subway will accommodate the majority of the surface cars now entering the business district in Wabash Avenue, thus greatly relieving the surface congestion in the narrow throat between the railroad yards west of State Street and east of Indiana Avenue.

In addition to the primary object of relieving surface congestion, a great advantage to be realized from these subways will be the establishment of a much needed station service directly connecting the Northwestern, Pennsylvania-Burlington-St. Paul, Lake Shore, and Illinois Central-Michigan Central steam railroad terminals. This complete subway route further provides for a direct passenger movement between the south lake shore district and the west and northwest districts At present direct transfer facilities downtown between these important districts are unavailable.

Much surface line improvement, however, should, in the opinion of the commissioners, be put into effect at once without waiting for the construction of the above surface car subways. This is urgently required not only because of the rapidly increasing street traffic and the increasing rush-hour passenger traffic on the surface lines, but also the additional street congestion which will unavoidably result from subway and elevated construction work. These improvements require strict enforcement of traffic regulations rerouting as follows:

1. Prohibiting the existing abuse of parking vehicles on car streets and any unnecessary use of tracks by vehicles in rush hours.

2. The reservation of safety loading berths at nearside stops.

3. The use of visible traffic signals at important crossings, maintained and operated by city authorities.

4. The diversion from the heavier car line streets of unnecessary vehicular movement.

5. The abatement so far as practical of interlocking surface loops and divisional operation by further through routing of balanced car movement in the nature of a zone service and the establishment of short lines turning back at the edge of the congested district.

Commission Also Recommends Skip-stop

The commission adds that while future surface line operation, routing and schedules cannot possibly be predicted with any reasonable definiteness, it is contemplated that with such a supervisory board as recommended in the report, the city-wide development of the surface lines in conjunction with the rapid transit lines should be carried out efficiently as the growth of the city proceeds. This development should encourage the further establishment of:

1. Logical through routes on sufficiently short headway to render them efficient and attractive to patrons:

2. Further development of the zone system of car operation by means of which service on these long lines may be tapered off according to the traffic demands by establishing short line terminal routes.

3. Skip-stops whenever practicable. The entire outside system of surface line stops should be revised so as to eliminate needless stops, especially on diagonal streets or where transverse streets are offset.

4. Finally, outlying lines intersecting rapid transit lines should be arranged so that transfer of long haul passengers may be facilitated without disturbing or disconnecting the through surface line service along important thoroughfares reasonably required by the traffic

Wages Should Be Regulated

Committee Report to National Municipal League Favors Giving Power to Commissions as Experiment

THE National Municipal League, an organization founded by representatives of civic bodies throughout the country, received at its twenty-second annual meeting in Springfield, Mass., on Nov. 24, a committee report treating broadly on the subject of public regulation of wages, hours and working conditions of utility employees. In general the committee in question, that on franchises, felt the outstanding fact to be that "continuity" is a fundamental interest of all three parties concerned: for the employees, continuity of employment; for the companies, continuity of earnings, and for the public, continuity of service.

The committee believed that the public interest is sufficient to warrant the adoption of legal measures to prevent strikes, but that until effective substitute measures for the adjustment of the grievances of employees have been worked out and tested, it would be unfair and impracticable to deprive the employees absolutely of the right to use this weapon of self-defense.

Public control over the relations between utilities and their employees, the committee said, might be established by: (1) the inclusion of the necessary provisions in franchises; (2) a general regulation from time to time by statutes or ordinances, and (3) the fixing of standards by regulating commissions or tribunals. The franchise method would be open to the objections that many perpetual, long-term or indeterminate franchises already exist, that a long-term contract is an unsuitable means for regulating changing wages and that employees are not a party to franchise agreements. Where franchises come up for renewal, however, definite provision should be made for the settlement of disputes. Maximum working hours and other working conditions might be fixed, but specific wages should not be established unless made subject to frequent revision.

As for general regulation, the committee stated that wherever well-equipped commissions exist, the duty of establishing detailed standards and rules relative to the relations of utilities and their employees might properly be imposed upon such bodies. As to the settlement of particular disputes and the fixing of wages, etc., in particular cases, the committee favored that experimentally the power be given to the commissions rather than to special tribunals, the decisions to be final for comparatively short periods.

Boston Subway Policy Defended

City Ownership and Private Operation of Tunnels Shown to Be Wise After Twenty Years' Experience and Investment of Thirty-five Millions

CORPORATION Counsel John A. Sullivan of Boston made a vigorous and telling defense of the subway policy of the municipality for the last twenty years at a hearing Dec. 4 in connection with the Boston Elevated Railway revenue investigation. Declaring his belief in city ownership and private operation under present conditions, Mr. Sullivan showed that although Boston has lent its credit to the extent of about $35,000,000 for subway construction, the policy has been sound from the beginning, and that the losses therefrom claimed by the Boston Real Estate Exchange at a former hearing are without foundation.

Mr. Sullivan said that the city's financial relation to the tunnels and subways had been so misrepresented as to make it appear that the municipality had been blundering along in reckless fashion through the entire history of Boston rapid transit legislation. The criticism is that the tunnel leases are unfavorable to the city; that the city is sustaining losses annually on this account; that public ownership is a bad policy financially, and that the city would have been better off had the Boston Elevated Railway built and owned the subways and tunnels and paid taxes on this property to the city. In reality the leases and rentals, taken as a whole, are very favorable to the city, which sustains no loss on their account and will ultimately gain greatly by them. The policy of public ownership has had the sanction of the Legislature, of the city government, and of the people as expressed by popular vote. Mr. Sullivan said, however, that he believed the public would choose to-day an unfavorable contract involving city ownership and stand the financial loss in preference to a more favorable contract between the road and the city by which the company would own the subways.

Public Operation Not Favored

The only doubt that has ever been expressed, the speaker said, is as to whether public operation should have been added to public ownership. "Personally I should oppose public operation," said Mr. Sullivan, "but that of itself is a question simply of expenditure. If the day ever arrives when these communities are so well organized that they can administer these transportation systems efficiently and economically, then it will be proper at that time for the public to operate the transportation systems as well as to own them. In my judgment that day has not arrived, and the best solution of this kind of problem is to have the public own the subways and tunnels and lease them to private corporations for operation. Knowing the history of the public ownership of these tunnels and subways, therefore, I was astonished when I read the Boston Real Estate Exchange's wail over the taxes it said the city is losing—losing because the city owns the property and therefore cannot tax the road on it. In other words, the city cannot tax non-taxable property. This loss was put at $200,000 a year, and it made it look as if the city needed a conservator. Of course, there is no loss of taxes on the tunnels and subways, any more than there is on the City Hall or the City Hospital." The case was made to appear worse by combining two losses which could not possibly co-exist, *viz.*, the so-called losses of public and of private ownership throughout the same period.

More serious than this illogical combination of losses, Mr. Sullivan said, is the misstatement as to the annual deficit in the interest and sinking-fund requirements of the city's rapid transit loans. There was no deficit in the interest requirements in 1915, or in any prior year, and there never will be. The combined rentals will always take care of the combined interest charges, because the average rate of interest paid by the city on the bonds is 3.84 per cent, and the rentals paid to the city are, to speak broadly, 4.5 to 4.875 per cent. The actual results of twenty years' ownership of subways in Boston are: (1) No deficit in interest requirements; (2) total deficit in the entire period of only $58,869 in sinking-fund requirements, and (3) an equity in favor of the city in the tunnels and subways of $3,778,986, represented by the amount in the sinking funds up to Jan. 31, 1916. All this has been secured without calling for a single dollar from the taxpayers in the entire period.

In the present year, 1916, the taxpayers made their first contribution toward the cost of the subways. The car riders have in general paid the whole cost of construction and of operation of this road. The city appropriated $77,910 from taxes to take the place of the penny tolls of the East Boston tunnel, which were abolished in February, after due popular vote and legislative enactment. The total appropriations required for this purpose will probably not exceed $400,000, which is less than one-half the value of the city's present equity in the tunnel.

There will be some debt when the existing subway and tunnel bonds mature, but that will be refunded and eventually retired, so that the city will own the entire system of subways and tunnels free from debt, without having required any contribution from the taxpayers other than the above-mentioned $400,000 raised to take the place of the East Boston tunnel tolls. Beginning with 1946, there will be large additions, amounting to about $686,000 a year, paid in from the rentals of subways, which at that time will be debt free. In the future it is desirable that each subway built shall finance itself, but the rate at which this can be done depends upon the state of the money market. The highest rate the city has been obliged to pay on subway bonds is 4.25 per cent.

Metropolitan Ownership and Control Opposed

Mr. Sullivan emphasized the fact that the city is opposed to any plan for the ownership and control of tunnels and subways by a metropolitan organization or commission. Boston has taken the risk of financing the subways; it now has a substantial equity in them, and it will not surrender them to a metropolitan district now that its experiment seems likely to succeed. The city will fight such a plan to the last ditch. Nor will it consent to control by a metropolitan commission. It owns its subways and it wants only Boston citizens on any commission which plans future rapid transit development within the Boston territory. The city has reason to believe that a metropolitan commission would very early in its career plan rapid transit development in such a way as to subordinate Boston interests to outside interests and to put its highways under a new servitude in favor of the municipalities outside. Such plans would probably find favor in the Legislature, owing to its political complexion, and such great undeveloped areas as West Roxbury and Dorchester would have to wait until outside interests had first been served.

In these undeveloped districts there are but eight persons per acre, compared with 40.4 persons in the rest of Boston. Four new wards have 41 per cent of the land in the city and only 12.5 per cent of the

population. Until better transportation is provided, the development of the city will be retarded. In reply to inquiries, Mr. Sullivan said that Mayor Curley of Boston is not opposed to an outside commission's taking over tunnels and subways outside Boston proper, as in Cambridge. The state could presumably take the Boston subways by eminent domain if it so desired, but the city would oppose it because the whole cost paid by the state for recoupment would very likely not be worked out through rentals.

If the communities are to make a substantial reduction in taxes, they might well claim some supervision over the company's expenditures. Moreover, if there should be a formal guarantee on the part of the public of, say, a 6 per cent dividend for the company, there should be some participation by the public in the control. On another point Mr. Sullivan stated that in view of the possible benefits to real estate and population increase resulting from the building of a rapid transit line, it would be proper in some instances to provide deliberately for the renewal of part of a subway bond issue at maturity, instead of establishing a rental which would invariably pay the sinking-fund requirements during the life of the bonds. A situation might even arise which would justify the city in building a certain subway line at its own expense and foregoing the advantage of rentals. A graduated rental and a policy of deferring the beginning of sinking fund payments might also be justified in some cases. In such event the rental would naturally be increased during the latter portion of the lease and the city should be guaranteed against immediate loss by having the rents equal to the interest requirements from the beginning.

Who Should Pay the Transportation Cost

In response to a question, Mr. Sullivan said that theoretically the car riders ought to pay the entire cost of transportation, but as a practical matter, if resort must be had to reduction of taxes or to increased fares, it would work out better in the long run to have a reduction in taxes, at least temporarily. There is some equity in having taxpayers who may not use the company's service to any extent contribute toward a subway fund which will ultimately become an asset of the city. There are owners of automobiles whose property values have been enhanced by the street car lines, and to that extent they may well be called upon to assist. A special assessment against individuals, however, in place of a general tax levy, would be undesirable and difficult to enforce.

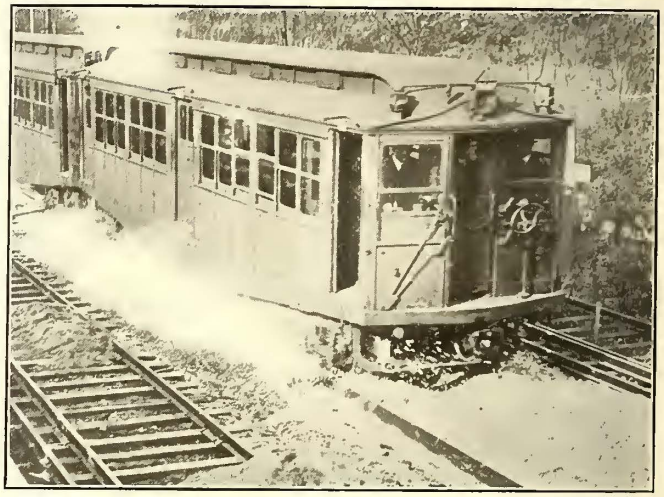
President Brush Discusses Higher Fare Problem

Following Mr. Sullivan, President Matthew C. Brush of the Boston Elevated Railway answered a number of inquiries bearing upon the problem of higher fares. Mr. Brush said that if the company could secure the needed revenue in other ways it would be unfortunate to resort to a 6-cent fare, and that it would be better to go so far as to subsidize a transportation company to secure a continuance of a fare arrangement on which the community has been built up. In Boston the facilities offered for a 5-cent fare exceed those anywhere else in the world, if the interrelation of rapid transit and surface line service is taken into account. As far as loss of business resulting from a 6-cent fare is concerned, Mr. Brush felt that unquestionably there would be a net profit, although a 20 per cent gain could not be expected. Some of the short-haul riders would be lost, and there would not be enough falling off in traffic to offset the benefit of higher fares from those who continued to ride.

New Derailing Train Stop Tested at Boston

Train to Be Stopped Is Deflected Onto a Broken Stone Roadbed, Being Guided by Means of Wood and Steel Guard Rails

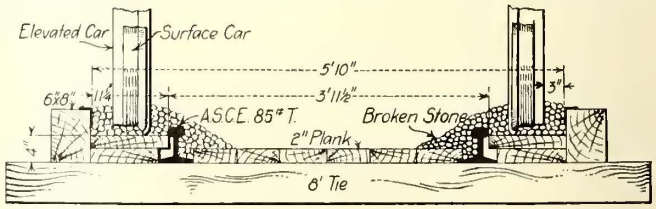
In the presence of the engineering committee on drawbridge operation recently named by Mayor Curley of Boston, Mass., representatives of the city and of the Massachusetts Public Service Commission, railway officials and newspaper men, a new derailing train stop was tested at the Forest Hills yards of the Boston Elevated Railway on Nov. 29. The development of safety precautions in connection with drawbridge operation for both train and surface car service has been given



BOSTON SAFETY STOP TESTS—ELEVATED TRAIN PLOWING THROUGH BROKEN STONE BED

constant attention by the Boston Elevated Railway since the fatal accident at Fort Point Channel on Nov. 7, and the test at Forest Hills indicates that a remarkably effective and simple means of stopping elevated trains is available for drawbridge approaches, even in cases where the motorman fails to shut off power and where the brakes fail to operate, if it is possible to install a derailing track on the right of way.

In all the conferences at Boston upon safety in operation at drawbridges following the recent disaster, emphasis has been laid by electric railway men upon the importance of instituting a gradual stop in bringing a train or car quickly to rest, and this principle has been recognized by the Massachusetts Public Service Commission in its finding upon the Fort Point Channel acci-



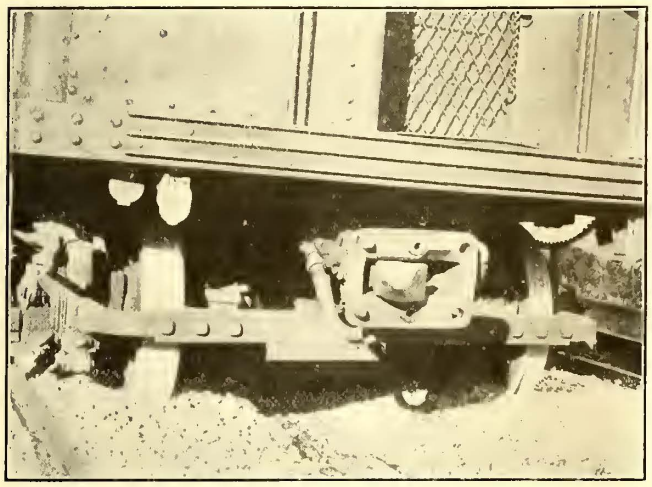
BOSTON SAFETY STOP TESTS—CROSS-SECTION OF SPECIAL EMERGENCY-STOP SIDE TRACK

dent. President Matthew C. Brush of the Boston Elevated Railway has taken active personal interest in the development of methods for increasing the safety of operation, and under the general direction of H. M. Steward, chief engineer maintenance of way, with the co-operation of other officials of the company, the new train stop or "decelerator" has been established.

As installed for test purposes at Forest Hills, the

train stop consists of a stretch of roadbed about 300 ft. long, without running or third rails, but provided with the usual 6-in. x 8-in. wooden guard rails. Between the latter crushed stone 1 in. in diameter is piled against each guard timber, and as a precaution against injury to the guard timbers a section of T-rail is installed as an inside guard and covered to a depth of about 3 in. with stone. The inside rail is about 8 in. from the guard rail, and the section of retarding track is provided at the connection with the ordinary running track with a thin wedge of wood, steel plated, to guide the wheels more accurately as the train leaves the running track.

Upon approaching the decelerating track with full power on the motors the supply of energy is automatically cut off as the third rail shoes break their contact



BOSTON SAFETY STOP TESTS—CLOSE VIEW OF FRONT OF FOREMOST TRUCK AFTER TRAIN HAS COME TO REST

and the train enters the crushed stone right of way at full momentum. The wheels are embedded in the crushed stone, forcing the latter down into the roadbed and against the guard timbers. The dead cars rapidly lose their momentum as the wheels roll forward, and a smooth stop with a retardation of about 2 m.p.h. per second results. A four-car train upon which a representative of the ELECTRIC RAILWAY JOURNAL rode, after a rainy night came to a dead stop in ten seconds from a speed of about 22 m.p.h., the foremost wheels in the train coming to rest at a point 203 ft. from the entrance to the derailing track. Beyond an insignificant jar as the train left the running rails, the retardation was virtually as smooth as in an ordinary service application of the brakes, and much smoother than an emergency stop would ordinarily be. At 25 m.p.h. a four-car train stopped in 232 ft. In some tests sand was used instead of trap rock and single cars of the box and semi-convertible type were tried. Crushed stone gave the best results. Representative data from the tests are given in the following table:

CAR AND TRAIN STOPPING TESTS, FOREST HILLS YARD, BOSTON ELEVATED RAILWAY

Nov. 27 AND 28, 1916

Number of Tests	Type of Car or Train	Speed in M.p.h. Entering Stop Section	Feet Traversed in Retardation	Remarks
1	20-ft. box	11.0	43	Sand used in stop section
1	20-ft. box	14.5	54	Sand used in stop section
1	4A3 semi.	14.5	62	Sand used in stop section
2	4A3 semi.	18.8	97	Sand used in stop section
2	4A3 semi.	18.3	96	Pebbles used in stop section
2	4A3 semi.	20.3	90	1-in. crushed stone used in stop section
1	2 elevated cars	23.5	177	1-in. crushed stone used in stop section
1	3 elevated cars	23.0	200	1-in. crushed stone used in stop section
1	4 elevated cars	22.0	215	1-in. crushed stone used in stop section
1	4 elevated cars	25.0	232	1-in. crushed stone used in stop section

Minor variations were noted according to the condition of the roadbed, extent of crushing, dryness, etc.

In general, a four-car elevated train entering the stop section at from 20 to 25 m.p.h. was brought to rest substantially within its own length.

It is planned to install a train stop built along the above general lines between the north and southbound tracks on the north approach to the Charlestown drawbridge, on the rapid transit lines, and also to provide a stop of this general character on the East Cambridge viaduct for surface cars. Whenever the draw is open a switch will automatically be set to turn a train passing a danger signal and automatic stop upon the intermediate roadbed, which will probably be equipped with one or more light bumpers in advance of the derailing section, the latter to be covered with moisture-proof paper or its equivalent.

Mechanical Design of Electric Locomotives*

The Author Discusses A. F. Batchelder's Recent Paper, Submitting Actual Operating Records, Which He Considers Most Important

BY C. H. QUEREAU
Superintendent Electric Equipment, New York Central Railroad

IN the main I agree with the conclusions that have been presented to the American Society of Mechanical Engineers in A. F. Batchelder's paper on the mechanical design of electric locomotives. However, it seems to me very unfortunate that this paper, as well as others recently presented, is simply a general statement of the conclusions of the writer rather than a statement of accomplished results. I am reminded very forcibly of the discussion indulged in about ten years ago before any considerable electrification of steam railroads had been accomplished. These discussions were based almost entirely on personal views and theories, without any demonstration. At the time of which I speak this was necessarily so, but there should now be available accurate figures based on actual operation. This criticism, in general, is true of all electrification papers, probably because of mistaken ideas on the part of those who have the facts or those who have the authority to make them public. That Mr. Batchelder appreciates this is shown by the last paragraph of his paper.

In Mr. Batchelder's paper the list of desirable features arranged in the order of their importance did not include "Maintenance." It is quite probable that convenience of maintenance was in the author's mind, but it seems to me of sufficient importance to be mentioned specifically.

The analysis of the action of a locomotive on curved track I must confess that I cannot quite follow, probably because I do not clearly understand what was written or have not the information on which the author bases his discussion. For instance, in describing the action of a two-axle swivel truck the statement is made that "the flange of the leading wheel gradually comes in contact with the outer rail, giving the guiding truck an angular motion about its outer rear wheel." I have believed that the angular motion of a four-wheeled truck was about its inner rear wheel, the fact being that when a truck is on a curve the outer forward wheel flange and the inner rear wheel flange are against the rail, the other two flanges not touching the rail. I do not see, however, that this difference is of particular moment, and bring it up only that the matter may be discussed and clearly understood.

*Discussion of a paper on this subject by A. F. Batchelder, presented before the American Society of Mechanical Engineers, Dec. 15, 1916, and published in abstract in the ELECTRIC RAILWAY JOURNAL for Nov. 4, 1916.

With regard to the operating advantages gained by having electric locomotives designed to operate in either direction, I consider this feature to be of so great importance that satisfactory designs must be found to meet this condition. This need exists notwithstanding the fact that the effect of a trailing truck contributes to unstable riding of the engine. Mr. Batchelder proposes to prevent the consequent oscillation by the introduction of resistance against swivelling. This scheme is practicable and has been so demonstrated, but it results in increased flange wear, at least when the locomotive's center of gravity is low.

I am particularly interested in the feature of reliability in service for electric locomotives. It is a requirement that is quite commonly omitted in a discussion of this kind. On railroads that run through a sparsely settled country, with comparatively few trains per day, a train delay of half an hour may be of comparatively little importance. But in Eastern territories, especially around the large cities, a delay of a very few minutes will upset the smooth operation of the railroad for hours, and the effect of it may reach back on the line for 150 miles. It is, of course, impossible to determine in dollars and cents the cost of a delay in congested territory, but that it may easily amount to large sums in over-time there can be no doubt, and its effect on the traveling public can better be imagined than described. It is my opinion that the prevention of such delays is worth considerable increase in the first cost of electric locomotives, and that the maintenance methods should be such as to prevent, so far as possible, delays to traffic, practically regardless of cost. It is decidedly poor policy to reduce maintenance costs if by so doing the result is an increase in traffic delays.

Mr. Batchelder very wisely considers the cost of maintenance of permanent way to be of more importance than cost of maintenance of locomotives. Yet it is extremely difficult to state definitely what, if any, effect the electric equipment has on the cost of maintenance of track. I believe, as a general proposition, it would be safe to assume that, if the cost of maintenance of way is no greater under electric than steam operation, it would be a satisfactory condition, which undoubtedly would not be used as an argument against electrification.

As to the cost of maintenance of electric locomotives, the difference in maintenance charges at the rate of 3.5 cents per mile and the frequently reported figure of 7 cents per mile may be figured as not less than $1000 per engine per year. This saving, when capitalized, represents a considerable sum, and its establishment would warrant an appreciable increase in first cost. The sum mentioned is 10 per cent of $10,000, or 5 per cent of $20,000.

So far as I know, there have been published very limited data as to service results, either as to first cost or maintenance, or reliability in service as shown by train-delay statistics. Under these circumstances it would be only reasonable to expect differences of opinion and, in all probability, failure to consider results as a whole. In consequence I am submitting herewith maintenance and operating records for the electric engines on the New York Central Railroad.

These locomotives are all equipped with bi-polar, gearless motors mounted directly on the driving axles. The operating results have been completely satisfactory to the officials of every operating department affected, although this statement does not include consideration of the net financial returns from the investment, which must take into account the item of fixed charges.

With the usual maintenance these locomotives ride satisfactorily and without undue effect on the track structure, and are perceptibly more comfortable than steam locomotives. In order to secure these results it is necessary to keep the total lateral motion, both at the boxes and at the center-pins, within limits which approximate three-quarters of the allowable lateral motion on steam locomotives.

Table I contains statistics which will permit a personal conclusion as to the reliability of these locomotives in service, and this will probably be more satisfactory than any general statement or expression of opinion, no matter how authoritative. In connection with this table I wish to enter a strong plea for the use of the unit "Miles Per Detention" rather than "Miles Per Minute Detention" for the preparation of statistics by which to judge the reliability of equipment in service and the efficiency of the organization responsible for maintaining it. Inclusion of the time element leads only to confusion, and is, therefore, worse than useless.

TABLE I—TRAIN DETENTIONS DUE TO DEFECTS OF ELECTRIC LOCOMOTIVES, NEW YORK CENTRAL RAILROAD

Miles Per Detention—All Locomotives

Year	Mechanical	Electrical	Grand Total
1912	48,271	103,967	32,965
1913	27,873	86,716	21,093
1914	35,625	57,395	21,981
1915	53,720	107,440	35,813
Original Rigid-Frame-Type Locomotives			
1915	59,583	187,260	45,201

Note: All detentions of two minutes or more included. In 1912 there were forty-seven locomotives in service. Since the middle of 1914 there have been sixty-three. Detentions due to man failure, or delays to following trains, not included.

TABLE II—INSPECTION AND REPAIRS OF ELECTRIC LOCOMOTIVES

Cost, Cents Per Mile

Year	Labor	Material	Total
1912	1.888	1.460	3.348
1913	1.982	1.454	3.436
1914	2.155	2.134	4.286
1915	1.901	1.379	3.280

Note: The above statistics were compiled in accordance with the requirements of the Interstate Commerce Commission. In the year 1914 it was necessary to replace all driving-wheel tires because of unsuitable material, regardless of the extent to which they had been worn. The costs of maintenance have been essentially as above since 1907, omitting 1914.

In connection with Table II the following facts should be borne in mind: The figures include the cost of inspection and maintenance of all the electric locomotives in both road and switching service. In 1912 and 1913 approximately half the total engine mileage, and in 1914 and 1915 approximately one-third of the mileage was that of engines used in switching service. Our experience has shown that the cost of maintenance of engines in switching service is about twice that of those used exclusively in road service. It follows that the cost of maintaining the road locomotives has been about 2.5 cents per mile and that of the switch engines about 4.9 cents per mile. In this connection it is only fair to call attention to the fact that these engines were not designed for switching service.

For the first ten months of 1916 the average cost of maintenance of all the electric locomotives has been 2.73 cents per mile. This gives a cost of approximately 4 cents per mile for the locomotives in switching service and approximately 2 cents per mile for those in road service. I expect these costs will not be exceeded for the entire year 1916, but doubt very much that we will be able permanently to keep the maintenance costs at this level.

A gun club, with twenty members to start, has been organized among the employees of the Kansas City (Mo.) Railways. The officers will instruct members in the handling of a gun. The company will assist in securing and building a club house, so that the expense to members shall be nominal.

Securing Industrial Democracy*

Capital and Labor Should Be Equal Partners—Profit Sharing Plan Suggested—Strikes and Lockouts Should Be Prevented by Law

BY GEORGE WESTON
Engineer Board of Supervising Engineers, Chicago Traction

THIS paper is presented for the purpose of bringing out a most liberal discussion of the subject, particularly of the fundamentals and recommendations contained therein, with the hope that it will have its influence in bringing the representatives of labor and capital into a more satisfactory and harmonious working relation for their own mutual benefit and permit the uninterrupted operation of public utilities for the accommodation of the public.

A copy of the paper has been received by the President of the United States and additional copies have been sent to his secretary for distribution. Others to whom copies have been forwarded are the presidents of the brotherhoods of steam railroad employees and other labor leaders; Chairman Newlands and Vice-Chairman Adamson of the joint committee on Interstate Commerce, United States Senate and House of Representatives; members of the Interstate Commerce Commission, railroad presidents, several state public utility commissions, officers of the Chamber of Commerce of the United States, the Chicago Association of Commerce, and many other interested organizations and individuals.

The necessity for a public utility is the need of some class of service to the public, and this requires capital investment and the work of labor skilled in the different branches necessary to create the property and operate it. Each should receive a fair return for its service, but neither capital nor labor should be permitted to exploit the property for unreasonable gain or for the exercise of objectionable, coercive union or political power. Capital should not be permitted to pile up huge profits at the expense of underpaid labor. Capital and labor should be partners in the business, each receiving its fair return from the net profits. When labor understands that it will be placed upon a footing equal to that of capital, that there will be one great democracy of interests building up a great public utility to serve the people, then the present general feeling of jealousy, dissatisfaction and unrest will disappear and harmony and general good feeling will be restored.

My connection with public utility matters for many years has caused me to give this subject considerable study. At the time of the street and elevated railway strike in Chicago in June, 1915, I compiled the following fundamentals:

(1) Capital and labor are dependent upon each other.
(2) Capital cannot be successfully employed without the help of labor, and labor cannot be profitably employed without the assistance of capital.
(3) From this fact it seems most fair and equitable that each should participate fairly in the results of their joint efforts.
(4) This principle should be the fundamental economic basis upon which to consider the relations between capital and labor.
(5) Therefore, the two chief elements necessary to create and operate a public utility have the same fundamental interest in properly performing the obligation to the public assumed in the franchise of the public utility.
(6) This obligation should be inviolate in principle, and good service to the public should be the first consideration in the operation of a public utility property.
(7) The obligation to give good service to the public falls upon labor as much as upon capital. Consequently, all legitimate and fair operating expenses necessary to give good service must be considered, as well as all reserve funds necessary for the upkeep of the property or other franchise obligations, before any increased division should be made to capital or labor.
(8) After having fulfilled all franchise obligations, any remaining earnings should be disposed of upon some fair basis to the benefit of both labor and capital.
(9) It would be unfair to increase the share to capital beyond a reasonable return upon the investment and not increase the return to labor, and it would be unfair to increase the return to labor by reducing the return to capital below a reasonably fair amount.
(10) From the fact that service to the public should be the first consideration of any public utility, it should be unlawful for the employees to conspire to strike or the employers to conspire to institute a lockout.
(11) It would seem that a national, state or city court or board of arbitration should be established by law, to which body should be referred all matters of dispute between employer and employees that cannot be settled between themselves, and this should be accompanied by a law making it a penal offense for employees to conspire to strike or for employers to conspire to institute a lockout.

It often becomes necessary for persons to be protected against themselves, and I am herewith recommending forced arbitration and legislation to prevent strikes or lockouts, not in order to attack either labor or capital but to prevent them from conducting a warfare based upon erroneous principles. The strong arm of the government should be used, not in favor of one side but impartially in favor of the general public for its general good. Is it fair to the general public to exact legislation to control rate making in the case of capital and then tolerate unlimited organization of labor and its use of threats and coercion to accomplish its selfish ends in regard to one element of rate making, *i.e.*, wages?

Profit sharing, as it has been practised in the past, differs from industrial democracy as advanced in this paper. The initiation of profit sharing and its discontinuance have been optional with the employer. Industrial democracy, however, as applied to public utilities means that along lines fair and equitable to all parties, capital, labor and the general public, the continuity of service to the public shall be regulated by law, nationally to the extent applicable, and by state and city legislation to the extent necessary, and that the character of service and rates and the distribution of gross earnings shall either be regulated by law or supervised by a board or boards of control established by law.

With large public utilities the following basis of profit sharing offers a simple method of adjusting income distribution so that capital and labor will each receive its just share. It must be conceded that the wages of labor at the present time in the United States are high by comparison with any previous time in its history or with any other nation. Present wages, therefore, can be taken as the minimum return to labor and be used as a fair basis for future payrolls to be charged to operating account, or be readjusted from time to time as the limitations of the gross income may require. The total amount thus paid will establish the percentage of the gross receipts paid to labor. This gross amount allowed to labor for future payrolls should be distributed between all classes of labor upon the basis of value of service rendered, the skill required, the hazard with respect to life or limb, etc.

It is necessary to determine what is a fair percentage of return for capital, including sufficient to care for extra hazards of the business and corporate organization expense, etc. This, together with general operating expense, including taxes, renewals, any other necessary reserve funds, franchise obligations and the possible establishment of a cash working reserve, should be first deducted from gross income. The residue, if any, should then be divided between labor and capital in the proportion that the total per cent of gross paid in wages to labor bears to the per cent of fair return to capital.

*Abstract of paper presented before meeting of Western Society of Engineers, Chicago, Ill., on Dec. 4.

Many other dispositions of surplus earnings in the interest of both capital and labor could be arranged and worked out in detail to cover the general principle or to fit any particular case. The above is simply an example.

In the discussion on the paper abstracted above, Ira W. Dye, Newark, N. J., declared there is no identity of interests between capital and labor to-day, and there cannot be until a few labor men have been elected upon the boards of directors and a few directors placed in the position of workingmen. He favored profit sharing with employees through stock ownership. C. W. Baldridge, Chicago, Ill., said that it is time to extend the functions of courts to deal with disputes between capital and labor and protect the paramount rights of the public. A. J. Schafmayer, Chicago, Ill., declared that the obligations that can be placed upon capital and labor are not equal because capital has, through franchise rights, received a monopoly. On this account, he argued, a strike should not be made a penal offense. He also expressed the opinion that there should be a third party in the division of profits, *i. e.* the public, which should get its profit through reduced rates.

MID-YEAR MEETING BOSTON FEBRUARY 16, 1917

ASSOCIATION NEWS

MID-YEAR MEETING BOSTON FEBRUARY 16, 1917

Engineering Association Committee Appointments Announced—B. R. T. Indorses Educational Committee Work—Equipment Committee Plans Definite Co-operation with Manufacturers—Several Sections Heard From

Educational Committee Notes

On Dec. 1 the electrical department of the Brooklyn Rapid Transit Company, by H. A. Robbins, superintendent of power, issued a notice which in part is as follows:

NOTICE TO ALL EMPLOYEES

About two years ago the American Electric Railway Association, of which this company is a member, tried the experiment of conducting correspondence courses for the employees of member companies. The same was not a success due to lack of organization. Therefore, the plan was abandoned and arrangements were made with the International Correspondence Schools of Scranton to take up the work. The American Association has approved and cooperated with the schools in preparing courses which will be offered. This arrangement makes it possible for those of our employees who desire to secure technical knowledge pertaining to their work in its many phases, such as steam, electric and mechanical engineering.

We are satisfied that material benefits will result to all who can and will give the necessary study time to any of the courses, and we would suggest careful investigation of the courses offered. However, all should appreciate that a lot of good hard study will be required to complete any of the courses.

Manufacturers' Association

Thomas Finigan, president of the Manufacturers' Association, has sent to the members copies of a letter summarizing the findings of the committee appointed to consider the advisability of continuing the association, and, further, to formulate plans, if possible, looking to the use of the association to promote the interests of the electric railway industry. As was fully explained in the issue of the ELECTRIC RAILWAY JOURNAL for Oct. 14, 1916, page 849, the recommendation was that the association be continued for another year at least for the following reasons: "1. That this is the first time that manufacturers and sellers of electric railway supplies have not participated as an organization in the activities of the electric railway convention, due to the action of the American Association at the meeting in Chicago, February, 1916, when the constitution and by-laws were altered so as to admit manufacturers to full company membership with all the rights and standing of railway companies. 2. Although manufacturing concerns are now members of the railway association their exact status has not yet been determined."

The committee report was signed by B. A. Hegeman, Jr., chairman; James H. McGraw and M. B. Lambert.

Equipment Committee to Have Flying Start

Although the Engineering Association committee on equipment has been appointed but a few days, a meeting is already scheduled for Dec. 13 in New York. The assignments listed in the ELECTRIC RAILWAY JOURNAL Nov. 18, page 1063, will be divided among sub-committees with instructions to consider particularly the revision of standards and recommendations now contained in the *Engineering Manual.* The following manufacturers' representatives have been invited to act in conjunction with the committee: C. F. W. Rys, Carnegie Steel Company; A. A. Green, Galena Signal Oil Company; C. E. Eveleth, General Electric Company; N. W. Storer, Westinghouse Electric & Manufacturing Company; W. S. Adams, J. G. Brill Company, and G. W. Lyndon, Association of Manufacturers of Chilled Car Wheels.

Committee Appointments

ENGINEERING ASSOCIATION

President F. R. Phillips has announced the following committee appointments. Other committees will be announced as soon as all of the members have accepted appointment.

Buildings and Structures—C. S. Kimball, Washington, D. C., chairman; H. G. Throop, Syracuse, N. Y.; F. F. Low, Boston, Mass.; H. E. Funk, Brooklyn, N. Y; James Link, Knoxville, Tenn.; R. C. Bird, New York City; G. C. Estill, Portland, Me.; H. R. Whitney, Springfield, Mass., and H. C. Young, Buffalo, N. Y.

Electrolysis.—A. S. Richey, Worcester, Mass., chairman; I. W. Gross, New York City.; E. B. Katté, New York City; E. J. Blair, Chicago, Ill., and G. W. Palmer, Jr., Boston, Mass.

Way Matters—C. H. Clark, Cleveland, Ohio, chairman; A. E. Harvey, Kansas City, Mo., vice-chairman; E. M. Haas, Cleveland, Ohio; E. M. T. Ryder, New York City; W. F. Graves, Montreal, Quebec; William R. Dunham, Jr., New Haven, Conn.; C. G. Keen, Philadelphia, Pa.; H. H. Ross, Toledo, Ohio, and D. P. Falconer, Rochester, N. Y.

Special Committee on A. I. E. E. Rules—J. W. Welsh, Pittsburgh, Pa., chairman; C. L. Cadle, Rochester, N. Y.; W. A. Del Mar, New York City; J. M. Waldron, New York City, and J. J. Sinclair, Brooklyn, N. Y.

JOINT COMMITTEE

Presidents Bradley and Phillips have also announced the following appointments:

Transportation-Engineering—G. H. Clifford, Fort Worth, Texas, chairman.

Engineering Association Members—J. W. Allen, Boston, Mass.; R. F. Carbutt, New York City, and E. F. Gould, Lima, Ohio.

Transportation & Traffic Association Members—F. W. Hild, Denver, Colo., and F. W. Coen, Sandusky, Ohio.

ACCOUNTANTS' ASSOCIATION

President M. R. Boylan announces the following as the committee to represent the association at the convention of the National Association of Railroad Commissioners: W. F. Ham, Washington, D. C., chairman; N. E. Stubbs, Baltimore, Md., and C. L. S. Tingley, Philadelphia, Pa.

The Traffic Inspector Discussed at Manila

Joint company section No. 5 held its twenty-first monthly meeting in Manila, P. I., on Oct. 10. A paper by Jerome Grindstaff, division superintendent, on "Duties of a Traffic Inspector," was presented by the author and discussed. As a paper of this kind is necessarily a summary of the details of the work of the official in question, Mr. Grindstaff's statements may be summarized for reference in the following epigrammatic form although these points were considerably expanded in the paper.

An inspector must bear in mind that he is engaged in a public service where he is constantly called upon to exercise great patience and self-control.

In going on duty he should inspect all cars leaving the carhouse and should make a trip over his entire division as soon as possible for the purpose of inspecting track, overhead wiring, signal lights and telephones.

He should be familiar with all schedules, transfer points, transfer connections, etc.

He should persistently endeavor to interest his trainmen in their work.

He should not humiliate trainmen by reprimanding them in the presence of passengers.

He should work in harmony with other inspectors and be as courteous to employees as to passengers.

He should keep his cars on time but should not allow the making up of time in dangerous locations.

He should prevent delays at layovers, adjust car capacity to demands and see that the cars are comfortable and sanitary.

He should see that the traveling public is handled safely.

He should issue instructions intelligibly and see that they are understood.

He should see that correct car signs are used and that the public is correctly informed regarding routing, etc.

He should exercise good judgment in the case of emergency, keeping up traffic by temporary rerouting if necessary.

He should explain operating details to passengers when questioned.

He should keep his superintendent informed of all special demands on the transportation facilities.

He should be well informed on all regular and special rules, making timely suggestions as to revisions.

He should confine himself to his own division as far as giving of orders is concerned.

He should exercise great care and good judgment in checking the work of conductors.

He should report accident cases fully and promptly, assisting the car crews in securing lists of witnesses' names.

In the discussion of Mr. Grindstaff's paper, O. Keesee, superintendent of transportation; J. M. Bury, assistant superintendent; Leopoldo Jiz and J. J. Dunning, traffic inspectors, and C. H. Van Hoven, claim agent, reinforced the speaker's remarks from their own experience, commending the intelligent use of the telephone service, the study of the general needs of the service, loyalty to the company's interest, and the exercise of tact. J. H. Blaisdell, just returned to Manila after a vacation in the United States, gave some reminiscences of his trip.

Snow Fighting and Preparedness

The above was the topic discussed at the meeting of the Denver Tramway Company Section held on Nov. 24, this being the thirty-ninth regular monthly gathering of the section. The attendance at this meeting was 200.

The topic of the evening was set before the members in papers by W. L. Whitlock and T. Sparks, who described the methods and equipment necessary in coping with the several types of snowstorms. The papers provoked a lively and lengthy discussion in which many members participated, and the chairman reluctantly adjoined the meeting at a late hour.

A Busy Session of Section No. 1

Eighty members attended the meeting of the Milwaukee Electric Railway & Light Company section held on Nov. 9. The election of officers resulted as follows: President, A. E. Wallace, division superintendent; vice-president, E. H. Olsen, promoted from secretaryship; secretary, F. A. Luber, draftsman; treasurer, T. J. Buckley, surveyor; director, E. J Archambault, civil engineer.

Three members described their experiences and observations at the Atlantic City Convention, covering respectively track work, rolling stock and transportation. F. A. Luber was announced to discuss current events of the way and structures engineering department which he did with the aid of lantern slides, some of which were of a humorous character. He described the layout of the new offices of the department and showed how it was related to the efficient carrying on of the work. Following this, motion pictures and lantern slides were shown to illustrate the fire prevention work of the company.

R. B. Stearns, general manager of the company, then presented to Bert Hall the gold medal awarded by the association for the best paper presented by a member of a company section. In his presentation speech Mr. Stearns remarked that the section had entered the competition three times and had carried off the medal every time. Officers and privates of the National Guard next discussed experiences in the service of the federal government on the Mexican border, after which retiring president Dentz reviewed the work of the section for the year and outlined the possibilities for the coming year. During the evening a quartet consisting of Messrs. Olsen, Cook, Miller and Abendroth sang several times.

As this issue of the paper goes to press word is received of an enthusiastic joint meeting of the gas, railway and electric sections of the Newport News & Hampton Railway, Gas & Electric Company. Details will be given in a later issue.

COMMUNICATIONS

Enamelling vs. Painting and Varnishing Cars

Union Traction Company of Indiana.
Anderson, Ind., Nov. 18, 1916.

To the Editors:

I have just noticed on page 1045 of your issue for Nov. 11 a short comment on car enamels and varnishes by Langdon B. Valentine. I am very much interested in this statement but cannot altogether agree with Mr. Valentine. Bear in mind that it is not my intention to doubt the correctness of his contention that the enamel process of painting does not make a first-class, lasting job of quality. While we have not perhaps made the elaborate or extensive tests which he claims to have made, yet our experience and opinion are quite the reverse.

We have some few cars to which we have applied the enamel process. These cars have been watched continually with great interest. The manufacturer has made great claims for his products, but we, like all the rest, are from Missouri. We had to be shown. We find, it is true, that with the enamel process the brilliant luster which the car has before it first leaves the paint shop is not retained, but this is the case regardless of whether a clear finishing varnish or the enamel process is used.

Our experience indicates that the life of car paint is largely if not wholly governed not only by the quality of varnish used but by the number of coats as well. We have some cars which we carried through the ordinary method of prime coats, service and colors, and finished with two and three coats of varnish. These cars were released about the same time from the paint shop that the cars were to which we gave the enamel process. The varnish used on these cars was conceded to be the very best that the market could produce. In less than thirty days the varnished car had lost its luster and did not even have an egg shell gloss. The enamel process, while it has lost its high luster, still maintains a beautiful egg shell gloss, and we predict that it will be necessary to revarnish the cars painted with the varnish system long before it will be necessary either to re-enamel or revarnish those painted with the enamel process.

We have had cars, as stated before, that after being thirty days out of the paint shop, even though they were cleaned all over once or twice a week with cleaning materials which in no way affects the varnish, looked as though they had not been revarnished for a period of a year or more.

The writer has begun to question whether such expensive methods of painting cars are worth while considering the amount of minor abrasions that they will receive in a season's run and the amount of touching-up which is necessary, especially as this touching-up usually demands a coat of color in order to make the car have a uniform appearance. It is the desire of almost every railway property to revarnish its cars every year, although conditions and financial situations arise which restrict the carrying out of this policy, and it is my belief that cheaper methods, whether it be material or process, are going to be compulsory to combat the ever-increasing price of labor and material.

I see no economy in revarnishing cars with expensive varnishes where the road is so fortunate as to have enough equipment to varnish it every year, but if the cost of materials and the method can be shortened it will enable the operator to get a greater number of cars and possibly all, through the paint shop every season. The tendency to-day is to economize in every way possible. It used to be that interurbans as well as city cars were dolled up with a lot of stripes and scroll work like a circus wagon, but the striping of cars on most properties has now been eliminated and the lettering is being reduced to the minimum.

In conclusion I would say, from the results obtained and with the conditions which must be met, that the enamel process is one which is worthy of the most careful consideration as I think it is the road not only to economical but to substantial car painting.

Recently we have painted a number of interurban cars with house paint. These were of a type that we only use on special occasions when traffic is extremely heavy. I consider that these cars look equally as well as the most expensive piece of work which we have put on, and I warrant that the luster and body of paint will last as long. If a car is to be varnished every year, the plan of giving a car a coat of house paint, which, at first thought, seems ridiculous, might not be such a joke after all.

R. N. Hemming,
Superintendent of Motive Power.

Side-Truss Construction for Railway Cars

L. B. Stillwell
Consulting Engineers
New York City, Dec. 7, 1916.

To the Editors:

We are much interested in reading in the Electric Railway Journal for Dec. 2 your editorial comment on the side-truss construction for railway cars, and are pleased to note that its great ability to resist distortion, or "weaving," in service, appeals to your judgment as being advantageous. In our opinion this feature of the side-truss construction is of the greatest importance, and becomes positively essential when the car body is extremely light, as distortion of a frail superstructure will soon land it in the repair shop. Your statement that the shock of impact between two cars is less than between long trains is obviously correct, but that the strength of superstructure is an important factor, even in case of collisions between two single cars, was apparent to all who saw the photographic record of wrecked cars exhibited at the Toledo meeting.

It is obvious that a car body structure that is designed to minimize destruction in case of derailment or collision will be capable of resisting any stress arising from even the most extreme service conditions. That the side-truss construction accomplishes this is demonstrated by several years' severe service record of several hundred cars.

L. B. Stillwell.

As a part of a campaign to teach children the dangers of taking "short cuts" over railroads, playing on the tracks or using railroad rights-of-way, bridges and trestles as highways, the Pennsylvania Railroad System has issued an illustrated calendar especially designed to appeal to young folks. The calendar is intended particularly for use in school rooms and will be supplied for that purpose throughout the cities, towns and country districts served by the Pennsylvania lines, both east and west of Pittsburgh.

Some Recent Advances in

EQUIPMENT AND ITS MAINTENANCE

This Week Too Master Mechanics Tell How They Handle Cars in the Shop and Keep Down Journal Troubles Respectively—Line and Cable Matters, and Crossing Safeguards Are also Covered in Several Articles

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates.)

Testing Line Insulators

BY D. D. EWING
Associate Professor of Electric Railway Engineering, Purdue University, La Fayette, Ind.

There is considerable truth in the old saying, "Put a rotten apple in the barrel and it will spoil all of the rest." And the fundamental idea involved is as true of the insulators on a line as it is of the apples in a barrel. The failure of the weak member of a system affects the welfare of all of the other members. Line surges set up by the destructive breakdown of a deteriorated or damaged insulator are likely to damage other insulators, and thus the trouble once started becomes cumulative. The problem of insulator testing as it confronts the operating man, therefore, is largely the problem of weeding out the defective insulating units before they actually break down.

For this weeding out process two methods of field testing have recently come into considerable use—the megger test and the telephone receiver test. The megger test cannot be used on a live line, and the testing equipment is somewhat expensive. Moreover, this plan requires a larger crew and is a little slower than the telephone receiver test. The results secured with it, however, are more definite than those obtained by the other method and are not affected either by the presence of an overhead ground wire or by the type of supporting structure. It has become quite popular for field tests on high-voltage transmission lines, particularly where a duplicate line is available for carrying the load while tests are being made.

The telephone receiver test can be performed by one man, as the apparatus and the methods used are of the simplest. Since the indication given the operator depends upon the shunting of leakage or unbalanced capacity currents from the pole through a telephone receiver, this test must be performed with the line energized. This instead of being objectionable is one of the important advantages of the method, since tests for defective insulators can be made without taking the line out of service. In a modified form the method can be used with steel supporting structures, but the best results are obtained when the supporting structures are of wood and where no overhead ground wire is used on the line.

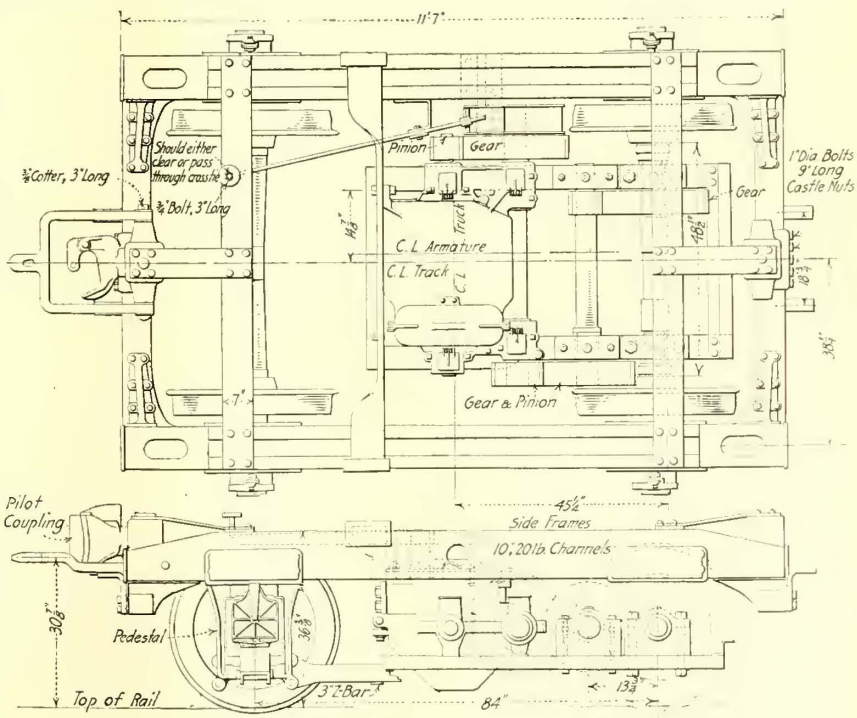
Continuity of service must prevail if trains are to be run in accordance with printed schedules and if desirable contracts for lighting and power service are to be secured. Poor line insulation, while not the only cause of service interruption, on many lines is an all too frequent cause. While experience has shown that no field test so far proposed is infallible, it has also shown that the consistent use of the method best adapted for a particular line eliminates to a large extent interruptions of service due to insulator troubles and decreases the average annual maintenance costs.

Handling Cars or Trucks with a Home-Made Electric Tractor

Present Equipment in the Long Island Railroad Shops Shows a Saving of 58 Per Cent on Each Truck Handled

BY J. S. MILLS
Foreman Electrical Department, Morris Park Shops, Long Island Railroad, Morris Park, N. Y.

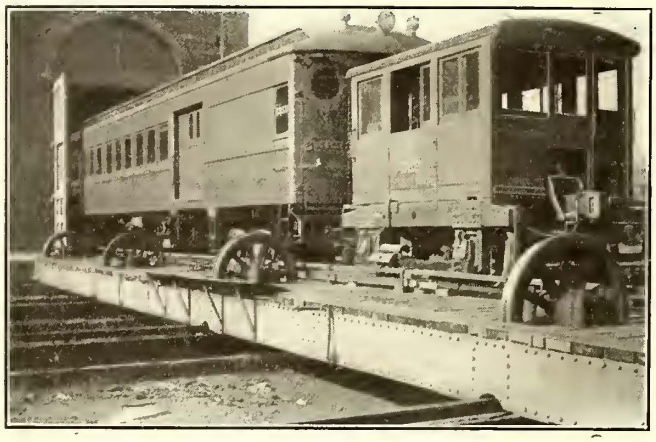
The writer has noted with interest the articles in the ELECTRIC RAILWAY JOURNAL on handling cars and trucks in shops, particularly those entitled "Portable Controller Proves a Time-Saver" and "A Movable Carriage for Current Collection," which appeared in the issues for Sept. 30, 1916, page 685, and Oct. 28, 1916, page 939, respectively.



PLAN AND ELEVATION OF MP-54 TRUCKS EQUIPPED WITH MOTOR AND TRIPLE-REDUCTION GEARS

The layout of a shop, of course, has a great deal to do

with the selection of the safest and cheapest method of doing this work. At the shops of this company an electric tractor was built and equipped for the purpose, and this has proven very satisfactory and has materially reduced the cost of the work. It consists of an MP-54 trailer truck with bolster guides and brake rigging removed, equipped with a GE-57 motor suspended on a carriage between the wheels. The power is transmitted through three sets of gears and pinions to one pair



ELECTRIC TRACTOR PULLING MOTOR-CAR OUT OF THE SHOP ONTO THE TRANSFER TABLE

of wheels. A shaft upon which a gear and pinion is mounted extends beyond the bearings and a band brake wheel is mounted on the same axle, being operated by foot from the inside of the cab. An R-27 controller, cast-iron resistance grids, circuit breaker and sand boxes are all mounted inside of the cab.

In order to remove the cab from the truck it is only necessary to disconnect the four motor leads, and to remove one pin from the brake rigging and eight ½-in. bolts that pass through straps holding the body to the truck. The tractor is equipped with two drawheads suitable for coupling with the two types used by this company, one being a Van Dorn & Dutton type which turns back out of the way when not in use and the other a standard automatic coupler.

Each track in the electric shops of this company holds two small cars, with a clear passage at each end, or one large car with space for one set of trucks in front of the car. An electrically-operated transfer table, equipped with a third rail for the movement of cars on and off the table, is located outside of the building and extends between two wings of the shops.

The process of handling a car when the removal of trucks is involved is as follows: It is first run off the transfer table into the crane house under its own power, the car body is lifted from the trucks by a crane, a rope is hooked onto the rear truck and both trucks are pulled from beneath the car. This rope is operated by a drum which is driven, through a clutch, by the main driving motor on the transfer table. The electric tractor is then coupled to the trucks, and they are either placed in the truck shop or on adjoining stub tracks. The tractor then takes the car, which rests on dummy trucks, and places it in the electric car shop. When the cars are again ready for trucks the operation is reversed.

Between alternate tracks inside the door adjoining the transfer table a standard bus-line receptacle is installed and connected to the 600-volt supply through a circuit breaker, so that when the contact shoe on the tractor leaves the third-rail on the transfer table a short jumper with a standard bus-line head on one end and with a fork on the other can be inserted in the receptacle to furnish power for operation.

The saving in time effected by the use of this electric-tractor in handling trucks amounts to 58 per cent and in handling car bodies still more. By the old method of handling one set of trucks with rope and block six men for six minutes were required, while with the electric tractor it requires three men but five minutes. Between twenty-five and thirty sets of trucks are shopped each week and these must be handled twice and often three times. Another saving is in the amount of rope used on the transfer table. Formerly this hemp rope, which is 4¾ in. in diameter and 160 ft. long, had to be renewed about once a month, but since the electric tractor has been in service, about eight months, only one rope has been used and that is still in service.

It was feared that in speeding up the work more than 50 per cent more accidents would occur but since this motor car has been in service not a man has been injured on this work.

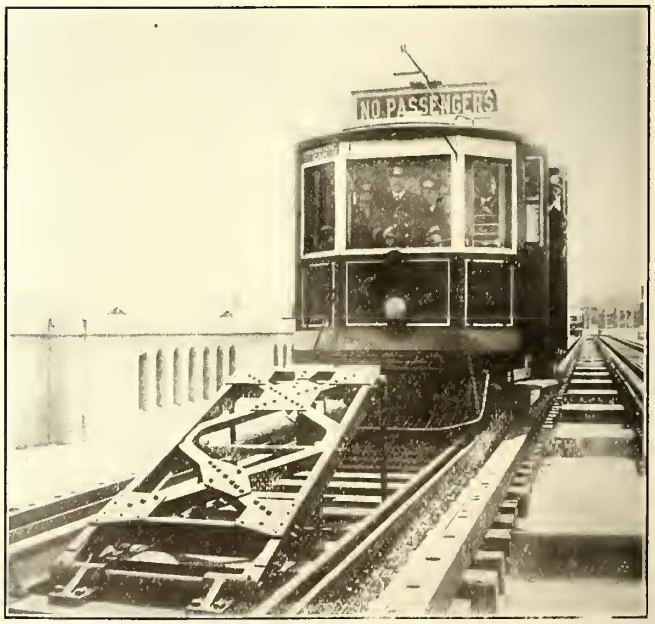
Safety Stop for Drawbridges and Grade Crossings

The Author Describes Several Devices for Safeguarding Traffic at Drawbridges and Grade Crossings

BY J. B. STRAUSS, C. E., CHICAGO, ILL.
President The Strauss Bascule Bridge Company.

The recent fatal accidents in Boston, Chicago and Vancouver, due to open drawbridges, have proved the necessity for more effective means for removing this danger. The ideal gate or barrier is one that will stop any vehicle positively, but at the same time so gradually that the impact will cause no damage. The writer has spent several years developing and testing devices for this purpose and the following is a description of some of his designs.

One of these is an automatic bumper, intended for



AUTOMATIC BUMPER RAISED TO STOP CAR ON APPROACH TO DRAWBRIDGE

street car traffic across bridges and railway tracks where there is little speed or impact. This device comprises a heavy structural steel "striking frame," as shown in an accompanying illustration. This frame is pivotally mounted between the rails with its top below the rail

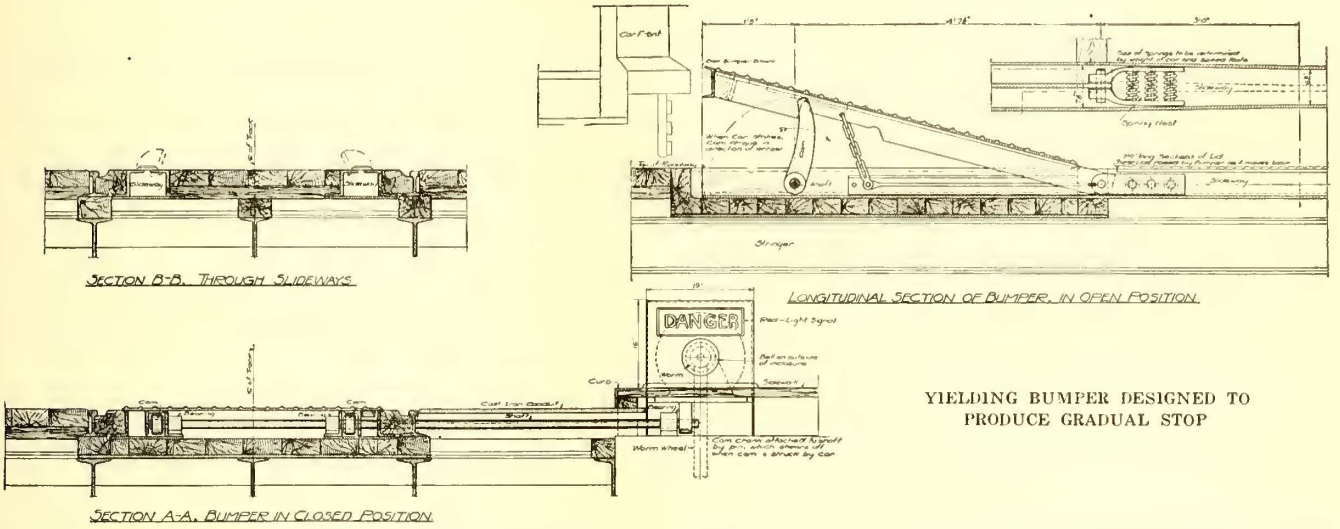
head when not in use. When traffic is to be stopped a motor lifts the striking frame so that it stands at an angle to the track, thus blocking traffic.

This form will not suffice where the speed of the car is high and the impact, therefore, heavy. For this condition a "yielding bumper" was developed, as is illustrated in the accompanying drawing. This form combines with the positive protection of the fixed bumper, a yielding element which permits movement when struck, thus offering a constantly increasing resistance until the car stops. The striking frame in the yielding bumper is mounted on a secondary traveling frame, which moves in slideways between the tracks, extending a distance of 50 ft. The slideways are made of two Z-bars, set so as to form wide slots. Spring shoes travel in these slots, these shoes being fastened to the toe of the traveling frame. The friction between these shoes and the inner surfaces of the slideways determines the force necessary to push the bumper along the track. The slideways are tapered so that their width at the far end is less than that at the other end, causing the friction between the shoes and the slideways to increase as the frame approaches the bridge. The strength of the springs may be changed for cars of different weights and speeds.

In addition to the above, a cam is provided automatically to raise the striking frame when traffic is to be stopped. Ordinarily this serves as a signal and is sufficient to cause the motorman to stop his car. However, should a car get beyond control, its front sill will engage the striking frame, which, with the traveling frame, slides forward under the force of the car. The resistance increases as the speed decreases, and the car is brought to a gradual stop. In combination with this bumper, there is a danger light and a signal bell which are automatically operated when traffic is to be stopped.

These bumpers are intended especially for car traffic, so another device called a "yielding barrier" was developed for general highway protection. This barrier is made in two types, the one designated as the "portal" type, having a frame across the roadway, for the purpose of supporting the chain or cable and the machinery which operates it. The chain barrier proper consists of three horizontal chains or cables spaced and held in place by a web system of lighter chains. It can be raised and lowered by the operator in the operator's house. It is fastened at the ends to some form of shock absorber, which, in case the barrier is struck by a vehicle will permit the chain to pay out and gradually bring the vehicle to a stop.

In the other form of the yielding barrier, the portal or cross strut is omitted and the chains or cables are left exposed. Where street car traffic exists a center post must be provided in this type to support the trolley wires. Where there are no trolley wires, this center post is omitted and there are simply the two side posts. This type, from the standpoint of appearance, may be considered better than the portal or cross strut type. In this design the operating machinery for raising and lowering the barrier is located beneath the roadway in a closed compartment, which, however, is readily accessible for inspection and repairs. It will be noted that this does not interfere with the trolley wires in any respect, that it takes up very little space and that it is simple and direct in operation. All forms of this yielding form of gate or barrier are covered by patents issued to the author.



YIELDING BUMPER DESIGNED TO PRODUCE GRADUAL STOP

These devices have been developed to produce a satisfactory method for the elimination of accidents in all kinds of traffic. The old flimsy railway and bridge gates have proved themselves to be insufficient protection and it is believed that some yielding form of barrier must soon become generally adopted.

Small Steam Turbines in the Power Plant

Among recent applications of the steam turbine to power plant auxiliaries is one adapting it to the driving induced draft fans the speed of which is low compared with that of the turbine. The perfecting of high-speed reduction gears has made possible the use of turbine-driven fans and a considerable number are now in operation. The fans used generally require from 25 hp. to 50 hp. and give a draft of 2 in. to 5 in. In one type of unit developed by the Terry Steam Turbine Company the maximum turbine speed is 4500 r.p.m. and the gear ratio is 3.7:1. Another type has a maximum speed of 3630 r.p.m. for the turbine, with a gear ratio of approximately 6.8:1.

Another application is to exciter driving. An example is furnished by the three 300-kw. exciter units now being installed by the Buffalo General Electric Company. To insure the plant against loss of excitation, two independent sources of power are provided to drive each exciter, which are direct-connected to an induction motor at one end and to a Terry steam turbine at the other end. The governing mechanism of the turbine is so arranged that if power for the induction motor should fail the turbine will automatically pick up the load. An interesting feature is the high pressure and temperature supplied to the turbine (275 lb. and 275 deg. superheat).

Cutting Out Journal Troubles on an Interurban Road

The Author Gives a Formula for Journal Brasses and Describes Methods of Eliminating Hot Boxes, Loose Journals and Other Troubles

BY A. BLANCHARD
Master Mechanic Boston & Worcester Street Railway

Much progress has been made during the past year on the Boston & Worcester Street Railway in the direction of eliminating hot journals. These were formerly the source of much operating inconvenience on this system, the main line cars of which reach a maximum speed of about 45 m.p.h. on level track. For many years the company has manufactured its own journal brasses, but a study of the road's experience led to the conclusion that there were several causes for our hot journals, such as improper composition and improper design of journal brass, wornout wedges, worn motor suspensions (on old-style motors having three-point suspension), improper journal packing and excessive braking effort. The last-named is 150 per cent maximum, which we find necessary in order to make a quick

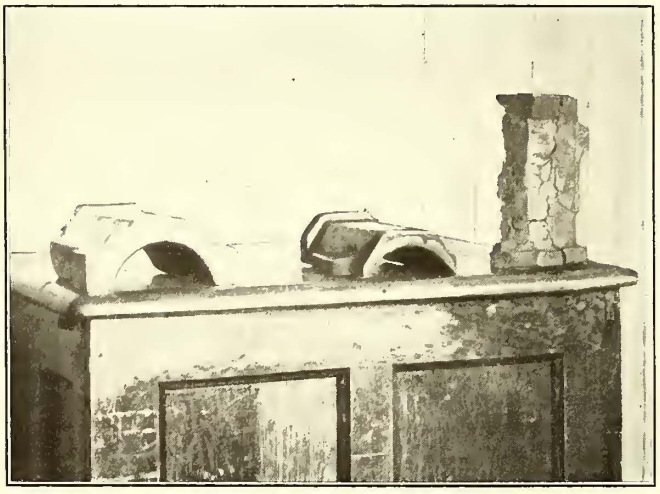


FIG. 1—(LEFT TO RIGHT) LATEST TYPE OF BRASS FOR SMALL CARS; EARLIER TYPE OF BRASS; BRASS CRACKED FROM OVERHEATING

stop with a loaded car on our long heavy grades, of which we have a great many.

Our first step was to find a mixture for our journal brasses, so that they would run cold from the start, without any lead lining, when properly fitted to the journal; also that it would not cut the axle when they did run hot. At the same time it could not be so soft that it would wear rapidly where the brass comes in contact with the wedge and sides of the journal box. After trying a great many different mixtures we found the following one would meet our requirements: Copper, 79 per cent; tin, 9 per cent; lead, 10 per cent, and phosphor copper, 2 per cent (containing 10 per cent of phosphorus).

Under ordinary conditions I consider it unnecessary to line brasses, but on account of the previous difficulties we have had with hot journals, which has caused a great many of our journals to become rough and hollow in the center, we are at present lining our brasses with 1/16-in. lead linings. We had considerable trouble in making the lining stick to the brass, as at first it would flake off or roll out, but we found the following practice would make the lining stick and prevent it from flaking off or rolling out. After boring the brass is heated, then painted with whiting, with the exception of the surface to be lined, to which surface we apply Reed's "Grade B" soldering flux. Then the whole brass is dipped in a bath of pure tin, after which it is put on an arbor while still warm and given 1/16 in. of lead lining.

Our second step was to find some way to stop the brasses from tipping and the button on the end of the journal from wearing a hole in the side of the journal box. We found that this was caused by the excessive braking effort that we were using, as when the brakes were applied the journal was pushed against the side of the journal box and in time wore a hole through it, and sometimes the brass would tip, causing it to wear

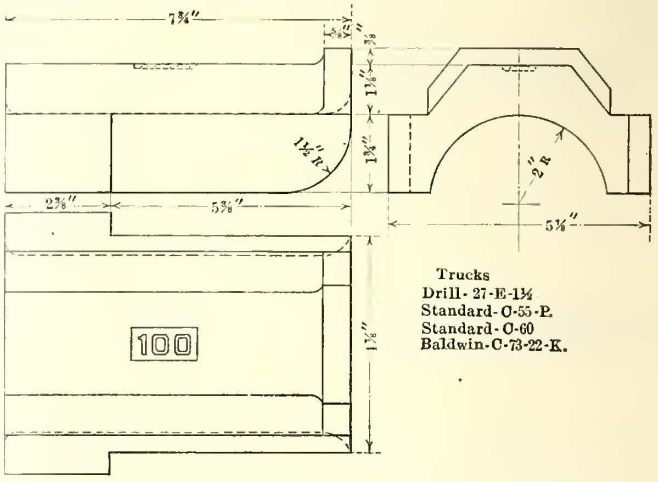


FIG. 2—REDESIGNED BRASS USED ON LARGEST CARS B. & W. ST. RY.

as shown at right of Fig. 1. We overcame this trouble by designing our brasses as shown in Fig. 2. This brass cannot tip and will not allow the end of the axle to come in contact with the side of the journal box. As this brass will not allow the axle to increase its distance, to any great extent, from the center of the truck, we have not had any more hot journals caused by the motor suspension (on motors with three-point suspension) binding on the truck frame. On our larger cars we have four types of trucks in which we formerly used four types of journal brasses, but by making a slight change in some of the journal box wedges we are

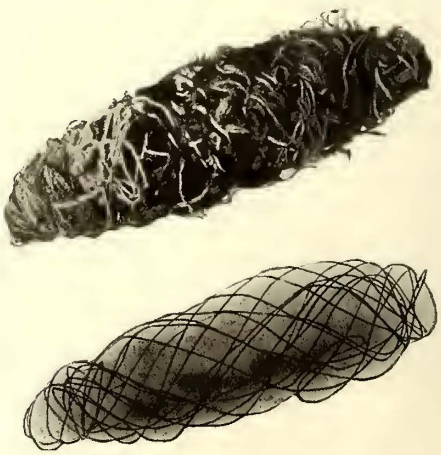


FIG. 3—ORDINARY AND X-RAY PHOTOGRAPHS OF SPECIAL PACKING

able to use one type of brass for all four types of trucks. Due to hot journals in the past, some of our journals had to be turned down, as they were very rough. The original size was 4¼-in. by 8-in. M.C.B. type. Therefore we have journals 4 3/16-in., 4⅛-in., and 4 1/16-in. diameter, and in lining our brasses we use four different sizes of arbors and stamp the brass according to its diameter.

We had a great deal of trouble to find a suitable

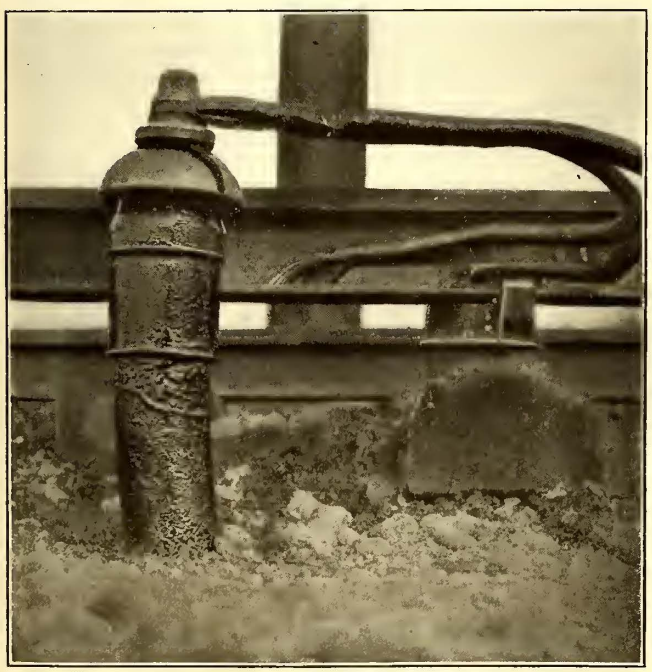
journal packing, one that would not pound away from the journals. We have adopted the "Elastic" car waste, manufactured by the Elastic Car Waste Company, Philadelphia, Pa. This waste is put up in different size rolls, which are woven with soft brass wire as shown in the illustration. We use the "Electric" size and put five rolls in each journal on our large cars, four under the journal and one at the end. This type of waste is more difficult to put into the box than the ordinary loose waste, but when once in place it is practically impossible for it to pound away from the journal. Before using, the elastic packing is saturated in Galena car oil for forty-eight hours and then drained twenty-four hours in a room at about 70 deg. Fahr. The rolls are then put into the journal box without additional oil. We have had some of this waste in service for over six months and have not added any additional oil or had to touch the initial installation.

Brasses have also been redesigned to fit our smaller cars, and the left-hand brass, Fig. 1, is one of these latest types remodeled in shape as indicated by comparison with the middle brass, which is the first of the new mixture to be placed in service. About 75 per cent of the cars are now fitted with improved brasses, and last Labor Day was the first holiday on which the company ever ran its service without a hot journal.

We expect to get at least four years' life per brass now compared with six months' maximum under the former practice, and the improvement in car service so far is most gratifying.

A Third-Rail Feeder Plug

The method of supplying current to the third-rail from the feeders on the Puget Sound Electric Railway, Tacoma, Wash., is shown in the illustration herewith. A tap from the feeder cable is led down the pole and run under the track through Orangeburg fiber conduit to the side of the third-rail. An insulated plug, made



CONNECTION FROM FEEDER TO THIRD RAIL SHOWING SPECIAL PLUG

especially for the Puget Sound Electric Railway by the Standard Underground Cable Company, is attached to the top of the fiber conduit This plug, which is protected by a petticoat very similar to that of a high-tension insulator, has a bolt extending through the petticoat, which is threaded and takes a nut. The terminal of the third-rail connection fits down over the bolt and is held tightly in place by means of the nut.

Cable Faults Located by Small Portable Instrument

Practical Method of Locating Feeder Troubles Is Tried Out by Several Operating Companies

The location of cable faults is a problem common to all electric railways, and many companies have devoted considerable study to developing methods of locating their cable troubles. The method used in most instances to locate faults such as grounds or short-circuits between cables is to send an interrupted current through the defective cable, and then an exploring coil connected

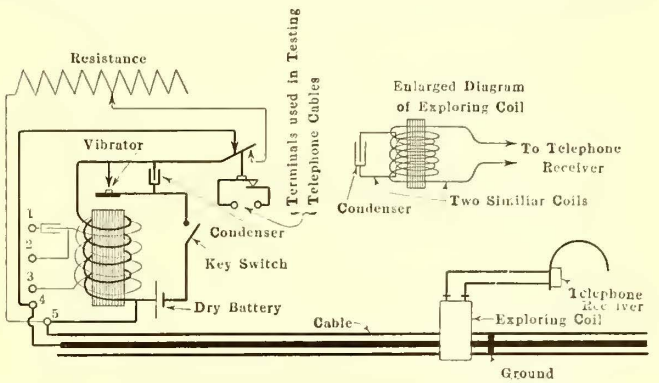


DIAGRAM OF INSTRUMENTS AND TESTING CONNECTIONS USED IN LOCATING CABLE FAULTS

to a telephone receiver is applied to the cable at intervals along the line. If the exploring coil is between the fault and the source of the interrupted current a current will be induced in the exploring coil, causing a sound in the telephone receiver. If the sound is very weak or if none at all is heard it indicates that the exploring coil is beyond the fault. By continued trial it is thus possible to locate the trouble within a few feet.

An instrument called a "telefault" is used quite extensively for the purpose of detecting faults by the method just outlined. The design and adjustment of this instrument is such that the pulsating current which is sent through the cable causes a distinct tapping sound in the telephone receiver when the exploring coil to which it is attached is held close to the cable. This tapping is similar to the sound made by a woodpecker and it is an important feature of the instrument since it is essential that a characteristic sound be produced—one that can readily be detected from the humming sound which might be caused by induction from adjoining cables.

The accompanying illustration shows the wiring diagram and testing connections which are used in locating cable grounds and short-circuits. A single dry cell is connected in series with a key switch, a vibrating current-interrupter and the primary winding of an induction coil. A condenser is connected across the interrupter contacts to absorb the spark. There is also a secondary winding on the induction coil and a set of resistances for locating troubles in telephone and signal cables, but these resistances are not used for testing for power cable troubles.

The pressing of the key switch causes the vibrator to operate, and a pulsating current is sent through the cable to the point where the cable is grounded to the

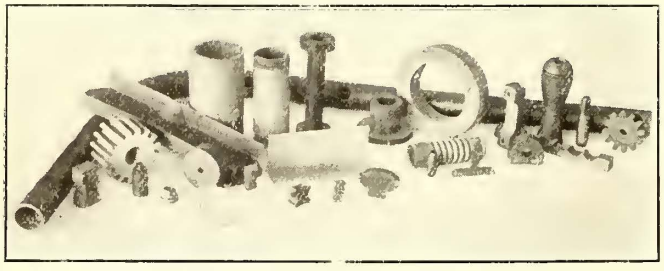
sheath. The sheath then forms the return circuit back to the instrument. The exploring coil consists of two exactly similar coils of fine wire wound on a laminated iron core. As shown in the diagram the terminals of one coil are connected to a condenser, and the other coil is connected to a telephone receiver. The coils and condenser are mounted in the same case. This is made of bakelite and is small enough to be easily held against the cable with one hand. The operator in search of a fault applies the exploring coil to the cable at intervals along the route, and the characteristic tapping sound is heard until a point in the cable is reached where a sound is heard on one side, but where none is heard on the other. This is the location of the trouble.

A test of the instrument was made by the New York Edison Company. In this case a three-conductor 250,000-circ. mil cable was shorted by a 3000-ohm resistance placed at a point unknown to the testers. This short-circuit was located in two hours and thirty minutes at a point about 4 miles from the substation. Only six manholes along the line were entered in making the test. In trying out the telefault the Interborough Rapid Transit Company of New York City used it in locating a ground in a single conductor, lead covered, 2,000,000-circ. mil cable.

Other tests of a similar nature have been made, and the companies that have used the instrument believe that it saves much time in locating cable faults. It has been pointed out that the sound heard in the telephone receiver is a tapping like that of a woodpecker, for this reason its makers, W. N. Matthews & Brother of St. Louis, Mo., have named it the "Woodpecker Telefault."

A New Electrical Insulation

A new form of electrical insulating material called "Condensite-Cellulac" is being placed on the market by the Diamond State Fiber Company, Bridgeport, Pa. This material is said to be entirely different in physical and chemical characteristics from any other form of fiber, hard rubber, mica or synthetic insulation. It is said further to combine in great part the stable physical and chemical properties, and high dielectric resistance of condensite, which is employed in its manufacture, and the good qualities of the best grade of vulcanized fiber. These properties are summarized by the manufacturers thus: It is permanently anhydrous and



SHAPES IN WHICH NEW INSULATING MATERIAL IS ALREADY BEING MOLDED

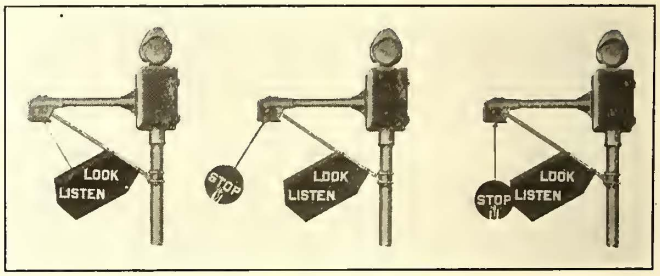
non-hygroscopic, and is impervious to the action of oil and ordinary acids or solvents. It is infusible and is not affected by the action of heat within the range of temperature ordinarily encountered. It is not fragile and will stand considerable vibration or shock.

This insulating material is furnished in merchantable shapes, sheets, rods, tubes, etc., and is readily machined. It may be formed into very thin sheets (0.015 in. or less in thickness). It can also be supplied in the soft uncured state, permitting of its being hardened in the place in which it is to be used, as for instance, in making gaskets for hot lines, steam, hot water, compressed air, etc.

Three-Aspect Automatic Flagman

A special type of visual signal to protect dangerous grade crossings has been developed by the Union Switch & Signal Company, Swissvale, Pa., which, while displaying a "stop" indication by the movement of a disk in normal operation, is so designed that a failure of any part of the apparatus or the absence of power will cause a second or emergency "stop" indication. In other words, this signal has three aspects, one indicating "proceed," and either of the other two indicating "stop," as shown in the accompanying illustration.

Under normal conditions this flagman indicates the approach of a train by swinging a red banner on which



THREE ASPECT FLAGMAN—FIRST POSITION—PROCEED; SECOND POSITION—SIGNAL SWINGING, STOP; THIRD POSITION—SIGNAL HANGING VERTICAL, STOP

appears the word "stop," and displays a red light attached to the banner. When no train is approaching the banner is held to one side between two screens upon which is painted the phrase "look and listen," and the lamp suspended from the banner is not lighted. If the circuit through the holding magnets is broken, but the apparatus is otherwise in good condition, the banner will swing irrespective of the approach of a train. If the circuit is broken through the operating magnet but not through the holding magnet the banner will be retained in its extreme position between the screens until a train approaches when it will be released and ultimately assume a vertical position with the banner stationary but fully displayed. If current is totally cut off the mechanism, or if the operating parts become disconnected, the banner will also assume the vertical position and be fully displayed.

The operating mechanism is inclosed in a weatherproof case and consists essentially of operating magnets for driving the swinging banner and of holding magnets for retaining the banner at one end of its arc of travel.

This flagman is designed to operate normally at 10 volts direct current. It requires an average of 0.4 amp. for swinging the banner, and 0.4 amp. for the 5-watt 12-volt lamp while the banner is swinging. The holding magnets require normally 10 milliamp. when the flagman is latched in the clear position. The signal can be equipped with a bell for further protection. The control of the flagman can be effected by any of the well-known automatic or non-automatic methods.

The Kansas City, Clay County & St. Joseph Railway has contracted for an electric locomotive. The company will install in the locomotive the present motor equipment of its work car, using the steel frame of that car for the ditcher. The locomotive is needed to haul the ditcher and upkeep equipment, the freight cars transferred from steam lines, and the company's freight cars.

NEWS OF ELECTRIC RAILWAYS

Traffic and Transportation

Financial and Corporate | Personal Mention | Construction News

ST. LOUIS SETTLEMENT SUGGESTION COMMENT

Principal St. Louis Papers Agreed that Long-Time Settlement Is Desirable—President McCulloch Discussed Problem

The proposal made by the United Railways, St. Louis, Mo., to the city for a settlement of the differences between the company and the city, referred to at length in the ELECTRIC RAILWAY JOURNAL for Dec. 2, page 1170, has provoked much public discussion of the street railway question. Quite naturally, differences of opinion exist as to what seems best to be done, but such opinions as have been expressed contain no elements that would seem to prevent their reconciliation.

On one principal point the two leading daily papers, the *Post-Dispatch* and the *Republic*, are agreed, namely, that any temporary expedient is inadvisable. In this connection the *Republic* says that "the city should go to the bottom of the question having in mind the settlement not only of the troubles which are now worrying the company, but also of the future of street railroading in St. Louis, which future should be considered in the light of what other cities have accomplished in the way of bettering service or reducing fares." Similarly the *Post-Dispatch* says that "the adjustment merely of surface differences will leave the problem unsolved." It makes a plea for provision for subways and extensions in the city and suburbs, and says that the only satisfactory settlement will limit the earnings of the company to fair returns on a fair valuation and devote all earnings in excess of that to a fund for real rapid transit.

The *Republic* seems to think that there is a disposition on the part of the Mayor to hasten the proceedings and get the question out of the way as soon as possible. In this it "does not see promise of a satisfactory adjustment of the question."

Many subjects affecting the company closely were discussed by Richard McCulloch, president and general manager of the company, in an interview with a representative of the *Post-Dispatch*, published in that paper for Nov. 25. Mr. McCulloch said that he would be glad to present to the directors the suggestion that the city have a representative on the railway board with full voting power and such other rights as were enjoyed by other directors. He did not see, however, how it would be possible for the city to have a representative in the operating department of the company. Control of the company was lodged with the Public Service Commission, but if the State would delegate power to the city to create such an official he would recommend the proposal to the directors.

Mr. McCulloch said that the capitalization of the company could be reduced only by a financial readjustment agreed upon mutually by the security holders or through receivership and foreclosure. The company had outstanding approximately $40,000,000 of stock and $60,000,000 of bonds. Considering intangibles and obsolescence due to the rapid changes in the street railway art with the attending need for superseding equipment before it had anything like outlived its usefulness, he did not think the total of securities outstanding was excessive.

The *Post-Dispatch* had advocated editorially a return to the company limited to 5 per cent. Mr. McCulloch said that with any such condition as this imposed the company would not be able to compete for capital in the financial markets with other forms of investments and that it would be unable to secure the new capital that was constantly required. With respect to the traction settlement of 1907 in Chicago and the much more recent settlement in Kansas City, he personally liked the principle, because it made the city and the company partners and insured co-operation between them.

ELECTRIC RAILWAY LABOR SHORTAGE ACUTE

City and Suburban Lines Find It Increasingly Difficult to Secure Satisfactory Help

Although this is ordinarily the time of year when there is, if anything, a surplus of labor in the electric railway field, reports from a number of Eastern and Middle West cities indicate that some of the companies have actually had to abandon plans which they had in preparation for the expansion and betterment of their service. The strike in New York has been over now for weeks, so far as the railways are concerned, but the plans of the companies for resuming operations in full were delayed considerably on account of inability to secure men of the high standard fixed for the arduous metropolitan service.

Among the other large cities that report man shortage are Washington and Cleveland. But this is not all. Even the lines in semi-metropolitan and rural districts are reporting labor shortages. The Connecticut Company, in particular, has been hard hit in this respect. The call for men from other industries has been insistent now for months in Bridgeport, New Haven, Hartford, and other places in Connecticut where machinery and tool-making are the principal industries. J. K. Punderford, general manager of the Connecticut Company, says that motormen especially have quit to go into the factories.

In Cleveland, the question of labor shortage has been brought out forcibly by the demand for increased service there on some of the lines. There the amount of service given and the fare question are almost inextricably mixed under the Tayler franchise, by which the service is under the control of the city street railway commissioner. Yielding to persistent demand from the public and the newspapers, that official has consented to those increases in service which have been most persistently urged, but now that this has been done the question up for settlement is that of securing the men for the cars. The commissioner said recently that the demand for men in other work was so great, and the wages so high, that men would not take places on the cars at the wages the railway could pay.

So acute did the labor shortage become in Washington, D. C., that the Washington Railway & Electric Company resorted to an ingenious scheme of advertising calculated to increase applications for employment and bring the instruction department to a normal condition. Letters were mailed to more than 660 postmasters in Maryland and Virginia, in which the company said that it had recently received communications from residents of the vicinity of the particular postmaster addressed asking for information relative to securing employment with the company. The company then said to the postmaster that in order to be of material service to those in his vicinity who might be interested it would appreciate his posting on the post-office bulletin board a circular which was inclosed informing those interested how to apply for employment without the necessity of going to Washington. This poster accentuated the fact of steady employment at from $45 to $80 a month. The inquiries that these posters provoked were answered promptly by the railway with a letter suggesting an appointment for a personal interview. With this letter went a circular giving the necessary qualifications for appointment, the cost to enter the service and the rates of pay.

The Washington Railway & Electric Company up to Dec. 6 had applications for employment from forty-three men who read the circular posted on the bulletin boards of rural post offices. The expense of the trial to the company was only $30.50, $12 of which was for postage. The opinion prevails in the company that the plan is better than paid advertising in country newspapers and that it brings a better class of applicants for permanent employment.

ACTION URGED UPON CITY OF SEATTLE

The legal department of the city of Seattle, Wash., has been instructed by the franchise committee of the Council to bring suit against the Puget Sound Traction, Light & Power Company to require the company to pave its right-of-way. The committee of the Council acted upon the opinion of Walter F. Meier, assistant corporation counsel, who stated that the city has the right to force the company to comply with its franchise provisions, notwithstanding its appeal to the Public Service Commission for relief from such requirements.

This action is in conflict with an agreement entered into more than a year ago, when officials of the company conferred with Mayor H. C. Gill and other city officials. At that time, the company paid its 2 per cent gross earning tax under protest, and agreed to continue these payments until the Public Service Commission disposed of its petition, the amounts to be refunded in the event that the relief sought by the company was granted and confirmed by the courts. At that conference, it was also agreed that instead of paving right-of-way, the company should be required to plank such parts of the street, until the petition to the Public Service Commission had been acted upon. Accordingly the company planked its right-of-way in a number of improvement districts where the franchise required paving with the same material and at the same time the city paved the remainder of the street. In these districts, the company pleaded its petition to the commission as an excuse for not complying with the letter of the franchise.

The relief petition of the company to the commission asked that the company be relieved of paving its right-of-way, of paying 2 per cent of its gross earnings to the city annually, and of paying any of the cost of bridges used for street railway purposes. The petition has been pending nearly two years. Counsel Meier holds that the application to the commission does not relieve the company from complete compliance with the terms of its franchises until the petition has been acted upon and the relief prayed for has been granted. It has not been determined in what district the company will be cited to remove the planking and pave its right-of-way with the same kind of material used on the remainder of the street.

The utilities committee of the Council has taken up with A. W. Leonard, president of the Puget Sound Traction, Light & Power Company, the question of the company contributing toward the cost of constructing the proposed viaduct and bridge on West Spokane Street and across the West Waterway.

NEW TERMINAL FOR INDIANAPOLIS

An important stage in the development of the interurban lines operating out of the city of Indianapolis, Ind., was marked during the week ended Dec. 9 by the purchase by the Terre Haute, Indianapolis & Eastern Traction Company of the Federal League Ball Park in Indianapolis. The park comprises about seven acres of ground within a few squares of the central business district of the city, and is to be used as a site for new interurban freight terminals for all the interurban lines entering Indianapolis. The three freight houses adjoining the Traction Terminal Building and passenger station at Indianapolis have for some time past proved inadequate to handle the increasing volume of freight business.

The new property is valued by real estate men at approximately $250,000, and has a frontage of 600 ft. on Kentucky Avenue, making it accessible for all traction lines entering the city as well as for manufactories and other shippers. The facilities for handling interurban freight in Indianapolis will be more than doubled when the new freight stations are completed.

The work of removing the grandstands and other structures on the ground formerly occupied as a baseball park will commence at once, and plans are now being made for the new buildings to be erected by the Terre Haute, Indianapolis & Eastern Traction Company. These new freight stations will be of brick construction, as attractive architecturally as possible. Proper track facilities, storage and transfer houses will be provided. The work on the new buildings will probably commence in the spring of next year.

BOSTON TUNNEL EXTENSION OPENED

The extension of the Dorchester tunnel of the Boston (Mass.) Elevated Railway from Washington Street to Dewey Square was opened for traffic on Dec. 3. Although the length of tunnel placed in commission is only ¼ mile, the new service represents one of the most important improvements in rapid transit from the standpoint of public convenience that has been completed by the Boston Transit Commission during the last few years. With the exception of the East Boston tunnel, Boston has had no crosstown rapid transit line of major importance running east and west, although the Atlantic Avenue elevated line has to some degree compensated for this condition by the loop and inter-terminal service operated upon it in the course of its history. The Dorchester tunnel, when completed, will enable high-speed train service to be rendered between Harvard Square, Cambridge, and Andrew Square, Dorchester, the section between Harvard Square and Park Street being popularly known as the Cambridge subway. In order to accommodate the public as far as possible in advance of the completion of the tunnel, the Boston Elevated Railway has established service in the downtown sections of this tunnel as rapidly as the completion of stations has permitted. Under this plan trains were operated from Harvard Square to Washington station following the completion of the tunnel under Winter and part of Summer Street, and the further extension of service to South Station under the present terminal point provides rapid transit from Cambridge and the various suburbs at the west of the Charles River to the South Terminal Station of the New York, New Haven & Hartford and Boston & Albany railroads.

EXPERIENCE ORDINANCE UNCONSTITUTIONAL

Judge Joseph H. Beall of the City Court of Yonkers, N. Y., on Dec. 1, declared unconstitutional the fifteen-day ordinance, which forbids the operation of a trolley car in that city by men not having had that period of instruction in that city. In the decision Judge Beall said:

"The so-called experience ordinance should be declared invalid for its very obscurity. No man can tell what it means. And no man's reputation and liberty should be placed at stake by a law which neither the author of it nor any other person, including the court, can understand. This decision has no relationship to the strike in this city, except to take into consideration existing conditions. It relates purely to an interpretation of this ordinance as exercised by the Council of the police power which could only be exercised in behalf of all the people of the city and not of any class. One of the first requisites of any law or ordinance is that it be reasonable, and this ordinance is not reasonable."

"Nothing is reasonable which threatens a community with ruin. And in connection with that phase of the matter it is right that the court should take judicial notice of conditions which have existed in this city for a number of months; the practical paralysis of the means of transportation for a long period of time, the discomfort and inconvenience that have resulted, the accidents to life and limb and property, the peril and expense of the child on its way to school and the laborer to his work, the grave and serious injury to all forms of business, the deadening effect upon and the irreparable loss to all holdings of real estate, the necessary withdrawal of the police from the ordinary avenues of their work, and, most of all, the nation-wide blot upon the fame and reputation of the city, which is ineffaceable."

Judge Beall's decision was rendered in the case of Louis Schwam, a motorman, who was arrested on complaint of Samuel Hoey, president of the local of the Amalgamated Association in Yonkers, who alleged that Schwam had not been trained for the period stipulated in the ordinance. Assistant Corporation Counsel Cohen of Yonkers was quoted to the effect that the city could not appeal from the decision, as it was returned in a criminal case, and that, as the defendant had no interest in taking the case to a higher court, the decision would stand.

Mount Vernon and New Rochelle repealed similar ordinances lately, as a result of the recent strike on the lines of the Yonkers Railroad and the Union Railway, New York, included in the system of the Third Avenue Railway. The Common Council of Yonkers refused to do so.

MESSRS. BEMIS AND BURCH TESTIFY IN CLEVELAND

E. W. Bemis testified on Nov. 27 before the board of arbitrators which is to decide on the power contract between the Cleveland (Ohio) Railway and the Cleveland Electric Illuminating Company. He said that money was not all that was involved in the differences between the company and the city. The question should be decided in a way that was for the best interests of the city. The welfare of the municipal light company should be considered, as well as the welfare of the railway.

Edward P. Burch engineer in the employ of the city, and F. W. Ballard, former commissioner of light and heat, witnesses for the city, both testified that the railway would save money in the long run by accepting the bid of the municipal light plant. They argued that the cost of producing energy was steadily going down and that no contract that might continue for eighteen years should be made. Mr. Burch said that the saving under the bid of the municipal plant would be $355,000 and that the railway's own figures showed that it would lose $15,000 by taking the Illuminating Company's contract.

Mr. Burch testified before the board on Dec. 4 to the effect that the municipal plant is economically and efficiently handled and that it will be in a position within two years to supply the Cleveland Railway with all the power needed. He was the last witness for the city in the hearing. There will be some testimony in rebuttal.

DALLAS VOTE FAVORS LOCAL CONTROL

The final count on Dec. 6 of the postcard vote on the Dallas traction and lighting franchises showed the total of ballots cast to be 15,422. Of this number only 10,474 were found eligible. The vote in favor of the franchises was 9896 and against them 578. Mayor Lindsley and the City Commissioners announced that the franchises unamended would be passed on Dec. 8. Petitions are being circulated for a referendum election on the franchises after their passage by the commissioners.

The plan for the settlement of the differences in Dallas provides for new franchises to the consolidated street railways and the new lighting company to be organized by J. F. Strickland and C. W. Hobson, under which the control and management of the properties will be vested with local Dallas interests. The vote shows the desire of the public to keep the operation of public utilities in private hands where capital shows a desire to operate the properties in the best interests of all.

New York Road to Be Scrapped.—No efforts will be made to electrify the Wellsville & Buffalo Railroad, which has been abandoned after ten months' unsuccessful operation. Construction gangs have already started to take up the rails at several points. The equipment will probably be scrapped.

Strike in Marion.—The night force of motormen and conductors on the Marion (Ohio) Street Railway stopped work on Nov. 22, because of the discharge of a motorman. Once out, they demanded an increase in wages. The company offered to take the men back at the schedule of wages which prevailed before the strike.

President on the Railroads.—President Wilson in his address to Congress confined himself largely to the pressing railroad problem. He made it clear that he had not abandoned his program of legislation to prevent a recurrence of the situation that confronted the country recently through the prospect of a disastrous strike of railway trainmen. He reiterated all except one of the recommendations concerning railway conditions which he laid before Congress last summer when the general railroad strike threatened.

East Cleveland Will Push Paving Case.—Common Pleas Judge Levine has set Dec. 15 as the date for hearing the case of the city of East Cleveland, Ohio, against the Cleveland Railway in an effort to compel the latter to pave the 15-ft. space occupied by its tracks on Euclid Avenue the entire distance through the town. A similar suit was brought last spring, but Judge Levine ruled that the city could not ask the company to make improvements until the town itself had started the work. It is now almost finished with the exception of the portion occupied by the tracks.

An Electric Railway Roll of Honor Man.—James W. Drury, who had served for many years as a motorman on the lines of the Louisville & Southern Indiana Traction Company, died at his home in New Albany, Ind., on Nov. 16. Mr. Drury started to work with the Louisville & Southern Indiana Traction Company in 1887 on the first mule car in the city of New Albany. In 1903 he ran the first interurban car for the company through Jeffersonville to Louisville. In all of the twenty-five years with the company he was never inside a courthouse and had never had an accident charged to him.

Paving Suit Won by Company.—Supreme Court Justice Lehman has dismissed an action by the city of New York to recover the cost of tearing up the tracks of the Third Avenue Railway for the purpose of repairing a sewer. It has been the custom to charge the cost of removing and relaying the tracks to the railway companies, but when a bill for $1,008 was handed to F. W. Whitridge, president of the Third Avenue Railway, he refused to pay. The city's practice was based on a statute of 1884, but Justice Lehman ruled that the Legislature could not have intended to make a charge against a railroad in a case where the company was not responsible for the damage the city was compelled to repair.

Pass Law Retroactive.—Under the ruling of the attorney-general of Kentucky many public officials of Kentucky will have to decide by New Year's whether they will give up their passes on railway lines or give up their public offices. This applies to employees of the railways who are as such entitled to passes, but who also are frequently serving the public in some capacity, many without salaries. Numbers of railway employees who will be affected, for instance, live in suburbs and serve without pay on school district boards, town trustee boards, etc., seldom with emoluments. By the terms of the anti-pass law effective on Jan. 1 the State is depriving itself of the services of these men, few of whom can afford to give up their passes in the interests of the public.

Montreal Negotiations to Be Investigated.—As a result of a petition signed by 106 electors of Montreal, Canada, Justice J. M. McDougall of the Superior Court for the district of Ottawa and the county of Argenteuil, Quebec, has been appointed by the Superior Court to investigate the relations existing between civic authorities of Montreal and the Montreal Tramways. In the petition it is charged that the tramway has attempted unduly to influence the action of at least one civic official; that certain proposals, said to be unfair, for the granting of a new franchise to the company were prepared by the company for submission to the Board of Control, and that for the purpose of eliminating unfavorable newspaper criticism, the company secured control of certain newspapers and attempted to obtain control of others. The negotiations between the city and the company were referred to in the ELECTRIC RAILWAY JOURNAL for Dec. 2, page 1173.

Coming Public Service Commission Appointment.—Guesses are already being made as to the disposition Governor Whitman of New York will make of the four vacancies that will have to be filled by him on the Public Service Commissions during his second administration. Of these the place on the commission for the First District, now occupied by Commissioner Charles S. Hervey, who was appointed this year to fill out an unexpired term, will become vacant on Feb. 1 next year, as will the place of Devoe P. Hodson, an Erie County Democrat appointed by Governor Sulzer, on the up-State commission. On Feb. 1, 1918, the term of Oscar S. Straus, who succeeded Edward E. McCall as chairman of the Commission for the First District, will expire, together with that of Seymour Van Santvoord, chairman of the up-State commission. Governor Whitman has already announced that he will reappoint Commissioner Hervey, but beyond that nothing is known in public of his plans.

Toledo Fare Suggestions.—The sliding scale of fares for Toledo, Ohio, as prepared by Henry L. Doherty of the Toledo Railways & Light Company, starts with a 5-cent straight cash fare and free transfers; then six tickets for 25 cents and transfers only on 5-cent cash fares; six tickets for 25 cents and free transfers; seven tickets for 25 cents and 1 cent for transfers; eight tickets for 25 cents and 1 cent for transfers, eight tickets for 25 cents and 1 cent for transfers, with rebate of 1 cent on transfers; eight tickets for 25 cents and free transfers; five tickets for 15 cents. Under the plan of carrying an equalization fund, the fare will be reduced to the next lower point when this fund reaches $200,000 and will be increased to the next higher rate when it reaches a minimum of $100,000.

PROGRAMS OF ASSOCIATION MEETINGS

Pennsylvania Street Railway Association

Final plans are being made for the meeting of the Pennsylvania Street Railway Association on Dec. 12 and 13 at the Adelphia Hotel, Philadelphia. The session on Dec. 12 will be devoted to a discussion of insurance questions, while at the session on Dec. 13, taxation, lightning protection, electric welding, the jitney and the electric railway in mobilization will be considered.

National Fire Protection Association

The biennial meeting of the electrical committee of the National Fire Protection Association will be held in March, 1917, in New York City, the day and place of the meeting to be announced later. As usual, the provisions of the national electrical code as they now exist will be considered, together with reports of all sub-committees. Suggestions for amendments to the code, in order to be included in the bulletin, must be specific, and where a change is desired in a rule or section of a rule definite wording for such change must be given, together with the reasons why the change is recommended and these suggestions, together with all committee reports, must be in the hands of Ralph Sweetland, secretary of the electrical committee of the association, 141 Milk Street, Boston, Mass., not later than Jan. 15, 1917. As heretofore, the meeting will be open to all interested and such persons will not only be welcome but are urged to be present and give the committee the advantage of their experience and advice.

New York Railroad Club

The list of papers for the ensuing season of the New York Railroad Club, with the exception of the month of May, is as follows:

December, 1916—No paper. Annual Christmas entertainment, Waldorf-Astoria.

January, 1917—"Accident Prevention," with motion pictures of "The House That Jack Built." By Marcus N. Dow, general safety agent of the New York Central Railroad.

February, 1917—"Cost Accounting." By Henry Lehn, maintenance of way accountant of the New York Central Railroad.

March, 1917—Annual Electrical Night. "Electrification of the Norfolk & Western Railroad," with particular reference to economic and operating features thereof, with moving pictures by the Westinghouse Electric & Manufacturing Company, to be described by an operating official of the railroad company. C. H. Quinn, chief electrical engineer, will be invited to prepare a paper descriptive of the more interesting and peculiar engineering and structural features. By L. E. Johnson, president of the Norfolk & Western Railroad.

"Economic and Operating Features of the Electrification of the Chicago, Milwaukee & St. Paul Railroad, with moving picture illustrations by the General Electric Company, described by an operating official of the railroad. Mr. Beeukes, electrical engineer, has been invited to prepare a paper on the peculiar engineering and structural features. By C. A. Goodnow, assistant to the president of the Chicago, Milwaukee & St. Paul Railroad.

April, 1917—"Railway Water Supply." By C. R. Knowles, Chicago, superintendent of water service of the Illinois Central Railroad.

Financial and Corporate

ANNUAL REPORT

United Railways Investment Company

The income statement of the United Railways Investment Company, San Francisco, Cal., showing the net income applicable to its common stock when the company and its subsidiaries are considered as one, is as follows for the year ended June 30, 1916:

Gross earnings	$34,495,572
Operating expenses	$17,037,090
Taxes	1,479,258
Total	$18,516,348
Net earnings	$15,979,224
Other income	402,906
Gross income	$16,382,130
Deductions from income (rents, miscellaneous interest, etc.)	3,858,887
Income before deducting fixed charges	$12,523,243
Fixed charges—interest on bonds, notes, etc., held by the public	*6,179,063
Net income	$6,344,180
Dividends on preferred stock held by public	†1,738,901
Balance available for improvements, etc., and dividends on common stock	$4,605,279
Improvements, etc., charged against income by the several companies	1,775,007
Balance available for dividends on common stock	$2,830,272
Proportion applicable to common stock of United Railways Investment Company (5.025 per cent)	1,025,119

Note: The foregoing statement includes no charges for depreciation, as such, and no amounts charged against income for sinking fund requirements.

*Includes $186,138 interest on Series "B" second mortgage 5 per cent bonds of Sierra & San Francisco Power Company, payable in like bonds.

†Includes $799,130 for dividend on United Railways Investment Company preferred stock, although none was declared during the year.

In the preceding year the gross earnings, according to a similar statement before published, amounted to $32 574,111, and the income available for dividends was $2,071,423, of which $828,705 was applicable to common stock of the United Railways Investment Company, at the rate of 4.062 per cent.

Owing to an apparent lack of understanding by stockholders and the public in regard to the structure of the United Railways Investment Company, the report this year by means of an organization chart and a detailed description shows the exact inter-relations of the various companies. The United Railways Investment Company is solely a holding company, having interests in two widely separated districts, around Pittsburgh and in California. Its interests in the Pittsburgh district are represented by holdings of stock in the Philadelphia Company, which in turn controls the Pittsburgh Railways, the Duquesne Light Company, the Equitable Gas Company and the Pittsburgh & West Virginia Gas Company. The interests of the United Railways Investment Company in California, however, are represented by its holdings of stocks of the California Railway & Power Company, which controls the United Railroads of San Francisco, the Sierra & San Francisco Power Company and the Coast Valleys Gas & Electric Company. The Pittsburgh situation and the California situation are entirely separate, neither having any direct relation with the other, but each being operated and accounted for as a distinct entity.

The last fiscal year of the Philadelphia Company showed a revival of business in the Pittsburgh district, with the result that the company was able to increase its common stock dividend rate from 6 per cent to its normal rate of 7 per cent. The income of the company from the holdings of income debentures of the Pittsburgh Railways increased from $330,739 to $600,000. The latest detailed comparative statement for the Pittsburgh Railways, whose fiscal year ends March 31 as in the case of other parts of the Philadelphia Company group, was published in the Electric Railway Journal of July 22, page 159.

In contrast to the dividend increase in the Pittsburgh district, the common and preferred issues of the California Railway & Power Company are at present paying no dividends at all. The income of this company for the year ended June 30, 1916, amounted to $203,327, with expenses of $36,947. After the payment of the regular 7 per cent dividend on the prior preference stock, there was a profit and loss surplus of $14,013.

Of the various companies in the California group the one of chief interest to the electric railway field is the United Railroads of San Francisco. How this has fared lately is shown by the following comparative income statement for the years ended June 30, 1915 and 1916:

	1916 Amount	1916 Per Cent	1915 Amount	1915 Per Cent
Operating revenue:				
Passenger	$7,692,258	99.2	$7,968,094	99.3
Other operating revenue	59,485	0.8	56,000	0.7
Total	$7,751,743	100.0	$8,024,094	100.0
Operating expenses and taxes:				
Maintenance of way and structures	$550,046	7.1	$633,943	7.9
Maintenance of equipment	371,561	4.8	435,826	5.4
Transportation	3,353,488	43.2	3,129,802	39.0
General	630,139	8.1	558,255	7.0
Total operating expenses	$4,905,234	63.2	$4,757,826	59.3
Taxes	508,800	6.6	516,000	6.4
Total operating expenses and taxes	$5,414,034	69.8	$5,273,826	65.7
Operating income	$2,337,709	30.2	$2,750,268	34.3
Other income	178,525	2.3	208,058	2.6
Gross income	$2,516,234	32.5	$2,958,326	36.9
Income charges	515,470	6.7	522,147	6.5
Income before deducting bond interest	$2,000,764	25.8	$2,436,179	30.4
Bond interest	1,604,026	20.7	1,628,652	20.3
Net income	$396,738	5.1	$807,527	10.1

The last fiscal year, it is said, was in point of earnings one of the most unsatisfactory in the history of the company. Through the unregulated competition of the jitneys, which throughout the year were permitted to enjoy a large percentage of the short haul traffic, serious inroads were made into the gross earnings, which it was not possible to recoup by a reduction in operating expenses. The passenger revenues decreased $275,836 or 3.5 per cent, and a small increase in other operating revenues was sufficient only to reduce the loss in gross operating revenues to $272,351 or 3.4 per cent. Operating expenses, however, rose $147,408 or 3.1 per cent, in spite of decreases of $83,897 or 13.2 per cent in maintenance of way and structures and $64,265 or 14.7 per cent in maintenance of equipment, on account of numerically greater increases of $223,686 or 7.1 per cent in transportation expenses and $71,884 or 11.8 per cent in general expenses.

The combined effect of decreased revenues and increased expenses was slightly lessened by a decrease of $7,200 or 1.4 per cent in taxes, but the operating income fell off $412 559 or 15 per cent. Moreover, other income decreased $29,533 or 14.1 per cent, so that the total loss in gross income amounted to $442,092 or 14.9 per cent. Income charges, consisting of rentals, interest on notes, etc., showed a small decrease, as did bond interest, but the net income suffered a loss of $410,789 or 50.8 per cent. After making a profit and loss charge of $550,000 for depreciation and other adjustments, the surplus as of June 30 amounted to $1,270,610. The depreciation reserve at the end of the year showed a balance of $75,507. During the year there was a decrease of $219,109 in the property accounts for sold or scrapped material, and additions and betterments were made to the extent of $180,734.

American Railways, Philadelphia, Pa.—The American Railways has sold to Newberger, Henderson & Loeb and Bioren & Company, Philadelphia, and Scott & Company, Wilmington, Del., $2,475,000 of its 5 per cent thirty-year bonds secured by the deposit as collateral of $1,675,000 first mortgage 5 per cent bonds of the Ohio Valley Electric Company, and $800,000 of 5 per cent bonds of the Consolidated Light & Power Company. These bonds of the controlled companies are guaranteed, principal and interest, by the American Railways. The American Railways has called for payment on Feb. 1, at 100½ and interest, $628,000 of the $2,300,000 of three-year 5 per cent notes issued on Feb. 1, 1916.

Bay State Street Railway, Boston, Mass.—The Bay State Street Railway has been authorized by the Massachusetts Public Service Commission to issue $2,500,000 of coupon notes, bearing interest at 6 per cent, to pay for reconstruction of track equipment and betterments. The notes mature serially $357,000 on Dec. 1, 1917, and each year in like amount up to and including Dec. 1, 1922. On Dec. 1, 1923, the final $358,000 in notes mature.

Boston (Mass.) Elevated Railway.—The special commission investigating the finances of the Boston Elevated Railway gave a final hearing on Nov. 28. On this occasion the various relief measures proposed by the company were attacked, but some of the interests opposing an increase in fares, reduction in transfer privileges or abatement of taxes, favored the purchase of the Cambridge subway by the State or the city of Cambridge, subject to a thorough investigation of the transportation problem of the Boston district.

Cape Electric Tramways, Ltd., Cape Town, South Africa.—The profit and loss account of the Cape Town Electric Tramways, Ltd., on June 30, 1916, showed a profit of £72,497, and after providing for debenture interest and redemption of debentures and taking into account last year's balance, a net credit of £31,404 remained. The traffic receipts during the last year showed a small improvement, but this was more than offset by the higher cost of operation, including increased labor charges and war allowances. During the year the tramways carried 22,477,366 passengers as compared to 21,680,070 in 1915.

Consolidated Cities Light, Power & Traction Company, New York, N. Y.—Klemm & Keen and Brooke, Stokes & Company, Philadelphia, Pa., are offering $3,000,000 of the first lien 5 per cent gold bonds, due July 1, 1962, of the Consolidated Cities Light, Power & Traction Company heretofore owned by the Cities Service Company. In 1912, $7,000,000 of these bonds were sold in England, making the total amount of the issue $10,000,000. The bonds are secured by deposit with the Bankers Trust Company, trustee, of substantially all the common stocks and certain of the bonds of thirteen properties. The Cities Service Company subsequently acquired the equities of the Consolidated Cities Light, Power & Traction Company in these subsidiaries and guaranteed both the principal and interest of the first lien 5 per cent bonds. The bonds are being sold at 92½ to yield about 5½ per cent.

Fresno (Cal.) Interurban Railway.—The California Railroad Commission has authorized the Fresno Interurban Railway to issue $149,700 of first-mortgage 6 per cent twenty-five-year bonds, under its deed of trust to the Mercantile Trust Company, San Francisco. These bonds are to substitute other bonds heretofore authorized under another form of mortgage. The company is also authorized to issue $70,000 of these bonds, and 350 shares of stock of a par value of $35,000. The $70,000 of bonds are to be sold at not less than 80 per cent net, and the stock at the same rate. Both are to be issued so that the par value of the stock issued shall at all times be not less than 50 per cent of the bonds. The proceeds from stock and bonds are to go as follows: $49,597 for extending the company's railway line, $25,000 for a gasoline motor car and $10,000 for rights-of-way. The Fresno Interurban Railway has also been authorized to execute notes for $3,850 and $4 000 to pay deficits in operation of the company's line during construction and cost of materials in connection with the construction. The notes are to be for not more than two years at 8 per cent. The company has heretofore been authorized by the commission to issue 450 shares of stock at a par value of $100 a share, $149,700 of bonds and a note for $10,396. Its main line is 16 miles long.

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—The Indianapolis Traction & Terminal Company has filed a petition with the Indiana Public Service Commission asking for approval of an issue of car trust certificates amounting to $125,000. The company proposes to pay

$33,000 in cash on an order for twenty-five cars already placed, and issue the remainder of the purchase price in car trust certificates.

Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo.—Judge Bird of the Jackson County Court, at Kansas City, Mo., on Nov. 29, discharged Jacques Harvey and I. D. Hook as receivers of the Kansas City, Clay County & St. Joseph Railway and turned the property over to J. R. Harrigan, general manager. This action followed the approval of a new appeal bond of the railway by the Supreme Court of Missouri in the suit against it by the Interstate Railway, which previously obtained a judgment of $1,500,000 against the company. The plaintiff had resisted the approval of the bond for a year. The Supreme Court recently declared that the bond supplied by the National Surety Company for $3,400,000 was insufficient, because the bond represented more than 10 per cent of the Surety Company's capital and surplus. A new bond for the same amount, filed as a result of this decision, had, in addition, the names of six leading bankers of Kansas City and St. Joseph. The appeal of the suit, in which judgment had been entered, will be heard in the April term by the Supreme Court.

Knoxville Railway & Light Company, Knoxville, Tenn.—The Knoxville Railway & Light Company has decided to pay off and discharge all of the consolidated mortgage 5 per cent gold bonds bearing numbers from 1 to 926 inclusive, and from 1751 to 3000 inclusive, on March 1, 1917, at 107½ on each $100, with interest accrued to March 1. The company has also elected to call and redeem all the two-year 6 per cent collateral notes of the company outstanding on Jan. 3, 1917, at 101½ and accrued interest for each $100.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—Bodell & Company, Providence, R. I., are offering a block of Mahoning & Shenango Railway & Light Company 7 per cent cumulative preferred stock at a price close to par.

Metropolitan Street Railway, New York, N. Y.—Announcement is made of the termination of the agreement entered into under date of Dec. 10, 1907, by the stockholders of the Metropolitan Street Railway for their protection. The committee had a claim pending against the New York City Railway for breach of its guaranty with respect to the payment of dividends at 7 per cent per annum upon the stock of the Metropolitan Street Railway. This claim was finally allowed by the court as a general claim against the assets of the New York City Railway to the extent of $1.75 a share. The New York Railways, the successor to the Metropolitan Street Railway, offered to purchase the claim of the committee for cash at 45 per cent of $1.75 or 78¾ cents per share. Counsel for the committee reported that as other litigation was pending, it was not possible to determine accurately what dividend would ultimately be paid upon general claims, but that in their judgment the dividend would not be more than 45 per cent and might be materially less than that amount. Counsel for the committee also advised that adjustment would probably be subject to considerable further delay and advised that the committee accept the offer of the New York Railways. The chairman of the stockholders protective committee now announces that having exhausted all means of protecting the rights and interests of the participants the agreement entered into to conserve the interests of the stockholders has been terminated. A cash distribution of 85 cents for each share of the stock of the Metropolitan Street Railway deposited under the agreement is to be made in full liquidation of the interests of the holders. John I. Waterbury, chairman of the protective committee, says that the members of the committee will not accept any compensation for their service in the interest of the depositing stockholders.

Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn.—The Federal Court at Minneapolis has ordered the foreclosure of the mortgage securing an issue of $1,000,000 of first mortgage bonds of the Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company. The issue of $1,000,000 of bonds is pledged as collateral to secure an issue of $750,000 of three-year notes.

Seattle & Rainier Valley Railway, Seattle, Wash.—Frank P. Helsell, chief deputy prosecuting attorney of the State of Washington, has advised Fred J. Carver, attorney, that since the Seattle & Rainier Valley Railway is complying with the statutory provisions regulating such foreign corporations, the State has declined to institute *quo warranto* proceedings to oust the railroad, as requested by Mr. Carver. Mr. Helsell claims the lawyer was acting as creditor of the old Seattle, Renton & Southern Railway. Attorney Carver urged four grounds for bringing the proceedings: (1) That the new company was organized under the general corporation laws of Delaware, and by virtue of those laws was not permitted to do a street railway business within that State; (2) that the new company has issued bonds in excess of double the amount of the paid-up stock in violation of the Washington law; (3) that under the Delaware law, there is the same bond limitation; (4) that the bonds of the company were issued to an amount in excess of the assets received in exchange for them. Prosecutor Helsell states that in Delaware special incorporation laws govern companies doing a street railway business in that State, and that the fact that the Seattle & Rainier Valley Railway was incorporated under the general law does not, under the Washington statutes, exclude it from doing business in Washington. Helsell also asserted that the bond law, given as the second ground, had been repealed, and that even if a similar one existed in Delaware, it was not applicable to the local corporation. Replying to the fourth reason, Helsell said that the State was in possession of no facts that would justify an allegation that the amount of the company's bonds exceeded the assets received in exchange for the bonds.

Springfield Terminal Railway & Power Company, Springfield, Ohio.—The Springfield Terminal Railway & Power Company has been organized to succeed the Springfield, Troy & Piqua Railway. The management remains unchanged, except that F. J. Green, who has been vice-president and general manager, succeeds to the presidency. The company has authorized an issue of $350,000 of first mortgage 6 per cent serial gold bonds of 1916. These bonds will be used to fund floating indebtedness and constitute the new company's only indebtedness. Of the $350,000 of bonds $250,000, the portion outstanding, is now being offered for subscription by C. W. Anderson & Company, Chicago, at 101 and interest. The remaining bonds can be issued only for betterments and additions to the extent of 85 per cent of their cost.

Standard Gas & Electric Company, Chicago, Ill.—The directors of Standard Gas & Electric Company have declared a dividend of 1.5 per cent on the preferred stock for the quarter ending Nov. 30, payable on Dec. 15, to stockholders of record of Nov. 29. This is an increase of one-half of 1 per cent over the quarterly dividends recently paid.

Third Avenue Railway, New York, N. Y.—E. A. Manice has been elected a director of the Third Avenue Railway to succeed George W. Davison.

United Light & Railways Company, Grand Rapids, Mich.—William P. Bonbright & Company, New York, N. Y., are offering for subscription at 99 and accrued interest $1,500,000 of 6 per cent convertible gold debentures of the United Light & Railways Company dated Nov. 1, 1916, and due Nov. 1, 1926. The debentures are convertible at the option of the holder upon ten days' notice from Nov. 1, 1918, to Nov. 1, 1923, into 6 per cent preferred stock at the rate of $1,125 par value for each $1,000 par value debenture. The issue is callable in whole or in part upon thirty days' notice any time prior to Nov. 1, 1921, at 102 and interest and thereafter at 101 and interest. The debentures are in the denomination of $100, $500 and $1,000 registerable as to principal in all these denominations, but fully registerable only in the $1,000 denomination. The New York Transit Company is trustee of the issue.

Washington Water Power Company, Spokane, Wash.—The Farmers' Loan & Trust Company, New York, N. Y., trustee under the indenture securing the first and refunding mortgage 5 per cent bonds of the Washington Water Power Company, dated 1909 and due in 1939, has $33,880 to invest for the quarterly purchase of bonds for the sinking fund, and is advertising for proposals until Dec. 15.

DIVIDENDS DECLARED

Arkansas Valley Railway, Light & Power Company, Pueblo, Col., quarterly, 1¾ per cent, preferred.

Brooklyn (N. Y.) Rapid Transit Company, quarterly, 1½ per cent.

Frankford & Southwark Passenger Railway, Philadelphia, Pa., quarterly, $4.50.

Indianapolis (Ind.) Street Railway, 3 per cent.

Iowa Railway & Light Company, Cedar Rapids, Iowa, quarterly, 1¾ per cent; quarterly, 1¾ per cent, preferred.

Second & Third Streets Passenger Railway, Philadelphia, Pa., quarterly, $3.

United Railways & Electric Company, Baltimore, Md., 2 per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

ATLANTIC SHORE LINE RAILWAY, SANFORD, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Oct., '16	$25,367	*$24,841	$526	.....	.....
1 " " '15	24,486	*24,452	34	.....	.....

BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.

1m., Oct., '16	$84,964	*$72,994	$11,970	$27,675	††$15,526
1 " " '15	81,178	*67,879	13,299	16,845	††3,382
4 " " '16	374,050	*296,935	77,115	110,906	††33,065
4 " " '15	352,785	*259,633	93,152	67,740	‡26,015

COLUMBUS RAILWAY, POWER & LIGHT COMPANY COLUMBUS, OHIO

1m., Oct., '16	$307,437	*$187,470	$119,967	$42,863	$77,104
1 " " '15	272,152	*155,914	116,238	40,189	76,049
12 " " '16	3,461,301	*2,039,510	1,421,791	512,332	909,459
12 " " '15	3,076,070	*1,828,835	1,247,235	473,115	774,120

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

1m., Oct., '16	$1,458,380	*$807,437	$650,943	$419,085	$231,858
1 " " '15	1,245,866	*650,441	595,425	373,097	222,328
12 " " '16	16,518,224	*8,878,592	7,639,632	4,998,342	2,641,290
12 " " '15	14,173,088	*7,532,353	6,640,735	4,385,885	2,254,850

CONNECTICUT COMPANY, NEW HAVEN, CONN.

1m., Oct., '16	$812,160	*$682,222	$129,938	$96,174	‡$56,896
1 " " '15	711,184	*508,782	202,402	98,014	‡127,637
4 " " '16	3,502 968	*2,578,596	924,372	391,402	‡653,585
4 " " '15	3,067,969	*2,008,869	1,059,100	392,438	‡759,458

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

1m., Oct., '16	$271,636	*$160,412	$111,224	$63.665	$47,559
1 " " '15	222,456	*125,272	97,184	63,051	34,133
12 " " '16	2,911,182	*1,736,727	1,174,455	753,533	420,922
12 " " '15	2,430,418	*1,436,389	994,029	760,804	233,225

GRAND RAPIDS (MICH.) RAILWAY

1m., Oct., '16	$103,659	*$70,579	$33,080	$15,995	$17,085
1 " " '15	97,125	*71,592	25,533	14,061	11,472
12 " " '16	1,286,511	*838,788	447,723	178,555	269,168
12 " " '15	1,189,541	*826,024	363,517	164,353	199,164

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

1m., Oct., '16	$72,302	*$49,895	$22,407	$15,166	$7,241
1 " " '15	63,932	*40,069	23,863	15,951	7,912
12 " " '16	793,677	*536,681	256,996	189,025	67,971
12 " " '15	722,203	*469,777	252,426	189,242	63,184

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

1m., Oct., '16	$205,999	*$127,095	$78,904	$41,474	$37,430
1 " " '15	189,636	*121,088	68,548	43,141	25,407
12 " " '16	2,355,769	*1,442,952	912,817	510,379	402,438
12 " " '15	2,135,656	*1,299,749	835,907	497,717	338,190

NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.

1m., Oct., '16	$60,133	*$48,738	$11,395	§$5,943	‡$6,710
1 " " '15	45,190	*40,898	4,292	§4,495	‡1,129
4 " " '16	206,894	*184,312	22,582	§25,795	‡1,013
4 " " '15	170.076	*166,354	3,722	§25,038	††14,412

PHILADELPHIA (PA.) RAPID TRANSIT COMPANY

1m., Oct., '16	$2,417,096	$1,380,594	$1,086,502	$814,450	$272,052
1 " " '15	2,219,105	1,232,080	987,025	816,615	170,410
4 " " '16	9,007,921	4,986,327	4,021,594	3,259,138	762,456
4 " " '15	8,066,753	4,530,010	3,536,743	3,264,763	271,960

RHODE ISLAND COMPANY, PROVIDENCE, R. I.

1m., Oct., '16	$478,522	*$363,881	$114,641	$120,714	‡$21,388
1 " " '15	439,590	*342,111	97,479	120,284	‡4,630
4 " " '16	2,151,092	*1,468,416	682,676	482,832	‡232,127
4 " " '15	1,898,150	*1,363,844	534,306	481,673	‡84,313

WESTCHESTER STREET RAILROAD, WHITE PLAINS, N. Y.

1m., Oct., '16	$15,799	*$17,483	†$1,684	$1,893	††$3,554
1 " " '15	22,249	*21,720	529	1,606	††1,049
4 " " '16	78,373	*81,561	†3,188	7,436	††10,519
4 " " '15	96,381	*87,792	8,589	6,393	‡2,315

*Includes taxes. †Deficit. ‡Includes non-operating income. §Excludes interest on bonds, charged income and paid by the New York, New Haven & Hartford Railroad under guarantee, also interest on notes held by the New York, New Haven & Hartford Railroad, not credited to income of that company.

Traffic and Transportation

CROSSING SAFETY CONSIDERED

Commission, Electric Railway and Automobile Representatives Confer at Rochester, N. Y., on Safety Measures

On Nov. 28 the Public Service Commission for the Second District of New York met at the Powers Hotel, Rochester, with the executive and sub-committees appointed some time ago from among representatives of automobile clubs and electric railway officials to consider greater safety at grade crossings of electric railways and highways. Among the outstanding conclusions arrived at during the conference were the following:

Obstructions which prevent the observance of an approach of an electric train at grade crossings should be removed or diminished.

Character of crossings should determine whether obstructions should be removed or diminished.

Obstructions on railroad property should be removed at the expense of the railroads.

Obstructions on public highways should be removed at the expense of the public authorities.

Obstructions upon private property should be removed upon recommendation of the joint committee, and if they cannot agree the Public Service Commission shall decide.

Data should be acquired on the character of grade crossings for 1000 ft. along the tracks and 200 ft. along the highway at all crossings.

Automobile horns should be standardized.

Devices on trolley cars and automobiles for signaling are as effective as the present condition of the art of signaling affords.

Trolley car whistles and automobile horns should have distinct sounds.

Trolley car motormen should be required to sound their whistles beginning 1000 ft. from a grade crossing, and keeping it up until the head car is not less than 300 ft. from the crossing.

Headlights should be used at night, if possible in conjunction with a reflecting device, at grade crossings.

Uniform signaling devices for automobiles and trolley cars should be adopted.

A large stationary distance marker should be adopted. It should read: "Railroad Crossing 500 ft. Ahead," and the Public Service Commission should use arrows on the signs in its discretion.

Fifteen miles an hour should be adopted as a maximum speed at which an automobile should cross a grade crossing.

One of the most discussed proposals was that for establishing a 15 m.p.h. minimum for autoists crossing tracks at grade. At the morning session Charles R. Barnes, electric railway inspector for the Public Service Commission, made a report in which he said that after all contrivances for safety have been used the personal equation still was a factor that was of primary importance.

It is possible that the commission may ask the Legislature for additional power to meet the recommendations adopted as the result of the study carried on by the committees and by the commission. At present the commission has power to order the elimination of steam railroad grade crossings, and can make certain regulations for the operation of trains for greater safety at grade crossings, but aside from actual elimination the commission has no power over surrounding highway conditions to enforce greater safety at grade crossings. While the commission has power to make regulations for the operation of electric cars and trains at grade crossings, it has no control over other surrounding highway conditions. In the case of electric railways there is no provision of law for the elimination of grade crossings, and it is not likely that such provision could be made at this time. If, as seems likely, the commission asks for the power to control the surroundings of steam railroad grade crossings, members of the committtees with which the commission has been working have advocated the same power for electric railways.

PORTLAND JITNEYS DIE HARD

Operators Take Advantage of Technicality in Law to Operate at Regular "For Hire" Prices

The action of the City Council of Portland, Ore., in requiring jitneys in that city to operate under franchise has resulted in jitney drivers running their cars as taxicabs through a technicality in the "for-hire" license ordinance. Under this plan the jitneys operate anywhere in the city at regular "for-hire" prices, but specialize in service over certain streets for a 5-cent fare. Where there were routes before the jitney franchise ordinance went into effect there are zones now. The zones have been printed in black and white and posted in every machine. There are concentration points in the lower business districts, and from these points cars are dispatched to the different zones by men in charge of the work.

City Attorney La Roche, in his interpretation of the ordinance under which the former jitneys are operating, stated that machines operating under this ordinance were not compelled to have a fixed standing place, and that the maximum fare charged for any certain zone and for the hour must be filed with the Department of Public Utilities, as well as posted inside and out of the car. In releasing two taxi-jitney drivers in the Municipal Court recently who were charged with having operated without a franchise and without having had their speedometers inspected Judge Langguth of the Municipal Court said:

"Operation of the machines under the present law may be an evasion on the part of the drivers, but this court cannot read anything into the law. I want to warn the members of the Chauffeurs' Union that if they intend to operate under this law they must comply with it in every term. I am not going to show favors on either side, and it will be for the drivers to carry out their part of the contract."

An appeal from the action of Commissioner Daly of the Department of Public Utilities in approving the "zone system" of the taxi-jits and issuing certificates for licenses for the operation of the machines has been filed with the City Council. The appeal is based on the ground that the schedule of zones and rates for service are not clear or distinct or easily understood; that the uniform method of fixing rates has not been followed; that a uniform zone system has not been established and that the schedule of rates is not made according to time consumed in serving a zone or the distance traveled as required in the taxicab and "for-hire" ordinance. The petitioners ask that all the actions of Commissioner Daly in approving the applications and issuing certificates for the issuance of licenses for the operation of the taxi-jits be rescinded by the Council. It is asserted that only the individuals residing within one of the zones served by the machines have advantage of a 5-cent fare, while all other residents of the city have to pay for the hire of such machines on an hourly basis, which is claimed to be discriminatory and unfair.

R. A. Leiter, counsel for the Portland Railway, Light & Power Company, appeared before the Council in behalf of the petitioners with the statement that the appeal had been filed in accordance with a provision of the taxicab ordinance which permits an applicant who has been denied a license for the operation of a machine by the Department of Public Utilities to appeal to the City Council.

Commissioner Daly said that he had not had sufficient time in which to go into the petition, and asked that the matter be postponed for a week, at which time he will make a report on the application. He also stated that his report covering the granting of reasonable franchises to jitneys will be ready for the consideration of the Council at an early date.

With the recent decision of Municipal Judge Langguth that the taxi-jits have a right to operate under the taxicab and "for-hire" ordinance, providing they comply with all the regulations, further molestation of the operation of the machines will be deferred until additional legislation is enacted by the Council. Unofficial reports place the number of taxi-jits in operation at 200.

The various applications for franchises to operate jitneys in Portland were to be considered by the Council on Dec. 7, when Commissioner Daly planned to have the proposed zone system for taxicabs ready for presentation to the Council.

ANOTHER JITNEY DECISION IN PENNSYLVANIA

Certificates to Jitneys Will Be Granted Only When Owners Demonstrate They Can Furnish Satisfactory Service

Jitneys are common carriers within the meaning of the Pennsylvania Public Service law and can only be operated when their owners have obtained certificates of public convenience from the Public Service Commission, which will grant authority to operate only when applicants for certificates show that they have safe and adequate vehicles. This in substance is the ruling of the commission in a decision rendered on Dec. 6. The opinion was written by Chairman Ainey and refuses a certificate to Peter Graco, against whose operation of a jitney the Allegheny Valley Street Railway had filed a protest.

The opinion is the first in which the commission has taken a stand against jitneys not of sufficient size to meet demands of traffic. It lays down rules, and under the decision will come probably a score or more of jitney operators in western Pennsylvania who have been complained against, while the case will furnish a precedent in other cases which may be brought. The opinion says:

"It is clearly apparent from the evidence that their automobiles were frequently and dangerously overloaded; some times as many as sixteen passengers were permitted to ride in automobiles with seating capacity for four or five persons. Passengers were at times seated on the doors or mudguard of the cars or permitted to stand on the running board, and others were crowded within the automobile. Not infrequently passengers were permitted to be crowded beside the driver in the space calculated for but one passenger."

It is also pointed out that the street railway lost money through this unrestricted competition, and after quoting numerous decisions the opinion says:

"The conclusion is irresistible that the professions and the conduct of the said respondent and all the circumstances involved in the jitney business in which he is engaged, constitute him a common carrier of passengers. . . . We may not properly permit individuals to engage in public service unless the safety of the public is reasonably assured and until we have determined that the proposed service is necessary or proper for the convenience, accommodation or safety of the public. . . . Even though we were convinced as we are not that the street railway is not furnishing adequate service and that automobile transportation is necessary for the convenience of the public, this applicant has failed to show that the five passenger automobile is of sufficient size or of proper form of construction to meet any public demand for transportation convenience. If there be any necessity whatever in this locality it is surely one requiring a larger automobile and better arrangements for public service than the one he offers. This and the allied cases must be disposed of on the broad ground of public necessity."

In an opinion by Chairman Ainey of the commission on Dec. 7, in the case of the Wilkes-Barre Railway against Walter J. Parsons for operating a jitney bus from Wilkes-Barre to points beyond the limits of the city, the Public Service Commission holds that the act of 1915 giving cities the right to regulate the operation of motor vehicles in no wise restricts the Public Service Company law with reference to the requirement as to the issuance of certificates of public convenience, preceding the beginning of the exercise of the rights to operate automobiles as common carriers. The commission orders that the respondent, Walter J. Parsons, his agents, servants and employees cease from carrying on the public service mentioned until he shall have obtained a certificate of public convenience.

ILLINOIS TRACTION WINS FARE CASE

The Interstate Commerce Commission on Dec. 4 approved an increase by the Illinois Traction Company, Peoria, Ill., of the fare between St. Louis, Mo., and Venice, Madison and Granite City, Ill., from 5 to 10 cents. This action nullifies a provision of the franchise under which the St. Louis Electric Terminal Railway, the local end of the Illinois Traction System at St. Louis, obtained the use of St. Louis streets. The franchise bill, signed on April 6, 1907, provided that the fare to be charged from St. Louis to Granite City, across the McKinley Bridge, should be 5 cents. This

was accepted by the company, and the 5-cent fare has been charged since the bridge was opened to traffic in November, 1910. The unofficial report of the finding of the commission says that the commission held that the St. Louis Electric Terminal Railway is a common carrier, and as such is subject to the commission's jurisdiction. It was also held by the commission that interstate fares, when prescribed by a municipal ordinance, are not conclusively presumed to be reasonable, even if accepted by the carrier as one of the conditions of a franchise. The proposed issuance of commutation tickets, valid only during certain rush hours, was tentatively approved. The main argument before the commission in the case was summarized in the ELECTRIC RAILWAY JOURNAL of Nov. 4, page 995.

Accident Talks in New Albany Schools.—Mrs. Minnie Riddle of the safety department of the Louisville & Southern Indiana Traction Company, New Albany, Ind., and allied lines, is delivering talks on accident prevention in the public schools of New Albany. Mrs. Riddle recently completed a campaign of education in the public schools of Chicago.

New York Subway Record Broken.—All records for subway traffic in New York were broken on Nov. 20, when 1,400,747 passengers were carried on the various branches of the underground system of the Interborough Rapid Transit Company between 12.01 a. m. and 11.59 p. m. The capacity of the subway as designed originally was 600,000 passengers daily.

Employees Requested to Take Their Paper Home.—At the top of the cover of the United Railways Bulletin for November, published monthly for distribution among the employees of the United Railways, St. Louis, Mo., was stamped the following: "Take the Bulletin home. There are things in the paper which will be interesting to your wife and children."

Detroit Rerouting Grants Allowed.—The Common Council of Detroit, Mich., has adopted the report of the joint committees on public utilities and traffic and police regulations to the end that rerouting of cars within the heart of the city may be accomplished. By the adoption of the report and the accompanying resolution the Detroit United Railway is authorized to construct several curves and other pieces of special track work, as well as some straight track, all necessary to move the cars and loop them differently than is possible by the existing tracks. The company intends to proceed with all possible speed to install the tracks.

Near-Side Stops and Prepayment Operation in Walla Walla.—On Nov. 20 the Pacific Power & Light Company, operating the railway system in Walla Walla, Wash., through the Walla Walla Valley Railway, began the operation of the near-side stop, with the prepayment method of fare collection. While the near-side stop will be general in its application, it will not prevail under all conditions. The company explained these exceptions to its patrons in advance. Fares are taken as passengers enter cars, except at terminals, where passengers are permitted to enter cars while the carmen are preparing for the return trip. The changes were brought to the attention of patrons by printed leaflets distributed in the cars. The company closed its notice to its patrons with a number of maxims, such as: "Safety First," "Alight Facing Forward," "Wait Until Car Stops," "Safety Always."

Extension in Burlington County Fare Case.—The case of the Burlington County Transit Company, Hainesport, N. J., charged with increasing fares on its line between Burlington and Moorestown and Mount Holly without having made improvements which were ordered by the State Public Utility Commission, was before the commission recently. The company received a certain time to show that it had made the improvements promised. The company's representative convinced the commission that the delay in securing new cars and getting material for repairs was due to trade conditions, and was not the result of any negligence on the part of the company. The promise was made that these improvements would be made at an early date, and in accepting this statement the commission granted another extension to Jan. 9, at which time, if the company has not made the alterations, the increase of fare will be automatically prohibited.

Company to Operate Under Long Beach Jitney Franchise.—The Long Beach Transportation Company, a corporation with a capital stock of $50,000, has been formed by the individuals who recently purchased a ten-year jitney franchise at Long Beach, Cal. The purchase price was $6,600, and 3 per cent of the gross receipts are to be paid each year to the city during the ten-year period. Fifteen buses, built in the Ford shops at Long Beach at an approximate cost of $10,050, will be put in service about Dec. 15. Two routes will be covered, each extending about 2½ miles from the down-town terminus, and transfers will be issued between the two lines. The maximum fare will be 5 cents, with half-fare rates for public school children and free transportation to officials and postmen. A ten-minute service will be in operation from 6 a. m. to 7 a. m., a five-minute service from 7 a. m. to 8 p. m., and a ten-minute service from 8 p. m. until midnight. R. S. Julian has been elected president and general manager of the corporation, with F. H. Church as secretary and assistant general manager.

Company Writing Jitney Insurance Disbarred.—The jitney business in Seattle, Wash., and other large cities in the State has been imperiled by a ruling of State Insurance Commissioner Fishback, who announces that the Casualty Company of America, practically the only company issuing the $2,000 bond for jitneys required by the State, has been debarred from writing insurance in Washington. The Casualty Company of America, which recently absorbed the Pacific Coast Casualty Company, has furnished nine-tenths of the jitney operators with their bonds. Other companies have bonded a few of the motorbus men, but the jitney drivers have found it difficult to obtain bonds anywhere except from this company. The Casualty Company of America's stock is said to be impaired to the amount of $650,000, and until its affairs are in a condition satisfactory to the State Insurance Commissioner, it will not be allowed to do business in the State. The company was allowed until Dec. 4 to adjust its finances. The insurance rate on the $2,000 jitney bonds was raised recently from $175 to $250.

School Children's Fares Discriminatory.—The Railroad Commission of California has rendered its opinion on the application of certain citizens for an order requiring the San Francisco-Oakland Terminal Railways, Oakland, to grant a rate of one-half the regular fare of 5 cents for children attending the public schools, and has reached the following conclusion: "A class of persons cannot be given a special rate when the only distinguishing characteristic of the class is the purpose for which the people in the class are traveling. The service performed by carriers in transporting children attending public schools is the same as that in transporting other children and other persons, the only distinguishing characteristic, as shown by the pleadings and evidence herein, is the purpose for which these children are being transported. This distinguishing characteristic cannot warrant the commission in making a special rate in such cases." On Nov. 16 the applicants for the special rate for school children petitioned the Railroad Commission for a rehearing. This application was denied by the commission the following day.

Commission Transfer Order Set Aside.—An order of the Board of Public Utility Commissioners of New Jersey, made at the request of Bradley Beach, after a hearing directing the Atlantic Coast Electric Railway to issue transfers to its patrons in Asbury Park and Bradley Beach, was set aside on Dec. 1 by the Supreme Court of New Jersey in an opinion handed down by Justice Trenchard. The company operates an electric railway from the junction of Main Street and Cookman Avenue, Asbury Park, southerly through other municipalities and Bradley Beach to Belmar. In the syllabus of his opinion for the court Justice Trenchard said: "When a traction company organized under the general traction act of 1893 obtains from a municipality an ordinance granting a location of street railway tracks, and accepts the same, a regulation of rates of fares contained therein, if lawful and reasonable, constitutes a contract between the company and the municipality which, during the life of the franchise, remains inviolable, and it is incompetent for the Board of Public Utility Commissioners to impose upon the company an additional burden in violation of such contract respecting fares."

Personal Mention

John Harvey, an inspector of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, has been promoted to a new assistant superintendency with the company.

C. F. Franklin has resigned as superintendent and purchasing agent of the Winona Interurban Railway, Warsaw, Ind., effective on Jan. 1. No successor to Mr. Franklin has been named.

W. D. Frazer, who retires as general manager of the Winona Interurban Railway, Warsaw, Ind., on Feb. 1 will continue to serve as vice-president of the company and will act as counsel for the receiver.

W. J. Fillmore has been appointed acting superintendent of the Elgin & Belvidere Electric Company, Marengo, Ill., during the absence of L. H. Moss, who is spending a number of months in the East.

J. C. Schade, who has been assistant secretary and assistant treasurer of the Winona Interurban Railway, Warsaw, Ind., has been named general manager under C. J. Munton, the receiver. He will assume his duties on Feb. 1.

Fred J. Green, who has been vice-president and general manager of the Springfield, Troy & Piqua Railway, Springfield, Ohio, has been elected president of the Springfield Terminal Railway & Power Company, organized as the successor company, as noted elsewhere in this issue.

J. W. Osborn, for five years master mechanic of the Chicago & Milwaukee Electric Railroad, Highwood, Ill., now the Chicago, North Shore & Milwaukee Railroad, has resigned. Previous to his service as master mechanic he was assistant electrical engineer on the same property for five years.

Joseph F. Collins, chief inspector of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, has been promoted to the position of division superintendent of a new division of the company, to be known as the Mahoning Valley division, comprising the main line from New Castle to Warren, the lines to Mineral Ridge and Leavittsburg and the Warren City line.

Trevor C. Neilson, assistant claim adjuster of the Columbus Railway, Power & Light Company, Columbus, Ohio, has been appointed claim agent of the East St. Louis & Suburban Railway and related properties, with headquarters at East St. Louis, Ill. Prior to his acceptance of the position of assistant claim adjuster of the Columbus Railway, Power & Light Company in 1914, Mr. Neilson was in the service of the operating and claims department of the United Railroads, San Francisco, Cal., for six years. Mr. Neilson was born abroad and is an attorney by profession.

W. M. Acworth, the well-known English economist and railroad expert, is expected to arrive in Canada about Dec. 15 to sit as the English member of the commission appointed by the Dominion Government to inquire into the railway situation in Canada. Mr. Acworth has visited the North American continent several times and represented the British Government at the International Railway Congress at Washington, D. C., in 1905. While he was in Washington at that time Mr. Acworth gave evidence on English railway law and practice before the Elkins committee of the United States Senate. He also appeared before the Hadley commission on railway operation in 1911. He is a director of the London Underground Railway and London United Tramways.

Edwin K. Morse has been named as transit commissioner of Pittsburgh, Pa., by Mayor Joseph G. Armstrong, as noted briefly in the Electric Railway Journal of Nov. 25, page 1126. Mr. Morse has studied the subject of transportation in Pittsburgh for about eight years. He has been connected as consulting engineer with the Pittsburgh Subway Company, which has been unsuccessful in obtaining an ordinance for the construction of a subway in the city with private money and private ownership. He was associated for twelve years with the Jones & Laughlin Steel Company as consulting engineer in the reconstruction of the Eliza furnaces and its rolling mills. He designed and superintended the foundations for all the hot metal bridges for the Carnegie Steel Company and that company's railroad bridge across the Allegheny River on the road to the lakes. He has in the past been connected as consulting engineer with the city of Pittsburgh. The object of Mr. Morse's study as transit commissioner will be to devise ways and means of relieving the abnormal congestion in the downtown business section of the city of Pittsburgh, where owing to the Allegheny and Monongahela Rivers on two sides and the so-called "hump" on the third side of the small triangle representing less than 225 acres of ground, is one of the most congested business sections in the world, and one that can never be changed geographically or topographically. Mr. Morse will also take up and study the question of relief by subway and report to the Mayor and the Council within one year from Nov. 6, the time of his appointment.

James D. Callery has resigned the presidency of the Pittsburgh (Pa.) Railways. He will continue to serve the company as chairman of the board of directors. The vacancy caused by the resignation of Mr. Callery will be filled by Sumner L. Tone, now vice-president of the Duquesne Light Company, one of the subsidiaries of the Philadelphia company, of which the Pittsburgh Railways also is a part. Mr. Callery's resignation will go into effect on Jan. 1, 1917. He has just purchased a seat on the New York Stock Exchange, and will associate himself with N. K. McMullin in the brokerage business. Mr. Callery was born in Pittsburgh on Nov. 11, 1857. He began his business career with his father in the leather manufacturing business. Mr. Callery's father, the late James Callery, founded the Pittsburgh & Western Railroad and was interested in the first horse-car line established in Pittsburgh. In 1889, when president of the Second Avenue railway in Pittsburgh, James D. Callery decided upon a change in motive power of the railway to electricity, and the Second Avenue line was the first in Pittsburgh proper to be operated successfully by that power. In 1902 Mr. Callery was elected president of the consolidated street railways of Pittsburgh, known as the Pittsburgh Railways. Mr. Callery is a vice-president of the Philadelphia Company and of its subsidiary companies, is president of the United Traction, the Southern Traction Company, the Allegheny Light Company, the Pittsburgh Railways and subsidiary companies, and vice-president of the Consolidated Gas Company, Pittsburgh. In addition to these offices he is a director of the Colonial Trust Company and the Diamond National Bank, Pittsburgh, the Westinghouse Electric & Manufacturing Company, the Westinghouse Machine Company, and the United Railways Investment Company.

OBITUARY

James Phair, superintendent and master mechanic of the Manitowoc & Northern Traction Company, Manitowac, Wis., since the line was built twelve years ago, died on Nov. 17. He had been ill for more than two years.

Millard F. Thompson, Carlisle, Pa., died on Dec. 1 from a stroke sustained some weeks ago. He was sixty-seven years old. Mr. Thompson was interested in railway work throughout Pennsylvania and was secretary-treasurer of the Carbondale Traction Company from 1892 to 1896. He was also secretary-treasurer of the Jeannette & Pittsburgh Street Railway and the Greensburg & Mt. Pleasant Railway and president of the Pennsylvania & Western Railroad.

Josiah Quincy Bennett, who was identified with the supply of power to the first electric railway service operated in Massachusetts, by the West End Street Railway, in Cambridge, Mass., died at his residence in that city Nov. 29, at the age of sixty-two. He was president of the Cambridge Electric Light Company, of the Weymouth Light & Power Company, Athol Gas & Electric Company, and other utilities in the central station field, and was a director in various industrial organizations. He is survived by his widow, three sons, and one daughter, who is the wife of Ralph M. Sparks, general passenger agent of the Bay State Street Railway.

Construction News

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

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

FRANCHISES

New York, N. Y.—In a report by the Bureau of Franchises, upon the application of the Union Railway Company for permission to construct, maintain and operate an extension from a connection with the existing tracks of the company in West 207th Street or Emerson Street southerly along Vermilyea Avenue to Dyckman Street and westerly along Dyckman Street to Hudson River, Harry P. Nichols, Chief of the Bureau, recommends that the petition of the company be denied but that the company be informed that the Board of Estimate and Apportionment will favorably consider a petition for an extension on Amsterdam and Nagles Avenues and Dyckman Street from 207th Street to the Dyckman Street Ferry, provided the company will stipulate to accept a contract providing for the use of the overhead system of electricity on Dyckman Street during the first five years of the grant and at the end of such term to substitute therefor the underground system.

Columbus, Ohio.—The Columbus Railway, Power & Light Company has received a franchise from the Council to construct and operate a double-track line on East Eleventh Avenue, from Fourth Street to Field Avenue, opposite the east entrance to the State Fair Ground. By the terms of the franchise the company is to pay one-half the city's portion of the cost of the Eleventh Avenue subway under which the track will run. This will be approximately $20,000. The new line will complete a loop connecting the Cleveland Avenue and Fourth Street lines.

Pemberville, Ohio.—The Toledo, Fostoria & Findlay Railway has received a franchise from the City Council to maintain and operate the line formerly operated by the Lake Erie, Bowling Green & Napoleon Railway on Front Street, from the westerly boundary line of the village of Pemberville to a point on Bierly Avenue where the line connects with the Toledo, Fostoria & Findlay Railway.

San Angelo, Tex.—The franchise recently granted by the City Council to the Interstate Electric Corporation of New York for operating a street railway system in San Angelo has been confirmed by the voters.

Vancouver, Wash.—The City Council of Vancouver has refused to grant the Portland Railway, Light & Power Company a franchise on First Street to enable it to make a loop about its property and return onto the Interstate Bridge.

TRACK AND ROADWAY

Calgary (Alta.) Municipal Railway.—The city of Calgary has purchased 30 tons of 80-lb. rail from the city of Lethbridge for the construction of ½ mile of single track to connect with the north section of the city over the new Center Street bridge. The opening of this route will save a mile ride between the two outside sections of the city as compared with the present route via West Calgary.

Pacific Electric Railway, Los Angeles, Cal.—Elevation of the Monrovia line of the Pacific Electric Railway from a point between the Selig Zoo and the bridge over Mission Road, to clear the streets at Rose Hill, was ordered in a communication recently approved by the Board of Public Utilities for transmission to the Los Angeles City Council. The streets over which the company will be required to elevate its tracks, if the order is approved by the Council, are Mission Road, Turquoise, Tourmaline, Topaz and Ruby, about 1 mile.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—This company has completed the construction of an extension from Stow to Diablo, 1.36 miles.

Castro Point Railway & Terminal Company, Richmond, Cal.—The Castro Point Railway & Terminal Company has filed with the Railroad Commission of California an application for authority to issue $89,000 of its capital stock, $45,153 to discharge obligations, and the remainder to continue the construction of its line and facilities. The commission last June authorized the issue of these shares when the company should prove to the commission that it had completed a substantial unit of its proposed line. The application says that the company has built a line of single track 1500 ft. in length connecting the San Francisco-Oakland Terminal Railways in Richmond to a wharf which the company has leased to Charles Van Damme. This track permits the street cars of the railway to run to and on the wharf, connecting with the ferry service maintained by the Richmond and Point San Quentin in Marin County. The company states that the cost of construction of its lines to Nov. 1, 1916, was $64,569.

Tidewater Southern Company, Stockton, Cal.—This company has filed a new application with the Railroad Commission of California for authority to construct an extension from Hatch to Irwin City. Engineer Lindsay of the Tidewater Southern Company states, regarding the matter of the road withdrawing its application for the extension and immediately filing a new one, that the action was taken for the purpose of correcting some technical omissions. The extension of the road to Irwin City will be carried out according to original plans. Under date of Nov. 9, Byron A. Bearce, president of the company, in a letter to A. G. Chatham of Turlock, stated that work on the extension from Hatch to Irwin City would begin within a week after the right-of-way has been secured. There are two applications pending before the Railroad Commission. One asks permission to take up the tracks on Sharp's Lane, and the other applies for the right to dispose of 600 shares of stock. If the petitions are granted, the road will issue $600,000 in stock for the purpose of electrifying the road from Modesto to Turlock, and to build the extension to Irwin City, and for the purchase of two passenger coaches and two additional freight motors. Mr. Bearce also states that the stock is now practically sold, and the money is in San Francisco, awaiting the action of the commission on the application.

Shelbyville & Frankfort Realty Company, Shelbyville, Ky.—C. E. Coon, president of the C. E. Coon Company, McConnellsville, Pa., has just completed an inspection of the proposed rights-of-way between Frankfort and Shelbyville over which it is proposed to construct an electric railway to connect with the Louisville Interurban Railway and the Kentucky Traction Company lines. The promoters have agreed to provide Mr. Coon with the rights-of-way and the survey, provided he will build and equip the line and put it into operation. [June 10, 1916.]

Winnipeg (Man.) Electric Railway.—It is reported that the Winnipeg Electric Railway plans to construct a direct electric line to Transcona.

Norwood, Canton & Sharon Street Railway, Canton, Mass.—The Selectmen of Norwood have granted a petition of the Norwood, Canton & Sharon Street Railway, the Norwood Electric Light Department and the New England Telephone & Telegraph Company for the right to construct a new pole line to be used jointly by these companies in Norwood.

Manchester Traction & Light Company, Manchester, N. H.—Steps have been taken by the Manchester Traction & Light Company for the construction of a new dam at Gregg's Falls, 20 ft. below the old dam.

New York Municipal Railway, Brooklyn, N. Y.—The Public Service Commission for the First District of New York has received bids for the construction of the connecting link between the New Utrecht Avenue (West End) line and the Culver line, in Brooklyn. The connection is to be a three-track approach from the West End line to the Culver line, about 600 ft. long, rising from the Thirty-eighth Street cut at the point where the West End line leaves that cut, slightly west of Tenth Avenue and south of Thirty-seventh Street. The approach, curving to the northeast across Tenth Avenue, rises to the elevated grade of the Culver line at a point about 371 ft. east of Tenth Avenue. The low bidder on the contract was Thomas Dwyer of Broadway and 215th Street, New York City, and his price for the work was $42,268.

International Railway, Buffalo, N. Y.—The village board of Lancaster has asked the International Railway to double-track its Buffalo, Depew & Lancaster division to handle the increasing traffic over this surburban line. The village has also asked for additional car service during the rush hours. A number of large industries are located in Depew and the traffic on this division has greatly increased within the last two years.

Interborough Rapid Transit Company, New York, N. Y.—Bids will be received by the Public Service Commission for the First District of New York, 120 Broadway, New York, until Dec. 14 for the installation of cable-feed pipes for part of the Seventh Avenue-Lexington Avenue line.

Niagara River & Eastern Railway, Niagara Falls, N. Y.—The stockholders of the Niagara River & Eastern Railway have authorized the directors to renew their application to the Public Service Commission for the Second District of New York for permission to construct a double-track electric line from Lockport, N. Y., to the Devil's Hole, near Niagara Falls, N. Y. [March 18, '16.]

Piedmont & Northern Railway, Charlotte, N. C.—A survey has been made by the Piedmont & Northern Railway for an extension from Gastonia to Kings Mountain. This is a section of the line to be built to complete the gap between Gastonia and Spartanburg.

Stark Electric Railroad, Alliance, Ohio.—This company reports that during 1917 it expects to construct a line between Alliance and Marlboro, 6 miles.

Cleveland, Akron & Canton Terminal Railway, Cleveland, Ohio.—J. J. Breitinger, who is associated with O. C. Barber of Barberton in the plan for constructing an electrically operated subway under East Fifty-fifth Street, Cleveland, stated recently that work on the improvement will be begun in the spring. [Aug. 28, '15.]

***Dayton, Ohio.**—It is reported that Will I. Ohmer, president of the Recording & Computating Machines Company, contemplates the construction of an electric railway from the center of the city to the factory of the company.

***Tiffin, Ohio.**—Plans are under consideration for the construction of an electric railway from Gibsonburg to Tiffin, via Helena, Millersville, Burgoon, Bettsville and Maple Grove, and from Tiffin to Marion, via McCutcheonville, Upper Sandusky and Harpster. Owen A. Charles, secretary of Chamber of Commerce, Tiffin, is reported interested.

Brantford & Hamilton Electric Railway, Brantford, Ont.—This company is constructing a 1500-ft. extension from Market Street, the present terminus of the company's line in Brantford, to the Lake Erie & Northern Railway station.

Brantford (Ont.) Municipal Railway.—An extension is being built by the Brantford Municipal Railway on Morrall Street, Brantford.

Port Arthur (Ont.) Civic Railway.—The Port Arthur Civic Railway will resurface the tracks on Cumberland Street from McVicar to Arthur Street and will replace the present rail joints with 100-lb. joints.

Northwestern Pennsylvania Railway, Meadville, Pa.—Construction has been completed on this company's new line from Cambridge View to Venango, 3½ miles. The new line replaces about 3 miles of track between Cambridge Springs and Venango, which will be abandoned.

Houston, Richmond & Western Traction Company, Houston, Tex.—It is reported that contracts for supplies and equipment will be let by the Houston, Richmond & Western Traction Company some time in February or March, 1917, for its proposed line between San Antonio and Houston. Ed Kennedy, Houston, purchasing agent. [Nov. 11, '16.]

Ogden, Logan & Idaho Railway, Ogden, Utah.—A report from the Ogden, Logan & Idaho Railway states that the company is constructing 9 miles of line south from Kent.

Salt Lake & Ogden Railway, Salt Lake City, Utah.—Material has been received, and work will soon be begun by this company on the double-tracking of its line between Farmington and Riverdale, 5 miles.

Blue Ridge Light & Power Company, Staunton, Va.—This company proposes to construct an extension in Staunton.

SHOPS AND BUILDINGS

Visalia Electric Railroad, Exeter, Cal.—Plans are being made by the Visalia Electric Railroad to construct a modern passenger station and freight station at the end of its El Mirador extension.

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.—This company has purchased the Federal League Ball Park in Indianapolis, comprising about seven acres of ground within a few blocks of the central business district of the city to be used as a site for new interurban freight terminals for all interurban lines entering Indianapolis. The work of removing the grandstands and other structures on the ground will commence at once, and plans are now being made for the new buildings to be erected by the Terre Haute, Indianapolis & Eastern Traction Company. The work on the new buildings will probably commence in the spring of next year.

Kansas City (Mo.) Railways.—It is reported that five of the eleven carhouses of the Kansas City Railways will be abandoned. These five will be merged with the six larger divisions that are to remain. This change is to be made so that the system may be centralized more. The carhouses which will be maintained will be remodeled and recreation and rest rooms provided.

Northern Ohio Traction & Light Company, Akron, Ohio.—The substation, transformers and carhouse, including eight cars, of the Northern Ohio Traction & Light Company, at Massillon, were recently destroyed by fire, causing a loss of about $50,000.

Rhode Island Company, Providence, R. I.—This company will abandon its present headquarters at the Union Station and move to the corner of Fountain and Mathewson Streets as soon as the three-story Palmer block can be increased to seven stories. It is expected that the block will be finished next July.

POWER HOUSES AND SUBSTATIONS

Albany (N. Y.) Southern Railroad.—Preparations are being made by the Albany Southern Railroad to extend its electric transmission line from Brainard into the town of New Lebanon, where the company has recently been granted a franchise.

Columbus, Delaware & Marion Railway, Columbus, Ohio.—Orders have been placed by Eli M. West, receiver for the Columbus, Delaware & Marion Railway Company, for new equipment for the Marion and Stratford power plants and the Prospect substation, to cost about $27,000. Contracts have been placed for copper wire and transformers amounting to about $6,000, for the local lighting system. The equipment for the Marion power plant will consist of a 750-kva. frequency changer set, one 50-kw. motor-driven exciter set, three switchboard panels, and one voltage regulator. Three 220-kw. transformers, which the company has in stock, will also be installed. At the Stratford plant one 425-hp. Heine boiler and smokestack and one 3000-gal.-per-minute turbine-driven centrifugal circulating pump will be installed. Three 100-kw. transformers will be placed in the Prospect sub-station.

Toledo Railways & Light Company, Toledo, Ohio.—Work on the proposed new central electric generating station of the Toledo Railways & Light Company will be rushed as rapidly as possible. The present generating facilities of the company are now taxed to the utmost, and a 20,000-kw. generating unit will be added to the equipment in the present plant to care for the local power load until the new plant is in operation. The present generating capacity, by the addition of the new unit, will be brought up to 85,000 kw. An order for the first of the 20,000-kw. units for the new central station has been placed with the General Electric Company, and it is expected that further orders for additional units will be placed before the completion of the new powerhouse.

Monongahela Valley Traction Company, Fairmont, W. Va.—An agreement has been entered into between the Monongahela Valley Traction Company and the Clarksburg Light & Heat Company by which a large transformer station will be erected in Clarksburg to enable the companies to supply energy to one another in case of emergencies.

INDUSTRIAL NEWS

Review of Trade and Market Conditions

Rolling Stock Purchases **Business Changes** **Trade Literature**

RISING PRICES DISCUSSED IN NEWARK

Contributions from Several Departments of the Public Service Railway Depict Graphically the Hampering Effects of the Present Abnormal Stringency in Labor and Materials

At the meeting of the American Electric Railway Association Company Section of the Public Service Railway, held in Newark, N. J., on Nov. 16, representatives of the several departments of the railway discussed the effects of the rise in prices upon their several lines of work. As stated in the issue of the ELECTRIC RAILWAY JOURNAL for Nov. 18, page 1062, after an opening paper on public relations by Ex-Senator E. W. Wakelee, associate general solicitor of the company, J. A. Pearson, purchasing agent, opened a discussion on "The Effect of the European War on Market Prices and Deliveries of Railway Material." He was followed by G. J. Newton, local purchasing agent; General Manager R. E. Danforth; F. L. Foulks, distribution department; H. H. George, construction department; P. F. Maguire, maintenance-of-way department, and A. Scheer, Jr., mechanical department. As the subject of rising prices was thus covered so comprehensively, it has been deemed advisable to summarize in this department the data and opinions included in the remarks of these speakers.

THE PURCHASING AGENT'S POINT OF VIEW

By way of introduction, Mr. Pearson said first that he, as purchasing agent, felt like an operating man and wished to be considered as such. Comparing his topic with that of public relations he said that the latter is indefinite and has to be handled with gloves, while the purchasing agent deals with prices, so that purchasing is an exact science. The remarkable thing about the effect of the European War on prices in this country was that for about a year the effect was negligible. In fact, in the early part of 1915 prices were very low. There was great depression, the mills had little work, and the railways had no trouble in getting deliveries of all kinds of materials at the low prices. About Sept. 1, 1915, the effect began to be felt and it was noticed that the railroads could not obtain sufficient freight cars. Embargoes were placed on deliveries of goods all over the East. Last winter there were in and around the port of New York 18,000 freight cars containing all kinds of material which could not be moved. Public Service was not greatly affected except that on the South Amboy pier about 7000 freight cars loaded with coal were accumulated. It was, however, very difficult to move goods through the State of New Jersey and prices on all goods began to rise.

In the spring of 1916 there appeared to be a lull in the congestion, so that from May to July the pressure for material decreased. But in September prices began to climb again and deliveries to be delayed, until to-day conditions are twice as bad as they were a year ago.

Mr. Pearson emphasized the fact that during his twenty years' experience as purchasing agent he has never seen a situation like the present one, the difficulty applying to every item of a railway's requirements, even blotting paper, pens and ink. He believes, however, that soon after the close of the war, which apparently will last from one to two years longer, prices will be greatly reduced. The foreign demand will cease and there will be active competition for our markets.

Coming to the subject of the immediate future, Mr. Pearson advised early placing of requisitions and the carrying of liberal stocks. He stated that while it may seem ridiculous in 1916 to talk about ordering goods for 1918 delivery, that is the best that can be secured in some lines. For instance, a steam turbine cannot be bought to-day for delivery before 1919. On the subject of increases in prices, Mr. Pearson quoted, as examples, the following: "In 1914 we paid 19 cents a pound for brass pipe, whereas in November, 1916, the price was 41 cents, an advance of 110 per cent. Condenser tubes which under the company's last contract cost 18 cents per pound were recently offered for delivery next May at 53 cents as a special favor. Track spikes which in 1914 were bought for $1.40 per hundredweight, now cost $2.75, an advance of 97 per cent. In 1914 the discount on machine bolts was 75 and 5, while to-day it is 25 and 5, an advance of 250 per cent. The advance in twist drills has been 250 per cent, tie rods 50 per cent, tamping picks 40 per cent, steel pipe 70 per cent, iron wood screws 92 per cent. Brass screws have advanced to an unheard-of degree, while cold rolled steel has gone up 183 per cent.

"Car wheels are about 21 per cent higher than in 1914 with deliveries of from twelve to eighteen months, while rails are $6 per ton higher with about the same deliveries. Copper is very important to the railway company and the effect of the rise from 18¾ cents to 32 cents is very serious. While the railway is not directly concerned in the price of coal, as energy is purchased from the Public Service Electric Company, it is of interest to note that while the company has long-term contracts the contractors are not able to live up to them, due to shortage of cars and other difficulties. It has been necessary, therefore, to buy coal at an advance of $4 per ton."

Comparing the railway with the manufacturer under the present abnormal conditions, Mr. Pearson pointed out that the latter is making so much money that he can afford to buy raw material regardless of cost. The railway, restricted to a 5-cent fare, must purchase economically, but its business is not considerable compared with that of manufacturers and its purchasing agent is helpless in the present market. Material can be had at some price, but the railway desires to make some money, which cannot be done by paying bonuses. It is necessary, therefore, for the men in the several departments to look ahead and give the purchasing agent all possible time.

OFFICE SUPPLIES ARE HARD HIT ALSO

Mr. Newton confined his attention to the subject of stationery, noting particularly that some papers have more than doubled in price, for example, bond paper, of which a good watermark grade could be bought recently at 6½ cents per pound, now brings 14 cents. The importation of sulphite from Europe has ceased and American manufacturers seem not to be able to provide a suitable substitute. Apparently the amount of sulphite put into paper has been reduced and the quality has suffered while prices have increased. Deliveries, also, are very slow. The following table is indicative of the situation:

Material	Former Price	Present Price
Bond paper, cents per pound	6½	14
		2 cents more for colored stock
Manila writing paper, cents per pound	4½	12
Ledger paper, cents per pound	10½	18
		2 cents more for colored stock
Scratch pad paper, cents per pound	4	10
Kraft paper, cents per pound	4	12
Gem clips, cents per thousand	16	40
Brass fasteners, cents per thousand	52½	93½
Ink, dollars per dozen quarts	$3.60	$6.00
Pins, cents per pound	32	70

HOW THE WAY DEPARTMENT IS AFFECTED

Messrs. Maguire and George went into details of track construction prices, stating, as an example, that hard-center special-work construction cost 35 per cent less a year ago than to-day, while the cost of solid manganese

steel construction has gone up 65 per cent and is still rising. This is due to the increase in the cost of manganese from $100 to about $500 per ton.

Last year the company was able to place an order for a bridge at 2¾ cents per pound, while now the price is 6¼ cents, or 127 per cent increase. In the item of rail braces and tie rods the increase has also been large. Seven-inch braces for tram rail have gone from 23 cents to 34 cents each, an increase of 47.8 per cent; those for 7-in. groove girder rail from 20 cents to 34 cents, an increase of 70 per cent. Tie rods which formerly cost 24 cents have gone to 36 cents each, a 50 per cent increase.

Mr. George also took up the subject of lumber and ties. Creosoted yellow pine ties, 6 in. x 8 in. x 8 ft., formerly cost 83 cents each, but are now $1, a 20-per cent increase; whereas untreated chestnut ties formerly 50 cents are now 62 cents, an increase of 24 per cent. Bridge timber has gone up from 28 per cent to 69 per cent, depending upon the size; 12-in. x 12-in. long leaf yellow pine, for example, being now $41 per 1000 ft. as against $32 last year, whereas 8-in. x 6-in. timber is $65 as against $38.50. Three-in. x 10-in. timber is $42; 6-in. x 8-in., $36; 8-in. x 8-in., $37, and there has been a general increase in the price of creosoted yellow pine lumber of about $15 per 1000 ft.

Mr. George also gave the following table showing the general increase in the cost of paving by contract for this year and last, the prices not including the concrete foundation or the rail plaster along the webs of the rails.

Type of Pavement	Price Per Square Yard, 1915	Price Per Square Yard, 1916	Per-centage Increase
Granite block, cement joints	$2.25	$2.45	8.9
Granite block, tar joints	2.39	2.56	7.1
Granite block, sand joints	2.08	2.25	8.2
Trap rock block, cement joints	1.65	1.70	3.1
2d hard clipped block, cement joints (clipping and laying)	.82	.87	6.1
2d hard unclipped block, cement joints (laying only)	.56	.61	8.9
Newark specification granite block cement joints	2.70	2.90	7.4
Newark specification granite block, tar joints	2.85	3.02	6
Newark specification granite block, sand joints	2.60	2 77	6.5

The company has had to pay as high as $3.78 per square yard for granite block pavement laid with cement grouted joints, including the concrete base. This would be about $3.20, not including the foundation. Along with the increase in prices of material have gone increases in labor costs, the minimum increase being about 20 per cent. In addition it has been necessary in some cases to reduce the working day from ten to nine hours, although payment is made for ten hours work. The higher-priced men have been most loyal to the company, so that the actual increase for track labor has been at least one-third. In some cases skilled men have been required to do track labor, increasing the cost very much more.

Among other items mentioned by Mr. George were the following: Standard steel inter-track picket fence, which formerly cost about $2.25 per linear foot erected, cannot now be had for less than $2.83 per foot, not including erection; the lowest bid for fence erected being $4.10. The present price is at the rate of approximately 8 cents per pound for steel, an increase of 82 per cent. Concrete foundation in tracks has gone from about $5 to $6 per cubic yard or from about 50 cents to 60 cents per linear foot of track. Six-inch terra-cotta pipe has gone from 13 cents to 16 cents per linear foot and other sizes in proportion. Cast-iron drain boxes, formerly 1½ cents per pound, are now more than 2 cents. Green paint, used on steel trolley poles, formerly 14 cents, is now 27 cents, an increase of 93 per cent. Taking an average of twenty-eight items entering into track construction, there is an increase for 1916 over 1915 of 43½ per cent, making an actual increase in the cost of track construction work of from 20 per cent to 30 per cent.

Testimony from the Line Department

Mr. Foulks naturally dwelt upon the subject of copper, in which the distribution department is most interested. He used a price chart in explaining the fluctuations in this material, applying this to conditions on the local property. He said that approximately 215,000 lb. of copper were used in 1915, exclusive of composition line castings, bond wires, etc. which would require 40,000 lb. more. If purchased in May, 1916, instead of September, 1915, this amount of copper would have cost $76,250 more than it did, an increase of 51 per cent.

To illustrate the effect of high prices on the distribution department, Mr. Foulks presented the following table:

	1913	1916	Increase
Bond wires, 10 in.	$0.4050	$0.5850	45 per cent
Bond wires, 12 in.	0.4385	0.8120	85 per cent
Bond wires, 36 in.	0.8078	1.4960	85 per cent
Composition Castings	1914	1916	Increase
Approach ears	$0.18	$0.27	50 per cent
No. 17 splices	1.05	1.22	16 per cent
No. 29 splices	0.57	0.782	37 per cent
No. 00 ears	0.248	0.31¼	26 per cent
Galvanized Span Wire	1913, Per 100 Ft.	1916, Per 100 Ft.	Increase
¼ in.	$0.73	$1.05	44 per cent
5/16 in.	0.885	1.28	44 per cent

He also said that a recent quotation from one manufacturer for a large quantity of No. 00 ears was 46 cents, although it was actually placed with another manufacturer for 38 cents. There has been a recent advance of 12½ per cent on all inclosed fuses.

How the Mechanical Department is Affected

Mr. Scheer opened his part of the discussion by a humorous reference to a recent experience in purchasing steel bolsters for the cars which the company plans to build next one. One steel company facetiously asked, "Well, can't you gentlemen come in about a year? We are closing out all orders and are not taking on anything new for the coming year." Manufacturers seem to be developing considerable facility in explaining why deliveries are not made, but the fact remains that the railway cannot get the material. In regard to the labor situation Mr. Scheer said that while it is true that the hourly rate paid by manufacturers is higher than the rate paid by the railway, a considerable part of the high weekly wage which proves so attractive to many workmen now is partly due to overtime.

To illustrate the increase in prices in mechanical department supplies, Mr. Scheer quoted the following table:

	1914	1915	1916
Babbitt-metal, per lb.	$0.286	$0.31	$0.38
Brass bearings, each	2.62-3.40	2.79-3.02	4.47-5.68
Steel wheels, each	11.59	14.42	18.89
Axles, each	8.77	6.58	16.68
Copper wire, per pound	0.155	0.164	0.326
White lead, per pound	0.06	0.06	0.091
Brooms, each	0.342	0.33	0.42
Linseed oil, per gallon	0.485	0.60	0.73
Rubber hose, per foot	0.028	0.027	0.031
Machine bolts, each	0.026	0.023	0.067
72-in. canvas, per foot	0.20	0.18	0.29

Applying these data to the local railway, he said that the 5000 lb. of babbitt metal used per month will represent an annual increase of $5,640 over the cost in 1914. Similarly, the 366 brass bearings used monthly will cost $18,156 more per year; steel wheels, $5,436 per year; axles, $3,408 per year. In the item of bolts, 2500 of the 3-in. to ¾-in. x 2½-in. size are used per month. In 1914 they cost slightly over 2 cents each, but now they cost more than 6 cents, the increase being 158 per cent. In this small item alone there is an annual increase of $1,230. The total increase for the few items mentioned above is $38,870 per year, a striking instance of how the war is affecting the mechanical department.

The General Manager's Point of View

In closing the discussion abstracted above, Mr. Danforth said that with the increased cost of material averaging about 30 per cent, the company will spend about $1,500,000 next year in the ordinary operation of the property, using the same quantities of materials as usual. In view of the circumstances brought out in the discussion it is evident that the maximum life must be obtained from all parts of the equipment. Nothing should be wasted, from stationery to car wheels. To offset the increase in cost of operation the cars must be made to earn more. A reduction in the cost of accidents would help in this direction. His closing sentence sums up the situation: "Let's save the pennies where we can, the dollars will take care of themselves."

JOHN F. OHMER DISCUSSES REGISTER MANUFACTURE

Increased Demand and Greater Use—Production Cost Figures Abnormal—Paper Supply Presents a Serious Problem

The abnormally high material prices have enforced conditions upon the manufacturers which have been very difficult to meet. In a recent interview, John F. Ohmer, president Ohmer Fare Register Company, Dayton, speaking of the manufacturing and sales condition in the fare register field pointed out what high material and labor prices mean to a company which rents its product on a long-term basis. Business for his company, Mr. Ohmer said, has been good this year, particularly since June. A very high proportion of the users of his company's fare registers have renewed their contracts, new companies have been added as customers, and a large number of additional registers have been required for use in the increased car service now given.

Wages Are 50 Per Cent Higher

The Ohmer fare register is rented for five or six-year terms, and the repairs and renewals of the machines are made by the manufacturer. This means, under present conditions, a very greatly increased cost not only for the materials and supplies required in maintenance work, but higher living costs for the maintenance men.

Moreover, as in other lines of manufacture, the cost to produce registers, and especially to develop new products, is higher than ever before contemplated. Wages have been increased at least 50 per cent during the last two years. Tool makers, many of whom are employed in register manufacture, receive from 60 cents to 67½ cents per hour, and some shop employees on special development work are paid wages as high as $80 a week.

The materials mostly used in register work are those which have shown the greatest rises in price. Brass that three years ago cost 13 cents a pound is now from 40 to 45 cents. Light malleable castings have risen from 6 to 18 cents a pound. Soft sheet steel has risen 200 to 300 per cent, high-speed steel 500 per cent, and the alloy used for die-casting register printing wheels and other essential parts is now quoted at about 80 cents per pound.

Paper Supply Situation Very Delicate

A most important feature of the Ohmer fare register is the printed permanent record of the fare transactions. Thus the demand for register paper increases with the traffic of the electric railways. Rolls of specially prepared paper are sold to the railways for use in the registers. The rental contracts contemplate that the register manufacturer will supply suitable paper at a fair cost, subject to fluctuation of the market. At the present time the paper is costing more than its selling price. No attempt has ever been made to profit by the sale of paper, and now that its price ranges between 9½ and 11 cents per pound, with prospects of further increases, the growing demand for paper means a greater loss. The sales price has not been increased.

The amount of paper supplied during a year for use in Ohmer registers is many tons. The stock is special and available from only one mill. It is a part linen paper, the make-up and finish having been determined only after several years of use. This paper is suitable for use in high and low altitudes and in hot and cold climates. It now is very difficult to obtain at any price. Substitute papers cannot be used if satisfactory printing results are expected.

The paper is received from the mills in large parent rolls. These are cut, and small rolls of sizes suited to various types of registers are prepared. In rerolling, the stock is inspected for surface and gaged for width and thickness. Thus the first cost of the stock is only part of the final cost of the printing register paper cost.

The ink rollers of the fare registers, according to Mr. Ohmer, represent the greatest cost increase per part of the elements of a register. These are made of very high-grade felt, impregnated with a special ink. Felt has risen greatly in price, and dyes for the special ink used are hardly obtainable even at unheard-of prices. The manufacturer who supplies the ink has only a limited supply of dye, and this was purchased at $1,500 a ton.

Mr. Ohmer has always shown great interest in the welfare of his employees. He has introduced into his plant many features which have brought working conditions to the highest level. Last August he addressed the following bulletin to his employees. It is pertinent to the wage-earners whose pay is now much higher than it has ever been, except at present.

"SAVE NOW

"No man knows when or how the European war will terminate, and no man knows what the economic and industrial condition in this country will be following the adjustments which must be made all over the world after the tremendous destruction of life and property in Europe ceases.

"After the Franco-Prussian War of 1870 and 1871, *i. e.*, in 1873, the United States of America suffered the worst financial panic on record, causing great depression in all lines of business activity, coupled with much distress and suffering for a number of years. It, therefore, behooves us to lay aside some of our earnings to carry us over the stormy days which may follow the close of the European conflict. Save now while the saving is good."

ELECTRIC WELDERS RENEW MUCH TRACK

E. C. Price Explains the Reasons for Exceptional Demands for Track Repair Materials

At the close of the construction and repair season inquiries for the Indianapolis portable electric welder are even more numerous than they were during the open season. This statement and those which follow are based on a recent interview with E. C. Price of the Indianapolis Switch & Frog Company, Springfield, Ohio. This company's November sales of welders, joint and bonding plates and special welding steel exceeded those of any previous month.

Mr. Price attributes the present activity in welder and welding material sales to the difficulties encountered by the electric railways in buying rails and other track renewal and repair essentials. "Why should a railway," he says, "install new track now at premium prices, when it is possible to repair it and avoid double costs for materials, such as rails, which have a normal life of ten to twenty years? The rail situation to-day, with the makers asking premiums of $20 to $30 a ton and insisting on contracts carrying with them unchangeable and uncancellable specifications, has put the special work makers into a guessing competition."

In July, it is stated, the mills made the ruling that contracts must carry the specifications with them. Formerly a fabricator could contract for a tonnage of rail, and later, as his orders warranted, he could specify the section of rail to be delivered. Now he must specify when he makes the contracts and, as everyone knows, the deliveries are remote. "Thus," Mr. Price says, "the individual special-work makers are embarrassed for rail and cannot accept all the business offered. And all the rail in the store yards of the frog builders if it were properly exchanged as orders for frogs were received would not build all the frogs that the railroads now desire to order.

"This difficulty and others with which the electric railways are confronted has forced them to a more general use of reclamation methods. One of these is the use of the Indianapolis welder for filling rail cups and renewing joints by welding on plates."

Rail Joint Work Expands Rapidly

Rail joint work with this welder has increased enormously during 1916. The number of joints applied so far this year is double that for 1915. In 1912, when the process was new, less than fifty joints were applied, and since that year nearly 50,000 joints have been put on with the Indianapolis welder.

More than 200 welders have been sold to the electric railways. The Bay State Street Railway and the Public Service Railway each use seven outfits, and many other roads have four or five. These outfits are almost entirely engaged in track work. Only three have been purchased primarily for shop work. Of course, on rainy and cold days some roads use their outfits for shop repair work, but their primary use is for rehabilitating track by building up cupped rails, repairing broken and worn special work and for applying new joint plates.

The Ohio Electric Railway made use of its welder recently for welding rails and rail chairs to the floor of a 70-ft. bridge.

As an indication of the active use of the 200 welders in service, Mr. Price stated that during 1916 his company had sold 600,000 lb. of coated, fluxated welding steel rods. About 31,000 lb. of this was for welding manganese steel special work. Of the total sold, 300,000 lb. was for applying joints and general shop work, and an equal amount for filling rail cups and building up manganese centers.

The price of welding steel has not been changed since 1912. A large stock has, with difficulty, been maintained by a safe margin until the recent great demand for track renewal work lowered the reserve somewhat. Mr. Price says that this special welding steel is essential if good results are to be assured.

ROLLING STOCK

Nashville (Tenn.) Interurban Railway, has placed an order for one freight car with the Southern Car Company, High Point, N. C.

South Boston Industrial Railroad, Boston, Mass., has ordered, through the Wendell & MacDuffie Company, Eastern agents for the Russell Car & Snowplow Company, one single-truck snowplow.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y., is said to be in the market for fifteen city cars similar to the ten purchased by this company in 1915 and also for seven center-entrance interurban cars.

United Railways & Electric Company, Baltimore, Md., noted in the ELECTRIC RAILWAY JOURNAL of Oct. 28 as purchasing seventy-five double-truck, semi-convertible, four-motor pay-within cars, will purchase twenty-five additional cars of this type.

Alton, Granite & St. Louis Traction Company, Alton, Ill., has purchased five new cars, three of them to be chair cars, with motors, and two passenger trailer cars. The three motor cars will be of steel, with center entrances, and will have a capacity of forty-six passengers each. The trailers will have center aisles and cross seats, and will each carry sixty passengers. The plan will be to improve the interurban service between Alton and East St. Louis by using two-car trains part of each day.

TRADE NOTES

Horace N. Trumbull has been appointed advertising manager of the S K F Ball Bearing Company of Hartford, Conn.

George K. Morrison, who has been identified for many years with General Electric Company, has been elected vice-president of the organization.

Johnson Fare Box Company, Chicago, Ill., through its Eastern agents, the U. S. Metal & Manufacturing Company, has just received an order from the International Railway, Buffalo, N. Y., for thirty-five of its fare boxes.

Holden & White, Chicago, have been appointed general sales agents by the Garland Ventilator Company for the sale of Garland ventilators in the steam railway field as well as the electric railway field.

Terry Steam Turbine Company, Hartford, Conn., announces the appointment of Stephenson & Nichols, Monadnock Building, San Francisco, as its representatives in northern and central California and the northern part of Nevada.

Peter Smith Heater Company, Detroit, Mich., has received an order for eighty-one hot-air forced-ventilation heaters, six hot-water heaters and seven equipments of gravity-type electric heaters. These heaters will be installed on ninety-five cars recently ordered for city service in Akron and Canton, Ohio, Evansville, Ind., Rockford and Springfield, Ill., Saginaw, Detroit and Grand Rapids, Mich.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has received a number of large orders for motor equipment within the last few weeks as follows: Hodenpyl, Hardy & Company, New York, N. Y., have purchased twenty-nine double equipments of 532-B 50 hp. motors for roads at Rockford and Springfield, Ill., and Evansville, Ind.; also five quadruple 140 hp. 600-1200 volt equipments with HLF control for Michigan Railways, Jackson, Mich. The Detroit United Railway has purchased eight quadruple 140 hp. high speed equipments with HL control. The Lake Shore Electric Railway has ordered thirteen quadruple 140 hp. 600-1200 volt equipments with HL control and four quadruple 40 hp. equipments.

McQuay-Norris Manufacturing Company, St. Louis, Mo., announce the removal of its Chicago office to 1140 South Michigan Boulevard. It also announces that L. H. Dally has succeeded H. G. Paro as manager of the Chicago branch, and H. W. Sweeney has succeeded F. W. McKeen as manager of the Pittsburgh branch. R. W. Long has been transferred from the field force of engineers, and will manage the Denver branch.

ADVERTISING LITERATURE

Anglo-American Varnish Company, Newark, N. J., has issued a booklet on its railway varnishes.

Gurney Ball Bearing Company, Jamestown, N. Y., has issued Vol. II of its publication, "Bearing on Bearings."

Automatic Ventilator Company, New York, N. Y., has issued a pamphlet on its Flower brush holder for railway motors.

Armstrong Cork & Insulation Company, Pittsburgh, Pa., is distributing a booklet on its nonpareil corkboard insulation.

Jeffrey Manufacturing Company, Columbus, Ohio, is distributing bulletin No. 141 on its single roll coal-crusher for power houses.

New England Oil, Paint & Varnish Company, Boston, Mass., has issued a pamphlet on an impregnable coating for cement and brick.

Drew Electric & Manufacturing Company, Indianapolis, Ind., has issued a pamphlet on its motormen's safety mirror for closed or for open cars.

Hyatt Roller Bearing Company, Newark, N. J., has issued bulletin No. 1523 of "Engineering Helps" on the selection and mounting of its roller bearings.

Gould Coupler Company, New York, N. Y., is distributing a pamphlet on its universal truck lever type automatic brake adjuster for Brill 39E. and 27F. trucks.

Railway & Industrial Engineering Company, Pittsburgh, Pa., is distributing a pamphlet on outdoor transformer substations protected by Burke Horn Gap equipment.

Shepherd Electric Crane & Hoist Company, Montour Falls, N. Y., has issued bulletin M-1 on its form 2XS floor-operated, single-speed, direct-current electric hoist.

Weiss Manufacturing Company, Springfield, Ill., is distributing a pamphlet on its non-freezable street railway switch equipment, which includes Weiss switch blocks.

Lord Manufacturing Company, New York, N. Y., has issued a bulletin on the National Safety Device & Manufacturing Company's air rectifier which is designed to eliminate frozen air.

Lackawanna Steel Company, Buffalo, N. Y., has issued a 32-page catalog on the Abbott rail joint plate, which is a device to strengthen and improve the efficiency of the ordinary angle-bar joint.

Albert & J. M. Anderson Manufacturing Company, Boston, Mass., is distributing a pamphlet on a testing clamp suitable for testing watt-hour meters, or to be used in any place where temporary electrical connections are desired.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued leaflet 3510-A on its No. 101-K railway motor. This is a 30-kw., 40-hp., 600-volt motor and is especially adapted to the operating conditions requiring the handling of heavy loads at slow speed.

Link Belt Company, Chicago, Ill., has issued a booklet describing its traveling water-intake screens. The installation at the Philadelphia Electric Company stations is described and illustrated. The Metropolitan West Side Elevated Railway Company of Chicago purchased the first screen built by this manufacturer for installation in 1895. Other booklets recently issued describe the Link Belt coal and ash handling equipment for power stations, locomotive cranes for storing and reclaiming coal and the details of the Peck carrier for coal and ash handling.