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DO YOUR SNOW-EQUIPMENT OVER-HAULING EARLY

The perennial advice to do Christmas shopping early that usually begins to be spread broadcast by everybody to everybody at about this time might well be applied in the case of snow-fighting equipment on electric railways. Indeed, there is even greater necessity for forehandedness in the case of snow-equipment repairs than in Christmas shopping, because the date set aside for the annual exchange of gifts is unalterably a calendar fixture, while the date of the first heavy snow-storm may be almost any time. It is not unreasonable to expect snow on any day after election day, Northern New York having already had a 2-in. fall. Yet a recent trip along the shores of the Great Lakes has disclosed place after place unprepared, sweepers and snowplows being stowed away at the ends of long lines of summer equipment, sadly in need of inspection and at least some repairs. If the same situation exists in the stores department, and there is only an insufficient supply of salt, brooms and shovels, it is safe to say that the first snow-storm will be in the nature of a disaster in disorganizing the service and in direct loss of revenue—the price paid not only by those lacking in foresight, but by those too busy with other things to exercise it.

MAKING FARE ZONES UNIFORM

A favorable answer to the Massachusetts Northeastern Street Railway's petition to the New Hampshire Public Service Commission for the right to establish a 6-cent fare unit on its lines within the Granite State was in a measure expected, in view of the fact that the Massachusetts board had allowed the 6-cent rate for lines of the company operating under its jurisdiction over a much more populous territory. The two commissions sat jointly during a part of the hearings on the new tariff, and their similar though separate conclusions are welcome. One point of special interest in the New Hampshire case has to do with the length of fare zones. To the disadvantage of the company, a single fare has previously prevailed over the Hudson-Pelham Center line, which is 6.22 miles in length, as compared with an average zone length of about 3 miles on the system. The commission logically held that the maintenance of so long a zone was an unjustified discrimination, and it approved the subdivision of the long zone into two virtually equal sections. By this action, the company will secure a much fairer return for its service over the section in question, and the public over the entire system will receive uniform treatment as to rates. The case illustrates the point that rates may sometimes be discriminating and at the same time most unprofitable to the operating utility, and that local increases may offer the most equitable solution from the dual standpoints of the company and its patrons.

FINANCING THE BOMB SQUAD

"It is all beautifully simple. You give the strikers a nickel and they buy a brick with it and soak you with the brick." Thus spoke Don Marquis recently in his column in the New York *Evening Sun*, in satirically commenting upon the fact that striking carmen in New York City were stationing organ grinders along the streets to beg financial aid from the general public. When we published Don Marquis's remarks in last week's issue, however, their truth had not been fully brought home to the public. Last Saturday four officials of the union local, a striking subway guard and a chauffeur were arrested and charged with complicity in a plot that had resulted in the dynamiting of the 110th Street and Lenox Avenue subway station on Oct. 25. Probably the most striking revelation made by the police was that the money used to buy the dynamite and carry out the plot came from the nickels and dimes taken in by the strikers' hand-organ collectors. The folly of lending financial aid in a haphazard manner to an uninvestigated, and, on its face, questionable cause, was never better illustrated. It is to be hoped that the public has learned its lesson. The Amalgamated Association officials promptly disclaimed any knowledge of the plot, but it would have been very much more to their credit if they had been responsible for its detection rather than the police, especially as they should have known what the local treasurer was doing with the money collected. The least thing which these officials can now do is to make plain to both public and police that they are co-operating to the fullest extent with the authorities in running down all who had anything to do with this dastardly outrage.

CAR SHORTAGE AFFECTING POWER PRODUCERS

Reports from western Pennsylvania and Ohio indicate an unprecedented situation in that power producers are unable to obtain deliveries of steam coal under their contracts, the reason being the inability of coal producers to supply fuel according to agreement because of a severe and apparently growing shortage of cars. In the absence of extended storage supplies of coal, this places before the power station operators the sole alternative of going out in the open market and purchasing fuel at prices two or three times greater than those normally obtaining under long-time contracts, and

where the demand is for 100 tons or more daily the added expense becomes staggering. The situation seems to have become acute only within the past couple of weeks, and it is, of course, possible that it is sufficiently local in character to be short-lived. Nevertheless, under present conditions, wherein the regulation-hampered transportation systems of the country are glutted with freight that their arbitrarily-restricted facilities cannot handle, it becomes quite possible for such a coal-car shortage as exists in Ohio to spread over a considerable area, and it behooves every electric railway that produces its own power to be prepared to meet the condition. Stored coal is, perhaps, the most obvious safeguard, but another is the purchase of private cars by the power producer for use only in his coal service, and at least one of the companies affected by the present situation is considering this plan. However, whether this would be more desirable than the costlier plan of coal storage is incidental. The immediate necessity is preparedness in some form in case the coal-car shortage spreads.

AXLE-MOUNTED MOTORS ON FLEXIBLE TRACK

In connection with our comment of three weeks ago on the absence of damage to the track on the Chicago, Milwaukee & St. Paul Railway's electrified divisions there has been raised the question of cause and effect, reference being made to the fact that direct-mounted motors of very much less weight than those on the Milwaukee invariably make trouble with rails laid in city streets.

Admitting this to be absolutely true, however, does not render unreasonable the results that have been obtained with the Milwaukee's axle-mounted motors. On a track that is laid according to steam railroad standards, vertical flexibility is invariably present. Each tie "pumps" through a goodly fraction of an inch as heavily loaded wheels pass over it, and the rail, during the passage of a train, moves in a clearly-defined series of waves. In consequence of this freedom from rigidity, joint trouble such as that which occurs on city systems, where the rails are held rigidly in the plane of the street pavement, is absolutely unknown. Although the use of plain joint plates having only four small bolts might appear to be an invitation to joint trouble from the viewpoint of a city railway's maintenance engineer, such a construction has been in use for years under heavy electric locomotives without any evidences of distortion.

Flexibility of roadway is, no doubt, dependent to some extent upon climatic conditions, as exemplified by the fact that rail breakages on steam roads are more frequent in winter than in summer, one frequently advanced reason being that the frozen ground acts like a solid anvil upon which the rail is pounded. Yet the assumption of a hard-frozen track involves also the assumption of insufficient or imperfect drainage, and where ballasting of desirable materials and ample depth is provided it is difficult to see wherein general track conditions could be greatly affected by the existence of low temperatures.

In brief, the electrically operated railway, heretofore, has been almost invariably compelled to provide extreme rigidity of track, and with this has developed a conception of the phenomena of rolling loads that is based primarily upon this condition. Now that electric equipment is coming to be used upon the non-rigid roadbed common to steam railroad practice, a revision of ideas seems to have become necessary.

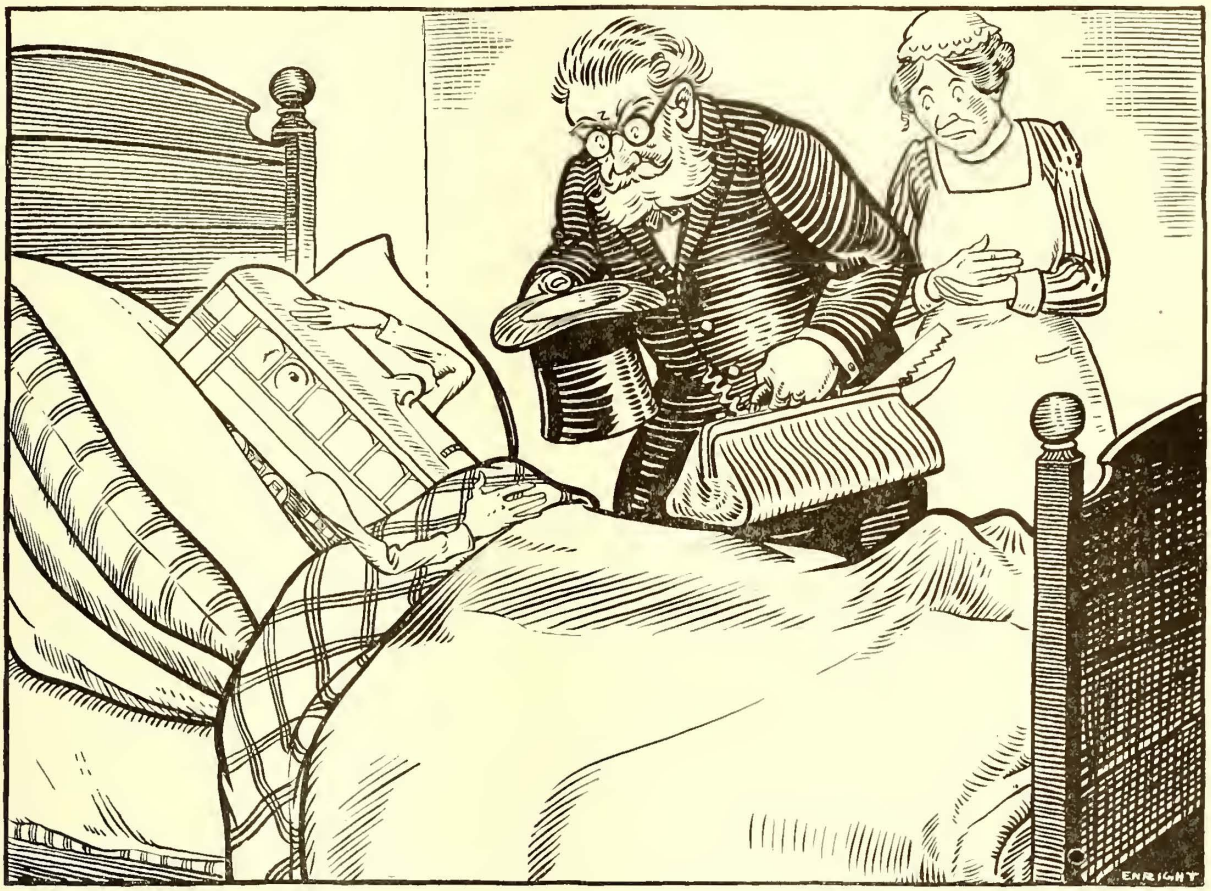
RAIL CORRUGATION STUDIES IN CHICAGO

The further testimony on the subject of rail corrugation, presented this week as a result of the studies made in Chicago, throws interesting light on the subject, although it does not conclusively prove or disprove any of the theories which have been advanced to account for this most mysterious phenomenon. Chicago is peculiarly well suited for a study of this kind, because much of the rail there was laid at about the same time, and also because two distinct types of track sub-construction were employed, namely, concrete and ballast. As steam railroad track which is laid on ballast is much less subject to corrugation than electric railway track, it has been hoped that the use of ballast in city track would reduce the trouble, but practically no difference was found in Chicago between the two types of sub-construction used. The natural conclusion is that where heavy girder rails are held tightly in the pavement and the sub-grade and ballast are thoroughly rolled, the conditions are as favorable to the development of corrugation—if corrugation is caused by rigidity—as if the track was laid on concrete.

The relation of the contour of the wheel to that of the rail was also considered in the Chicago analysis, and the conclusions reached were the same there as elsewhere, namely, that where the bearing of the wheels on the rail is only along the gage line, the steel in the rail becomes cold rolled and corrugation begins. As observations in the field showed slightly greater signs of cold rolling on rails having considerable corrugation than was found on rails where the wear appeared only along the gage line, the Chicago engineers believe there is some connection between the amount of cold rolling and the amount of corrugation, although they take care to explain that the cold rolling may have been effected by many other causes than merely by a difference in contour between wheel and rail.

Those in charge of the analysis do not advance any theory as to the cause of rail corrugation as a result of their observations. This is a wise policy, because while we believe the ultimate cause or causes will be determined and that progress is being made in this direction, we do not believe that the solution will be found from a study of the conditions on any one property. If it was otherwise, the cause would have been determined long ago. Nevertheless, it is only by such studies as have been made in Chicago and conducted with equal care that the problem will be solved. The answer is elusive, but that fact should not discourage investigation. Rather it should make the solution all the more eagerly sought.

Cure the Sores in Time



The Early Use of Publicity Ointment Would Have Saved This Doctor's Visit

UNLESS your road is the Millennium Rapid Transit Company there are sore spots in your relations with the public.

These may be caused by things that you have done or left undone; in either case they are dangerous if neglected.

The only way to cure these sores before they become dangerous and require the services of a doctor (or perhaps of an undertaker) is by applying THE OINTMENT OF PUBLICITY.

Publicity means an attempt to bring about an understanding with the public even if it involves a frank confession that for once the railroad was wrong but won't do it again.

Some publicity campaigns are principally noteworthy for the ingenious presentation of subjects that the railroad wants the public to think about; there is always, and properly, more or less matter of this kind.

But the KIND OF PUBLICITY THAT STICKS ITS HEAD IN THE SAND never accomplishes very much; the successful publicity campaign must concern itself with things about which the public is clamoring for information.

Why can't I get a seat? Why can't we have more transfers? My taxes have gone up, why shouldn't yours? These are the kind of questions that car riders want answered.

To ignore these and more serious questions only leads to the formation of convictions almost invariably hostile to the utility corporation.

If explained as they arose there would be few serious controversies between corporations and the public they serve.

Very often a thing can be explained BEFORE IT OCCURS; a new type of car or a change in service or a franchise extension can be prepared for in a way to make it popular.

These things don't "happen." They are premeditated. Practically everything which the railway does is premeditated. Changes such as those mentioned should be bulletined to the public long in advance.

Or the railroad can stand mute until some newspaper springs the story in such a way as to put the corporation in wrong from the start.

In the latter case the corporation has an uphill fight on its hands—a fight which A SIMPLE REMEDY or A LITTLE FORESIGHT would have avoided.

If there is not a conscious policy of "taking the public into your confidence," the question,—What will people say?—is not likely to be asked with sufficient frequency or seriousness.

The safest way is to have a man on the staff whose particular and only business is to ask that very question, WHAT WILL PEOPLE SAY?

And to do everything humanly possible to avoid the thinking and saying of things that are untrue, unfair or unpleasant.

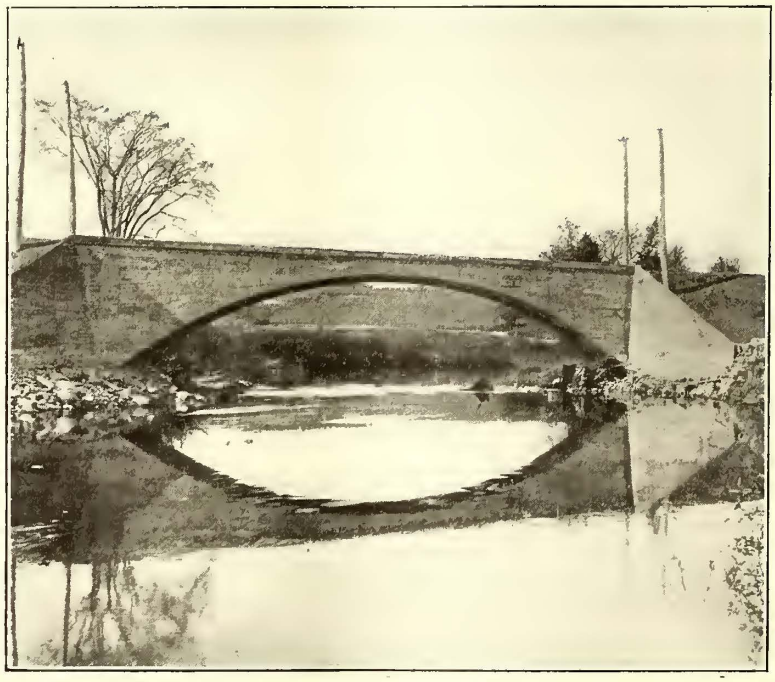
Yes, you have guessed it. Such an individual is known as a PUBLICITY MAN.

An Interurban Freight Line in the Farthest Northeast

Two-Thirds of the Revenue of the 32-Mile Aroostook Valley Railroad of Northern Maine Is Obtained by Handling Lumber and Farm Products in Twenty-Car Trains That Are Hauled by 1200-Volt Locomotive Equipment

WITHIN a few miles of the international line that bounds the State of Maine on the East, and in the extreme northeastern corner of the country, is an interurban property, the Aroostook Valley Railroad, that may justly lay claim to distinction upon grounds other than its geographical location. Since the completion, some four years ago, of the 32-mile route now in service, a freight business amounting to upwards of $60,000 per annum has been developed, so that this field of revenue actually brings to the company about double the returns that are obtained from passenger service.

The original section of the road to be constructed extended between the towns of Washburn and Presque Isle with a spur to make a connection with the Canadian Pacific Railway at Washburn Junction, the latter being a town of 800 inhabitants, while Washburn and Presque Isle have populations respectively of 1600 and 3000. This section of the line, which was built in 1910, was about 10 miles in length, passing through several small villages en route. In 1912 the road was extended north and east from the terminal at Washburn to West Caribou, this being a village across the Aroostook River from the town of Caribou which has a population of 5500 and is the largest community in the district, and an 8-mile branch was built northward to Sweden, a town of 1000 population.



AROOSTOOK VALLEY RAILROAD—CONCRETE ARCH BRIDGE OVER PRESQUE ISLE STREAM

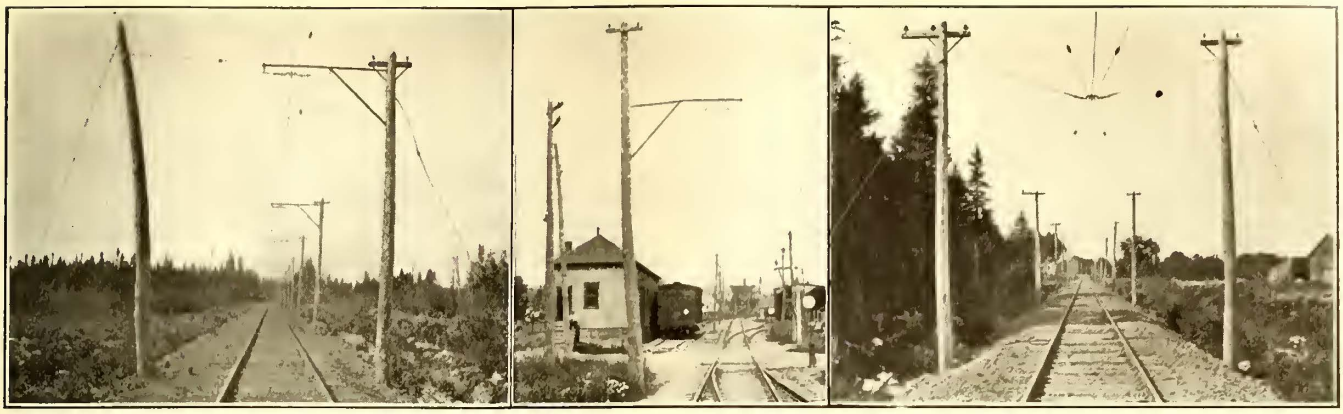
All of these towns are located in the midst of an extensive farming and lumbering district in Aroostook County, famous almost the world over for its potatoes since the county alone contributes the major portion of the annual yield of potatoes for the State of Maine, approximating 24,000,000 bushels. In addition, large quantities of hay and other produce are raised for shipment, and there is an extensive lumber trade throughout the district, as it is on the edge of the still unexploited sections of the Maine woods whose supplies of timber once made the shipbuilding industry of the United States a dominating influence in the world's commerce.

Because of the relatively small population of the communities within the district and the extensive farming and lumbering industries the freight business of the railway has been developed with greatest rapidity. For the year ending July 1, 1915, the freight that was handled amounted to 75,580 gross tons. Included in this traffic, outward bound, were more than 1,000,000 bushels of potatoes and large quantities of lumber, starch and hay. In addition there was an inward-bound traffic of fertilizer, grain, flour and other supplies. A considerable portion of the traffic is interchange freight with the Canadian Pacific Railway, physical connection between the two roads being made at the previously-mentioned town of Washburn Junction. An extensive package and light express business also is carried on by utilizing the baggage compartments of the regular passenger cars, since the small villages through which the line passes have no means of communication with the outside world other than wagons that have to be hauled over bad roads through a heavily wooded and rough country.

As remarked above, the railway operates 32 miles of route, providing 37.7 miles of single track, and 1200-volt equipment is used. Train service is conducted strictly in accordance with steam railroad standards for both passenger and freight movements, a chief dispatcher being located at Presque Isle from which office telephone connections are maintained with the various sidings and terminals. At the present time the passenger service consists of six trains per day in each direction, four between Presque Isle and Caribou and two between Presque Isle and Sweden. The freight traffic is handled by a single train that makes a round trip over the entire line each week day. Trains of more than twenty cars are frequently hauled during the winter season when traffic is heavy, advantage being taken of the fact that grades are generally in favor of the heaviest shipments.

Track and Overhead

The entire road is laid with light grades and curves and is thus adapted to handling an extensive freight traffic. With a few exceptions the grades are limited to 1 per cent, generally in favor of the outward-bound

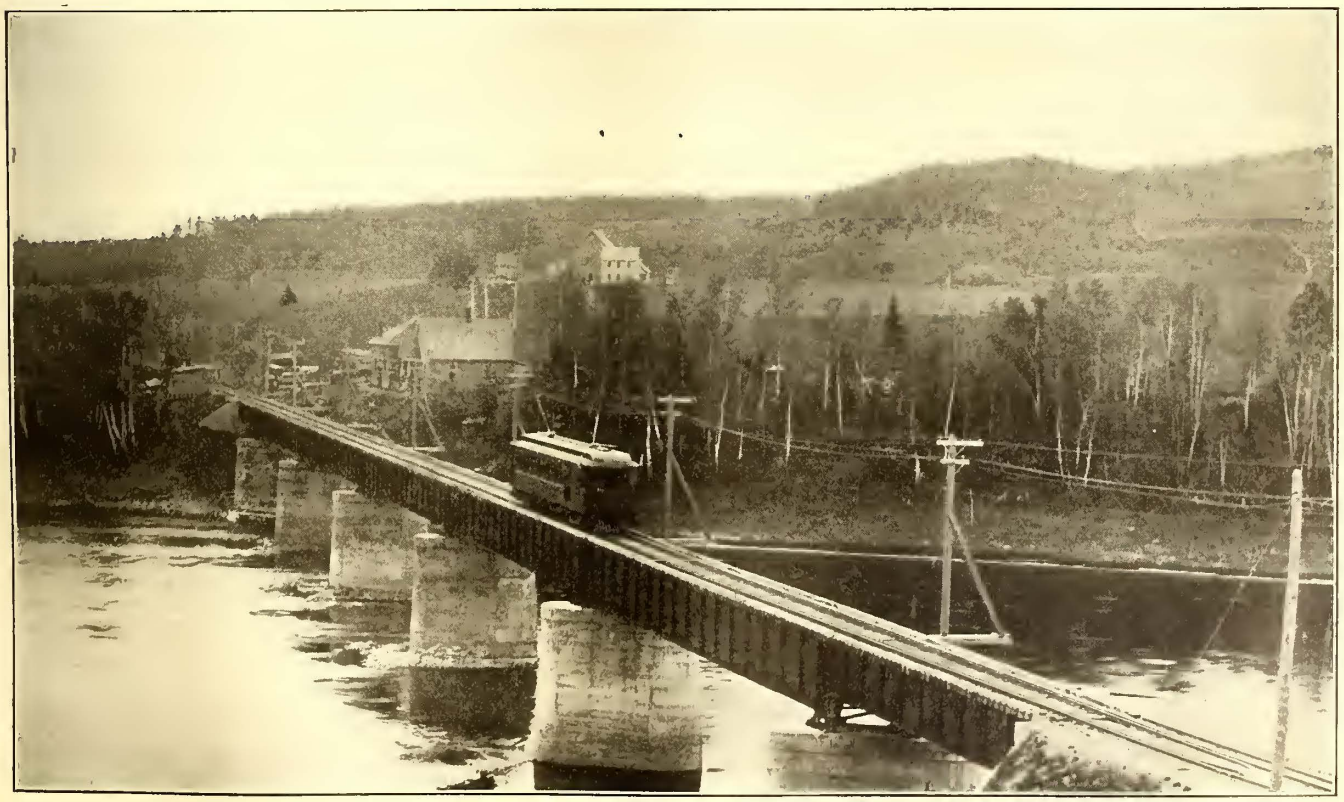


AROOSTOOK VALLEY RAILROAD—TYPICAL BRACKET CONSTRUCTION FOR 1200-VOLT CONTACT SYSTEM; OVERHEAD CONSTRUCTION AT SIDING, SHOWING ABSENCE OF FROGS; SPAN CONSTRUCTION FOR 1200-VOLT CONTACT SYSTEM

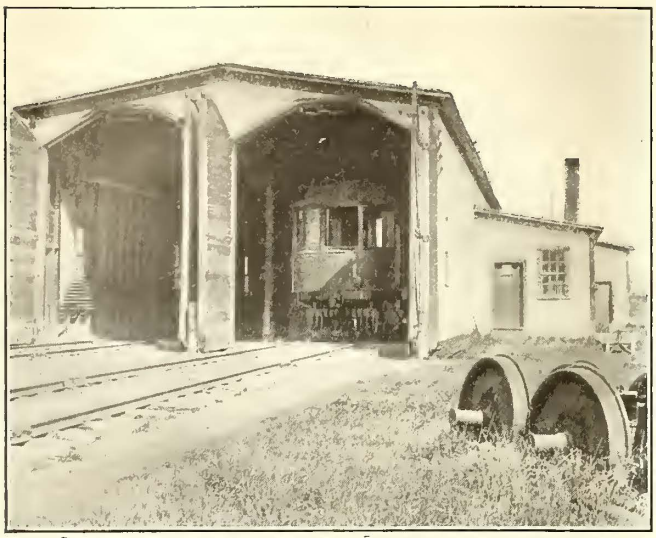
traffic, and surveys have recently been made with the idea of reducing still further the maximum grades. The road is single track throughout and is constructed over a private right-of-way with the exception of about 2 miles east of the town of Washburn, where the tracks follow a highway. For the overhead contact system both bracket and span construction are used with 30-ft. wood poles and a direct-suspended No. 0000 trolley wire. The only feeder copper that is installed in addition to the trolley wire is a single No. 0000 wire extending from the substation at West Caribou for a distance of 12 miles along the outlying branch to Sweden. Of course, the track is of standard gage, and it consists of 70-lb. steel rails with No. 0000 concealed bonds. At the sidings and spurs the use of frogs has been avoided altogether. To this end the trolley wire from each siding is brought out parallel to the main line for a suitable distance and there is no connection between the two contact wires. While this necessitates changing the trolley pole when a siding is entered, a train which is about to be sidetracked is usually approaching at a low speed, while trains that are moving along the main line are usually running at full speed. In any case it is considered that, with a trolley frog in the wire, it would be necessary for the conductor to look after the trolley pole to a certain extent, and therefore the shifting of the trolley pole involves but little additional effort.

Two bridges of interest from a civil engineering standpoint are used on this road. One of them, which crosses the Aroostook River between Washburn and Presque Isle, consists of steel girders mounted on a series of solid concrete piers. The other is located on the freight line that makes connection with the Canadian Pacific Railway at Washburn Junction and crosses a tributary to the Aroostook River called the Presque Isle Stream. This bridge, 100 ft. in length, is constructed of reinforced concrete and it replaces a pile trestle which was removed to effect a reduction in grade.

Numerous spurs and sidings have been constructed at various points along the line to reach the storage warehouses that have been constructed by the company for holding potatoes and also for incoming freight. The



AROOSTOOK VALLEY RAILROAD—STEEL BRIDGE OVER AROOSTOOK RIVER



AROOSTOOK VALLEY RAILROAD—CARHOUSE AT PRESQUE ISLE

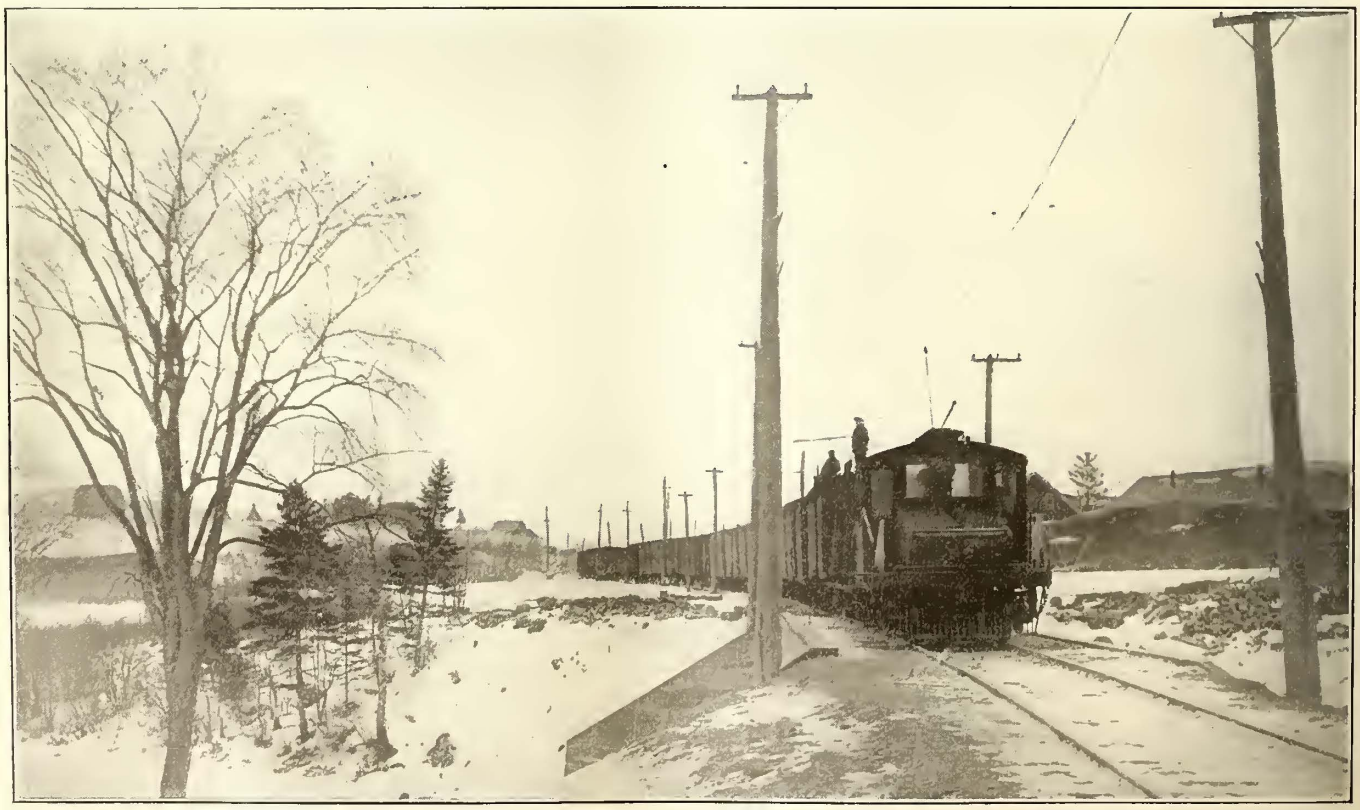
AROOSTOOK VALLEY RAILROAD—TYPICAL WAY SHELTER

use of storage warehouses is almost essential to the handling of freight traffic in this locality, since large quantities of potatoes and hay must be stored for winter shipment in accordance with market conditions, while many carloads of fertilizer and other supplies must be held until road conditions will allow heavy teaming to farms that are located at some little distance from the railway line. Altogether the Aroostook Valley Railroad has the equivalent of sixty-three 50-ft. storehouses which are reached by the company's tracks.

Power Supply and Substations

All electric power required for operating the railway as well as for the local power and lighting in the various towns along the route, is supplied by the Maine & New Brunswick Electric Power Company, Ltd., from a hydroelectric plant located on the Aroostook River about 2 miles across the international boundary in the province of New Brunswick. This power station contains one 1500-kw. and two 500-kw. horizontal units operating under a 78-ft. head. The dam is about ½ mile above the power house and water is conducted to the fore bay through a canal cut out of solid rock. The water supply is ample at all seasons and no steam or other reserve power is required for the system. Sixty-cycle power is generated at 11,000 volts and is transmitted to substations at this voltage. In addition to the railway load the power company supplies electricity for a large number of towns in this section of the State of Maine, the entire system including 115 miles of transmission lines operating at 11,000 volts and 45 miles operating at 33,000 volts.

One of the railway company's substations, which is located at the town of Munson Hill on the



AROOSTOOK VALLEY RAILROAD—FREIGHT TRAIN HAULED BY 40-TON 1200-VOLT ELECTRIC LOCOMOTIVE

Aroostook River midway between Presque Isle and Washburn, is supplied over an independent line usually operated from a separate generating unit, while the other railway substation, located at Caribou, takes care of a combination railway and power load.

These two 1200-volt direct-current substations, which supply all current for operating the railway, contain similar converting equipment. In each is installed two General Electric 200-kw., 600-volt synchronous converters operating in series to give 1200 volts. The transformers are of the single-phase oil-cooled type rated at 110-kw. each and wound for 11,000 volts primary with 370-volt double secondaries. Thus the total transformer capacity is 330 kw., or approximately 80 per cent of the normal rating of the converters. This capacity is ample, however, since the railway load is intermittent and the peaks are of short duration. In addition to the railway equipment each substation contains an 11,000-2300-volt transformer for supplying both local lighting and power service.

The switchboards include the usual machine and feeder panels of standard 1200-volt type, and have the circuit breakers and switches mounted at the top of the board, operation being effected by a control handle placed in the middle section of the panel. Each of the substations is operated on a single twelve-hour shift, this lasting in one case from 7 a. m. to 7 p. m. and at the other substation from 6 a. m. to 6 p. m. Any additional service that may be required is obtained by calling upon the operator to work overtime.

Rolling Stock

The passenger equipment includes four interurban cars, each having a compartment for baggage and express. Each car is equipped with four General Electric No. 217, 600-1200-volt, 50-hp. motors geared for a speed of 35 m.p.h. Two of the cars have Type-K control and the other two Type-M control. Control current at 600 volts is obtained from a dynamotor, which furnishes also the current for lighting and for operating the CP-24-cu. ft. air compressor on each car. General Electric straight-air brakes are used for all cars. Electric heaters are used and these are fed directly from the 1200-volt trolley.

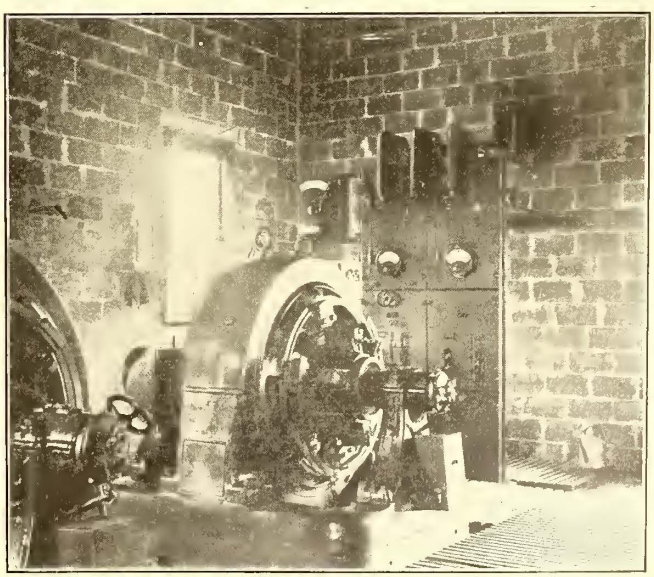
The equipment for handling freight service includes one 40-ton locomotive and an express car weighing about 30 tons which can be used also for hauling the trains when this is necessary. The locomotive is of the center-cab type with sloping end cabs for housing the equipment, the center section containing the controller, air compressor, etc., and suitable accommodations for the operator. The locomotive is built for straight 1200-volt operation and is equipped with four General Electric No. 206, 600-1200-volt motors and Type-M multiple-unit control. Compressed air is furnished by two CP-29 1200-volt air compressors and a dynamotor furnishes 600-volt control current, the air brake being of the combined straight-air and automatic type suitable for handling standard freight cars. The heavy locomotive-type express car is equipped with four General Electric No. 205, 600-1200-volt, 75-hp. motors and Type-M multiple-unit control.

All repairs and inspections of rolling equipment are made in a two-track repair shop located at Presque Isle and supervised by one competent repair man who is also an armature winder. As required, a helper is called in for making heavy repairs, but as a rule the one repair man is able to handle all maintenance work. A regular inspection of the equipment is made twice each month and light inspections are made daily. Two of the cars which have seen the most service have made 158,000 miles and 138,000 miles, respectively, without the removal of an armature, and the electric locomotive has made 100,000 miles to date without any delays due to electrical equipment. The average cost of power for moving trains is given as 4.27 cents per passenger car-mile and 3.3 cents per freight car-mile.

AROOSTOOK VALLEY RAILROAD—SUBSTATION AT CARIBOU

Plans for Extension

An important addition to the existing system is definitely projected at the present time, and all surveys and preliminary work for the construction have been completed. This new line will be known as the Quebec Extension Railway and it will extend westward from the town of Washburn for more than 100 miles across the northern portion of the State of Maine to the Quebec border. This project is intended primarily as an electric freight road connecting with the Quebec Central Railway in Quebec and with the Canadian Pacific Lines in New Brunswick, and it will constitute a direct route cutting more than 100 miles from the present haul through the provinces. The profile of the new line is distinctly suited to the hauling of heavy freight, the maximum grade being 1 per cent. Present plans contemplate the use of direct current at a voltage of 1200 or more for the contact line. Traffic will be handled with locomotives for the freight service and multiple-unit trains for the passenger service, according to the ideas of the officers of the company, who are A. R. Gould, president; L. E. Gould, vice-president; M. S. W. Dingwall, general superintendent, and H. N. Crandall, treasurer.



AROOSTOOK VALLEY RAILROAD—INTERIOR OF MUNSON HILL SUBSTATION

Determining Reasonable Rates Under Municipal Ownership

Rates Should Be Fixed in Same Manner as Those for a Utility Privately Owned, Surplus Going to Credit of General Tax Fund

A PAPER that hits directly at a fundamental injustice toward privately-owned utilities on the part of cities which are inclined toward municipal ownership, was presented on Oct. 18 by J. B. Lippincott before the American Society of Civil Engineers. This paper, which was entitled "A Method of Determining a Reasonable Service Rate for Municipally-Owned Public Utilities," was published in the September issue of the *Proceedings* of the society.

To show the necessity of a more sound understanding of the fundamental basis of proper rate regulation, Mr. Lippincott states that for California, with the steam railroads excluded, the value of municipally-owned utilities is only 5.1 per cent of those privately owned. A new and undeveloped state, such as this one, manifestly cannot publicly build all its utilities, but of late and at present voluntary investment in privately-owned utilities in California is awaiting the determination of public policy in regard to protection of private investments. Heretofore the fixing of rates for municipally-owned utilities in California has often been looked upon as a political rather than as an economic question, it being a popular and easy road to public favor to advocate the reduction of any rate. To Mr. Lippincott's mind, however, the rate for utility service should be based on the fair value of the property used and useful, irrespective of whether the plant is privately or municipally owned. The municipal plant should be viewed as an investment of public funds by the city, and it should be operated with the view of obtaining a profit on the investment.

Private Utilities Should Be Protected Against Unjust Competition

If the rates for the service of publicly-owned utilities are too low and deficits are made up from the general tax fund, such administration is unfair to privately-owned utilities and will tend to discourage the investment of private funds therein. Although the public should be able to enjoy the profit and security of its own service, there is a broad equity involved that requires the protection of the privately-owned plant which has been built in good faith and is being operated under public regulation so that its rates are just and its service adequate. It would be a public misfortune to confirm the impression that private investments are to be overridden unfairly and in such a way as to injure legitimate investment. If unfairness is practiced in the larger centers of population, having substantial bonding resources, it is likely to delay the development of the back country, where public credit for large enterprise is lacking.

In short, therefore, Mr. Lippincott believes that capital invested in private utilities should be protected against unjust competition by publicly-owned utilities. If this is to be accomplished, greater attention must be given to the rates of the publicly-owned utilities. Private rates should be sufficient to provide, first, for the expenses of operation and maintenance; second, for depreciations, and, third, for a return on the fair value of the property. This last item will provide interest on the bonded debt and any profit accruing to the owner. The same rate elements would apply in a case of a publicly-owned utility, but there would be an additional expense for a bond redemption fund. This has no counterpart in a privately-owned plant, as the bonds of the latter are seldom retired, but on maturity are taken care of by a refunding process.

Bearing the Cost of Municipal Ownership

There are four classes of people, Mr. Lippincott states, who should assist in bearing the cost of a municipally-owned public utility: (1) The city as a whole, or the government; (2) the consumer; (3) the owner of vacant lots, and (4) the real estate promoter who desires extensions made to new subdivisions.

1. *The city's share of the expense:*

In Mr. Lippincott's opinion, the city should provide from the general tax budget the annual contributions to the bond redemption fund for the municipally-owned utility. If the municipality's credit has been used in the issuance of bonds for the purchase or reconstruction of the utility plant, then the refunding of these bonds from the general tax budget is virtually repayment for the plant by the city as a whole.

2. *The consumers' share of the expense:*

The consumer should pay for the operation and maintenance of the system and, if the municipally-owned utility is to be treated on the same plane with one privately owned, depreciation and interest on the fair value of the property should also be charged to the consumer. To deduct depreciation and interest from the rates would put such a handicap on competing privately-owned utilities that they probably could not live. Any profit should be expended in the ordinary extensions and betterments to the system, so as to avoid the necessity for frequent bond issues to make these improvements. If any surplus accrued over and above such expenditures for improvements and betterments, it should be turned into the general funds of the city for the purpose of reducing taxes rather than rates.

There are two classes of consumers for a municipally-owned plant, those who are not taxpayers in the community and those who are. The consumer who does not contribute taxes is paying a fair price for the service received, and he is not entitled to have the cost of this service reduced simply because he happens to be temporarily a resident of the community. On the other hand, property owners have guaranteed the payment of the public debts. If the bond redemption fund is provided for from the general tax levy, all taxpayers are proportionate owners of the utility. A share of the profits accruing from this ownership should revert to the taxpayers through the general fund, so that the consumer who is a taxpayer will receive an indirect benefit from the ownership of the utility.

3. *The vacant-lot owner's share of the expense:*

Unless a charge is assessed against owners of vacant lots, they secure benefits without adequate contributions to cover the expense of the utility plant. Some system of assessment on such vacant property on a frontage basis should be developed to cover this element, as is often done in street paving and sewer work. Moreover, there are many vacant lots in the old and established portions of the city where the plant has long been built, and lot owners here cannot be assessed as in the case of extension to a new division. Possibly they should be charged an assessment each year, which should go into a fund for ordinary betterments of the system or into the public treasury.

4. *The real estate promoter's share of the expense:*

The real estate promoter, Mr. Lippincott says, is continually making new subdivisions and petitioning the utilities, whether publicly or privately owned, to make extensions therefor. With publicly-owned utilities it

is usually demanded that the promoter shall pay for the cost of extensions. This policy has been followed by many of the publicly-owned utilities, but it has resulted in political agitation and has been vigorously resisted by the interests who are active in their efforts to speculate on the community. It would be equitable, however, to require the owner to pay a frontage tax to cover the cost of the utility system fronting the property in question, this contribution is to be returned when this part of the plant is on an earning basis. As regards main plants built for the distant future, which may equitably be assumed to involve the promoters' lands, a portion of the cost of the excess capacity should justly be charged to the promoter.

In conclusion, Mr. Lippincott states that this whole problem of establishing municipal utilities on the proper rate basis cannot be solved with a rule that will apply to all cases. A general theory on which all muncipalities should proceed, however, should be adopted. The cities of the country should be managed fairly and scientifically, not only for the interests of the citizens therein, but also for those who have financed in one way or another their utilities and early development.

Reading of Technical Journals Necessary

Those Who Keep Their Knowledge and Practices Up to Date by Such Reading Show It by the Condition of Their Properties

THE last issue of the *Southwestern Electrician* contains a letter from H. S. Cooper, secretary Southwestern Electrical & Gas Association, on the reading of technical journals. Some extracts follow:

"In recent trips among the members of this association I have been impressed with the great differences in practice in certain matters where it would seem that there could be no two opinions on the subject. One of these matters was in the use of the technical journal; in some offices I found them carefully opened, piled and filed convenient to the hand of the manager or other head of department, or of their clerk or stenographer. From such a good operative arrangement the practice 'ran down' until in some offices the journals were flung unopened into a corner or on the end of some table or desk, there to lie in dust and disgrace until the janitor gathered them into the trash barrel.

"Now, apart from the fact that such a practice as the latter is a direct waste of the subscription money, lies the farther fact that the officer or official who so neglects valuable and timely sources of information on subjects that are of direct importance to his employer is not properly earning his salary! That may seem a strong way of putting it, but it is nothing but the truth, and I have found it almost an invariable rule that the officer, official or head of department that was 'slack' in the reading, saving and filing of the technical journals pertaining to his business was only one degree removed from the one who did not take them at all 'because they cost so much.'

"One of the duties of my official position is to keep acquainted with the contents of the various technical and trade journals and publications that apply to the various kinds of public utilities that are members of this association. These publications grade from 'good' through 'better' to 'best.' There is none of them that I could conscientiously say is useless or poor. In every one of them I find something that I know to be of value to some of the members—either directly at once or to be filed for future use and emergencies. And to those capable and conscientious operatives who properly use their journals there is the same result; a hint here, a suggestion there, here a little information of instant value, there something to be remembered and filed against some future condition.

"This applies not only to the 'literary' portion of these publications, and he who thinks that this is their only value is badly mistaken. Not only to the purchasing agent but to every head of department does the 'advertising section' appeal. The manager, superintendent or foreman who does not keep up with what is new in the materials, machinery, appliances and apparatus of his particular line or department is only performing a portion of his duty, he is out of date, behind the times —a 'has been'!

"The technical or trade journal of to-day is the livest, most 'up-to-now' assistant that the public utility man has. It is carefully edited, well printed, fully illustrated, thoroughly indexed both as to literary matter and advertisements. It is the Always Ready Reference of the minute, and the officer, official, head of department, or even workman, who does not use it is neglecting one of his best friends!

"And that leads me to another matter; that is, that I have been surprised to find how many of the larger utilities are actually stingy when it comes to paying out money for subscriptions to their trade and technical journals. They talk about the one, two or three dollars per year as if it were that many hundreds; they look at the expenditure as if it were an expense instead of an investment which, properly handled, will bring them good returns. Of course, if the journals when received are treated like stepchildren or poor relatives, left unopened, thrown into corners, unread, unhonored and unused, then they are a very costly expense, for such treatment of a most useful adjunct of the business soon transmits its influence to other portions.

"Now, I am not soliciting subscriptions for any trade or technical publication, I am not interested financially in any of them, my only interest in their use is that I have not only found them of immense value in all the businesses which I have managed, but I have yet to find a real up-to-date, hustling, successful manager or head of department who does not promptly and fully read his technical and trade publications, note and file the matter that interested him or was or would be of use to him in his business. * * * And in no other way can any operative, no matter how high or low his position, keep so fully abreast of the times in his business as by early and careful perusal of his trade and technical periodical from its front to its back cover. And from no other source can he obtain the 'immediately useful' as he can from a well-filled and indexed present volume of those same publications.

"Those who have tried this know that the above is the truth. Let those who have not tried it give it a trial for six months or a year and they will thank me for calling their attention to this matter!"

New Traffic Ordinance in Portland, Ore.

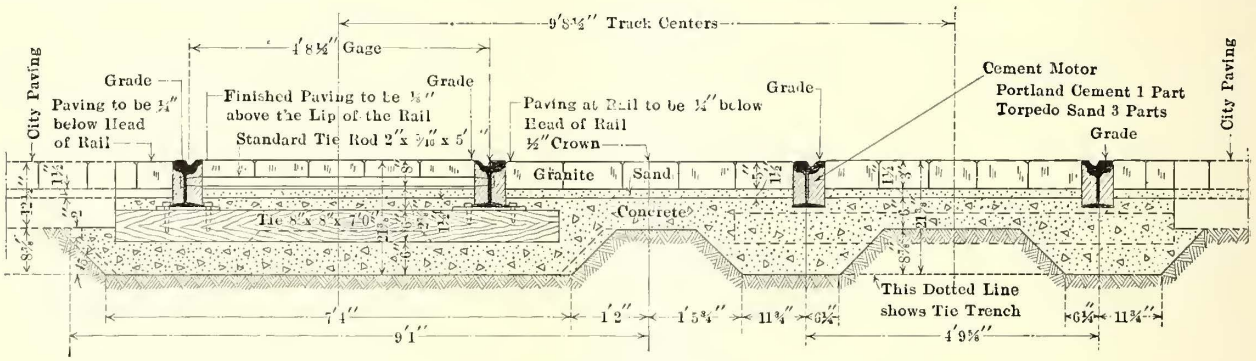
The new traffic ordinance in Portland, Ore., held in abeyance since Oct. 1, has been amended and placed in effect. In accordance with a general request from automobile owners, vehicles of all sorts will be permitted to pass to the left of standing street cars. As originally framed, vehicles were prohibited from passing either to the right or left of street cars standing to take on or discharge passengers. Children less than seventeen years old will not be permitted to drive machines on the streets unless accompanied by a parent or guardian, and then only after they have taken an examination to determine their fitness to operate a machine.

Rail Corrugation Studied in Chicago

Investigation of 72 Miles of Single Track Reveals Corrugations to Be as Prevalent on Ballast Foundations as on Concrete—Study Also Leads to the Conclusion That Curved-Head Rails Would Greatly Reduce the Rate and Amount of Corrugation

INNUMERABLE theories have been advanced setting forth the causes and remedies for rail corrugation, but so far instances have always been found which did not coincide with these theories. An article in the ELECTRIC RAILWAY JOURNAL of July 8, 1916, contributed by T. Norman Jones, Jr., chief engineer of the Virginia Railway & Power Company, Richmond, Va., indicated that corrugation was not as prevalent on a ballasted track foundation as on track laid on a concrete foundation. Since practically all of the track laid in Chicago since 1907 is about equally divided between these two types of construction, it offered a particularly fine opportunity to determine the merits of ballast and concrete foundations in their relation to rail corrugation. Accordingly, George Weston, engineer for the Board of Supervising Engineers Chicago Traction, had a survey made of 36 miles of street, or approximately 72 miles of single track, which was about equally divided between that laid on solid concrete and that laid on crushed-stone ballast. The results of this survey, which was made by C. S. Holcomb, assistant engineer, indicate that there is no particular advantage between these two types of construction in so far as providing a remedy for rail corrugation is concerned, and that corrugation is about as prevalent on one as on the other.

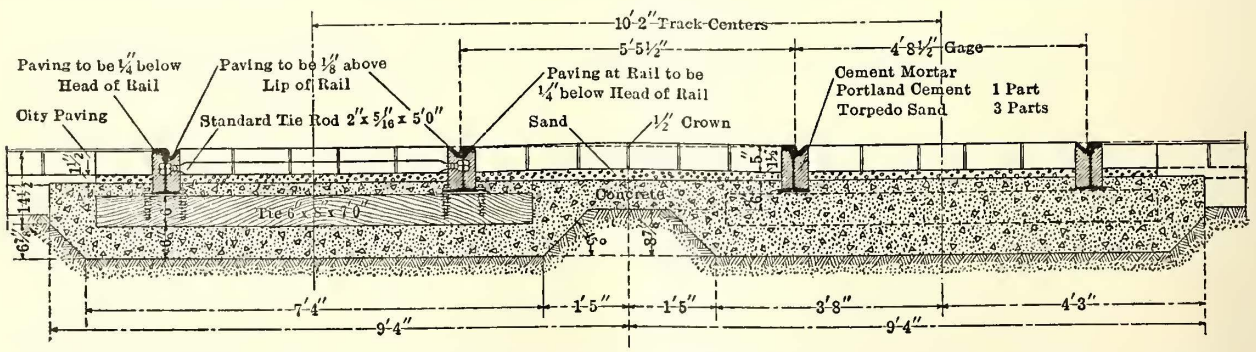
Two routes were selected in making this investigation, one over tracks of solid concrete foundation and the other over tracks with a crushed-stone foundation. Each route covered about 18 miles of street and contained track laid in all years from 1908 up to the present time. The location and the amount of corrugation were observed from the front platform of a car, a record being compiled en route. In selecting the two routes, every effort was made to have them as near comparable as possible, both as regards the average age and the amount of traffic. This was practically impossible, however, and, as indicated in the tabulations, the track on concrete foundations averages about one-half year older than that on the ballasted foundation, and the average traffic over the concreted track was somewhat heavier than that over the track laid on crushed stone. In other words, the conditions under which the survey was made were more favorable for the ballasted construction than for the concrete.



CHICAGO TRACK STUDIES—TYPE 2, CONSTRUCTION WITH CONCRETE IN STRINGERS UNDER RAILS

DISCUSSION OF DATA

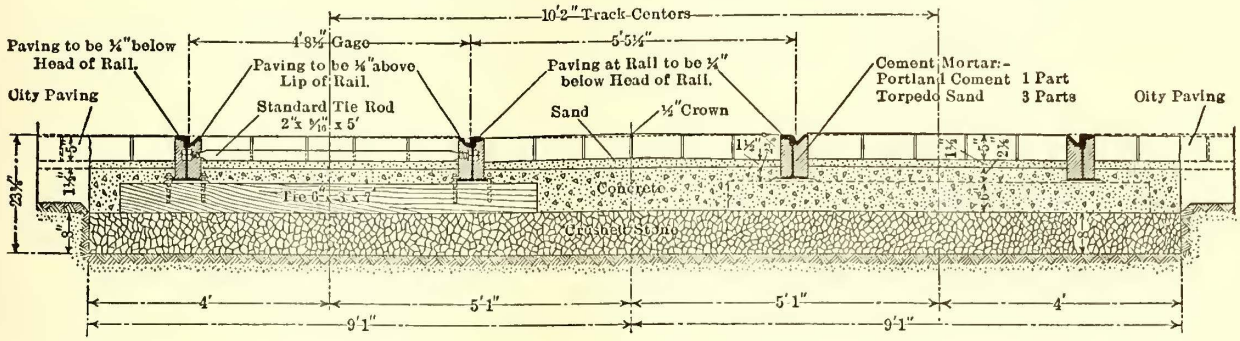
It will be observed in the tabulations on page 1013 that the amount and character of corrugation was indicated in three ways in the column under the head "Conditions," namely, by the terms "None," "Trace," "Slight" and "Corrugated." The term "None" indicates that the rail either had no corrugations or they were so few and of such slight depth as to be unimportant. The term "Trace" indicates that the rail had few corrugations, usually in small stretches but of no great depth and covering not more than 3 per cent of the whole distance inspected. The term "Slight" indicates rail having corrugations usually of no great depth



CHICAGO TRACK STUDIES—TYPE 2A, CONSTRUCTION WITH CONCRETE FOUNDATION OF UNIFORM WIDTH AND DEPTH

but covering from 3 per cent to 20 per cent of the whole distance inspected. The term "Corrugated" indicates rail having corrugations usually deep enough to be felt by the vibration of the cars running over them and extending for more than 20 per cent of the whole distance inspected.

Under the heading "Type of Track" it will be noted that two kinds of concrete track construction and one kind of ballasted construction were inspected. These three types are shown in the accompanying illustrations. Type No. 2 track construction was one of the original types adopted by the Board of Supervising Engineers, as a substitute for Type No. 1, in which steel ties were employed. In laying this type of track a trench was excavated to a depth of 19½ in. below the surface of the street and beneath the ties and the rails. Before the concrete foundation was put in place the track was lined and surfaced on blocks and wedges. From the cross-section of this track it will be observed that the concrete forms a continuous stringer beneath the rails 18 in. wide at the top and 32 in. wide at the bottom. The quantity of concrete was also reduced by simply pressing the subgrade under the ties. After two years' experience with this type of construction it was found too expensive to prepare the subgrade and the 4-ft. tie spacing did not afford sufficient bearing for the rails. Type No. 2-A, also shown in an accompanying illustration, was then developed to remedy these difficulties. In this type of construction the tie spacing was reduced to 3 ft. and the subgrade was made of a uniform width and depth, thus permitting the use of a 10-ton roller to prepare a stable subgrade to receive the concrete foundation.



CHICAGO TRACK STUDIES—TYPE 3, CONSTRUCTION WITH TIES RESTING ON BALLAST ON A ROLLED SUBGRADE

Type No. 3 track construction includes a ballast foundation, as shown in one of the accompanying illustrations. This is laid in a 24-in. trench and provides 8 in. of crushed-stone ballast beneath the ties. After the subgrade has been thoroughly rolled with a 10-ton roller, the crushed stone is put in place and rolled, following which the ties are placed at 2-ft. centers and the rails laid on them. When the rail has been spiked in place the track is hand-surfaced on the ballast. All the rail used is of the Chicago standard 129-lb. grooved girder section. It rests on 6-in. x 9½-in. tie plates and

RECORD OF RAIL CONSTRUCTION ON CONCRETE FOUNDATION

Street	From	To	Miles of Street	Type of Track, No.	Year Laid	Condition
12th St.	Halsted St.	Paulina St.	1.1	2-A	1909	Trace
Ashland Ave.	51st St.	39th St.	1.5	2	1908	Slight
Belmont Ave.	Lincoln Ave.	Robey St.	0.5	2-A	1910	Corrugated
Belmont Ave.	Robey St.	Western Ave.	0.5	2-A	1911	Slight
Center St.	Clark St.	Lincoln Ave.	0.1	2	1908	None
Clark St.	Grand Ave.	Center St.	1.8	2	1908	Corrugated
Fullerton Ave.	Western Ave.	Chicago River	0.7	2-A	1910 1911	Trace
Fullerton Ave.	Chicago River	Clybourn Ave.	0.3	2-A	1913	None
Fullerton Ave.	Clybourn Ave.	Southport Ave.	0.3	2-A	1914	Trace
Fullerton Ave.	Southport Ave.	C., M. & St. P. R. R.	0.1	2-A	1914	Trace
Fullerton Ave.	C., M. & St. P. R. R.	Sheffield Ave.	0.3	2-A	1911	Trace
Halsted St.	Fullerton Ave.	North Ave.	1.0	2-A	1911	Slight
Halsted St.	North Ave.	Division St.	0.5	2-A	1912	Trace
Halsted St.	Division St.	N. Bridge	0.2	2-A	1909	None
Halsted St.	Chicago Ave.	Grand Ave.	0.3	2-A	1909	Trace
Halsted St.	Lake St.	VanBuren St.	0.5	2	1908	Trace
Halsted St.	Van Buren St.	12th St.	0.7	2-A	1909	None
Lincoln Ave.	Center St.	Sheffield Ave.	1.2	2-A	1908	Trace
Madison St.	Paulina St.	Clinton St.	1.6	2	1908	Trace
Paulina St.	12th St.	Madison St.	1.0	2-A	1915	Corrugated
State St.	35th St.	18th St.	1.9	2	1908	Slight
Wentworth Ave.	Archer Ave.	26th St.	0.4	2	1908	Trace
Wentworth Ave.	55th St.	59th St.	0.5	2-A	1908	Slight
Western Ave.	Belmont Ave.	Fullerton Ave.	1.0	2-A	1910 1913	None
Average age.					1910.5	

SUMMARY

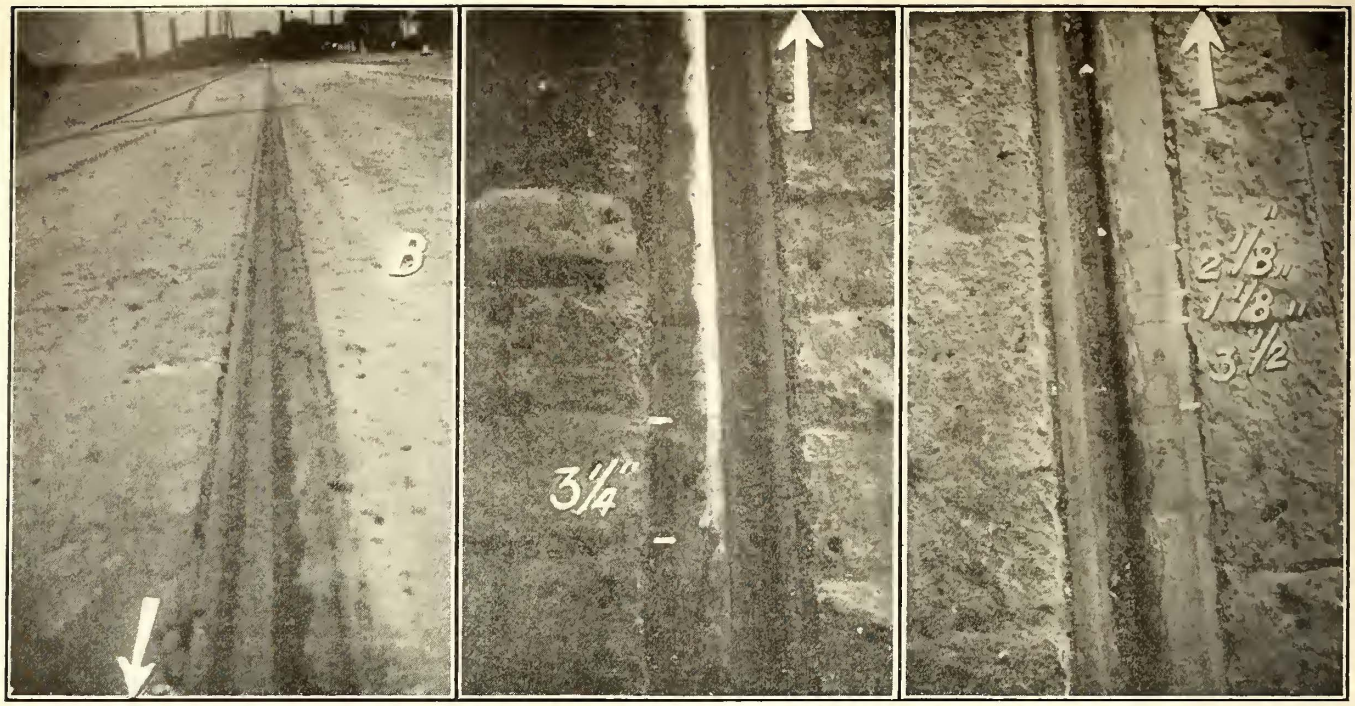
Miles of Street	Condition		Per Cent
2.3	Either continuous or in spots	None	12.8
7.0		Trace	38.9
5.4		Slight	30.0
3.3		Corrugated	18.3
Total. 18.0			100.0

RECORD OF RAIL CORRUGATION ON BALLAST FOUNDATION

Street	From	To	Miles of Street	Type of Track, No.	Year Laid	Condition
26th St.	Wentworth Ave.	Indiana Ave.	0.5	3	1908	None
35th St.	Ashland Ave.	W. App. to Bridge	0.4	3	1910	None
35th St.	E. App. to Bridge.	Parnell Ave.	0.8	3	1909	None
35th St.	Parnell Ave.	Wentworth Ave.	0.4	3	1911	None
35th St.	Wentworth Ave.	State St.	0.3	3	1914	None
39th St.	Indiana Ave.	Wentworth Ave.	0.5	3	1913	None
51st St.	Racine Ave.	Ashland Ave.	0.5	3	1911	Slight
59th St.	Western Ave.	Halsted St.	1.0	3	1912	None
69th St.	Halsted St.	Racine Ave.	0.5	3	1911	Trace
Ashland Ave.	39th St.	35th St.	0.5	3	1913	Trace
Clark St.	Monroe St.	Archer Ave.	1.8	3	1909	Slight
Fullerton Ave.	Sheffield Ave.	Halsted St.	0.3	T.V.C.	....	None
Halsted St.	N. Bridge	S. Bridge	0.2	3	1909	None
Halsted St.	Grand Ave.	Lake St.	0.4	3	1912	Trace
Halsted St.	59th St.	63rd Pl.	0.6	3	1912	None
Halsted St.	63rd Pl.	69th St.	0.7	3	1913	Slight
Indiana Ave.	26th St.	39th St.	1.5	3	1911	Corrugated
Racine Ave.	69th St.	67th St.	0.3	T.V.C.	....	Slight
Racine Ave.	67th St.	63rd St.	0.5	3	1910	Trace
Racine Ave.	63rd St.	55th St.	1.0	3	1914	Corrugated
Racine Ave.	55th St.	51st St.	0.5	3	1913	None
State St.	18th St.	12th St.	0.6	3 Spec.	1908	None
State St.	12th St.	Monroe St.	0.9	3	1909	Trace
Wentworth Ave.	Archer Ave.	26th St.	0.5	2	1908	Trace
Wentworth Ave.	39th St.	Root St.	0.3	3	1908	Slight
Wentworth Ave.	Root St.	55th St.	1.7	3	1907	Slight
Average age.					1911	

SUMMARY

Miles of Street	Condition		Per Cent
6.1	Either continuous or in spots	None	35.5
3.3		Trace	19.2
5.3		Slight	30.8
2.5		Corrugated	14.5
Total. 17.2			100.0



CHICAGO TRACK STUDIES—FIGS. 1, 2 AND 3, CORRUGATED RAILS

is held in place by screw spikes. The Chicago rail is a 9-in. section which is laid in 60-ft. lengths with Lorain electrically-welded joints. Tie rods, 2 in. x 5/16 in. x 5 ft. in size, spaced at 6-ft. intervals and inserted 5⅛ in. above the rail base, hold the rail to gage.

An examination of the data given as a result of this investigation for the amount and character of rail corrugation also reveals the fact that this phenomenon is not a respecter of age or conditions. For instance, much of the oldest track shows no indication of corrugation, whereas on some of that constructed much later corrugations of a maximum wave length and depth have appeared. It will also be noted that while there is more track of the ballasted type of construction having no corrugation than there is of track laid on concrete foundation, yet there is only 19.2 per cent of the ballasted track showing a trace of corrugation, whereas there is practically 40 per cent of corrugations in this stage on the track laid on the concrete foundation. Corrugations termed as "slight" and "corrugated" are in about the same amounts for both types of construction, although possibly there is slight balance in favor of the ballasted track. However, when one considers the fact that the average age of the concreted track is one-half year less than the ballasted track, and that the concreted track carries a lighter traffic, the results indicate that one type of track has very little advantage over the other in so far as corrugations are concerned.

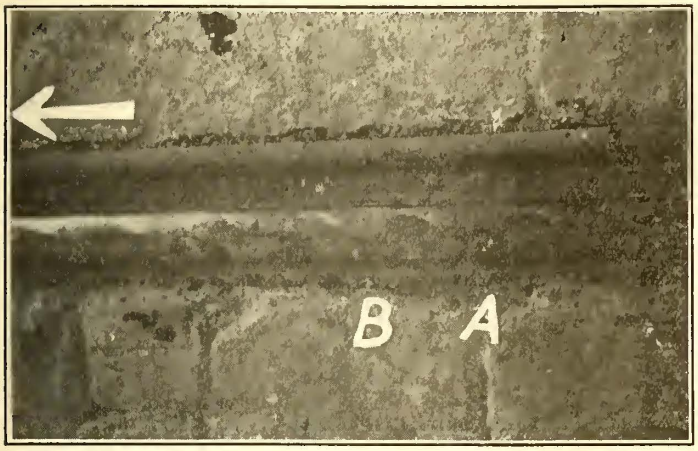
Corrugations Appeared in One Month

A further study of this phenomenon with particular reference to its appearance on rail which had been in service but a short time was made by the engineers of the Board of Supervising Engineers. One particularly aggravated case in which pronounced corrugations appeared after the track had been in service only one month was examined in great detail. This track is Type 2-A, or the concrete foundation with yellow pine ties, and it was built in April, May and June of the present year. The pavement is of granite block grouted in place, and the investigation of its condition which follows was made on Aug. 25, 1916. An inspection of this track shortly after it was placed in operation showed unusually strong indications of rail corrugation, and because of its early occurrence it was made the subject of an investigation. The track was placed in operation about July 1, so that the conditions which are described were the result of about two months of wear of 50,000-lb. double-truck cars operating on an average headway of seven minutes.

CHICAGO TRACK STUDIES—FIG. 4, CORRUGATED RAILS

Fig. 1, shown in the accompanying illustration, is a general view of the inside rail of the eastbound track looking west. The small arrow parallel to the rail and near the border of this and other halftone illustrations indicates the direction of traffic. In this view it will be noted that just to the right of the point where the gage line meets the border of the illustration there are a number of dark areas on the head of the rail. These extend some distance back in the view. They are pronounced corrugations and are typical of those occurring on most of the rail along this street. Fig. 2 shows a short portion of this same rail on which the corrugations, due to the angle of the reflected light, show as bright areas on the head. In this illustration it will be noted that the corrugated areas are

irregular in outline and consist of a series of small areas, each of which starts near the gage line and widens out on the head in wave-like form, returning again approximately to the gage line. Two lines were drawn across the rail at the points indicated before the view was taken. These lines were drawn at the trough or neck in the corrugated area to show the wave length,

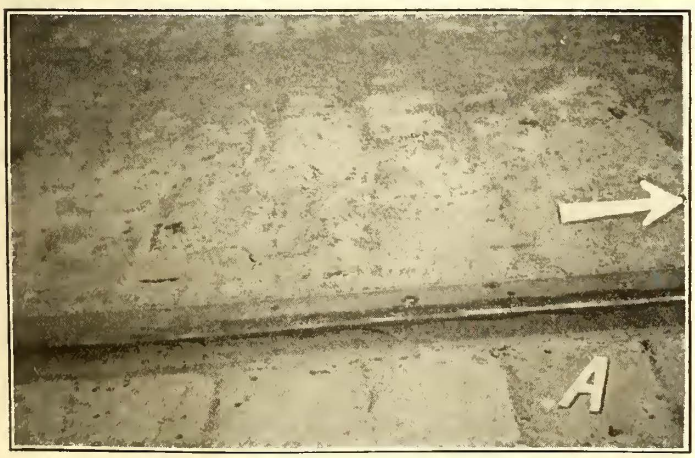


CHICAGO TRACK STUDIES—FIG. 5, CORRUGATED RAIL

which is 3¼ in., or about the average length of the corrugations on the rail at this point.

Fig. 3 illustrates a condition quite similar to that shown in Fig. 2, except that the dimensions of the corrugations are indicated in more detail. Thus the length of the lower corrugation is 3½ in., while that of the upper one is 3¼ in. It will also be noted that the distance from the trough to the crest of the upper corrugation is 1⅛ in., and that the greatest width of corrugation is not equally distant from the troughs. The distance from the crest to the trough is longer in the direction of traffic.

Fig. 4 shows a more pronounced case of corrugation than the other views. On the side of the rail head away from the gage line slight worn areas are perceptible. Lines drawn on the paving block to the right of the rail head indicate these points of wear. The length of one of these worn areas on the opposite side of the rail is 2¼ in., and the distance between the areas averages 1¾ in. This makes the average distance between



CHICAGO TRACK STUDIES—FIG. 6, CORRUGATED RAIL

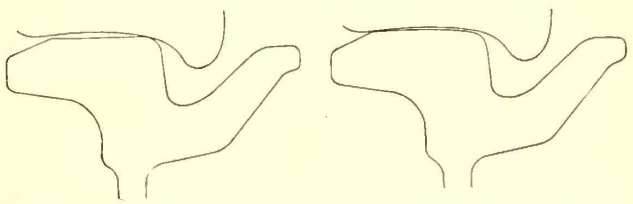
the waves about 4 in. It will also be noticed that the crest of the corrugation beside the gage line is the same as the crest of the corrugation or worn area on the side of the head away from the gage line. This area of wear along the outside of the head is also perceptible in Fig. 3.

Fig. 5 shows a further development in the corrugation. The crests of the corrugations on the gage side and on the outside of the head, at points marked "A" and "B," have become so pronounced that they practically meet in the center of the rail head. The small oval areas affected by corrugation appear not to receive the wheel treads as they pass over them. Fig. 5 was taken at about the point marked "B" in Fig. 1.

Fig. 6 is a view looking at the gage line and into the groove. This rail is corrugated, as may be observed by the darker portion along the gage side of the head. Just below the gage line are strips of extruded metal which appear to have been sheared off the head of the rail by the wheels. It will also be noted that there is practically no flange wear on the gage side of the throatway, and the strips that have been sheared off the head are from portions that project inside the gage line.

CONCLUSIONS DRAWN

After assembling and analyzing the foregoing data and conditions, certain conclusions were drawn regarding such pronounced rail corrugations appearing in such a short time. It is believed that the first point of bearing of the wheels on the new rails was only along the gage line. The area of contact between the rail and the wheel was such that the steel in the rail could not support the strain but was cold rolled and extruded into the groove. This cold rolling or extruding process



CHICAGO TRACK STUDIES—FIG. 7, CONTOURS OF AVERAGE WORN WHEEL AND RAIL—FIG. 8, SAME WHEEL ON RAIL, PROVIDING FULL CONTACT BETWEEN WHEEL AND RAIL

continued until sufficient metal was removed from the gage line and its immediate vicinity to allow the outer edge of the wheel tread to come in contact with the back of the rail head. This is the condition that brought about the results shown in Figs. 4 and 5, where worn areas were observed opposite the crests of the waves in the corrugations along the gage line. The fact that as the new rail wore, two points of contact between the wheel and the rail appeared, indicated that most of the wheels passing over this track were average-worn wheels and had concave treads.

Fig. 7 is an average-worn wheel section placed on a standard rail-head section. The wheel section shown represents the average of twenty-four worn wheels, twelve of which had thick flanges and twelve had thin flanges. Since these twenty-four wheels were badly worn, it is possible that the section shown in Fig. 7 is rather an exaggerated condition, but in a general way it represents the average of the wheels that were operated over this track. If the section shown is accepted as representing the average-worn wheel, the two points of contact which were observed where the corrugations became pronounced can readily be explained.

EFFECT OF CURVED RAIL HEAD ON WEAR

Another point brought out in the analysis of these conditions was that the rapid rate of uniform wear or development of corrugations on this new rail represented an extreme case of the effect of operating wheels of one contour over rail of an entirely different contour. It also

indicates an advantage in having a rail contour and a wheel contour which would provide a full contact which remain approximately the same throughout the life of the rail and the wheels. In the particular case cited if the rail-head contour had been a curve of long radius inclining slightly toward the gage-line side of the head, it is believed that the rate of wear would have been greatly reduced and the conditions observed perhaps much delayed. The line of contact between a rail of this kind and an average-worn wheel is shown in Fig. 8.

Uniform Wear and Corrugations on Same Track

While the conditions described in the foregoing paragraphs represent the general condition of this section of track, there were some stretches of rail, which while showing considerable wear, some along the gage line and some along the back of the rail, did not develop corrugations. Where the wear was uniform it extended back from the gage line from ½ in. to ¾ in. Wear of this kind, as well as that along the gage line and the back of the rail where it is corrugated, may be readily explained, but nothing in this investigation tends to show why the wear should be uniform along some stretches of track and corrugated in waves of from 3¼ in. to 4 in. in length in others. Observations in the field showed slightly greater signs of cold rolling on rails having considerable corrugation than was found on rails where wear appeared only along the gage line. Therefore, it appeared that the conclusion should be drawn that the greater the amount of cold rolling the greater would be the amount of corrugation. Whether this variation in the amount of cold rolling, however, is due to the differences in the composition of the rail metal, to variations in the relation of the rail heads to the wheels, to differences in the rails themselves and in the method of placing them or to some other cause was not indicated by these observations. It is also too early in the life of this rail to tell with any degree of certainty whether these corrugations will increase to such an extent as to require grinding or whether they will gradually disappear and leave a smooth running rail. In any event the conditions described as a result of this investigation may add something to the information on the subject of rail corrugation which may prove of value to others.

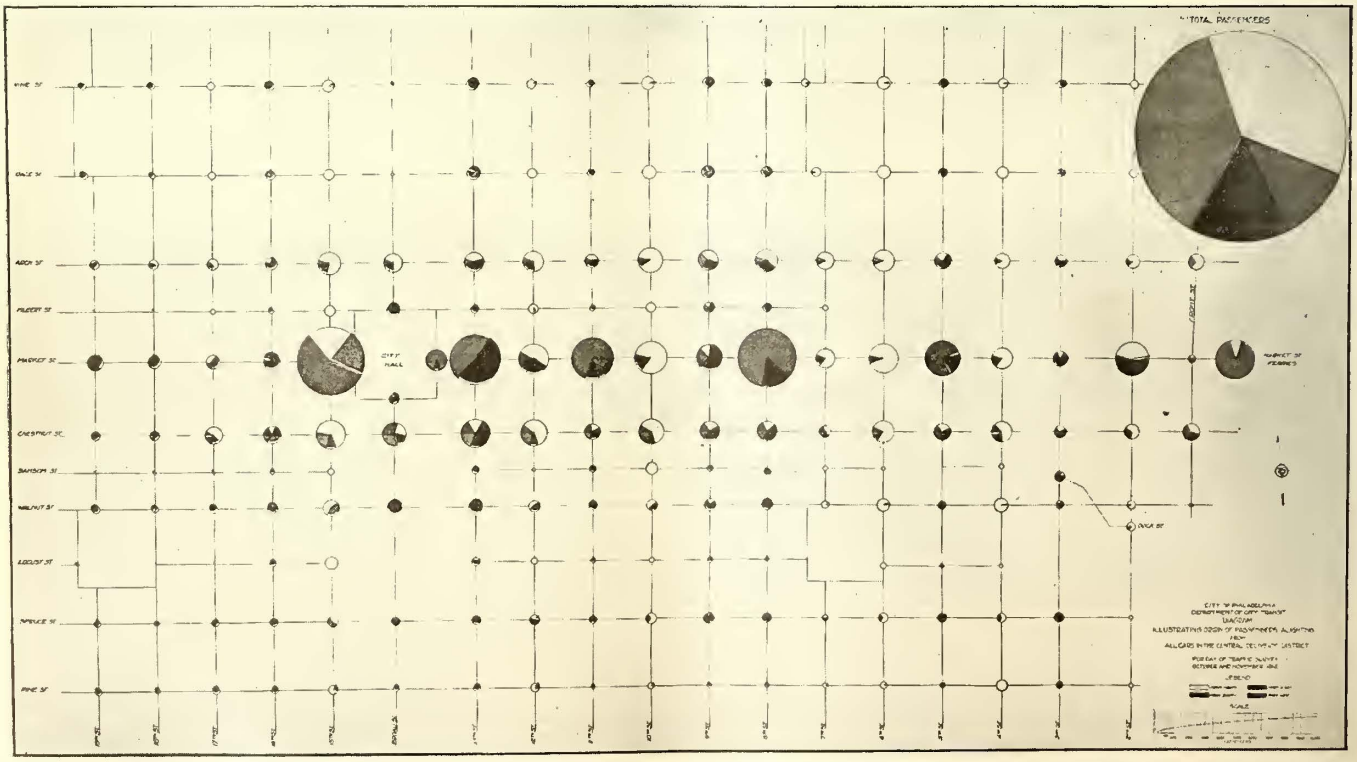
Rapid Transit Progress in Philadelphia

Department of City Transit Describes Construction Work in 1915—Deficits from Rapid Transit Operation Will Disappear About 1940

THE report of the department of city transit of Philadelphia for the year ended Dec. 31, 1915, in reviewing the rapid transit situation in that city, states that since the appointment of the transit commissioners of 1912 a definite program for the construction of new lines has been evolved. The constitution and laws of the state have been amended as recommended, giving the city legal authority, financial ability and executive machinery necessary to establish a complete high-speed railway system. The city's borrowing capacity has been increased by more than $100,000,000, applicable to transit development upon most advantageous plans. The department of city transit has been organized and detailed plans for the entire system are well under way. Two of the more important lines are now under construction.

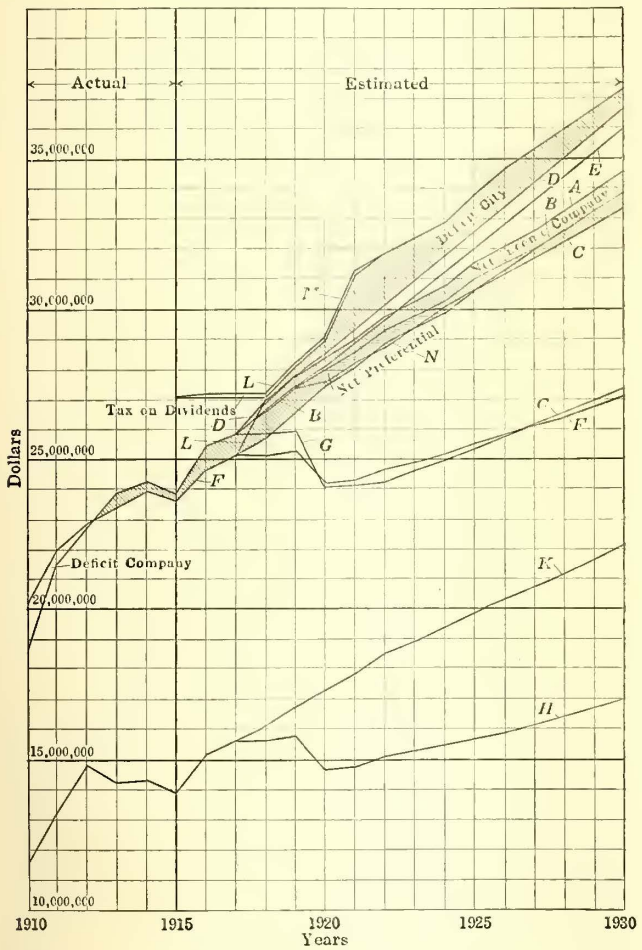
The report states that the department has discussed at length and actually reached a tentative agreement with officials of the Philadelphia Rapid Transit Company for the equipment and operation of any and all rapid transit lines which may be built by the city. Forms drawn in detail and embodying the provisions of this arrangement have been prepared by the department, although the agreement for equipment and operation has not yet been closed. It now remains only to push the construction work to completion in as rapid and efficient a manner as possible, and to close, preferably with the Philadelphia Rapid Transit Company or with an independent company, a contract or lease for the equipment and operation of the lines as constructed.

In regard to the specific work accomplished during the



TRANSIT REPORT—SPECIMEN DIAGRAM, SHOWING PASSENGER ORIGINS AND DESTINATIONS, ACCORDING TO CARDINAL POINTS OF COMPASS, AT EACH STREET CORNER IN PHILADELPHIA'S CENTRAL BUSINESS DISTRICT

last calendar year, the report says that this year saw the adoption by Councils of the project of transit development and the beginning of actual work on the subway and elevated system. On Jan. 25, $500,000 was appropriated for reconstruction and relocation of sewers in and near the central business district, all but a small portion of which work was completed within the year. In March Councils called an election for the purpose of authorizing an increase in the city's debt in the amount of $6,000,000, to be devoted to the construction of the Broad Street subway and the Frankford elevated railway. The vote being affirmative, $3,000,000 was appropriated for each of these lines, contracts were let and work was begun on certain sections during the remainder of the year.



OPERATION BY AGREEMENT WITH THE PHILADELPHIA RAPID TRANSIT COMPANY, WITH FREE TRANSFERS

A—Gross income (P. R. T. Co.) plus net income from Camden Tube.
B—Gross income (P. R. T. Co.).
C—Total expenditures (P. R. T. Co.).
D—Total gross revenue (P. R. T. Co.) plus net income from Camden Tube.
E—Total gross revenue (P. R. T. Co.).
F—Total cash requirements, surface and Market only.
G—Gross revenue, surface and Market only.
H—Operating expenses and taxes, surface and Market only.
K—Total operating expenses and taxes—all lines except Camden Tube.
L—Total cash requirements.
M—Total cash requirements plus sums returned to P. R. T. Co.
N—Gross income (P. R. T. Co.) less net income from Camden Tube and net preferential.

TRANSIT REPORT—DIAGRAM, SHOWING FINANCIAL RESULTS OF OPERATION UNDER SUGGESTED PROGRAM IN PHILADELPHIA

As various plans of construction and lease have been discussed and developed thus far, estimates of the traffic, service and financial results of each to the city and the operating companies have been prepared in complete detail. In all, sixteen principal plans were under consideration during the last year, each of which is described in detail in the report of the department. Plans 1-3 embrace the system recommended by the department of city transit in its special report to Councils on Feb. 11, 1916. Plans 4-7 refer to the system authorized by Councils on June 30, 1916, under various conditions of lease. Plans 8-11 embrace the system as authorized by Councils, but including the delivery loop in the central district. Plans 12 and 13 give the estimated results of the Broad Street line alone. Plans 14-16 contemplate operation by the Philadelphia Rapid Transit Company under a suggested modification of the original program, this modification involving a recognition by the city of cash actually paid in by the Philadelphia Rapid Transit Company and the Union Traction Company.

The estimated financial results of operation to the city of the rapid transit lines authorized by the ordinance, incorporated under the suggested plan, are fully set forth in the report. In this connection the report presents an interesting diagram, shown in the accompanying illustration, giving the financial outcome up to 1930. It is stated that the city's deficit for one year, including tax abatements for the elimination of exchange tickets, which is a maximum of $1,818,200, will disappear in about 1940. This would leave thirty profit-earning years before the expiration of the contract, after which time the city would own the entire property and equipment practically free of debt by reason of the operation of the sinking fund. As estimated on the basis of the present and past statements of the company, the minimum surplus or net income of the company applicable to the stock of the Philadelphia Rapid Transit Company is $796,790 in 1922. Under the preferential clause of the proposed plan, a surplus is to be maintained at not less than approximately $630,000. It is said, therefore, that under present expectations the abatements and credits allowed the company will be sufficient to offset the preferential payment which would otherwise be due the company.

In discussing the various plans, the report remarks that the maximum yearly deficit does not vary widely as between the various proposals, except in the case of the last three, which differ materially from all others in terms of lease and program of construction. The total deficits for the period from the beginning of operation to and including 1930 appear formidable. They are much more than offset, however, by real collateral benefits which the city receives in the way of taxes on abnormal increases in assessed valuation due to rapid transit development, from time-saving afforded by the high-speed system or from the abolition of the 3-cent exchange tickets. Moreover, the deficits represent nearly the full amount of accumulated loss from operation, as the deficits after 1930 are smaller and in most cases disappear within a few years. Thereafter in perpetuity the system should be profitable to the city in itself.

The report also includes a series of diagrams, one of which appears on page 1016, showing the results of a special study of the traffic in the central business district in Philadelphia. From the general passenger survey, made in 1912, the number of passengers boarding and alighting from cars at each street corner was compiled and plotted in graphical form. Different colors were used to indicate the proportion of passengers for travel east, west, north and south at each street corner. This information was used primarily for estimating the traffic at the stations on the recommended delivery loop. The diagrams, it is said, show conclusively that the locations recommended for the north, east and west sides of the loop will serve the greatest number of people with the greatest convenience.

Freight Locomotives for the South Shore Lines

The Chicago, Lake Shore & South Bend Railway Has Recently Entered the Business of Handling Freight on a Steam Railroad Basis by Placing in Operation Two Single-Phase Locomotives Designed Especially for the Service

WITH a keen perception of the possibilities of increasing the revenue of the railroad through the handling of freight, the Chicago, Lake Shore & South Bend Railway Company has laid plans and begun activities toward the moving of this class of traffic on a large scale. The opportunities presented are most promising, considering the route of the road through the rapidly-growing district around the south shore of Lake Michigan, where construction work of interesting proportions is in progress. This involves the handling of large quantities of building material, to say nothing of the present and later possibilities for transporting the products of the industries that have been established in the vicinity.

Interchange arrangements have already been completed with the Illinois Central Railroad and the Chicago, Joliet & Eastern Railroad, and negotiations are well under way for interchange with a number of other lines. Joint tariffs have been established with some ninety steam roads, and application has been made for membership in the American Railway Association. Inasmuch as all construction and equipment on the South Shore Lines comply with standard steam railroad practice throughout, it is expected that this membership will be promptly granted. The company has already joined the Master Car Builders' Association.

No less-than-carload freight is being handled at present, but the company has purchased real estate in all the towns along its line for the location of freight houses to be built next spring, and as soon as these are ready all classes of freight will be solicited.

An entry into the freight business on so elaborate a plan naturally gave rise to the necessity for suitable motive equipment to handle heavy trains. The service was, therefore, not begun in earnest until the arrival, thirty days ago, of two new 72-ton locomotives built by the Westinghouse Electric & Manufacturing Company, and designed especially for the requirements of the road and the service. In general, these are eight-wheel, swivel-truck, 6600-volt, single-phase, four-motor locomotives, capable of exerting continuously with forced ventilation a tractive effort of 13,600 lb. at a speed of 15.8 m.p.h. with 220 volts at each motor. They will exert a tractive effort of 20,800 lb. for one hour at approximately 12.4 m.p.h., and with clean dry rails will give a momentary maximum tractive effort of 36,000 lb. A feature of the design is the mounting of all equipment, piping and conduit within the cab in easily ac-

SOUTH SHORE LOCOMOTIVES—VIEW OF LOCOMOTIVE SHOWING BOX CAB WITH SIDE DOORS

SOUTH SHORE LOCOMOTIVES—LOCOMOTIVE AND TYPICAL FREIGHT TRAIN

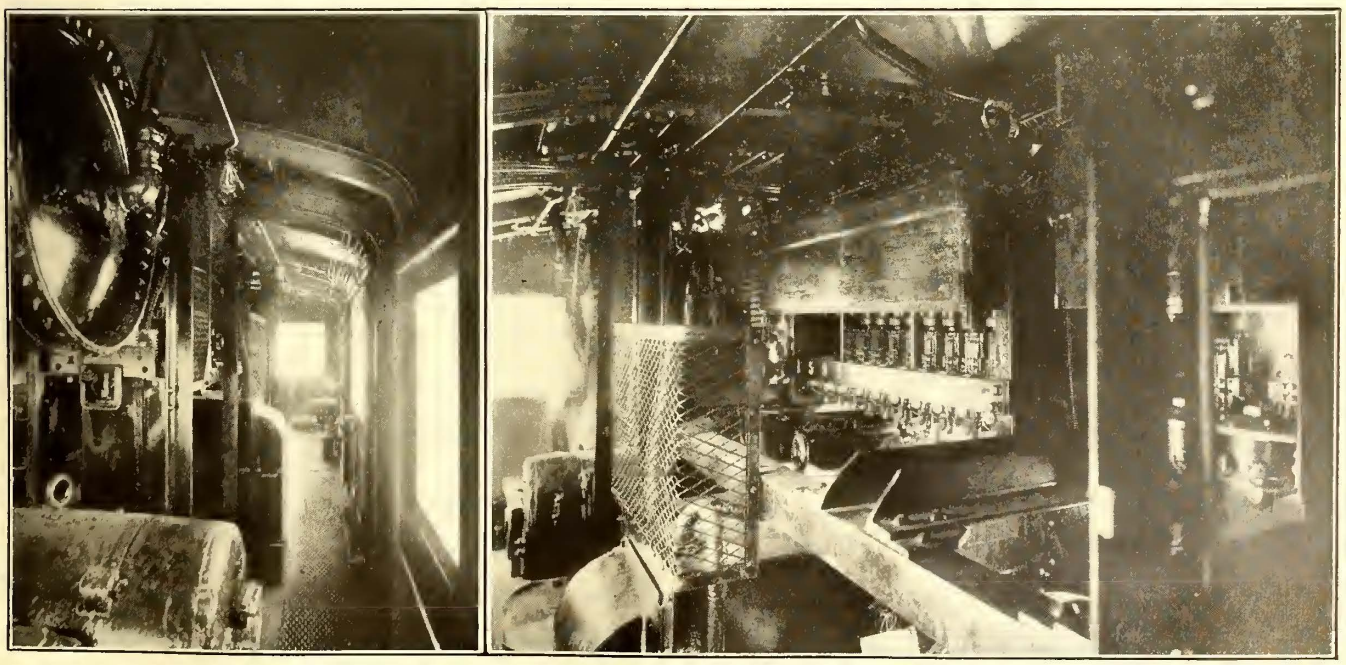
cessible positions, the cab having both side and end doors and being so arranged that all items of equipment can be removed without any difficulty through the doors and windows.

LOCOMOTIVE TRUCK AND MOTOR EQUIPMENT

The locomotives are mounted on Baldwin locomotive-type trucks equipped with 50-in. wheels. The trucks are of the equalized, pedestal type with cast-metal side frames placed outside the wheels. These frames are similar in general design to those used in steam locomotive practice, and they are braced transversely, at each end, by a wrought-iron cross-tie, lipped over the frame and strengthened by angle irons. The springs are of the half-elliptic pattern, and are mounted directly over the journal boxes, the two springs on each side being connected by an equalizer that is fulcrumed at its middle point. Both equalizers are provided near the outer ends with coiled springs which bear against the side frames. This construction tends to reduce the severity of the shocks transmitted to the frames when passing over rough tracks. The frame pedestals are fitted with shoes and adjustable wedges, so that wear at this point can be readily taken up.

The trucks have rigid centers, and side bearings are applied to one truck only to give a three-point suspension. The rigid wheelbase is 9 ft. 6 in. and the total wheelbase of the locomotive is 24 ft. 10 in. Between truck centers the distance is 15 ft. 4 in. The motors are inside hung from two spring supports on the truck bolsters and the two axle bearings, and connected to the axles through tool steel gears and pinions, with seventy-eight and eighteen teeth respectively. The truck bolsters, like the body bolsters, are the built-up type with one-piece top and bottom members 22 in. wide.

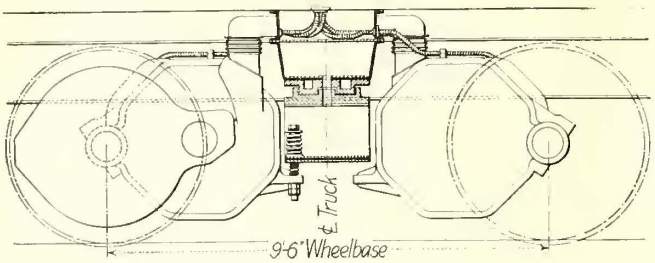
Four type Westinghouse No. 151, single-phase, 25-cycle, series motors are provided and each is capable of developing on the stand, when supplied with an air blast of 1000 cu. ft. of air per minute, 170 hp. for one hour with a temperature rise in any of the windings not to exceed 75 deg. C. above that of the entering cooling air. This rating requires 830 amp. at 220 volts. When operated continuously as above without exceed-



SOUTH SHORE LOCOMOTIVES—INTERIOR VIEWS SHOWING SIDE AISLE IN CAB AND SWITCH GROUPS MOUNTED ABOVE TRANSFORMER

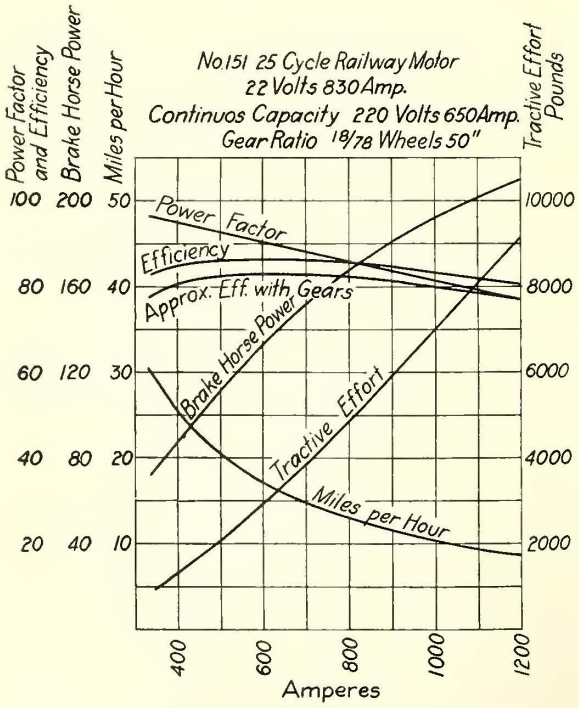
ing the same temperature limits, the motor delivers 142 hp., requiring 650 amp. at 220 volts.

The armature windings are simple multiple coils connected to the commutator through preventive coils, and cross-connected in the armature to equalize the strength of the field in each of the several magnetic poles. The



SOUTH SHORE LOCOMOTIVES—CROSS SECTION OF TRUCK SHOWING ARRANGEMENT FOR MOTOR SUSPENSION AND VENTILATION

motor frames are the box type made of cast steel and as light as possible to provide the necessary mechanical strength, since they form no part of the magnetic field, which is entirely laminated. Two entirely separate sets of coils make up the field windings; one, the main field circuit for producing the effective magnetic field, and the other, an auxiliary or compensating winding which balances the armature reactance in the field. The main field windings are made up of coils of several turns of strap copper, and in general are very similar in construction to those used on the common large direct-current motors. They are held in place by clamps in such a manner that it is possible to remove them for repair without disturbing the auxiliary windings. The auxiliary windings are carried in slots in the pole faces



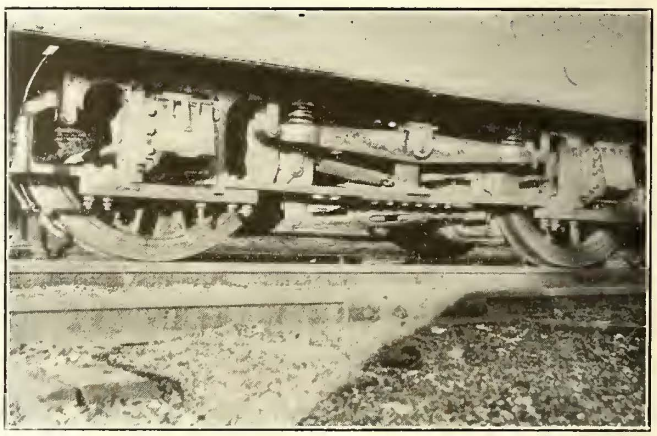
SOUTH SHORE LOCOMOTIVES—CHARACTERISTIC CURVES OF MOTORS

and are short-circuited on themselves to operate inductively. This connection reduces the voltage to ground on the winding to such a low value that no grounding trouble is likely.

Ventilation of the motors is supplied by an independent auxiliary motor and rotary fan which force the air through a duct built into the locomotive frame and connected to the motors at the bolsters by means of heavy canvas bellows of the customary construction.

CONTROL SYSTEM

The locomotives are equipped with Westinghouse unit switch type HB control. The 6600-volt trolley current is stepped down through a two-circuit railway type air blast transformer to a suitable potential for operating the No. 151 motors. Several taps on the secondary winding of the transformer conduct the low-voltage current to a unit switch group, from which it is conducted through a system of three preventive coils and then to the motors. These preventive coils between the various taps on the low-tension side of the transformer are provided so that the voltage may be raised or lowered on the main motors without opening the circuit. The low-tension circuits are not grounded, thus there is no short circuit in case of a ground on a motor, two grounds being required to establish a short circuit. As a precaution, the middle point of the low-tension side of the transformer is grounded through an incandescent lamp. As soon as there is a ground on the secondary side, this will cause the lamp to light. This serves as



SOUTH SHORE LOCOMOTIVES—VIEW SHOWING SPRING-CONTROLLED MAIN EQUALIZER ON LOCOMOTIVE TRUCK

a warning to the operator to bring the locomotive to a stop and locate and remove the ground.

The motors are connected permanently two in series and the pairs are connected permanently in parallel. The transformer switches as well as all other unit switches in the locomotive are operated by a 20-volt control circuit taken from the ten-cell storage battery and the small motor-generator set which floats on the line, both mounted on the upper level of the framing in the center of the cab. The control circuit to the transformer switches is governed from the main drum of either master controller, located one at each end of the locomotive. These controllers are provided with ten notches, and any of the last six may be used for continuous running.

The unit switch group for the control is made up of twelve unit switches of the electro-pneumatic type, each individual switch being provided with a strong magnetic blowout to extinguish the arc whenever the switch is opened. The reversers are drum-type switches, electro-pneumatically operated by a separate lever on either master controller. The location of these various switch units in the cab is on the upper level of the steel framing in the center, where it is particularly convenient for inspection and repair. A main line switch is placed at one end of the steel framing and inserted in the short length of cable between the pantograph and transformer. This is an oil immersed switch which is hand operated and provided with an overload trip to open

the switch whenever a predetermined limit in current is exceeded. It also serves to isolate completely the locomotive equipment from the trolley current, for the protection of workmen when it is necessary to work on any live part, and as an additional safeguard against the pantograph being accidentally raised.

The motorman's position is placed at the right-hand corner of the cab at both ends, looking forward, and the brake and control levers so arranged as to be within easy reach when he is hanging out the side window for switching and observing signals. The two-button block controlling the raising and lowering of the pantograph is placed just to the left of the controller, while the sander control is placed between the controller and air valve, and the bell and whistle valve at the right of the brake valves. The ammeter and air gage are mounted just to the left of the front window, and give the motorman exact knowledge of the load being placed upon the motors and the condition of the air system. A small equalizing tank in the air brake system is placed just in front of the motorman's seat, where it serves as a footrest for him. The control system also includes receptacles at each end of the cab, with circuits from the switch group leading to them through conduit for multiple-unit control, should occasion require such operation.

Both Westinghouse straight air and automatic air brake equipment is provided, and these are operated from separate control valves, one above the other, the straight air system being used in switching and handling the locomotive by itself. Air for the brakes and control system is supplied by two motor-driven geared compressors, located one at each end of the cab and controlled from the same governor. The two pumps are operated in parallel, so that both are cut in at the same time and bring up the air pressure that much faster. This arrangement equalizes the wear on the two units, although either pump will take care of the requirements in case the other is out of order. Their capacity is 50 cu. ft. of free air per minute each. As the locomotives are arranged for multiple-unit operation, a synchronizing connection is utilized in order that the load on the compressor of both locomotives will be equally distributed. The two brake cylinders are mounted, one at each end of the car underneath the pilot platforms, diagonally opposite.

Miscellaneous Equipment

Two double-shoe electro-pneumatically operated pantograph trolleys are mounted on the roof of the locomotive cab. These are insulated for 6600 volts and are connected by a 6600-volt cable, which is carried in the open on porcelain insulators to eliminate the possibility of any grounds. In order that the pantograph may be raised when there is no air pressure available, a small hand pump is installed in the cab, and by setting the valve to cut off the automatic air control a few strokes of the pump handle raise the pantograph. Located between the two pantographs is a standard locomotive bell, air operated, which is controlled by a valve in the engineer's cab. The two air whistles and headlights complete the equipment on the roof of the locomotive. These headlights are a combination of a Crouse-Hinds headlight switch located within the cab over the end doors, a General Electric Company 98-volt/6-volt transformer, and Esterline Golden Glow headlight, fitted with a 500-watt lamp. The switch has a neutral, a 6-volt and a 3-volt position, the latter being used to give a dim headlight while going through cities. The headlights are equipped with an adjustable socket for readily focusing the lamp in the reflector.

The locomotives are equipped also with Sharon M.C.B. automatic couplers with slotted knuckles mounted with Westinghouse friction draft gear at each end of the locomotive, and the bumpers at both ends are fitted with poling sockets. The sand boxes at each end of the cab are equipped with Leach sanders electro-pneumatically operated and serving four spouts. A bracket mounted on the framework in the cab is located just behind the motorman's position near the top of the cab, and serves to carry all the signal and marker equipment. The locomotives are painted black outside and green inside, with brown iron colored roof and red iron color inside the hoods. A weight analysis of the various parts of the equipment is given in the accompanying table.

	Pounds
Motor	8,933
Armature	3,500
Gear case	144
Axle bearing	108
Pinion, eighteen teeth	73.5
Gear, seventy-eight teeth	911
Line switch, type 310	328
Switch group, type 267	1,120
Switch group, type 268	326
Reverser, type 284	202
Main air blast transformer	5,070
Preventive coil, 550 amp.	411
Preventive coil, 355 amp.	406
Controller, type 189-C	74
Storage battery	93
Motor-generator set	115
Pantograph trolley complete	1,100
Blower motor housing	122
Blower motor, type N-B-45	1,180
Blower fan	75
Air compressor, type XD-4 K, complete	2,500
Total weight locomotive, complete	144,000

Chicago Traction Report

The seventh annual report of the Board of Supervising Engineers, Chicago Traction, as of Jan. 31, 1914, has been issued. The report is very largely statistical in nature, with numerous charts and exhibits included which show the financial and operating statistics for the year 1913 and summarize the progress made in rehabilitating the street railway properties under the supervision of the board since the work began, Feb. 1, 1907. This period of seven years ended the divisional operations of the street railways by separate companies, and the report, therefore, sums up the results of the work of rehabilitation. The total cost of rehabilitating and extending the original property by actual construction or by purchase from Feb. 1, 1907, to Feb. 1, 1914, was $91,316,136 of which $84,141,583 was charged to capital account and $7,174,553 to renewal account. If this capital expenditure is added to the Traction Valuation Commission's valuation of 1906, precedent to the 1907 ordinances, the total "agreed purchase price" of the four companies under the supervision of the board is placed as of the above date, at $139,916,583. As the plans for the unified operation of the Chicago Surface Lines were consummated during the year 1913, the report also contains the full text of the unification ordinance and operating agreement. The full text of the operating agreement between the Chicago Railways and the County Traction Company is likewise included.

According to the Bureau of Railway Economics, an analysis of steam railroad statistics as of June 30, 1915, shows a total of $6,004,496,162 of capital stock in the hands of 607,630 stockholders, who comprise what may be termed the general public. This figure, it may be said, was reached after deducting 688 railways by or for whom the stock of other railways is held, and the $2,519,956,813 of stock so held. The average holding per stockholder for the United States as a whole was $9,882. The average was $7,158 in the East, $15,928 in the South, and $12,365 in the West.

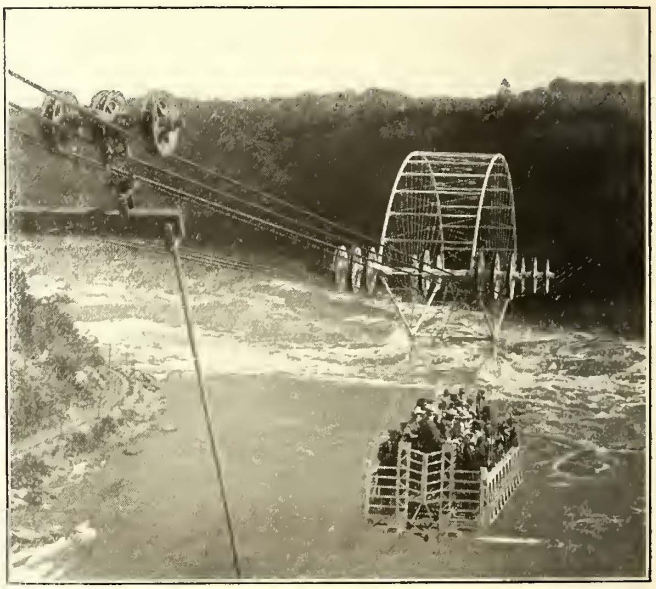
Aerial Tramway at Niagara Falls

During Three Months of Operation This Novel Cableway Has Taken Its Place as a Permanent Addition to the Facilities for Viewing the Whirlpool and Rapids

THE newest attraction for tourists visiting Niagara Falls is the aerial cableway spanning the gorge in which the Whirlpool is located. Although the International Railway, Buffalo, N. Y., is in no way financially interested in the enterprise the railway is making quite a feature of advertising the attraction because the cableway is most readily reached by its lines. In fact, the cableway connects two points on the company's Belt Line on the Canadian side of the Niagara River.

The cableway permits its passengers to obtain a new view of the Whirlpool and of the river above and below the sharp bend which occurs at this point. It has been in operation since the late summer and while still comparatively unknown is already attracting a fair business. After the public has gained greater confidence in the stability of the construction the cableway cannot but become popular with tourists.

WHIRLPOOL GORGE WITH AERIAL TRAMWAY ABOVE



CAR USED ON THE AERIAL TRAMWAY, NIAGARA FALLS, ONT.

During the construction period the installation was described somewhat in the technical press. Now that it is practically complete and has been in commercial operation for some weeks a general survey of the completed installation may prove of interest, particularly in view of its relation to the local electric railway traffic.

The elements of the cableway are as follows: The 1800-ft. span of six track cables with their anchorage and tension-regulating devices; the forty-five passenger car; the traction apparatus comprising the driving motor, the traction cable and the slack-adjusting counterweight; the safety and emergency devices; the loading platforms, and the terminal stations. These elements will be described briefly in the order given.

The track cables are six in number, of crucible steel and 1 in. in diameter. The core consists of seven round strands, a smooth surface being obtained by surrounding these with a layer of locked strands. The tensile strength of each of these cables is stated to be about 92,000 lb. At one end of the cableway where the cables pass over sheaves to a tension-regulating device, a section of more flexible cable takes the place of the stiffer track cable. The working tension in each track cable is 20,000 lb.

At the Colt's Point end of the span, which may be considered the main terminal, the track cables are substantially anchored, through 2-in. steel anchor rods, in a concrete block weighing nearly 750 tons. This is embedded in the face of the cliff and is so formed that the final anchorage of the rods is in a vertical direction, the rods being bent through 90 deg. over a curved surface of large radius and separated therefrom by closely spaced I-beam supports. The rods are in chambers in which their condition can readily be inspected.

At first the track cables were connected directly to the anchor rods by means of swivel sockets. Later, to avoid any possible danger, in years to come, of crystallization of the cables at the entrance to the sockets, heavy double steel bars were inserted between the cable ends and the rod ends. This insures the concentration of angular movement, which is very slight, at the shore end of the steel bars.

At the Thompson's Point end of the span each track cable is held in tension by a 10-ton counterweight. The cable passes over a 5-ft. sheave mounted on a steel tower anchored in concrete. This device insures constant tension in the cable regardless of temperature changes and loading, the sag in the span automatically adjusting itself to maintain equilibrium of forces.

The car, which has a capacity of about forty-five passengers, is designed for lightness, grace and novelty, consistent with ample strength. It is of steel and weighs, empty, about 3½ tons. Its foreign appearance is due to the fact that it was designed and constructed in Spain. It hangs from two axles each supported on the cables by six deeply-grooved wheels 2½ ft. in diameter, the axles being spaced by means of a gracefully arched, trussed frame. Guys connect the ends of the car and the axles to prevent teetering.

The motor for driving the car is located in a chamber at Thompson's Point. It is a three-phase, 25-cycle induction motor of 75-hp. capacity. It drives the traction drum through a 30 to 1 worm gear. The ⅞-in. steel traction cable is continuous from one end of the car to the other by the following route. From one end of the car it passes over a sheave at Colt's Point and across the gorge, over a supporting sheave at the entrance to the Thompson's Point station to the driving drum. Next it passes through a tension and slack-regulating device consisting of three sheaves, to one of which a 10-ton counterweight is attached, thence back to the car.

At each end of the span is a substantial and attractive station and series of stationary platforms. The restrictions imposed by the Canadian authorities made it necessary to keep all structures below the level of the adjoining banks. Hence the terminals had to be constructed in the solid rock. Leading to the stationary platforms are light ones suspended from the track cables, so that the car actually discharges its passengers some distance out from the bank. This construction insures the proper relation of levels of car floor and landing platform.

The control of the car is in the hands of the motor operator at Thompson's Point. He operates in accordance with signals from the conductor on the car. Detailed instructions can also be given from the car by means of a telephone connection. To supplement the manual control there are several safety devices necessitated by the danger of breakage of the traction cable, the possibility of the occurrence of a gap between the car and a landing platform, etc. As the grade at the termini is about 16 per cent, substantial locking devices are essential. However, this installation has the advantage over a railway in the fact that even if the traction cable breaks the car will merely oscillate backward and forward until friction brings it to rest.

To lock the car at the end of its travel there is a clutch on the traction cable which engages with a piston in a hydraulic cylinder, furnishing also an automatic stop. This clutch is interlocked with the car gate control. At each end there are also two limit switches one of which is normally operated by the car floor, the other acting in emergency.

The aerial tramway at Niagara Falls has been erected by the Niagara Spanish Aerocar Company, Ltd., under patents of a company in Bilbao, Spain. The latter has had a smaller cableway in operation at St. Sebastian, Spain, for several years so that the new installation is in no way an experiment. The scheme of tension regulation and other features, known as the Torres system, is the invention of a well-known Spanish engineer; and the whole plant has been installed in accordance with first-class engineering practice.

AMERICAN ASSOCIATION NEWS

Mid-Year Conference Committee Meets in Boston

At the meeting of the committee on the mid-year conference held in Boston on Nov. 9 the plans for the dinner program were discussed and a number of sub-committees were appointed. Those in attendance were: C. Loomis Allen, Syracuse, N. Y.; M. C. Brush, Boston, Mass.; H. C. Clark, New York; C. P. Dennett, Boston; E. L. Janes, Boston; Myles B. Lambert, Pittsburgh, Pa.; C. C. Peirce, Boston; H. E. Reynolds, Boston; Col. T. S. Williams, Brooklyn, N. Y.

The sub-committees appointed were as follows: To secure speakers—Messrs. Brush, Williams, Dennett and Peirce; on hotel arrangements—Messrs. Dennett, Peirce and C. V. Wood, Springfield, Mass.; on seating arrangements—Messrs. Janes, Lambert, Reynolds and Clark. C. Loomis Allen was appointed chairman of the reception committee with power to name his associates. L. S. Storrs, president of the association, was named as toastmaster.

The date for the Boston dinner was definitely settled as Friday, Feb. 2, 1917, and the names of a number of speakers of national reputation were canvassed with a view to securing at least two to appear on the dinner program.

Committee on United States Mail

Henry S. Lyons, secretary Boston Elevated Railway, has been appointed chairman of the committee on compensation for carrying United States mail of the American Electric Railway Association. This appointment is of particular interest, owing to the fact that the Interstate Commerce Commission has recently announced that it would investigate the general subject of compensation for carrying United States mail.

Chicago Elevated Section Elects Officers

At the meeting of the Chicago Elevated Railroad Company section held on Oct. 24, J. H. Mallon, safety engineer, section delegate to the Atlantic City convention, gave an interesting and amusing account of his visit to Atlantic City. His talk was illustrated with slides especially prepared for the purpose by A. F. Scholz, chief claim adjuster. Charles H. Jones, general foreman electrical department, also gave a lecture on "Electrolysis," which was highly appreciated.

The secretary's report showed that there are about 200 section members in good standing.

The result of the election was as follows: President, E. J. Blair, electrical engineer; vice-president, J. A. Jarvis, superintendent Metropolitan West Side Elevated Railway; secretary and treasurer, M. Bridges, chief clerk to master mechanic; librarian, P. V. Lyon; director two-year term, J. R. McDonald, general foreman Chicago & Oak Park Elevated Railroad; director one-year term, F. Artman, service inspector Northwestern Elevated Railroad.

Connecticut Company Section

A special meeting of the section was held on Oct. 19, preceded as usual by a dinner. Seventy-two members and guests were present. The purpose of the meeting was to furnish an opportunity for the members of the section to hear reports from representatives who had attended the Atlantic City convention.

In addition to the special order, a paper on "First Aid Work, Practical Application and Scope" was read by Dr. S. L. Spier, and P. Ney Wilson, roadmaster at New Haven, read the report of the committee on snow fighting. Dr. Spier, who has conducted courses of lectures on first-aid work in co-operation with a number of utility companies, discussed treatment in the case of accidents and the results of first-aid work. The report of the snow fighting committee elicited congratulations as to its quality. Abstracts of the report are to be distributed to the several division managers and superintendents.

Manila Section

The twentieth meeting of Company Section No. 5 was held in Manila on Sept. 12, forty-seven of the 110 members being present. The secretary stated that of the 1076 employees of the railway department of the company fifty-four are members of the American Electric Railway Association.

The speaker of the evening was D. S. Cairns, assistant general manager, his subject being "Experiences and Observations on a Seven Months' Absence from Manila." He described his trip made this year through China, Korea, Japan and the United States, most of his time being spent in the last-named country. In Shanghai and Tientsin he noted particularly the popularity of the street railway service as indicated by very heavy travel. In Vancouver, B. C., his attention was attracted by the roofless cars, which were described in the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 2, 1916,

page 401. These, he said, seemed very popular as the climate was conducive to outdoor traveling. In his address Mr. Cairns mentioned his visits in Chicago, where he attended the N. E. L. A. convention, Minneapolis, New York and Norfolk, and elsewhere.

COMMUNICATIONS

The Jitney Bus Situation in California

CALIFORNIA ELECTRIC RAILWAY ASSOCIATION
SAN FRANCISCO, CAL., Nov. 1, 1916.

To the Editors:

In California there are now 217,000 licensed automobiles, which gives this state more cars per capita than any other state in the Union. This condition is largely responsible for the fact that there are thousands of second-hand automobiles on the market available at prices within the reach of almost anyone who desires to purchase for cash or on credit. In the absence of any effective regulation in many of the cities, with the excellent condition of highways outside the limits of incorporated cities, which are open to jitney or interurban buses, and with absolutely no restriction or taxation, it is easy to see how the jitneys have gained so strong a foothold.

However, the public as a whole is beginning to realize that for their own protection something must be done, and the present jitney situation is gradually improving. Wherever the issue has been clearly drawn, that is, where the public has been called upon to decide whether the electric street car or the jitney is to have exclusive rights, the preference has always been expressed for the electric railway.

The regulation of jitney buses by local bodies has been a failure. The jitney drivers have adopted the plea of "Let the poor man earn a living," and this, as compared to the sound logic advanced by the electric railways has had its effect upon city councils and other municipal bodies—there has been a fear of being called "corporation men" which has prevented officials from carrying out regulation on a strictly fair and proper basis.

There have been a number of exceptions to this rule, and some cities are now preventing jitneys from paralleling electric lines. Long Beach, for example, has passed three separate ordinances in two years attempting to regulate jitneys. The city is now advertising an exclusive jitney franchise on streets other than those traversed by electric cars. In that city several electric lines have been abandoned because of jitney competition, but the abandoned service has not been replaced by the jitneys.

In nearly every case where a regulatory ordinance has been passed jitney men have resorted to the referendum and initiative. Doutbless this law was never intended for such a purpose, but it has lent itself well to the jitney drivers' purpose, and the result has been rather expensive to the cities in the cost of special elections.

After eight months of debate and experiment in Los Angeles, during which time jitney interests resorted to every conceivable trick to delay the ordinance, jitneys are now under the jurisdiction of the Board of Public Utilities—as are all other public utilities. This is considered a move in the right direction and fair to all concerned. In southern California generally, the public has become much more interested in fair play; legislation is being demanded, and particularly since the rainy season commenced the jitney is losing its popularity with the public.

The jitney as it exists to-day must in time disappear. The autobus is here to take its place somewhere, more than likely as a feeder to existing electric lines. Several companies are experimenting with various types of cars, and it is very likely that after the experimental stages have passed a design will develop which will be generally suitable.

Meantime—so long as independent jitneys are operated—it is essential that proper regulation and taxation of the jitney should determine just what its position as a public carrier should be. It must pay its proportion of taxation just as other public utilities do, and the public will demand this in the end. This is a question that should be adjudicated by the Railroad Commission, for it has been demonstrated that the situation cannot be adequately handled by local bodies. The rules and regulations must be uniform, and when established must be enforced. W. V. HILL, Manager.

Accounting Co-operation Desired

AMERICAN ELECTRIC RAILWAY ACCOUNTANTS' ASSOCIATION

BOSTON, MASS., Nov. 9, 1916.

To the Editors:

I trust you will permit me to add a word or two to the discussion started by your editorial of Oct. 14 and continued by the comments of Mr. Forse and "Accountant" in your issues of Oct. 28 and Nov. 4. On the general subject of the opinions of the certified public accountant in electric railway accounting matters, it may be stated that it is not always what is said by the outside expert that stirs a feeling of antagonism but quite often it is the way a thing is said. Moreover, it is very easy for the outside expert to assume that he knows why an account is wrong, when if he were familiar with all of the facts that may have led up to the adoption of the account he would be convinced of its correctness.

The Accountants' Committee is always willing to listen to any suggestions tending to improve the accounts and has invited criticism whenever a new system or an extended revision of an existing system has been contemplated. Before the present standard system was adopted the tentative text was sent out to all electric carriers with the request that it be carefully considered by all interested and that all who had any criticisms to make or suggestions to offer do so. It was promised that they would all be carefully considered before the final text was published. Many replies were received and every communication was gone over with great care and changes made if in the opinion of the representatives of the Interstate Commerce Commission and the members of the Accountants' Committee they would improve or clarify the system.

Wonderful strides have been made in improving the construction, equipment and operation of electric railways, all tending to make them more perfect, and it would be strange if the accounts as well could not be improved. Undoubtedly this will be done from time to time, and we hope and ask for assistance from all interested in this phase of the business.

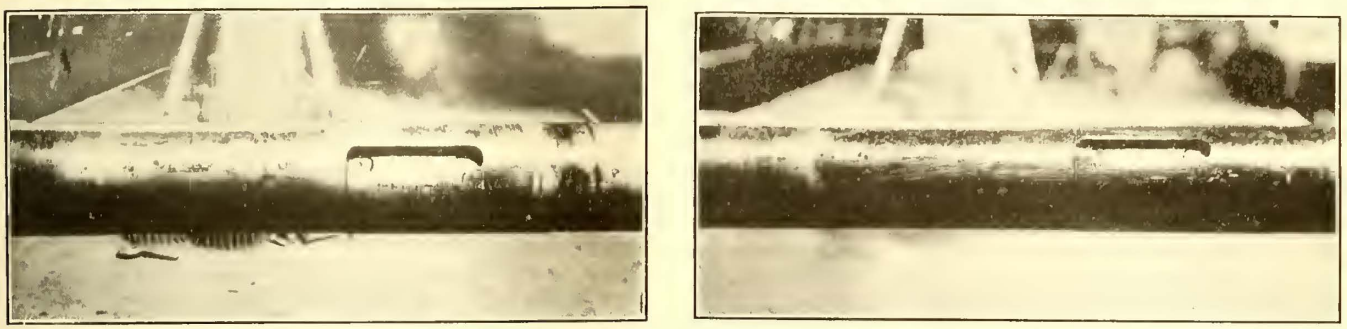
The electric railway accountants have twice attempted to get the active co-operation of the steam railroad accountants in an endeavor to make, if possible, a system of accounts that might be used by both kinds of carriers, but I regret to say that those who represented the steam railroads gave very little consideration to the ideas of those representing the electric railways, and unless a different spirit is shown the chances of getting together are rather remote.

H. L. WILSON, Chairman of Committee,
Standard Classification of Accounts.

Some Recent Advances in

EQUIPMENT AND ITS MAINTENANCE

Tilting Rails Increases Bearing Surface—$1,800 Spent Per Car Gives Topeka (Kan.) Railway an Up-to-Date One-Man Car Equipment—Lampblack and Paint Are Effective Materials in Axle Testing



BEFORE TESTING CLEAN THE AXLE WITH GASOLINE AND PAINT IT THOROUGHLY WITH LAMPBLACK

Finding the Defects in Car Axles

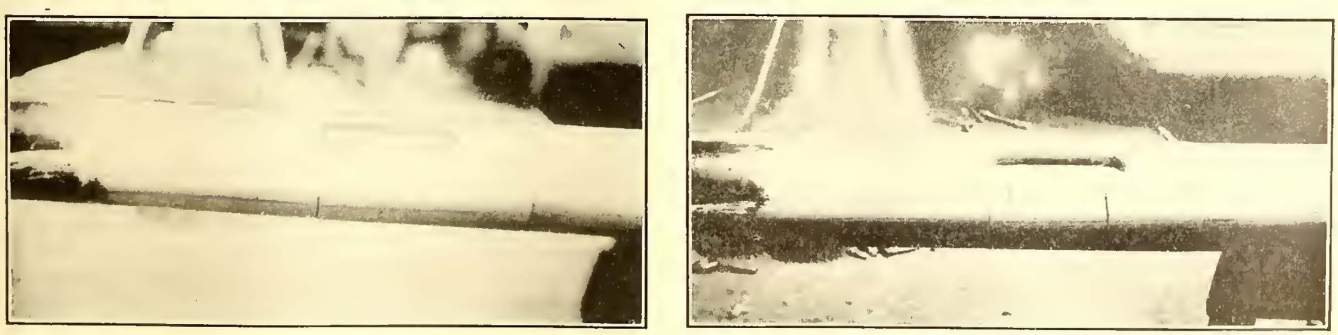
The Author Describes a Simple Method of Testing and Demonstrates the Importance of Tests for Defects When Axles Are Returned for Lighter Duty

BY R. N. HEMMING
Superintendent of Motive Power, Union Traction Company of Indiana, Anderson, Ind.

A crack, flaw or fracture in a car axle cannot be detected by sound on account of its being a solid mass. It is quite unlike a hollow pipe, a kettle, a plate or a glass drinking tumbler, which gives a flat or planky sound on being struck, if a crack exists, instead of a ring. It is also useless to attempt to find defects by sledging an axle mounted on trusses or on blocks, because the vibrations made by the hammer blow are for some peculiar reason absorbed by the supports. Trusting to this method of support during the test may result in the passing of a very defective axle as safe for service, only to be followed by a serious accident. Judging from the number of inquiries we have received in regard to safe mileage for axles, when they should be scrapped and whether or not it is possible to detect minute flaws, etc., it seems that information along this line is somewhat lacking. The following is offered as a contribution to this information. The method described has been in use for some time, and we have found it very satisfactory. The accompanying pictures illustrate the several steps in the testing process.

The axle is stripped of wheels and gears and cleaned all over with gasoline, including the keyway if there is one, in order to remove all grease and foreign substance. It is then painted with lampblack or plumbago of a medium to thin consistency. This is necessary and important as these materials will find their way into the smallest fracture. The third operation is to wipe off the lampblack or plumbago with dry waste until the axle is thoroughly cleaned all over, including the keyway. The fourth step is to paint the axle with white lead or white paint. After this it is suspended about 3 ft. above the floor by means of a rope sling attached at the balancing center. This places the axle at a convenient height for sledging and leaves both ends free. A fairly hard blow is then struck near the center of the axle, using a 10-lb. or 15-lb. sledge, the weight depending somewhat upon the size of the axle. Practice soon teaches one the size of sledge and force of blow to use, to produce the best results. With the axle suspended free to vibrate, the sledging renders visible any flaws and fractures which exist no matter how small, because the lampblack or plumbago which has been retained in the cracks or flaws shows through the white lead. The axles are carefully scrutinized all over and especially at the points adjacent to the keyway and fillets, and at that portion concealed under the wheel and gear seats.

In the last of the accompanying illustrations, there were three fractures visible, one above the keyway and two below. On the other side of the axle and opposite



WIPE OFF LAMPBLACK WITH DRY WASTE, PAINT WITH WHITE LEAD, SUSPEND FROM CENTER, STRIKE BLOW WITH SLEDGE, AND DEFECTS WILL APPEAR THROUGH WHITE PAINT

these two fractures, there was another small fracture about ¼ in. long at the right side of the keyway. Fractures due to service crystallization travel around the axle and not directly through it, but their depth may vary. Five axles with defects of this type were recently discovered in a period of ten days, and practically all of the defects originated at the keyway. This is evidence that keyways should be dispensed with and that solid gears should be used in place of split gears. It also suggests the importance of considering increases in the diameters of axles at the wheel and gear seats.

A large number of our city car axles are made from worn-out interurban axles, that is, those on which the journals have become undersized and unsafe for further interurban use. These axles have generally been in use for a long period and subject to heavy stress due to the high-speed, heavy-duty service and may, therefore, be somewhat crystallized, and may contain defects which will be inherited by the city service. Turning down one of these old axles, which we may assume to have been heat treated or otherwise specially forged, gives a city axle capable of long service and effects a considerable economy. This may, however, prove to be false economy unless the axle has been thoroughly tested before turning down, and even then it should be again tested before the wheels or gears are mounted upon it. The first test should be made to avoid the expense of turning if the fracture is evident, and the second absolutely to insure its reliability before it is placed in service.

It is quite possible that these old interurban axles may be the source of some of the city car axle failures regardless of keyway or size of axle. We have had few interurban car axles break, and those which have broken have usually failed between the gear and the axle, adjacent to one or the other. The writer has no recollection or record of any axle breaking on the outside of the gear-side wheel, or on either side of the off wheel. From this it is evident that the greatest torsion of the axle is between the center of the gear and the center of the wheel next to it.

The life of an axle on the mileage basis is practically incalculable, since it is governed by the class of service, the size of the axle, the presence or absence of a keyway, the track conditions, the speed, the gear ratio, the rate of acceleration and the climatic conditions in sections of the country where extremely heavy frosts or extremely low temperatures are experienced.

Reusing Worn Trolley Wire

BY G. H. MCKELWAY,
Line Engineer Brooklyn Rapid Transit Company

In the Electric Railway Journal of Aug. 26, 1916, page 367, an article appeared describing some of the methods used by the line department of the city of Havana. It was stated that when the trolley wire on any of the company's lines needed repairs because of weak spots the wire was removed, carefully inspected, and those portions not badly worn were cut out and were reinstalled on lines having light traffic or in yards.

While this practice is better than throwing away good wire, especially at the present price of copper, and losing the difference in value between the scrap and new prices, yet it would seem possible to improve upon it.

A method which appears to be better is one that is now used by a number of companies of gaging the wire while it is in place and taking down only those sections which have become badly worn or burnt. This makes it unnecessary to take down any wire and later to run it again, as all wire is left in place until it is worn out. The inspection and gaging can be done as cheaply by a man on a tower wagon using a micrometer as it could be done in the yard after the wire has been taken down. It will also permit of cutting the wire to be removed into short lengths instead of taking off the ears. This will cheapen the work still further.

A few bad spots may be overlooked by this method of gaging, yet nearly all of them can be found if an occasional ear be taken off and the wire gaged at this point as well as beyond the ends of the ears.

A further advantage is that the gaging permits of locating the thin places on the ground and makes easier the determination of the cause of the wear and its remedy by lining up wire, making repairs to tracks, etc.

Repair of a Motor Armature Spider

BY W. A. ERNST
Armature Winder, St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.

A small emergency repair job was done recently in the shop of this company on a Westinghouse 112-B motor armature spider. It was noticed that the insulation on the armature coils was cut at the end of the slots and that a number of coil supports and coil guards were broken at the pinion end. Extensive end play had caused the coil guard to strike against the pinion end bearing housing, and these repeated blows broke off

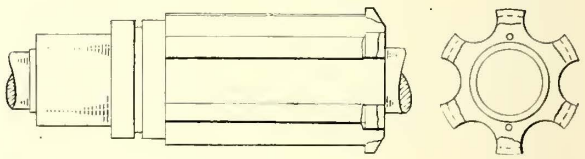


Fig. 1

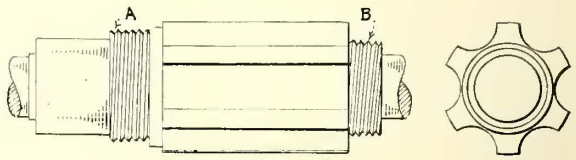


Fig. 2

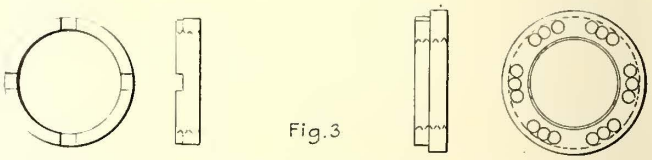


Fig. 3

METHOD OF REPAIRING MOTOR-ARMATURE SPIDER IN AN EMERGENCY

Fig. 1—Approximate shape of motor-armature spider before machining, showing broken lugs and original contour.
Fig. 2—Approximate shape after machining, *A* and *B* each having 8 U. S. threads per inch.
Fig. 3—Forged steel nut for *A*, forged steel collar for *B*; holes drilled in collar for ventilation.

some of the lugs on the pinion end of the spider so that the laminations became loosened. This made it impossible to replace the coils.

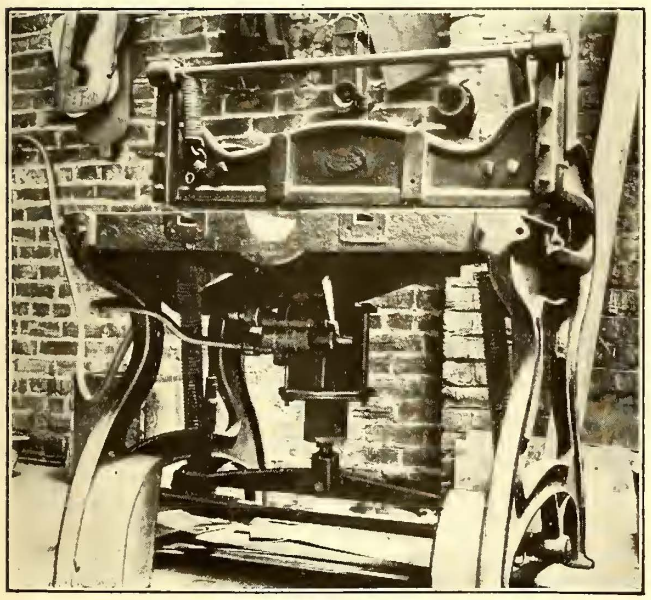
On temporarily clamping the laminations together and removing them, it was found that four of the six spider lugs were broken off and the other two lugs cracked. It was not possible to weld these lugs onto the spider, as the necessary equipment was not available. Accordingly, two rings were made, one to be used on the pinion end as a collar, and the other as a nut for the commutator end of the spider. The first ring was 2 in. wide with a radial thickness of 1½ in. and an inside diameter of 1 in. smaller than the outside diameter of the spider. The other ring was 2 in. wide with a

radial thickness of 1¼ in., and it was ¾ in. smaller in diameter than the armature spider. Both rings were made of mild steel. Each end of the spider was turned off and threads cut in order to take the two rings. Holes ½ in. in diameter were then drilled into the rings at each rib of the spider and a plug put in to help hold the rings. One was slightly chamfered on the end, while the other was notched for a spanner wrench, as shown. The key was then extended to its former length.

The laminations were white-leaded, and a new coil support was put on. This had been cast at a local foundry and machined at the shop. After replacing the laminations the commutator end coil support was placed in the wheel press and pressed into its former position, care being taken to have it pass over the key in the spider, a force of 40 tons being applied. The nut was screwed up tight, the pressure was released and the bolts were removed from the coil slots. The laminations were now tight, having no free movement at the bottom of coil slots as before. Five-eighth inch holes were drilled in the commutator end coil support on opposite sides, and a 7/16-in. hole through the nut into the spider. This was tapped out and a ½-in. set screw inserted. The commutator was then pressed into place, the thrust collars were replaced, the core was reinsulated, the armature was rewound and put back in service. That this was a successful method of repair is evident from the fact that at the end of six months the armature showed no signs of failure.

Air Cylinder Increases Metal Shear Capacity

In order to increase its capacity a hand-operated metal shear has been equipped with an air cylinder and engineer's valve in the shops of the Omaha & Council Bluffs Street Railway, Omaha, Neb. As shown in the accompanying illustration, the 6-in. air cylinder has been applied on the underside of the lower blade of

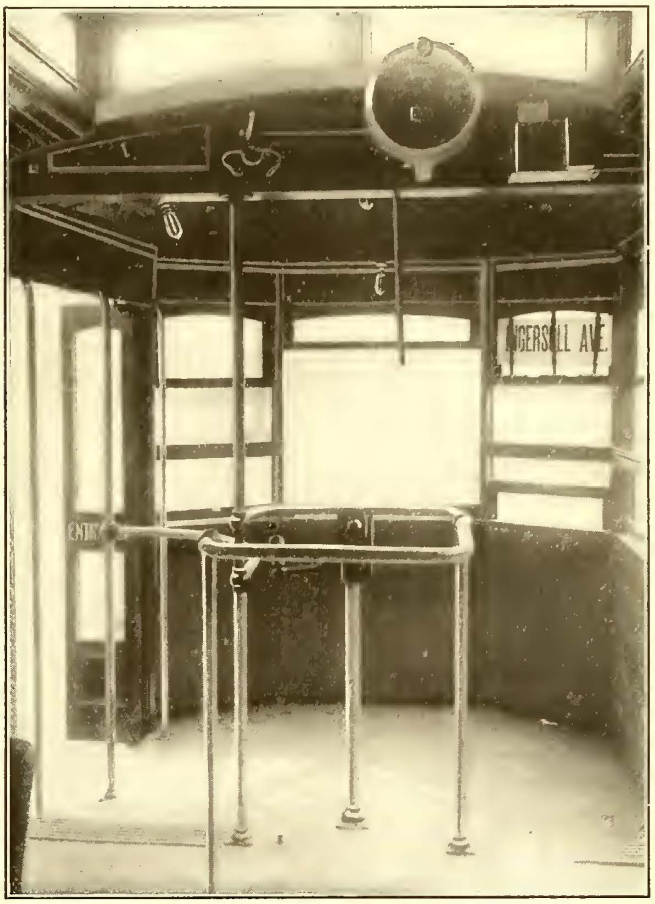


HAND-OPERATED METAL SHEAR IN THE SHOPS OF OMAHA & COUNCIL BLUFFS STREET RAILWAY

a Niagara Stamping & Tool Company's metal shear. Where this machine required two men to cut 18-gage metal before applying the air cylinder, one man is now able to cut 16-gage metal without difficulty and the capacity of the machine is not overtaxed.

Rebuilding Forty Old-Type Cars in Des Moines

Early this year the Des Moines (Iowa) City Railway's repair shops began remodeling forty of its old-type cars. The rebuilding of these cars, which was described and illustrated in the ELECTRIC RAILWAY JOURNAL of May 20, 1916, page 948, included removing the bulkheads, rebuilding the platforms by making them



REAR PLATFORM ARRANGEMENT OF REBUILT DES MOINES CAR

all of standard dimensions and providing a sanitary interior finish throughout the car body to facilitate cleaning.

In addition to the repairs made to the car bodies, they were all repainted inside and out. The trucks were overhauled and new brake rigging provided. The worn 5-in. axles were turned down for 4¼-in. x 8-in. journals, and the motors on all the overhauled cars were geared to the second and fourth axles instead of the third and fourth.

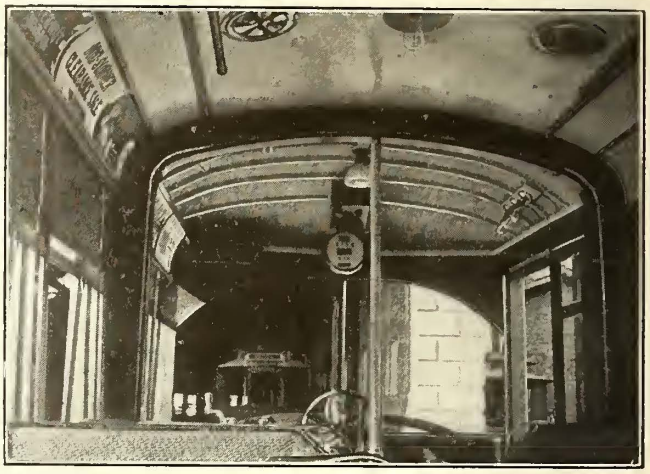
Experience had indicated to the head of the mechanical department that the tractive effort was increased when the motors were geared to axles No. 2 and No. 4, and much of the bolster play was also obviated. In the new positions the front wheels of each truck serve as idlers and clear the rails for the motor wheels. As a part of the overhauling program the following specialties were purchased and installed: Consolidated Car Heating Company's single-stroke bells for conductors' and motormen's signals, Golden Glow headlights, National Pneumatic Company's door engine arranged for manual operation, Peacock staffless brakes and Tomlinson radial drawbars. A view of the arrangement of the rear platform of one of these rebuilt cars is shown in the accompanying illustration.

One-Man Cars Giving Unrestricted View Forward

Topeka (Kan.) Railway Is Remodeling Thirty 30-ft. Single-Truck Cars for One-Man Operation

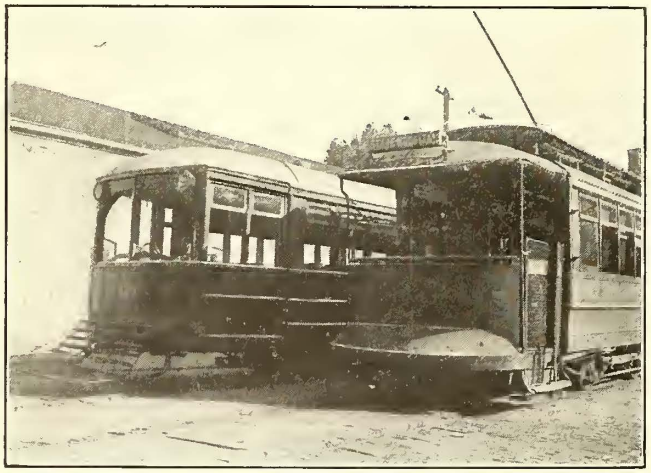
At a cost of about $1800 per car, the Topeka (Kan.) Railway is remodeling thirty single-truck, 30-ft., double-end cars, some of which have been in use for thirteen years, for one-man operation, incorporating some of the latest ideas in the design of cars of this type. The result is an increase in seating capacity from twenty-eight to forty passengers and a reduction in weight from 22,500 lb. to 22,000 lb., the latter weight including added air-brake and air-operated door equipment.

EXTERIOR OF REBUILT ONE-MAN CAR, TOPEKA (KAN.) RAILWAY



INTERIOR OF FRONT OF REBUILT TOPEKA CARS

As far as appearance is concerned, one of the most radical alterations was in the roof, formerly of the monitor type. The upper deck roof was dropped by sawing off the posts supporting it and wooden blocks were filled in to give a smooth contour for the canvas covering. Steel stay rods were inserted to strengthen the roof crosswise, a steel ceiling was mounted underneath, and ventilators were placed along the sides of the roof.



AT RIGHT, REAR END OF OLD SINGLE-TRUCK CAR, TOPEKA RAILWAY; AT LEFT, SAME END OF CAR MADE THE FRONT IN REBUILDING

The interior of the car was opened up by removing the bulkheads and substituting steel channels for them. The platforms were vestibuled as shown in the illustrations, the sash being arranged to afford as unobstructed a view from the car as possible. The rear platform was brought up to the level of the car-body floor, and curved seats were installed at the rear. In front a seat for one passenger was set just inside the door and a longitudinal seat for three passengers on the platform opposite the door. The lines of the body were extended with sheet steel across the sides of the former front vestibule (now the rear of the car) and on the left-hand side of the present platform.

Thirty-inch wheels were installed in place of the former 33-in. wheels, and the trucks were set further ahead to balance the weight of the controller. Two headlamps were used, one on each side under the roof, where they are out of danger of breakage and where they throw light onto the sides of the track. With the lamps in this position the light is not blinding to automobilists and it will be convenicnt, if desired, to color the upper third of the lamps in such a way as to indicate routing.

Those who have seen the cars are struck by the automobile effect of the exterior, this effect being accentuated on entering the car and looking forward. The absence of bulkheads and the low dash permit an excellent view ahead. The Topeka Railway has only one stub line, so that the operation of single-end cars is comparatively simple. A few double-end cars for this stub line are under construction.

Use of Slag-Coated Electrodes and Polarity Reversal in Electric Welding

In the discussion following the report of the committee on electric welding at the recent Chicago convention of the Association of Railway Electrical Engineers, the question arose as to the advantages of using slag-coated electrodes, and also the advantages of polarity reversal. In answer it was stated that when a slag-coated electrode is used, it is economically feasible to use a larger electrode, thereby getting excess heat and melting the metal away faster.

In this connection reference was made to a particular coated electrode on sale in this country which has an asbestos slag taped around the electrode itself. Such an electrode was described in the issue of the ELECTRIC RAILWAY JOURNAL for June 17, 1916, page 1144. The asbestos, and the clay with which it is impregnated, melt down and form a sort of glaze, covering over the electrode and protecting it against oxidation. The slag is of such a nature that the metal is absolutely clean and bright, as if it had been cut through, and there is no darkening, even on the surface of the metal.

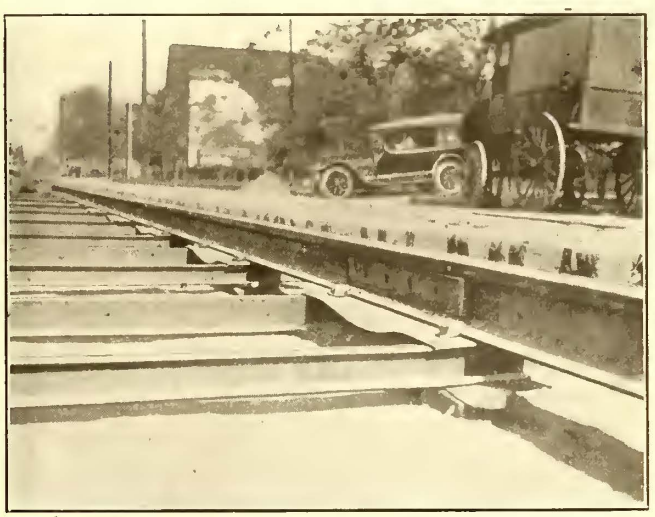
An electrode of this kind may be used as the positive terminal. In general, however, for ordinary metal electrode work on fairly heavy sections, it was considered that better heat distribution was secured by using the electrode as the negative pole.

Tilting Rails on Steel Ties Provides Full Wheel and Rail Contact

An editorial on "Reconciling Wheel and Rail Contours" in the ELECTRIC RAILWAY JOURNAL for Sept. 2 mentioned the tilting of steel rails in Cleveland for the purpose of obtaining a full line of contact between the wheel and the plain girder rail.

The accompanying halftone of a view on Broadway, Cleveland, Ohio, shows an example of this construction with the twin steel ties of the International Steel Tie Company. The total mileage installed or on order with these ties is 10 miles. As stated in the editorial, the axis of the rail is tilted inward at a slope of 1 in 25, so that the web is at right angles to the wheel-tread slope. In order to obtain this effect it is necessary to bend the channels at a point about 15 in. from the ends. The bending points, of course, will vary with the gage and type of rail. These channels are bent in a press especially adapted for bending both ends of a pair of channels at one time.

VIEW ON BROADWAY, SHOWING TEMPORARY TRACK AND CONCRETING GANG AT WORK



VIEW OF NEW TRACK BLOCKED UP READY FOR CONCRETING

Another feature in connection with the track construction on Broadway is the large saving made possible by the use of the steel ties. This section of track was only ten years old and it was originally built with white oak ties in a solid concrete foundation. Both the ties and the foundation were in an excellent state of preservation, but the rail had worn out. To put new rail on these wooden ties, while practical, was not deemed advisable because they would not last as long as the rail. It was therefore decided to leave the old ties incased in the concrete and lay entirely new track. Permission was obtained from the city to raise the crown of the street paving ½ in. This permitted the use of International twin-steel ties, which are 3½ in. over all in depth, and 100 lb. A. S. C. E. rail which is 5¾ in. high. The saving thus effected included the complete concrete foundation and the labor necessary to remove the old ties. In one of the accompanying illustrations this type of track construction is shown blocked up ready for concreting.

In addition to the order from the Cleveland Railway, this company is furnishing twin ties for tilted rails to the Connecticut Company for use in 1 mile of reconstruction at New Haven and also for 1 mile by the Union Traction Company of Indiana. It is curious to note that the Cleveland Railway and the Connecticut Company arrived independently at the conclusion to use a tilted rail. In fact, the Connecticut Company had been experimenting with the use of beveled Lundie tie-plates on wooden ties for some time past.

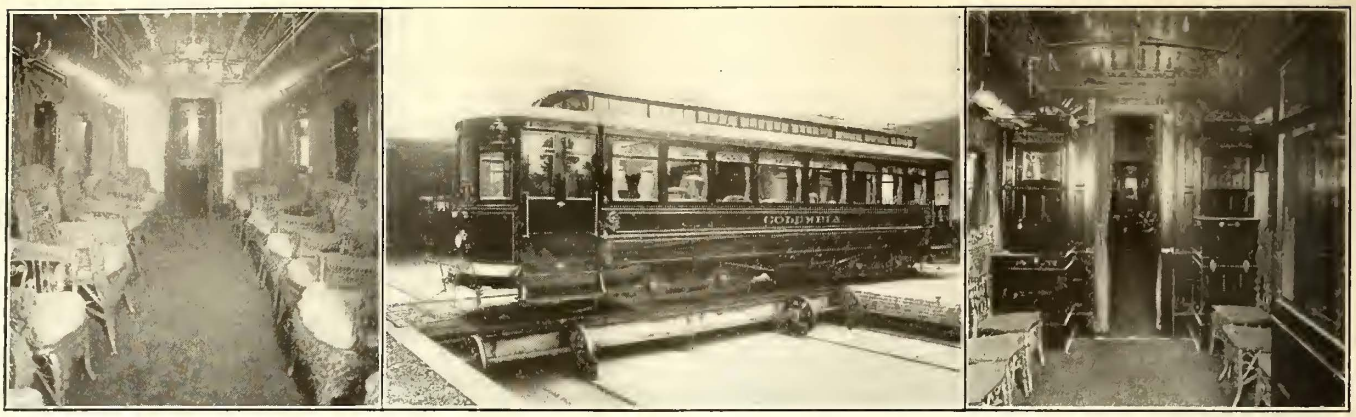
Furthermore, while the tilted rail is a novelty in American street railway practice, it is not uncommon in the bullhead rail construction with cast-iron chairs used in England. For example, the North-Eastern Railway uses a tilt of 1 to 20 in an intersection with the Hull Tramways.

The general advantages of tilted-rail track construction are decreased wheel-flange and rail-tread wear, and the possibility of using standard plain girder or A. S. C. E. rail sections. The specific advantage of the twin type of steel tie for tilted-rail construction is that the warped plate and bent-channel combination acts like the abutments of an arch, so that a thrusting resistance is afforded against the spreading of the rails. The warped edges of the plate serve to retain the concrete absolutely and also give the plate greater vertical strength. The great bearing surface at the ends of the twin ties also give assurance that the tilted construction will not lead to a center-bound or rocking track.

Washington Railway Spends $2,000 in Remodeling the "Columbia"

The Washington (D. C.) Railway & Electric Company has completely remodeled its private car "Columbia," and now boasts of one of the most elaborately equipped trolley cars to be found in service. The work, which was done under the direction of J. H. Stephens, superintendent, and G. E. Haar, Jr., master mechanic, was recently completed at a cost of $2,000. The car is designed for the use of the company's officials in making inspection trips over the system. It is to be utilized also by local civic organizations, who will entertain committees coming to the city for the purpose of arranging details for conventions to be held in the national capital.

The changes made consist of replacing the old-style vestibules with ones of recent design, installing new



OBSERVATION PARLOR OF PRIVATE CAR IN WASHINGTON, D. C., SHOWING ELABORATE FURNISHINGS; EXTERIOR VIEW; INTERIOR VIEW OF CAR, SHOWING BUFFET EQUIPMENT

carpet throughout, and renovating draperies, cushions and chairs. All fixtures have been finished in nickel, and the car has been repainted inside and out. A convenience room, built of mahogany to harmonize with the inside of the car, has been installed for use while the car is on suburban runs. The equipment of the car includes a water cooler, washbasin, icebox, luncheon tables and other appurtenances. Seating arrangements are provided for twenty persons, each having a roomy, comfortable willow chair.

In addition to the improvements made in the body several changes were made in the motors and trucks, the latter having new 4½-in. axles and new 34-in. steel-tired wheels. In addition new controllers and new air-brake equipment were installed. The car has also been equipped with air-operated sanders, and in addition to many changes in brake rigging, the old-type staff hand brakes have been replaced by modern staffless Peacock hand-wheel brakes.

Design for Increasing Car Capacity

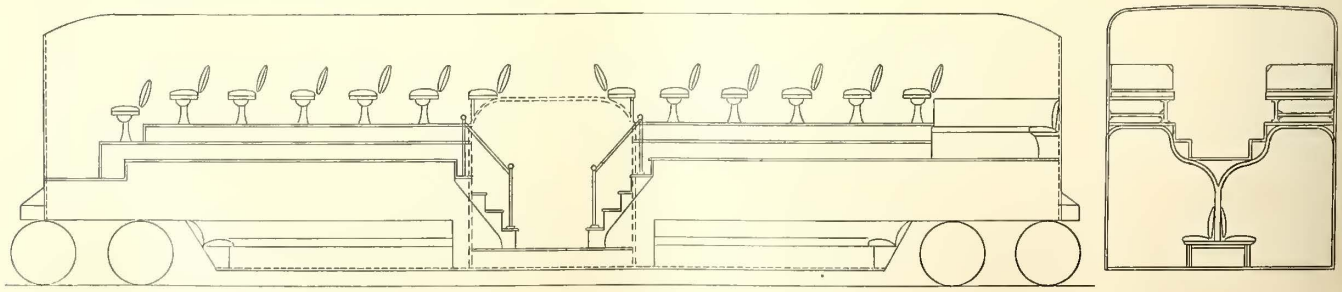
Patents have recently been issued to Fred Steffens, master mechanic, St. Joseph Railway, Light & Power Company, covering a new type of car for electric railway service. The prominent feature is the great increase in capacity which is attained by making use of a modified form of double-deck arrangement, although the design provides for galleries rather than an upper deck for the support of the elevated tier of seats. This arrangement is practically a reversal of the scheme adopted in the New York and Pittsburgh double-deck cars of three years ago, the seats on the lower deck being longitudinal and located along the center line of the car, while the upper tier of seats makes use of cross-seats located along the car sides. Access to the upper tier is attained by longitudinal steps along a central passageway, this passageway being reached by a stairway with five steps rising from a slightly elevated platform at the center portion of the lower deck.

The design calls for a length of 45 ft. over all and the total seating capacity is estimated to be ninety-eight, forty seats being provided on the lower deck while the galleries seat fifty-eight, the estimated weight per seated passenger being 400 lb. The height from top of rail to top of entrance floor is 12 in. and the height from rail to the top of the trolley board is 12 ft. 10 in., this over-all vertical dimension giving a clear height above the lower-deck aisles of 6 ft. 4 in., and a clear height of 6 ft. 8 in., above the floor of the gallery aisle.

Simple Transformer-Oil Moisture Test

While the only thorough test for suitability of oil for transformers and oil switches can be made with high-tension testing apparatus, very good indications of the presence of moisture have been obtained by J. K. Mackie, superintendent of the Connecticut Power Company, as follows: A sample of the oil to be tested is drawn from the bottom of the transformer, oil switch or storage tank. (Samples from the upper parts of the tank are not considered as suitable for the test as water is heavier than oil and usually collects at the bottom.) In the sample thus taken is placed powdered anhydrous copper sulphate. If moisture is present the copper sulphate will be dissolved, producing a blue color that will diffuse through the oil if moisture is in suspension. Since enough copper sulphate is added to insure a saturated solution, the intensity of the blue tint will be a measure of the amount of moisture present. As small percentages of moisture have a very deleterious effect on the dielectric strength of oil, however, the lightest shade of blue is sufficient indication that the oil should be dried by filtering.

It may be pointed out that other substances giving a deeper tint than copper sulphate may be used, the only requirement being that they dissolve quickly in water but not in oil.



DESIGN FOR CAR OF LARGE CAPACITY

LONDON LETTER

Review of Municipal Tramways Conference—8433 Women Conductors and 176 Women Drivers on Municipal Lines —Glasgow to Improve Car Lighting

(From Our Regular Correspondent)

In his presidential address to the annual conference of the Municipal Tramways Association, Peter Fisher, general manager of the Dundee Corporation Tramways, said that although some authorities had been considering the matter of decreasing fares, present conditions provided ample justification for suggesting that the existing low fares should be so adjusted that the increased costs would be fully met. There were 8609 women employed on tramways, 8433 as conductors and 176 as drivers. The development of tramways for good traffic was a question demanding consideration, and it was doubtful if the Government realized the assistance which the tramways could render in carrying munitions and general merchandise. The splendid manner in which women had taken up work on the tramways and the facility with which they had adapted themselves to this new employment had earned for them the approbation of the tramway authorities and the tramway patrons. The municipal tramway employees who had joined His Majesty's forces since the outbreak of the war numbered 20,905, 1893 had left tramway employment to join munition factories, £854,649 had been paid to dependents of employees serving with the forces, £43,800 had been collected on cars for national and other objects, and £36,070 had been contributed by tramway employees to various relief funds.

At the general business meeting of the Municipal Tramways Association, following the conference, the recommendation of the sub-committee of the advisory committee of the Board of Trade, that after the war all Government departments, local authorities, and statutory bodies entrusted with the control of moneys raised by taxes or rates should be under legal obligation to purchase, so far as possible, only goods produced within the Empire was discussed. The executive council of the association agreed with the principle enunciated in a resolution submitted by the council of the Incorporated Municipal Electrical Association, viewing with "deep concern" the recommendation. It was pointed out that there was no mention of Germany in the recommendation. C. J. Spencer, the secretary, asked why local authorities and similar bodies should have to buy in a restricted market if other people could buy where they liked. The executive council viewed with very grave concern any attempt to restrict the business activities of municipal tramways. An amendment to delete the paragraph from the report was lost, and the council's report was adopted. Henry Mozley, general manager of the Burnley Tramways, was elected president for the ensuing year, and J. Miles, Bolton, vice-president.

C. J. Spencer, general manager of the Bradford Tramways and honorary secretary of the Municipal Tramways Association, has compiled some statistics showing how the war has affected municipal tramway undertakings. Mr. Spencer's figures are based on returns he has obtained from eighty-eight towns throughout the country. They show, among other things, that out of a total number of employees of these eighty-eight undertakings in normal times of 55,208 no fewer than 20,805, or 38 per cent, have joined the forces of the Crown. Besides that, 1893 men have gone to munition factories. The amount paid by the local authorities concerned to dependents of tramway employees is £854,649, equal to an average allowance per man per week of 10*s.* 7½*d.* There has been collected on the cars for national and other objects a sum of £43,800, while £36,070 has been contributed by employees to relief funds. There are no fewer than 8433 women conductors. In some places, Glasgow being one of them, a few women are employed as drivers. The total number of women drivers for all the undertakings reporting is 176.

During the twelve months just ended the Birmingham Corporation tramway service has been interrupted on three or four occasions in consequence of the failure of the electric current. As it is necessary to mix poor quality coal with that of a higher standard in order to eke out the coal supply, boilers frequently fail to produce sufficient steam, and therefore it is impossible to maintain full pressure. On these occasions the officials at the power station have become aware of the low steam pressure, and there has been no alternative but to cut off the supply of electricity to the tramcars. Munition works, however, have not been interfered with, it being recognized that they have the first call upon the resources of the department.

Richmond and Kew are brought ten minutes nearer to the city of London by the new service of electric trains now running to Broad Street. The trains consist of six coaches, but three coach trains can be run in the midday hours when traffic is light. Current is supplied from the new power house at Stonebridge Park, which was built primarily for the Watford service, and will supply eventually the whole of the power required for these two branches.

The electrified portion of the London & South-Western Railway, between Waterloo and Claygate, on the new Guildford section of the line, is open for traffic. This is the last section of the line to be completed. The other sections, which have been in operation for some months past, have resulted in a considerable increase in the suburban traffic.

At a recent meeting of the Poplar Borough Council the minutes submitted by the electricity committee referred to a report by the electrical engineer on extensions required to meet existing demands. The installation of an additional 6000 kw. of capacity would cost about £76,500. As an alternative he suggests linking up with the generating station of the London County Council tramways at Greenwich, which would involve a capital expenditure by Poplar of about £8,100. It is considered that if the latter scheme were adopted it would be of advantage to both undertakings, as their respective peak loads occur at different hours. The committee expressed the opinion that it was undesirable at present to embark on the larger scheme, and negotiations with a view to the adoption of the linking-up scheme are to be continued.

The Glasgow Tramways Department has decided to improve the lighting of the cars. In view of the fact that the electric light can be switched off at a moment's notice, it is recognized that a considerable modification may be made of the drastic restrictions which have been in operation since the lighting order came into force in the spring. The present lighting restrictions have thrown a great strain on the motormen, and have hampered the conductors in collecting the fares and announcing the stopping stages. It is hoped that the better lighting of the cars will improve the general appearance of the streets without adding to the risks of aircraft attack.

M. I. Slattery has been appointed tramways manager to the West Ham Town Council in succession to J. S. D. Moffet, who is leaving to take up the management of the Belfast Corporation tramways. Mr. Slattery has held his present appointment under the London County Council for five and one-half years, prior to which he was general manager of the Oldham Corporation tramways. He has been associated with tramways during the whole of his professional career.

It is difficult at present to get new rails for tramway renewals, and much ingenuity is being used in repairing partially worn out rails so that their life may be extended. The rails on many of the tramway systems in Great Britain are not in first-class condition, so that the advent of a machine which has recently been used on several systems for grinding and deepening the grooves of rails has attracted considerable attention. In Wigan the machine of the Woods-Gilbert Rail Planer Company, London, by deepening the groove is thought to have increased the life of this track five or six years. So interested have tramway managers been in the success of this machine that the company demonstrated it recently at Bexley Heath, where grinding is under way. A number of prominent tramway managers were present and expressed appreciation of the process. The machine is of Australian extraction, and has been used on the Oldham, Ashton and Hyde tramways, and at Thanet, Cardiff and Wigan. It is fitted with transverse wheels and lifting gear to enable it to traverse clear of the track, although its weight is about ten tons. In this manner cars are allowed to pass. The machine is self-propelling and is both propelled and worked by a 50 hp. shunt motor. The grinding wheels are mounted on a separate trolley lowered onto the track by levers from the main trolley. A. C. S.

NEWS OF ELECTRIC RAILWAYS

PLEA FOR ST. LOUIS SETTLEMENT

President McCulloch Says Controversies with Utilities Have Hurt Community Development

In the October issue of the *Bulletin*, the company publication of the United Railways, St. Louis, Mo., President Richard McCulloch made a plea for an amicable settlement of disputes between the city of St. Louis and its utilities, in order that all interests might present a united front for the advancement of the community. He referred in particular to the franchise and mill tax controversies between the city and the United Railways and stated that the company would prefer to be a partner with the city rather than to be forced into the attitude of an opponent.

The detailed comments of President McCulloch were in part as follows:

"One of the obstacles to the growth and progress of this city has been the impression which has gone abroad that it is making war on its large institutions and its public utilities. This impression checks the growth of the city because no manufacturer or jobber would select for his headquarters a city having this reputation. The best asset of the city would be a hearty co-operation with its public utilities, and a national reputation for treating its large industries impartially and fairly. Prosperous enterprises, especially public utilities, would be an advertisement for St. Louis among those people who have money to invest and who are in a position to bring business to the city.

"The controversies between the city of St. Louis and the United Railways have long been advertised over the length and breadth of the land. This advertising has seriously crippled the United Railways in its financial arrangements and has undoubtedly hurt the city by keeping investors out of St. Louis.

"The controversies are two in number: First, the contention of the city as to the expiration of the street railway franchises, and, second, the litigation in connection with the collection of the mill tax by the city. It is the contention of the United Railways that all of its franchises have been extended by the St. Louis Transit and Central Traction ordinances. In the Jefferson Avenue case the company won its contention in the Circuit Court, but the matter was appealed by the city to the State Supreme Court, where it is now pending. In the mill tax case the Supreme Court decided against the company as regards the tax prior to 1910, and in June of this year the company paid to the city $1,839,205. The payment of the tax since 1910, amounting with interest to about $1,500,000, is still in litigation. The immediate payment of this additional large sum would seriously cripple the finances of the company, while the attack on the duration of its franchises puts a stop to all further improvements or extensions until a final court ruling is obtained.

"Would it not be a happy step in the line of progress for the city of St. Louis and the United Railways to get together, formulate an amicable settlement of these differences, clear them up at once and remove the pall which hangs over the property of the company? Would it not be better for the city to have a prosperous and flourishing street railway which would be financially able to keep abreast of the most recent progress in the art, which would be able to maintain its reputation of furnishing the best surface transportation in this country, and which would be a matter of pride to the citizens of St. Louis? Even if the city were eventually able to win all of its contentions and enforce its demand for its full "pound of flesh," would it be to the credit or advantage of the city to have forced its greatest public utility to the wall?

"The United Railways has from 5000 to 6000 employees and perhaps as many investors in its securities living here in the city. These with their families represent a substantial percentage of the population. The settlement of these controversies is a matter in which each one of them is vitally interested. A prosperous street railway is able to do much more for the city and much more for its employees than one which is financially crippled. If the company is to progress, it should not be loaded with burdens. It would prefer to be a partner with the city rather than to be forced into the attitude of an opponent."

The United Railways, through its attorney, Henry S. Priest, has sent a letter to City Counselor Daues, urging the calling of a conference between committees representing the company and the city, to discuss a plan for the adjustment of the mill tax and the question of the duration of its franchise and those of its constituent companies. He stated that with bonds of underlying companies maturing lack of surplus earnings would prevent their being paid out of income and that new bonds could be disposed of only under conditions unfavorable to the company.

PRESIDENT WILLIAMS ON THE FUTURE

Head of Brooklyn Rapid Transit Predicts Moving Platforms and Automobile Feeders for Transit

Col. Timothy S. Williams, president of the Brooklyn (N. Y.) Rapid Transit Company, was a contributor to a symposium in the seventy-fifth anniversary number of the Brooklyn *Daily Eagle* published Oct. 26, on changes likely to be brought about in the next seventy-five years. His contribution follows in full:

"Seventy-five years is a long period to look ahead in these days, and, of course, it is impossible to make any accurate predictions of what that period of years will show in the way of improvements in local transportation. In order to get a line on the future we naturally turn to the past, and find that during seventy-five years the whole system of urban transportation facilities has developed. For sixty years of this period transportation has been by cars operated on rails, and I imagine that this fundamental condition will not change for at least the next seventy-five years.

"The new railroad structures that are now building, both underground and overhead, would be a waste of money if they do not last at least fifty years, and the subway structures particularly ought to have an indefinite life. There undoubtedly will be changes in the equipment, and quite possibly in the motive power.

"On some lines there possibly will be continuous movement, like that which we have seen occasionally on a small scale in so-called moving platforms. I have heard competent railroad men predict that the street surface railroads would in a comparatively few years become obsolete. This I doubt. Of course, they will cease to be useful for long distances in cities, but the increasing density of population will require some facility for moving vast numbers of people short distances, and I do not see how this can be accomplished otherwise than by the continued operation of large vehicles on tracks.

"At the same time I think we will see in the next twenty-five years at least comparatively few extensions of street surface railroad tracks. This is because of the restrictions now imposed upon their construction in our city, and the impossibility of making their operation profitable in view of these restrictions, the original cost and the small return. In many outlying sections their place will be filled by self-propelled vehicles acting as feeders.

"Flying machines will undoubtedly become an important factor in carrying passengers, mail and small packages over considerable distances, but I hardly see how they can be of much practical use in local urban transportation.

"We are likely to see some radical changes in the conduct of vehicle and car operation on public streets. Regard for safety is likely to make necessary the setting aside of particular parts of our thoroughfares for pedestrians, pleasure vehicles, commercial vehicles and passenger cars, respectively. All cannot continue to be mixed up indiscriminately as they are at the present time."

DALLAS ELECTION GOES OVER

Failure to Agree on Details of Proposed Contract Makes Postponement Necessary

Negotiations by which it is proposed that both the railway and the lighting utilities of Dallas, Tex., shall be reorganized and taken over by the new companies headed by J. F. Strickland and C. W. Hobson are at a standstill, pending the receipt of the properly executed lease agreement by which the proposed new railway will take over and operate the Oak Cliff street car lines of the Northern Texas Traction Company. Reports from New York, where this lease is being drawn and executed, state that a hitch has developed over minor details, but that these are expected to be settled in a short time and the papers forwarded to Dallas.

The proposed straw vote on the question of permitting a valuation of $8,500,000 for the traction properties, instead of the valuation of $7,100,000 fixed by E. W. Bemis after a survey of the properties, is being held in abeyance pending the settlement of the lease question.

The drafting of the proposed new franchises, which are to be passed by the City Commission, instead of the two model "service-at-cost" franchises approved by the voters of Dallas at the election last April, is going forward in the city's legal department. It is learned that the "service-at-cost" feature will be the basic principle in these franchises, but that several features not included in the model franchises approved by the voters last April will also be included. Originally it was provided that at the end of ten years the city might take over the properties at their actual cash value, plus a small percentage, and at the end of twenty years either the city or some other interest might be privileged to buy them under certain conditions. In the new franchises a provision is inserted under which the properties may be taken over by the city or by any other interest designated by the city at any time. This transaction may be by purchase outright, or on another basis than a cash transaction, by assuming the outstanding obligations in bonds up to the amount of value recognized by the people of Dallas. This adds a means by which the city may acquire the properties without payment of cash.

Mayor Lindsley, in discussing the new features of the ordinances, explained that they were being drafted with two objects kept constantly in view. One is the proper protection to legitimate capital investments in Dallas, and the other the proper protection of the people of Dallas through rate and service requirements.

ATTEMPT AT STRIKE IN JACKSONVILLE, FLA.

An attempt was made on Oct. 21 to provoke a strike of the employees of the Jacksonville (Fla.) Traction Company. Only nine of the 244 employees responded to the call. As soon as the public officials learned that there was likelihood that some of the men would go out, Mayor Bowden issued a statement to the public in which he said:

"No rowdyism, jeering of trainmen, gathering in crowds or other disorder of any character will be tolerated. The police have received positive orders to this effect. Any person attempting any character of disorder will do so at his peril. The law will be upheld and order maintained."

The day after the men went out, Chief of Police Roach made a statement to the newspapers in which he said in part:

"There is nothing unusual as far as I can see. The people rode the street cars and the employees who desired to work did so. There were no cases of disorder, except three, in which arrests were promptly made. There were no fights or hostile gatherings. You may say for me, however, that any man, regardless of who he is, who starts any trouble, is going to have a hard time. Fewer arrests were made last night than have been made during any Saturday night for months. There is absolutely no occasion for excitement on the part of the people."

The places of the men who went out were filled promptly and the interruption to traffic was confined to filling the places of the few men who deserted their cars on the streets. These cars were manned after only a few minutes' delay, by employees transported in automobiles to the scenes of the desertions.

IMPORTANT RAPID TRANSIT LINK OPENED

The Public Service Commission for the First District of New York directed the Interborough Rapid Transit Company to begin service on the Ely Avenue extension of the Queensboro Subway from Hunter's Point Avenue station in Queens north to the new Queensboro Bridge Plaza station on Nov. 5 at noon. This provides the first through rapid transit link between the new $500,000 station on the Queensboro Bridge Plaza and Park Avenue and Forty-second Street, Manhattan. The order to begin service was made following an inspection of the new line by Commissioner Henry W. Hodge, engineer of the commission and representatives of the Interborough Company. The Queensboro subway is one of the most important links in the new dual system of rapid transit. Ultimately it will be extended west from Park Avenue, Manhattan, its present western terminus, to Times Square. At the Bridge Plaza station in Queens it connects with the important Astoria and Corona elevated extensions, which are being pushed to completion and which should be in operation within the next few months. When these lines are completed it will be possible for a passenger from any point on them to travel to the furthest limits of the Interborough lines in the Bronx, Manhattan or Brooklyn for a 5-cent fare. The Queensboro subway was begun several years ago and was earlier known as the Steinway tunnel. It was turned over to the city as a part of the pool of the lines under the dual subway arrangement, and now forms a part of the city's subway system operated by the Interborough Rapid Transit Company. The Bridge Plaza station in Queens has been described as probably the largest elevated station in the world. It is 480 ft. long, 90 ft. wide, and above the street level has a mezzanine and two levels of tracks. Four express tracks and four local tracks will pass through the station, providing accommodation at one time for four ten-car trains of the present 52-ft. Interborough cars, and four eight-car trains of the new 67-ft. cars purchased for the new operation under the dual system by the New York Municipal Railway Corporation.

SAN FRANCISCO CONSIDERING PURCHASE OF UNITED RAILROADS

Would Settle Question of Municipal Railway Extensions and Afford Transfer Privileges—City Could Not Issue Bonds

M. M. O'Shaughnessy, city engineer of San Francisco, Cal., is preparing a report to be submitted to the Board of Supervisors in the near future which will discuss the problems involved in the taking over of the United Railroads' system by the municipality. Perhaps the most urgent railway problem up for settlement is the question of the city's right to operate on upper Market Street. This matter is now pending in court. Meantime, on the completion of the Twin Peaks Tunnel the development of the 5000-acre tract which this tunnel is expected to open up will be delayed and the investment in the Church Street branch line will be deteriorating without having ever rendered service to the expectant residents of that district. Other problems are also involved in additional extensions which the municipality is desirous of making and in the absence of transfer exchange privileges between the municipal lines and the United Railroads. Transfer privileges are being demanded by residents of the North Beach, Golden Gate Valley and other districts where the use of both systems is desirable.

Mr. O'Shaughnessy's report is expected to point out that the United Railroads reorganization plan which has reduced the capitalization about one half has brought the system within the city's purchasing power, and that careful examination, taking into account the original outlay, probable final cost, interest on sinking fund, and depreciation, warrants the conclusion that the city could operate the system within its earning power. The operating revenues in 1915 were about $8,000,000 and in 1916 about $7,750,000. It has been made clear, however, that the success of any plan for purchasing the United Railroads depends primarily upon the possibility of financing it without putting through a bond issue. This is because the city will be close to its legal limit of 15 per cent of assessed valuation upon the issue of the Spring Valley bonds, assuming that the administration will later be successful on this issue.

ARRESTS MADE IN SUBWAY DYNAMITING CASE

Six men were arrested on Nov. 3 and accused by the police of New York of having been in a conspiracy to blow up subway stations in an effort to force a settlement of the street railway strike that would be favorable to the strikers. The short affidavit prepared at the direction of District Attorney Swann preparatory to the arraignment of the prisoners before a magistrate charged specifically that all of the prisoners, either directly or indirectly, were concerned in the placing of a dynamite bomb which exploded with disastrous results in the subway station at Lenox Avenue and 110th Street early on the morning of Oct. 24, referred to in the ELECTRIC RAILWAY JOURNAL of Oct. 28, page 947. Four of the six men arrested are said to be officials of Local No. 731 of the Amalgamated Association. The prisoners were committed to jail, in default of $20,000 bail each, for further examination. The cases of the men were set for hearing on Nov. 8, but the court put the matter over until Nov. 10, despite the protest of Louis Fridiger, representing the accused men.

Captain Tunney of the New York police bomb squad is reported to have said in an interview in which he described how the plotters had been apprehended:

"Merna confessed it was his plan to dynamite the Times Square or Fifty-ninth Street subway station this morning at 4 o'clock. Merna said to me, 'Why, I'm perfectly willing to give up my life to help these 11,000 strikers.' He said to me, 'I didn't want to kill anybody. At 110th Street we waited until two trains had passed so as to keep from blowing one up.'

"They admitted that all the money they used, $190, had come from the public. You know how strikers have been going around town playing hand organs and begging. They said they got $60, $70 and sometimes $80 a day in small contributions."

FATAL DRAWBRIDGE ACCIDENT AT BOSTON

About forty-seven passengers on a surface car of the Boston (Mass.) Elevated Railway were drowned on the evening of Nov. 7 when the motorman failed to stop before the open draw of the Summer Street bridge over the Fort Point Channel, the car being precipitated into the water from the easterly side of the inlet. The car was a double-truck equipment with a 25-ft. body and hand brakes. The seating capacity was thirty-four. It had longitudinal seats, was of the box type, and had been inspected and found in perfect operating condition less than three hours before the accident. The car left the P Street carhouse in South Boston at 5.13 p. m. inward-bound for the city proper, and carried between fifty-five and sixty passengers as it approached the drawbridge. The motorman escaped injury by jumping from the front vestibule before the car struck the water. He stated that he made a regular stop about 75 ft. east of the draw; that as he approached the latter he noticed the arc lamp at the easterly end of the bridge was not lighted, and that he did not see the gates or the red lantern usually hung on the latter. The car broke through the gates and, with the car body and forward truck, fell into the channel, leaving the rear truck on the bridge. About twelve passengers, besides the motorman and conductor, were rescued, the remainder meeting their deaths under water.

Matthew C. Brush, president of the Boston Elevated Railway, arrived on the scene shortly after the accident and, in co-operation with Mayor Curley of Boston and other city officials, the Boston Fire Department, harbor craft, police, naval officers and wrecking concerns, everything possible was done to reclaim the victims. As the car fell into the water, which is about 30 ft. deep at this point, it turned completely around and remained upright, facing South Boston. Several passengers escaped through the doors and windows after the plunge and were rescued soon after reaching the surface. During the night divers attached to the staffs of the Scott Wrecking Company, New London, Conn., and of the Hugh Nawn Contracting Company, Boston, cleared the submerged car of victims, and at 3 a. m. on Nov. 8 the car was raised to the surface by lighter chains and removed to the South Boston yard of the railway company, where it was subjected to an official examination by the Inspection Department of the Massachusetts Public Service Commission, the police authorities and officials of the company.

The drawtenders asserted that the lighting conditions were normal at the time of the accident. The gates were closed, one being bent backward out of shape by the passage of the car. The track was in first-class condition, and no trees are located in the district. The motorman, 25 years of age, had been in the employ of the company since June of the present year. The wheels of the rear truck, which remained on the street, were all found to be worn flat by the brake application before the car went over the end of the bridge. The motorman was arrested on the charge of manslaughter and was committed pending investigation. Although no official finding had been reached on Nov. 8, the evidence at that time pointed to failure of the human element in control of the car to observe the usual precautions in approaching the bridge. The disaster is the most serious one in the history of the company, which has been a pioneer in the "Safety First" movement and has constantly endeavored not to be excelled in the field of careful operation by any other electric transportation system.

CHICAGO ALDERMEN ON EASTERN TRIP

Robert Ridgway and W. B. Parsons, eastern members of the Chicago Traction & Subway Commission, arrived in Chicago Wednesday morning, Nov. 8, and with Bion J. Arnold, the Chicago member, are in conference in that city. Thursday morning sixteen Aldermen, members of the City Council local transportation committee, left for a tour of several eastern cities for the purpose of studying the subways under operation and construction, and to be better prepared to receive the report of the subway commission. In Philadelphia the aldermen expect to confer with T. E. Mitten, chairman of the executive committee and president of the Philadelphia Rapid Transit Company, and W. S. Twining, city transit commissioner. At Boston Prof. George F. Swain, Boston transit commissioner, and M. C. Brush, president of the Boston Elevated Railway, will conduct the party on the inspection of the Boston subways. In New York Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, and T. S. Williams, president of the Brooklyn Rapid Transit Company, will conduct the members on an inspection tour of the subways completed and those under construction as well. On the return trip the aldermen plan to stop at Cleveland, where J. J. Stanley, president of the Cleveland Railway, and Fielder Sanders, city transit commissioner, will meet them.

NEW PLAN FOR CLEVELAND RAPID TRANSIT LINE

In a letter to the City Council on Nov. 6, W. R. Hopkins, president of the Cleveland Rapid Transit Railway, stated that the former plan for financing the proposition had been dropped and that an entirely new one had been taken up, with excellent prospects of success. The greatest drawback to pushing the work was the greatly increased cost of construction since the franchise was granted. Mr. Hopkins said that the cost of building the first lines would be $3,000,000 above the estimates made when the franchise was granted, but that it was his opinion that the proposition would be able to carry this increased burden, if necessary. He said the company was pushing forward the new plan of financing. Mayor Harry L. Davis stated that, if the company would give the details of the new plan and assure the city of its intention to go forward with the work, he would probably be in favor of extending the franchise, but that the letter received does not contain the information needed. The franchise provides that at least $500,000 shall be spent on construction by Feb. 1, 1917.

Electrification from Stone Harbor to Ocean City Discussed.—Electrification of the Pennsylvania Railroad from Ocean City to Stone Harbor and extension of the line to Cape May were discussed recently between officials of the railroad and representatives of the county and coast resort governments and Chamber of Commerce at Stone Harbor, N. J.

Third Cleveland Power Arbitrator Selected.—Judge John M. Killits of the United States District Court, on Nov. 1, appointed A. F. Ingersoll, secretary of the Cleveland Association of Credit Men, as the third member of the board

of arbitration which will pass on the proposed power contract between the Cleveland Railway and the Cleveland Electric Illuminating Company. Engineer Joseph Alexander represents the company and Attorney T. L. Sidlo the city.

Franchise Goes Begging.—The city fathers of Henderson, Ky., some time ago drew up a new franchise ordinance which they proposed the Henderson Traction Company should purchase, to take the place of the one that expired on Oct. 22. The franchise was duly advertised for sale without evoking a single response and on the day the old franchise expired the City Council, concluding that no bids would be made, approved a suggestion that cars be permitted to continue running without the franchise. A meeting of the Council has been called to consider the situation.

Franchise Terms of Suburban Line Modified.—As the result of an agreement between the City Council of Seattle, Wash., and the Seattle & Rainier Valley Railway whereby the company is to be relieved of some of its franchise obligations, the company will begin work at once on the construction of its line on Dearborn Street, also an extension of its lines on Genessee Street. By the proposed agreement the company will expend approximately $100,000 in extensions and betterments, and will reduce running time between Seattle and Renton ten minutes. The Council has also agreed to allow the company to operate one-man cars on the Genessee Street extension.

City Replies in Tacoma Case.—City Attorney Harmon of Tacoma, Wash., has filed with the State Public Service Commission at Olympia a reply for the city of Tacoma to the complaint of the Tacoma Railway & Power Company, asking that certain franchise provisions be abrogated because the company was not making a reasonable rate of interest on its investment. The reply by Mr. Harmon was submitted to the city attorneys of Seattle, Spokane, Everett and Bellingham. Attorney Harmon raised the question of the jurisdiction of the Public Service Commission in the matter of abrogating franchise agreements. No date has been set for arguments before the commission.

Status of Norfolk Franchise Matter.—The new Council in Norfolk, Va., which went in on Sept. 1 appointed a committee to handle the matter of a new franchise for the Virginia Railway & Power Company. On Nov. 1 the Council met as a committee of the whole and after considering the proposed franchises for about two hours and voting on various amendments, finally referred it back to the committee and passed a resolution instructing the committee to ascertain the cost of securing an expert to draw new franchises. The cheaper gas committee is preparing data to present to the State Corporation Commission. No date has been set for the hearing.

Toledo Conference to Continue on Nov. 13.—At the conclusion of a conference on Nov. 2, the Street Railway Commission of Toledo, Ohio, adjourned until Nov. 13. A plan of establishing separate routes for the interurban lines and providing better service for their cars in and out of the city was discussed. The feasibility of paying dividends monthly was also before the commission and by some this was considered a good plan, as it would keep the people in closer touch with the proposed new community company. E. P. Usher, president of the Central Labor Union and a member of the Railway Commission, has assured that organization that copies of the franchise will be submitted to civic and labor bodies before it is finally adopted.

Montgomery Light & Water Power Company Wins Suit.—The United States Supreme Court has just denied the application on behalf of Montgomery Light & Traction Company for a writ of certiorari to review the affirmance by the United States Circuit Court of Appeals of the judgment theretofore awarded to the Montgomery Light & Water Power Company in the action instituted by it in the United States District Court to compel the traction company to take and pay for current for the operation of its street railway system from it pursuant to its contract. The contention of the traction company of non-performance on the part of the Water Power Company of said contract justifying a refusal on its part to take current was disposed of by the lower courts adversely to the traction company. The decision of the United States Supreme Court makes the judgment final.

East Cleveland Interests Considered.—In an interview on Nov. 2 between a committee of citizens of East Cleveland and officials of the Cleveland (Ohio) Railway as to the bearing of the proposed annexation of the suburb to the city would have on the street railway situation, John J. Stanley, president of the company, said he would hold the new territory on an equal basis with any other part of the city so far as the franchise and development are concerned. Mr. Stanley said that East Cleveland territory needed extensions and perhaps a crosstown line, but that the company had been unable to make improvements there because of failure to agree on terms of franchise renewal on Hayden and Euclid Avenues. He expressed the belief that the City Council would take a favorable stand on the matter, if the suburb was annexed. Fielder Sanders, street railway commissioner, said that, if the suburb was annexed, the street railway matter would then be under the control of the City Council. On the differences that have existed between the suburb and the company, Council would naturally take a viewpoint favoring its own citizens and in the interest of the people of Cleveland.

PROGRAMS OF ASSOCIATION MEETINGS

Central Electric Traffic Association

The Central Electric Traffic Association will meet in Indianapolis, Ind., on Nov. 13-16, inclusive.

Central Electric Railway Accountant's Association

The Central Electric Railway Accountants' Association will meet in Cincinnati, Ohio, on Friday and Saturday, Dec. 8 and 9.

Illinois Electric Railways Association

The meeting of the Illinois Electric Railways Association, scheduled for Nov. 17, has been postponed until Nov. 28 at the La Salle Hotel, Chicago.

Pennsylvania Street Railway Association

The winter meeting of the Pennsylvania Street Railway Association will be held at the Hotel Adelphia, Philadelphia, Pa., on Tuesday and Wednesday, Dec. 12 and 13.

Central Electric Railway Association

The next meeting of the Central Electric Railway Association will be held at the Secor Hotel, Toledo, Ohio, on Thursday and Friday, Nov. 23 and 24. The executive committee will meet on Wednesday evening, Nov. 22, at the same place.

Safety First Federation of America

The second annual convention of the Safety First Federation of America will be held in Baltimore, Md., Dec. 7, 8 and 9, upon invitation of the Safety First Society of Baltimore. Darwin P. Kingsley, New York, president of the federation, will preside at the sessions. The tentative program includes various subjects pertaining to public safety, such as uniformity in street traffic regulation, the railroad trespass question, fire prevention, health and sanitation, etc., and provides ample opportunity for the discussion of the papers.

Welfare and Efficiency Conference

At the fourth annual welfare and efficiency conference to be held at the Capitol, Harrisburg, Pa., under the direction of the State Department of Labor and Industry, on Nov. 21, 22 and 23, problems relating to the operation of steam and electric railways will be discussed. Governor Martin G. Brumbaugh will deliver the address of welcome. On the afternoon of Nov. 22 William D. B. Ainey, chairman of the Pennsylvania Public Service Commission, will preside. Samuel B. Hare, claim agent of the Altoona & Logan Valley Electric Railway, Altoona, Pa., will discuss "The Accident Problem of the Electric Railways." P. J. McGrath, financial secretary-treasurer of Division No. 85 of the Amalgamated Association of Street & Electric Railway Employees, Pittsburgh, Pa., will discuss the same problem. Similar questions relating to the steam railroads will be discussed the same afternoon.

Financial and Corporate

ANNUAL REPORT

Fonda, Johnstown & Gloversville Railroad

The income statement of the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., for the fiscal years ended June 30, 1915 and 1916, follows:

	1916 Amount	1916 Per Cent	1915 Amount	1915 Per Cent
Railway operating revenues:				
Freight revenue	$276,788	29.01	$239,574	27.39
Passenger revenue, steam division	51,039	5.35	54,137	6.19
Passenger revenue, electric division	586,208	61.44	536,479	61.33
Mail revenue	3,105	0.33	3,109	0.36
Express revenue	16,759	1.76	14,148	1.62
All other revenues from transportation	5,511	0.58	5,463	0.62
Revenue from other railway operations	14,599	1.53	21,847	2.49
Total operating revenues	$954,011	100.00	$874,761	100.00
Railway operating expenses:				
Maintenance of way and structures	$90,750	9.51	$75,149	8.59
Maintenance of equipment	57,399	6.02	52,553	6.01
Traffic expenses	8,667	0.91	8,155	0.93
Power	37,665	3.95	46,577	5.32
Transportation expenses	233,060	24.43	220,645	25.23
General expenses	65,561	6.87	64,154	7.33
Total operating expenses	$493,103	51.69	$467,236	53.41
Net revenue from railway operations	$460,907	48.31	$407,525	46.59
Railway tax accruals	44,608	4.68	39,500	4.52
Railway operating income	$416,299	43.63	$368,025	42.07
Miscellaneous operations (Sacandaga, N. Y., summer resort)—deficit	2,958	0.31	6,017	0.69
Operating income	$413,341	43.32	$362,008	41.38
Non-operating income	30,559	3.20	31,804	3.64
Gross income	$443,900	46.52	$393,812	45.02
Deductions from gross income	390,037	40.88	380,549	43.50
Net income	$53,863	5.64	$13,263	1.52

The general resumption in business in the cities and towns served by the company was not substantially reflected in its earnings until Dec. 1. During the year an increase in gross of $79,250, or about 9 per cent, was shown. The freight revenues were the largest in the history of the company, showing an increase over last year of $37,213, or 15.5 per cent. Of this $7,838 represented the increase in coal traffic and $29,375 in merchandise freight.

The increase in passenger revenues (electric) amounted to $49,728, or 9.2 per cent, that division carrying 6,586,931 passengers, which figure has never been exceeded except slightly in 1914. During the last seven months of the year more passengers were carried than during the same months of any previous year, which in view of the large number of automobiles in use was most satisfactory. The passenger revenues (steam) decreased $3,097, or 5.7 per cent, due principally to weather conditions and poor excursion business to Sacandaga during July and August of last year. Ticket sales to other points on the steam division showed an increase for the year.

The total operating expenditures of $493,103 showed an increase of $25,867, or 5.5 per cent, over the previous year. Removal of snow and ice cost $14,443, an increase of $9,022, which with amortization of various accounts, depreciation reserves and retirement of equipment exceeded such charges during the previous year by $24,657 and were higher than any preceding year. The company's operating pay roll, included in the above figures, amounted to $357,802, or about 38 per cent of gross revenue—an increase of $34,718, due to higher wages in all departments.

Taxes and income deductions increased, and, while the deficit from miscellaneous operations was smaller, non-operating income fell off. The higher net from railway operations was sufficient to meet these items and still leave an increase in net income from $13,263 in 1915 to $53,863 in 1916. After the payment of preferred dividends of $30,000, there was left a profit and loss balance of $23,863 for 1916, as compared to a deficit of $16,737 in 1915.

"Road and Equipment" account was charged during the year with amounts aggregating $50,615. Of this $29,472 was for paving in Amsterdam, Gloversville and Johnstown, and $10,897 was for five passenger coaches for the steam division. No securities have been issued and sold since 1911, and all additions to property since then, amounting to $256,576, which amount is subject to capitalization, have been financed through the use of surplus earnings and temporary loans.

This company operates 40.75 miles of steam road and 83.97 miles of electric road, a total of 124.72 miles. The following table shows the separate electric and steam revenues and expenses for the last fiscal year, with the increases or decreases as compared with the preceding year:

	Electric 1916	Electric Change	Steam 1916	Steam Change
Revenue from transportation	$591,731	+$49,951	$347,680	+$36,545
Revenue from other railway operations	9,928	—8,689	4,670	+1,440
Total electric operating revenues	$601,660	+$41,262	$352,351	+$37,986
Way and structures	$65,682	+$15,372	$25,067	+$228
Equipment	35,972	+4,221	21,426	+623
Traffic	2,794	—368	5,872	+880
Power	37,665	—8,912	....	....
Conducting transportation	142,650	+8,184	90,410	+4,231
General and miscellaneous	50,184	+2,167	15,376	—760
Total operating expenses	$334,949	+$20,665	$158,153	+$5,202
Net revenues	$266,710	+$20,597	$194,197	+$32,784
Operating ratio (per cent)	55.67	—0.41	44.89	—3.76

Dick, Kerr & Company, Ltd.

Considerably improved results are reported by Dick, Kerr & Company, Ltd., the electrical engineers and contractors of London, England, for the last financial year to June 30, 1916, the gross profits having increased from £46,900 to £71,400, and the net profits, after the payment of debenture charges, from £36,300 to £60,900. A sum of £25,000 was again transferred to a reserve against contingencies and 6 per cent was distributed on the ordinary shares, on which no return had been made since 1910-11, when a dividend of 5 per cent was forthcoming. Finally £20,400 was carried forward, or £2,000 more than the amount brought forward from last year.

The directors feel that, though it is difficult to foresee the position of the business in the future, they are warranted by the last year's results in paying the proposed dividend on the ordinary shares. During the last year, in addition to extensions of contracts for the supply of war material, which have kept the works fully occupied, the construction, equipment and management of one of the new national factories was intrusted to the company by the government. During the year the company also acquired control of Willans & Robinson, and the directors anticipate that the acquisition will be of considerable value in the future expansion of business. It is noteworthy that the last year's profits were arrived at after setting aside an undisclosed amount for special taxation.

Boston & Worcester Street Railway

Notwithstanding adverse weather conditions during almost the entire fiscal year, the gross passenger revenue of the Boston & Worcester Street Railway, Boston, Mass., showed some increase for the year ended June 30, 1916. Freight revenue increased 47.6 per cent, and the total increase of revenue from transportation amounted to $60,242, or 8.3 per cent. Expenses of operation, however, materially increased, largely because of the advance in wages. Increased prices of material, supplies and fuel and a substantial increase of snow and ice and electrical equipment expense also added to the total expenses. The income from operation, however, showed a slight increase for the last

fiscal year, and 3¾ per cent was paid in dividends on the common stock as compared to 2¾ per cent the preceding year. Surplus for the year, therefore, amounted to $42,205 as compared to $58,126 in 1915.

To give the detailed earning figures for the last two years, it may be said that the total revenue for the year ended June 30, 1916, amounted to $801,253 as compared to $738,796 for the preceding year. Expenses of operation compared as follows: Transportation, 1916, $273,492; 1915, $228,846; maintenance, 1916, $133,349; 1915, $120,425; general expenses, 1916, $81,491; 1915, $81,854; total expenses, 1916, $488,333; 1915, $431,126. The operating income for the two years, therefore, amounted to $312,920 in 1916 and $307,670 in 1915. Deductions showed a slight increase from $170,024 in 1915 to $170,945 in 1916 on account of higher taxes, and the surplus for the year totaled $141,974 in 1916 and $137,645 in 1915. During the year the company operated 2,250,762 car-miles and 154,376 car-hours. The dividends on the preferred shares of the Boston & Worcester Electric Companies, the controlling company, was increased from an amount of $2 to $2.50 per share for the fiscal year.

APPLICATION FOR RECEIVERS FOR THE SEATTLE & RAINIER VALLEY RAILWAY

Counsel States Litigation Is Without Merit or Substantial Foundation

An application for the appointment of a receiver for the Seattle & Rainier Valley Railway, Seattle, Wash., formerly the Seattle, Renton & Southern Railway, has been made to Federal Judge E. E. Cushman by creditors and former stockholders. Judge Cushman has fixed Nov. 16 as the date when the application would be heard on its merits. The plaintiffs are J. W. Wall, who has a judgment against the railway on account of personal injuries; G. A. C. Rochester, administrator of the estate of W. C. Bell, deceased, who also obtained a judgment for personal injuries, and W. F. Bickell, a stockholder of the old company. The application was precipitated by the proposed franchise changes which have been agreed upon by the City Council and the railway. The complainants allege that the bonds of the old company were used by the bondholders, who purchased the company at public auction in May, to pay for the company's assets contrary to law, and that the bonds issued by the newly organized company are void on the ground that they were discounted in violation of the state constitution. It is also asserted that the value of the property is not equal to the securities that have been issued against the company.

The company was reorganized recently and its name changed, after having been operated by receivers since 1912. The property of the company was sold on May 12 and on June 9 the bondholders took over the road, which was bid in by John C. Higgins of Higgins & Hughes, counsel for Augustus S. Peabody, trustee for bondholders, and Peabody, Houghteling & Company, Chicago. In July M. E. Sampsell, Chicago, was elected president of the new company, and Walter Brown was appointed local manager.

The present suit marks another chapter in the litigation which has beset the road since it was organized in 1890 as the Rainier Avenue Electric Railway. In 1894 it passed into the hands of receivers for the first time. Following a sale by the sheriff in 1895, the company, under the name of the Seattle-Renton Railway, was sold to Frank H. Osgood for $90,000. In 1903 the road was transferred to the Seattle, Renton & Southern Railway, the majority of whose stock was obtained in 1906 by William R. Crawford. Following the failure to pay bond and note interest in 1912 the road went into a receivers' hands again, where it remained until sold, in May, 1916.

John C. Higgins, of Higgins & Hughes, has made the following statement concerning the purpose and general merit of the recent development in the case:

"These papers have just been served upon us. We have examined them and think the litigation is without any merit or substantial foundation. It is simply designed to prevent or to embarrass the proposed settlement with the city, under which we are about to proceed with an extension of the railway and the improvement of the service."

Brandon (Manitoba) Municipal Railway.—The earnings from operation of the Brandon Municipal Railway for the year ended June 30, 1916, amounted to $29,258 as compared to $35,969 in the previous year. The operating expenses, however, showed a slight increase from $28,394 in 1915 to $28,660 in 1916, so that the gross income for the year decreased from $7,574 in 1915 to only $598 in 1916. The deductions from income, amounting to $32,552, showed a slight increase, the relative proportion of $20,100 for interest on funded debt, $5,968 for sinking-fund charges and $6,484 for depreciation being about the same as in 1915. The result of operation for 1916 was a net loss of $31,954 as compared to a loss of $24,339 in 1915. The increased net loss for the last fiscal year was due to the closing of the street railway system for ten weeks during the excessively heavy snowfalls of last winter. Not only was the revenue nil during this period, but the City Council decided that the motormen, conductors and carhouse employees should receive employment for the whole of the time the system was closed. The fare passengers carried during the last year totaled 627,739 as compared to 782,011 in 1915.

Bristol & Plainville Tramway, Bristol, Conn.—The stockholders of the Bristol & Plainville Tramway have authorized an increase in the outstanding capital stock of the company from $562,500 to $618,800, and will have the right to subscribe for the new stock at par on or before Nov. 21, on the basis of one share for every ten shares now held.

Boston & Maine Railroad, Boston, Mass.—The annual report of the Boston & Maine Railroad for the year ended June 30, 1916, covers the operations of the two owned electric railway branches, the Portsmouth (N. H.) Electric Railway and the Concord & Manchester, (N. H.) Electric Branch, and the one leased line, the Conway (Mass.) Electric Street Railway. The combined operating revenues of these first two lines for the last fiscal year were $250,358, a decrease of $530 from the returns of the preceding year. The total operating expenses decreased $26,912 to an amount of $158,663, so that the net revenue at $91,695 showed an increase of $26,382. The number of passengers carried increased from 4,916,019 to 4,931,397, while the number of car-miles run decreased from 1,090,202 to 1,068,142. The operating revenue of the Conway Electric Street Railway decreased from $11,107 in 1915 to $10,774 in 1916, but the operating expenses decreased to a greater extent, from $16,006 to $11,176, so that the operating deficit of $4,899 in 1915 was reduced to a deficit of $402 in the last fiscal year. After taxes and interest accrued, the deficit balance for the last year was $7,466 as compared to $11,946 in the preceding year.

Northern Ohio Traction & Light Company, Akron, Ohio.—Hodenpyl, Hardy & Company, New York, N. Y., and E. W. Clark & Company, Philadelphia, Pa., purchasers of the controlling interest in the Northern Ohio Traction & Light Company, during the week ended Nov. 4 placed funds with the Citizens' Savings & Trust Company, Cleveland, for the payment of the purchase price of the stock deposited. A payment of $3 a share had been made a month previously, and the payment on Nov. 4 was to have been $47 a share. The remainder, $50 a share, was to have been paid in one year from that time, but the purchasers decided to clear up the entire transaction at once.

Quebec Railway, Light & Power Company, Ltd., Quebec, Canada.—The gross earnings from operation of the Quebec Railway, Light & Power Company, Ltd., for the year ended June 30, 1916, amounted to $1,731,732 as compared to $1,548,096 in the preceding year, an increase of $183,636 or 11.8 per cent. After adding miscellaneous income of $236,868, the total revenue from all sources for the last year amounted to $1,968,601, an increase of $184,527. The operating expenses rose from $924,817 in 1915 to $1,029,751 in 1916, an increase of $104,934 or 11.3 per cent. The fixed charges and taxes of all kinds amounted to $723,447, leaving a net surplus of $215,403. This, added to the previous surplus, made a total surplus of $562,902 at the end of the year. During the year there was expended on maintenance account the sum of $220,602. The Quebec Railway, Light & Power Company operates 36 miles of line in Quebec and vicinity, including a 9-mile steam and electric road from Quebec to Tourmente. It also does a general lighting and power business.

Syracuse & South Bay Electric Railroad, Syracuse, N. Y.—The Syracuse & South Bay Electric Railroad and the Syracuse, Watertown & St. Lawrence River Railroad were sold under foreclosure on Nov. 1 to the reorganization committee representing the bondholders, for $201,000 and $35,000 respectively. The properties will be reorganized in accordance with the modified plan of reorganization reviewed in the Electric Railway Journal for Aug. 19, page 333.

DIVIDENDS DECLARED

Boston (Mass.) Elevated Railway, quarterly, 1½ per cent.

Pacific Gas & Electric Company, San Francisco, Cal., quarterly, 1½ per cent, original preferred; quarterly, 1½ per cent, first preferred.

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

Washington-Virginia Railway, Washington, D. C., 2½ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.

Period			Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m.,	Sept.,	'16	$90,489	*$72,639	$17,850	$27,700	††$9,652
1 "	"	'15	88,743	*62,455	26,288	16,908	‡9,559
3 "	"	'16	289,085	*223,941	65,144	83,231	††17,538
3 "	"	'15	271,606	*191,754	79,852	50,894	‡29,398

CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO

1m.,	Sept.,	'16	$43,680	*$25,183	$18,497	$11,455	$7,042
1 "	"	'15	40,981	*20,616	20,365	10,973	9,392
9 "	"	'16	351,576	*196,825	154,751	102,553	52,198
9 "	"	'15	322,121	*176,403	145,718	98,759	46,959

CONNECTICUT COMPANY, NEW HAVEN, CONN.

1m.,	Sept.,	'16	$847,871	*$619,080	$228,791	$97,959	‡$181,761
1 "	"	'15	754,081	*518,518	235,563	98,014	‡161,289
3 "	"	'16	2,690,807	*1,896,373	794,434	295,228	‡596,689
3 "	"	'15	2,356,784	*1,500,086	856,698	294,424	‡631,820

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

1m.,	Sept.,	'16	$206,901	*$127,708	$79,193	$41,887	$37,306
1 "	"	'15	184,243	*114,182	70,061	43,526	26,535
12 "	"	'16	2,339,406	*1,436,945	902,461	512,046	390,415
12 "	"	'15	2,137,834	*1,286,864	850,970	496,497	354,473

NEW YORK & STAMFORD RAILWAY, PORT CHESTER, N. Y.

1m.,	Sept.,	'16	$31,411	*$22,855	$8,556	$7,987	‡$626
1 "	"	'15	37,310	*26,015	11,295	8,000	‡3,364
3 "	"	'16	117,156	*81,596	35,560	23,961	‡11,763
3 "	"	'15	133,351	*86,752	46,599	24,000	‡22,808

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

1m.,	Sept.,	'16	$50,689	*$45,996	$4,693	§$5,816	††$321
1 "	"	'15	41,652	*40,840	812	$6,354	††3,828
3 "	"	'16	146,761	*135,574	11,187	$19,851	††5,696
3 "	"	'15	124,885	*125,456	†569	§20,542	††15,541

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO

1m.,	Sept.,	'16	$446,666	$286,763	$159,902	$44,759	$115,143
1 "	"	'15	340,917	212,823	128,094	53,081	75,013
11 "	"	'16	3,780,743	2,298,334	1,482,409	447,760	1,034,649
11 "	"	'15	2,829,360	1,748,733	1,080,627	466,669	613,958

PORTLAND RAILWAY LIGHT & POWER COMPANY, PORTLAND, ORE.

1m.,	Sept.,	'16	$453,731	*$244,193	$209,538	$178,811	$30,727
1 "	"	'15	454,856	*258,679	196,177	184,165	12,012
12 "	"	'16	5,422,757	*3,052,791	2,369,966	2,179,732	190,234
12 "	"	'15	5,639,948	*3,081,249	2,558,699	2,210,355	348,344

REPUBLIC RAILWAY & LIGHT COMPANY, YOUNGSTOWN, OHIO

1m.,	Sept.,	'16	$334,443	*$183,689	$150,754	$72,351	$78,641
1 "	"	'15	266,302	*153,933	112,369	56,845	55,636
9 "	"	'16	2,930,648	*1,707,140	1,223,508	628,182	599,809
9 "	"	'15	2,234,921	*1,372,515	862,406	503,691	359,899

RHODE ISLAND COMPANY, PROVIDENCE, R. I.

1m.,	Sept.,	'16	$515,829	*$363,735	$152,085	$120,714	‡$33,072
1 "	"	'15	474,919	*352,574	122,345	120,821	‡3,082
3 "	"	'16	1,672,570	*1,104,535	568,035	362,118	‡210,739
3 "	"	'15	1,458,559	*1,021,732	436,827	361,389	‡79,683

WESTCHESTER STREET RAILROAD, WHITE PLAINS, N. Y.

1m.,	Sept.,	'16	$18,372	*$19,805	†$1,433	$1,865	††$3,269
1 "	"	'15	23,397	*21,172	2,225	1,598	‡656
3 "	"	'16	62,574	*64,077	†1,503	5,543	††6,964
3 "	"	'15	74,131	*66,072	8,059	4,786	‡3,364

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

Traffic and Transportation

SIX-CENT FARE AUTHORIZED

Following Massachusetts Commission, New Hampshire Body Approves Fare Increase for Massachusetts Northeastern—Zones Made Uniform

The New Hampshire Public Service Commission, on Oct. 31, authorized the establishment of a 6-cent fare unit on the Massachusetts Northeastern Street Railway, Haverhill, Mass. An abstract of the decision of the Massachusetts Public Service Commission authorizing the 6-cent fare unit on this system within its jurisdiction was printed in the Electric Railway Journal of Oct. 28, page 951. Hearings were held in Boston jointly with the Massachusetts commission in 1915, a further hearing being held in New Hampshire early this year.

The company operates 45.87 miles of single track in New Hampshire and 82.44 miles in Massachusetts. It does not give service in any city or large town in New Hampshire, its entrance into Nashua being over the tracks of the Nashua Street Railway. The company heretofore charged 5 cents in each zone, and sold school-children's and workingmen's tickets on certain lines at reduced rates. The new tariff filed by it raises the general rate to 6 cents and proportionately increases the charge for the special tickets. As far as the rates are interstate, the Interstate Commerce Commission allowed the new tariff to take effect without question. The Massachusetts commission, after extended investigation, approved the tariff in the main, except as to certain zones radiating from the center of the cities of Lawrence and Haverhill. Lastly, the New Hampshire commission has found the new tariff reasonable in all respects. It went into effect on Nov. 1, the date to which it was suspended.

Like the Massachusetts body, the New Hampshire commission finds that the control over security issues and the scaling down of the issues of constituent companies upon consolidation, taken together with the very moderate capitalization per mile of road as compared with other like properties, preclude any charge of over-capitalization. The increase of rates cannot be said to represent an attempt to earn a return on watered securities. For the purposes of this case, in view of the financial history of the road, without attempting a valuation in detail of the property, its outstanding capitalization is taken as a moderate measure of fair value.

None of the constituent companies in New Hampshire has ever paid any dividends, and the Massachusetts Northeastern Street Railway, since consolidation, has paid one dividend of 3 per cent on the preferred stock, and none on the common. The fiscal year 1916 was the best in the company's history. In that year, after paying operating expenses and fixed charges, the net income remaining was $39,213—a sum insufficient for the payment of dividends on the preferred stock. This net income, the commission finds, was obtained only at the expense of an utterly inadequate reserve for depreciation. The road and equipment are in excellent condition of maintenance, the service generally satisfactory, and the management clearly and admittedly efficient. It is obvious, the finding states, that the failure of the company to earn a fair return can be attributed only to inadequacy of rates. The company is unquestionably entitled to such an increase within reasonable limits, as will, if possible, produce such a return.

The income requirements of the company, and the extent to which they will probably be met by the increase in rates, were fully discussed by the Massachusetts commission, and are not reviewed *in extenso* by the New Hampshire body. The latter board finds that if the raise in rate resulted in no decrease in traffic the revenue of the company would still be insufficient, after meeting operating expenses and fixed charges, to provide for depreciation and for the gradual payment of the floating debt, and to give even the minimum dividend of 6 per cent upon the common stock. It is obvious that the company has a legal right to make the proposed

increase, unless the rates contemplated are in themselves unreasonable, as being more than the service is worth. Yet for the reasons stated in the Manchester & Nashua, and Manchester & Derry cases, recently decided, it cannot be held that a 6-cent fare for zones of normal length on an interurban road in New Hampshire is unreasonable, when it does not produce more than a fair return.

The new tariff involves one readjustment of fare zones in New Hampshire. Hitherto the line from Hudson Center to Pelham Center has constituted a single zone, 6.22 miles in length. It is proposed to divide this into two zones, from Hudson Center to the Hudson-Pelham town line, 3.1 miles, and from the town line to Pelham Center, 3.12 miles. There is no other zone on the system equal in length to the zone as heretofore established, the average zone being about 3 miles in length. The statutory prohibition against discrimination would seem to be clearly violated by the establishment in one particular locality of a fare zone twice as long as zones generally on the same system in other localities of like character, when there are no considerations of competition, density of traffic or cost of service to justify the discrimination. No such conditions exist in this particular case, and there is no apparent justification for giving to this locality an obviously "undue or unreasonable preference or advantage." In the absence of special circumstances justifying a deviation from uniformity, it is said, the zones should be of as nearly equal length as the topography of the line will permit.

BUFFALO FARE PROCEEDING FINALLY AUTHORIZED

City Council After a Dozen Votes Decides in Favor of Rate Investigation

The City Council of Buffalo, N. Y., on Nov. 1, approved the application of Corporation Counsel William S. Rann for permission to apply to the Public Service Commission for an investigation into the rates of fare charged by the International Railway over its Buffalo city lines. Thomas Penney, vice-president and general counsel of the company, opposed the application and branded the threatened action of the City Council as a mere reprisal against the railway because of its action against the city for a review of its special franchise assessment, claimed to be unjust and exorbitant.

Favorable action by the City Council came as a surprise in view of the fact that the application of the corporation counsel was made almost two months ago, and after a series of hearings and conferences there appeared to be little inclination to favor the recommendation. Almost a dozen votes were taken and each time the application was defeated by a vote of four to one, but after a mass of evidence had been introduced before the Council by the city law department the application was approved.

The International Railway charges a straight 5-cent fare during all hours of the day with universal transfers for which no charge is made. Transfers are issued so as to allow passengers to reach any point in the city by the most direct route. A single 5-cent fare is also charged to Kenmore, a residential suburb north of the city line.

Following the approval of the application for a rate investigation, Mayor Louis P. Fuhrmann issued this statement to the ELECTRIC RAILWAY JOURNAL correspondent:

"I am opposed to using a rate proceeding simply as a big stick to prevent a corporation from exercising its legal rights. The corporation counsel assures us that he proposed this investigation in good faith and intends to put it through to a decision and with that assurance I am content.

"The prosecution of a rate proceeding involves the city in considerable expense, and if we can judge the length of time by other rate proceedings, this one, it is safe to say, will extend over a year or two. The corporation counsel seems to be strongly of the opinion that lower fares will result. While I am not personally so sanguine of the results as he is, I feel that he is better qualified to forecast the result. Lower carfares will result in a large saving to our citizens, and if this can be brought about it should be done.

"Many years ago the street railways then operating in the city, now consolidated into the International Railway, entered into a contract with the city, known as the Milburn agreement, whereby the charge for a transfer from one line to another was abolished and universal free transfers were granted and a rate of fare of 5 cents was fixed. If the institution of this rate proceeding is to abolish free transfer privileges then it is a serious matter. I am advised by the corporation counsel that the prosecution of a rate investigation can in no wise prejudice our right to free transfers.

"I feel, therefore, that the rate proceeding should be instituted and prosecuted to a speedy decision, and I trust that the result of it will be lower carfares for our people."

TWO-CAR FREIGHT SERVICE APPROVED IN BOSTON

The Public Service Commission of Massachusetts has issued a comprehensive finding approving the general principles of two-car electric railway freight service, based upon petitions of the Boston Elevated Railway and the Bay State Street Railway. Supervision of such service by the commission is declared essential to its proper limitation with respect to passenger traffic, but the board holds that a large and at present unutilized opportunity for broader development exists in eastern Massachusetts. In the opinion of the commission, the companies have as much right to operate freight trailer cars as they have to operate passenger trailers. The board enunciates the advantages to the public and to the companies of electric freight service in hours when the passenger traffic is at a minimum or below the mid-day and peak volume, and believes that the development of electric railway freight and express service should be encouraged, so long as such service is not permitted to encroach upon passenger traffic. The finding points out that the streets are not adapted to any large-scale development of electric railway freight service, and cannot, with propriety, be converted into freight yards. At the present time, in the judgment of the commission, such danger is remote.

The year ended June 30, 1916, was a banner year for electric railway freight and express business in Massachusetts, yet the Bay State company received from this source only $426,996 out of a total operating revenue of $9,770,609, while the Boston Elevated Railway received only $82,835 out of a total of $18,686,972. Traffic of a materially greater volume can be handled, in the commission's opinion, without public detriment under the regulation of local authorities and of the board. The commission is of the opinion that properly constructed and operated trailer cars can handle an equal volume of traffic with less public inconvenience and discomfort in two-car trains than in single cars.

FIRST PASSENGER TRAIN FROM NORTH SHORE THROUGH CHICAGO LOOP

The Chicago, North Shore & Milwaukee Railroad ran its first passenger train over the elevated system in Chicago on Nov. 6, to bring a party of 100 women from the North Shore town of Glencoe through Chicago to the Union Stock Yards on the South Side, where they visited the Armour Company's plant. The party was carried on a two-car steel train which had been equipped with third-rail shoes in order to operate on the elevated system, and the trip was made in one hour and twelve minutes. On the train a colored maid was provided to take care of the wraps, and each lady was presented with a corsage bouquet by the railway and a box of chocolate creams by Marshall Field & Company. At the stock yards the Armour Company served luncheon to them and one of their special lecturers took the party through the plant. While this is the first passenger train to make the trip over the city elevated lines, the company is carrying from two to ten tons of papers to the North Shore towns as far as Waukegan each morning on a train leaving the Fifth Avenue Terminal at 5.30 o'clock.

DETROIT REROUTING PLAN UP TO COUNCIL

On Oct. 31 the Common Council of Detroit, Mich., received the joint report of the committees on public utilities and on traffic and police regulations in favor of granting the Detroit United Railway permission to put in curves and other track work necessary to permit of the rerouting of cars to relieve the present frightful congestion in the heart of the city. In its report the committee said:

"Your committees believe the plan should be given a fair

trial. Your committees, however, feel that the power to fix the routes should be reserved to the Common Council and the accompanying resolutions so provide."

The provision on this point in the resolution states:

"It is further resolved that the Common Council reserves the right to continue the routes as now established or to make such changes in the routing of said cars as in its judgment may be necessary."

The committee's report was debated for and against for a considerable period. Alderman Littlefield led the opposition and moved that the report be referred back, stating he wanted it to die there, but on motion of Alderman Ellis it was laid on the table for a week in order that the members of the Council might familiarize themselves with the matter.

NEW ALBANY FARE TARIFF

The change in rates on the Albany-Troy line of the United Traction Company, Albany, N. Y., noted in the Electric Railway Journal for Nov. 4, page 996, related to a new tariff filed by the company with the Public Service Commission and not to authorization by the commission of the increase mentioned. The case of the company before the commission in which it sought permission to increase the fare between Albany and Troy from 10 cents to 15 cents was disposed of some time ago by the commission refusing to grant the increase. The new tariff which the company has issued is designed to become effective on Nov. 25. It seeks the elimination of transfers on the Albany-Troy interurban line. This matter has not yet come before the commission for a hearing.

San Francisco and United Railroads in Transfer Agreement.—An agreement recently made between the Municipal Railway, San Francisco, Cal., and the United Railroads provides for an exchange of transfers on a basis of equality between the two lines at Fillmore and Union Streets, where the two systems intersect.

Service Stars for Washington Employees.—The Washington Railway & Electric Company, Washington, D. C., has introduced merit and service badges in the form of five-pointed gold stars to be worn by uniformed employees on the left sleeve, each star indicating five years of continuous service of the employee wearing the insignia.

Heating Order in St. Louis.—An order has been issued to the United Railways, St. Louis, Mo., by the State Public Service Commission, regulating the heating and ventilating of the cars this winter. The new rule requires the ventilators and fresh-air inlets to be kept open at all times except when the temperature outside falls below 10 deg. Fahr.

Petition Presented for Permission to Abandon Service.—The Sandpoint & Interurban Railway, Sandpoint, Idaho, has applied to the Public Utilities Commission of Idaho to be allowed to discontinue the operation of its service between the city and the Great Northern Railway station, and between the city and Ponderay and Kootenai. The company says that the lines are unprofitable.

Park Traffic Stimulated.—Gen. John B. Castleman, president of the Board of Park Commissioners of Louisville, Ky., has stimulated travel on several street railway lines by giving an interview to the newspapers dwelling on the beauties of the autumn coloring in the city's parks. The general mentioned two of the parks particularly, both reached by lines of the Louisville Railway.

Near-Side Stops in Houston.—The near-side stop rule has been put into effect on the street railway lines of the Houston (Tex.) Electric Company. The rule is strictly enforced on all paved streets, but motormen are required to use their judgment at unpaved crossings as to the best side of the street for taking on or unloading passengers. This rule was put into effect on recommendation of the city public service department.

Committee Appointed to Consider Changes in Traffic Ordinance.—A safety-zone committee will be appointed by the commissioner of public works of Buffalo, N. Y., to consider proposed amendments to traffic ordinances so as to create safety zones in the business section. The committee will consist of a representative of the International Railway, the Automobile Club, the Team Owners' Association, the Auto Truck Owners' Association, the Auto Truck Manufacturers' Association, a taxicab company and four other citizens. It is said that one-way traffic in certain congested streets will be advocated.

Jitney and Railway Traffic Compared. — According to checks completed by A. L. Valentine, superintendent of public utilities of Seattle, street railway traffic over the Latona Bridge made a large gain, as compared with jitneys in the last year. Comparing one day last October with one day of October of this year, from 6 a. m. until midnight, the check shows that 449 street cars, carrying 10,766 passengers, were operated this year, and 426 cars, carrying 8353 passengers, a year ago. In one day during October this year 568 jitneys, carrying 2411 passengers, were operated across the bridge, as compared with 1038 jitneys carrying 4613 a year ago

Record Fair Traffic in Dallas.—Approximately 1,500,000 people were carried by the street cars of Dallas, Tex., during the sixteen days of the Texas State Fair, from Oct. 14 to Oct. 29, according to a check of conductors' receipts made in the office of Richard Meriwether, general superintendent of the Dallas Consolidated Electric Street Railway. It is estimated that more than 1,000,000 of these people rode to and from Fair Park. Not a single accident was reported during this time. A regular schedule of one car every forty-five seconds was maintained to Fair Park and during home-going hours five cars were loaded each minute in front of Fair Park gates.

See Mary Pickford Via Sedalia Cars.—To promote street car riding during the dull evenings, the City Light & Traction Company, Sedalia, Mo., has devised a novel scheme. The Sedalia company has made arrangements with the Luna Moving Picture House to honor transfers at its box office for 5 cents in payment of a 10-cent admission to the picture show. This conversion privilege is carried out the first part of each week from 6 p. m. to 11 p. m. The moving picture house charges but a small per cent of the original 5 cents and carries most of the loss. According to S. B. Ireland, general manager, the plan has been in effect a week, and in that time an increase in traffic has been noticed.

United Railroads to Post Accident Records.—A record of the accidents on the lines of the United Railroads, San Francisco, Cal., shows that during July the number of car-miles per accident was 3,955 and the number of passengers carried per accident was 32,546. In August and September the number of accidents was greater, a comparison of September with July showing a decrease of 995 car-miles per accident and 5,987 passengers per accident. Hereafter, according to an announcement in the *United Railroads Magazine* by William Von Phul, vice-president and general manager of the company, a statement of all accidents will be posted monthly in each division, classified as to their character.

Front End Fare Collector in Vancouver.—Aiming at speedier service, the British Columbia Electric Railway, Vancouver, B. C., has placed an extra fare collector at the point where outgoing cars stop on Hastings Street at its intersection with Main during the rush hours, so that passengers on paying a fare to him may enter the car by the front end as well as by the rear. The extra collector will be on duty between 4.30 and 6.30 o'clock on weekday afternoons and between 12.30 and 1.30 o'clock on Saturday afternoons. This is an experiment and the company has publicly expressed the hope that its patrons will adapt themselves to the new scheme so that they may benefit by the saving in time.

Toledo Automobilists Scored.—G. O. Smith, safety expert with the Doherty Operating Company, spent some time in Toledo, Ohio, recently in connection with the safety campaign of the Toledo Railways & Light Company. One of his chief criticisms related to the manner in which automobiles are driven. He said that in the business district the city furnished good semaphores and the police officials seemed to be alert, but in the residence districts, automobile drivers apparently paid no attention to the principles of safety. As long as drivers did not realize the responsibility that rested upon them, or were unwilling to assume at least a portion of that resonsibility, accidents were sure to occur, no matter how careful the motormen were.

Personal Mention

E. C. Thomas, general agent of the passenger department of the Pacific Electric Railway, Los Angeles, Cal., has been assigned to special duties.

F. E. Billhardt has been appointed traveling passenger agent of the Pacific Electric Railway, Los Angeles, Cal., with headquarters at Los Angeles.

H. O. Marler, traveling passenger agent of the Pacific Electric Railway, Los Angeles, Cal., will have supervision of the work formerly handled by E. C. Thomas.

R. E. Kelly, formerly traveling passenger and freight agent of the Pacific Electric Railway, Los Angeles, Cal., for the Eastern district, with headquarters at San Bernardino, has been appointed general agent for same territory.

John G. Williams, formerly statistician and accountant of the Public Utilities Commission of the District of Columbia, has resigned to become a member of the valuation staff of the Interstate Commerce Commission. His successor is James H. Botz.

L. O. Gordon, manager of the Valparaiso (Ind.) Lighting Company, has been appointed manager of the Jackson Light & Traction Company, Jackson, Miss., to succeed Raymond H. Smith, whose appointment as manager of the Sheboygan Railway & Electric Company, Sheboygan, Wis., is announced elsewhere in this column.

John M. Atkinson having resigned from the office of chairman of the Public Service Commission of Missouri will engage in the general practice of law in St. Louis, Mo. Mr. Atkinson will specialize in rate, valuation and reorganization cases and all other matters affecting public utilities, before state public service commissions and the Interstate Commerce Commission, and all classes of antitrust suits in State and Federal courts. He was formerly assistant attorney general of Missouri, is the author of the public service commission law of Missouri, and was speaker of the House of Representatives of Missouri.

L. H. Palmer, who was appointed acting general manager of the Eastern Pennsylvania Railways, Pottsville, Pa., on May 8, was appointed general manager of the company on Nov. 1. Mr. Palmer became connected with the Eastern Pennsylvania Railways in April, 1916, as general superintendent. He was appointed acting general manager following the death of W. B. Rockwell. Mr. Palmer was a member of the class of 1902 at Williams College. For five years he was employed in the operating department of the Central Railroad of New Jersey at Jersey City. He entered the service of the Metropolitan Street Railway, New York, N. Y., now the New York Railways, in the fall of 1906 as a clerk in the office of Oren Root, vice-president and general manager. In April, 1908, he was appointed assistant to the general manager for the receivers of that company, and in April, 1909, was made superintendent of transportation. He resigned from the Metropolitan Street Railway in November, 1912, to join the organization of Harrison Williams. In June, 1915, Mr. Palmer went to Baltimore, Md., to do some special work for the president of the United Railways & Electric Company. He resigned from that company to go to Pottsville. Mr. Palmer has been very active in the work of the American Electric Railway Transportation & Traffic Association.

Raymond H. Smith, general manager of the Jackson Light & Traction Company, Jackson, Miss., has been appointed general manager of the Sheboygan Railway & Electric Company, Sheboygan, Wis. The property at Sheboygan was recently acquired by the American Public Utilities Company, which also owns the property of the Jackson Light & Traction Company. Mr. Smith has been connected with the railway and light property at Jackson since November, 1912. He entered the employ of the Waterbury (Conn.) Traction Company in 1897 and occupied various positions until 1900, at which time he was transferred from the transportation department of the company to the headquarters of the Connecticut Railway & Lighting Company, Bridgeport, Conn., which absorbed the Connecticut Traction Company and several other properties in Connecticut. At Bridgeport Mr. Smith was made purchasing agent and secretary to J. E. Sewell, general manager. In 1903 he was made superintendent of transportation in Bridgeport and shortly after was appointed superintendent with jurisdiction extended to the repair shops and power plants. In August, 1907, Mr. Smith was appointed general manager of the Albany & Hudson Railroad, which operates a high-speed third-rail system from Albany to Hudson, the local service in the latter place, the gas plants in Rensselaer and Hudson and furnishes electricity for lighting and power. In July, 1909, he was appointed receiver of the Albany & Hudson Railroad and a few months later was made general manager of the Albany Southern Railroad, the successor to the Albany & Hudson Railroad. He continued with the Albany Southern Railroad until he was appointed to the position at Jackson. In Jackson Mr. Smith quickly identified himself with the business and social interests. He was the first president of the Jackson Rotary Club. Subsequently he was made a member of the Board of Trade of Jackson and last year was vice-president of that organization. He was one of the organizers of the Country Club and is vice-president of the club. When the Associated Charities of Jackson was organized, Mr. Smith was placed on the board of directors and received public recognition in the Jackson *Daily News* for his work in the interest of that body. In commenting editorially on Mr. Smith's resignation from the Jackson Light & Traction Company, the *Daily News* said in part: "Raymond Smith is the sort of a man that Jackson simply can't afford to lose. His fairness, his courtesy, his sense of justice, his willingness to put a shoulder to the wheel in behalf of any worthy cause, have not only served to popularize the public service corporation under his control, but have made the man an asset of tangible value to the entire community. The local lighting and street railway plant did not hold a high place in public favor when Mr. Smith came to Jackson. To bring about a complete change in public attitude, and at the same time put the property on a paying basis, was no small task, yet it was accomplished, and by a complete stranger who quickly won his way into the hearts of our people. It is not strange, therefore, that our citizens feel like assembling in mass meeting and putting forth an earnest protest over Mr. Smith's transfer to a new field of labor. Our people feel that he belongs here, and that they ought to have a prior claim to his services, notwithstanding that he has received a substantial promotion in recognition of his splendid work for the company."

OBITUARY

C. F. Emery, a pioneer in street railway work and for the greater part of his life associated with the Cleveland (Ohio) Railway, died at his home in East Cleveland on Nov. 1. Mr. Emery was born in New Hampshire and began work in that State in a chair factory. He went West and entered the same business. He promoted a race track on Miles Avenue, Cleveland, and so laid the foundation for his fortune. Some years later he established a transportation line between the old Wedell house, on Superior Avenue, and Woodland Avenue. This proved a success and he became a stockholder in one of the street railways. He served for many years as vice-president of the Cleveland Railway and its predecessors. A widow, three daughters and two sons survive.

Joseph S. Wells, secretary and treasurer of the Utah Light & Traction Company, Salt Lake City, Utah, is dead. Mr. Wells succumbed to pneumonia on Oct. 18 after a very brief illness. He was born on May 25, 1862, and entered business as a clerk. He became associated with the Utah Light & Railway Company in 1889, in which year he was also appointed secretary of the Salt Lake City Railway. In 1891 he became the company's secretary and treasurer, and in 1901 he was chosen as secretary and treasurer of the Consolidated Railway & Power Company. In 1904 he was made vice-president and cashier of the Utah Light & Railway Company and in 1906 general manager, which office he held until the recent transfer of the control from the Harriman estate, since which he had been secretary, treasurer and a director of the company.

Construction News

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

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

RECENT INCORPORATIONS

Atlanta & Anderson Electric Railway, Atlanta, Ga.—Application for a charter has been made by the Atlanta & Anderson Electric Railway to construct a line from Anderson to Atlanta, via Hartwell, Royston, Commerce, Jefferson, Hoschton, Duluth, Norcross, Doraville, Chamblee, and Decatur, 140 miles. The line will connect at Anderson with the line of the Piedmont & Northern Railway and will join the Decatur line of the Georgia Railway & Electric Company and also the tracks of the Georgia Railroad at DeKalb Avenue, in DeKalb County, and, according to the petition, will use both of these lines into Atlanta. Among the incorporators are J. L. Murphy, Kirkwood, W. H. Wright, L. G. Mann and Paul D. Reid, all of Atlanta. [Sept. 9, '16.]

FRANCHISES

Peoria, Ill.—The Peoria & Chillicothe Electric Railway has accepted the forty-eight year franchise granted by the Council of Peoria to operate cars over the tracks of the Peoria Railway along Adams Street. [Nov. 4, '16.]

Scranton, Pa.—The Scranton & Binghamton Railway has received a franchise from the Council of Scranton to construct an extension into the center of the town.

Nashville, Tenn.—The Nashville Railway & Light Company has received an extension of its franchise from the City Council of Nashville. It is planned to extend Deaderick Street from Fifth Avenue to the Capitol Boulevard and double-track Deaderick Street. The double tracks will also be laid through the Capitol Boulevard to Church Street, forming a loop which will give an all-car service in the business section of the city. An arcade is to be placed from Deaderick Street to the transfer station. Under the ordinance introduced, the entire expense of making the changes is to be borne by the Nashville Railway & Light Company. Other improvements scheduled in the ordinance are to lay an additional track on Fourth Avenue, south, from Broadway to the Sparkman bridge, a double track across the bridge to First Street and from there a single track, with necessary switches, on Shelby Avenue to Eleventh Street. The ordinance also calls for laying a track on Fifth Avenue, south, from Broadway to Mulberry Street, through private property to Second Avenue, and thence to Lafayette Street and the corporate limits. It will require laying a double track on Fifth Avenue, north, from Deaderick Street to Johnston Avenue. Extension of the West End street car system is proposed by laying a necessary track to operate a line on Compton Road from West End Avenue to Blakemore Avenue.

Huntington, W. Va.—The Ohio Valley Electric Railway Company has received an extension of its franchise from the city of Huntington to run to 1955. In return the company has agreed to make three extensions to its lines within five years, making a total of about 3 miles of new track and involving an expenditure of $100,000. After being in operation ten years it will pay an excise tax of 1 per cent on the gross revenue from two of the extensions.

TRACK AND ROADWAY

Montecito Railroad, Los Angeles, Cal.—This company reports that it will construct a 1-mile extension during the coming year.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—The Railroad Commission of California has issued an order authorizing the San Francisco-Oakland Terminal Railways to abandon for five years the operation of street cars on San Pablo Avenue, from the southerly boundary line of Richmond to Potrero Avenue.

Connecticut Company, New Haven, Conn.—The Public Utilities Commission of Connecticut has granted the Connecticut Company permission to relocate and straighten its tracks to conform to the widening of Congress Street from Housatonic Avenue to Main Street, Bridgeport.

Chicago (Ill.) Surface Lines.—A permit has been received by the Chicago Surface Lines from the superintendent of streets to construct extensions on Ewing Avenue from 108th Street to 118th Street, on 118th Street from Ewing Avenue to Brandon Avenue and on Brandon Avenue from 118th Street to 136th Street.

Woodstock & Sycamore Traction Company, Genoa, Ill.—A report from the Woodstock & Sycamore Traction Company states that it contemplates electrifying its road. The company operates a line between Sycamore, Genoa and Marengo, 26 miles, gasoline cars being used.

Murphysboro Electric Railway, Light, Heat & Power Company, Murphysboro, Ill.—A contract has been awarded by the Murphysboro Company to the Heman Construction Company, St. Louis, Mo., for the construction of an extension to Carbondale. Work will be begun at once and will be completed within six months. The cost of the proposed extension will be about $2000,000.

Union Traction Company of Indiana, Anderson, Ind.—Work has been begun by this company double-tracking 1 mile of track on its Indianapolis-Anderson division leading into Indianapolis. The cost is approximately $40,000.

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.—This company has begun raising its tracks 6 in. through Wayne County, Ind.

***Fort Madison, Iowa.**—It is reported that plans are being considered for the construction of an electric railway from Fort Madison to Keokuk, via Nauvoo, and probably to Quincy, Ill. J. M. Fisher, H. S. Payne and J. M. Smith, all of Nauvoo, are interested.

Morristown & Erie Railroad, Morristown, N. J.—The Morristown & Erie Railroad will electrify its line extending from Morristown to Essex Falls, 11 miles. The company has leased for six months an Edison electric storage battery car for a tryout under all weather conditions. If it is successful the company will purchase two cars and operate the road on a largely increased schedule.

Salem & Pennsgrove Traction Company, Salem, N. J.—Plans have been revised for the rebuilding of two spans of the Penns Neck bridge to permit the Salem & Pennsgrove Traction Company to operate its cars over the structure. The revision of plans was made necessary because some of the bids for the work ran as high as $72,000.

Buffalo & Depew Railway, Buffalo, N. Y.—This company reports that during the spring of 1917 it will construct its proposed extensions from Depew to Bowmansville, 2 miles, and from Depew to the New York Central Railroad Station at Lancaster, ½ mile.

Interborough Rapid Transit Company, New York, N. Y.—Operation was begun by the Interborough Rapid Transit Company on the Ely Avenue extension of the Queensboro Subway from Hunter's Point Avenue station in Queens north to the new Queensboro Bridge Plaza station on Nov. 5. The extension will ultimately continue west from Park Avenue to Times Square. At the Bridge Plaza station in Queens it connects with the Astoria and Corona elevated extensions which are being pushed to completion and which should be in operation within the next few months. The Public Service Commission for the First District has approved two agreements providing for the completion of the connection between the West Farms branch of the First Subway and the Jerome Avenue extension of the Lexington Avenue subway at 149th Street and Mott Avenue, and for the lengthening of the platforms of the Mott Avenue station of the First Subway about 280 ft. to the east. The two agreements have been submitted to the Board of Estimate for approval and for the appropriation of the necessary funds. The work of completing the physical connection between the First Subway and the Jerome Avenue line will be done by the Interborough Rapid Transit Company and paid for at an estimated cost of about $110,000. The station platform lengthening will be paid for by the city at an estimated cost of about $350,000.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.—This company will lay 100-lb. rails from the Toledo & Ohio Central Railroad track to the eastern corporation line of Bucyrus next spring. The foundation will be of cement and the rails will be laid on steel ties.

Toledo Railways & Light Company, Toledo, Ohio.—A resolution was adopted by the City Council of Toledo on Nov. 6, requesting the Toledo Railways & Light Company to extend the Cherry Street line to the city limits in West Toledo. Another resolution asks for a Y-switch on Detroit Avenue at the terminal of the South Avenue line. A third asks for the removal of the tracks from the east to the west side of Miami Street for some distance and that a loop be built at the end of the line, so that single-ended cars may be used.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—Work which was begun about a year ago has practically been completed by the Mahoning & Shenango Railway & Light Company on the reconstruction of its tracks from Wilson Avenue, East Youngstown, to Spring Common on West Federal Street. The improvement involved an outlay of more than $250,000.

Sand Springs Railway, Tulsa, Okla.—This company reports that it is double-tracking its line.

Brantford & Hamilton Electric Railway, Brantford, Ontario.—The Board of Railway Commissioners has authorized the Brantford & Hamilton Electric Railway to reconstruct its bridge across the Toronto, Hamilton & Buffalo Railway at Cainsville.

London, Ontario.—The townships of South Dorchester, Westminster and Dereham will submit a bylaw to ratepayers in January to provide $1,000,000 for a new hydroelectric railway.

London (Ont.) Street Railway.—It is reported that this company is completing the construction of a second track on a 2000-ft. section of Dundas Street, west of the fair grounds. The company plans to extend the Hamilton Road line from the present terminus at Egerton Street to West Street, 2200 ft.

Porcupine-Rand Belt Electric Railway, Porcupine, Ont.—Plans are now being revived by the Porcupine-Rand Belt Electric Railway for the construction of its proposed line. The company was incorporated in 1912, to construct an interurban railway from a point near the eastern boundary of the Province of Ontario in McGarry to Larder City, McVittie, Hearst, Gauthier, McElroy, Lebel, Boston, Dane, Otto, Teck, Grenfell, Eby, Burt, Holmes, Alma, Baden, Robertson, McNeil, Argyl, Hincks, Cleaver, Geikie, Bartlett, Musgrove and Doyle and surveys were said to have been completed for some of the lines. A special general meeting of shareholders was called to be held in Toronto recently to elect directors, to close a contract with the Porcupine Construction Company, to build two branch lines from Boston Creek to Swastika and from the Temiskaming & Northern Ontario Railway via Larder Lake, and for other purposes. W. J. James, Allandale, Ontario, secretary-treasurer. [Feb. 23, '13.]

Montreal (Que.) Tramways.—This company plans to construct at an early date an overhead bridge on Fortification Lane, Montreal.

Dallas, Tex.—Mark Lowd, chief engineer for the Stone & Webster interests in Texas, announces that a double track steel bridge will be constructed over the Trinity River and across the bottoms and will carry the interurban tracks and the tracks of the Oak Cliff street-car lines. This double track steel bridge will form a part of the steel and concrete viaduct that will span the Trinity River and bottom lands from the tracks of the steam railroads entering the new Union Passenger Terminal to First Street in Oak Cliff. The interurban lines recently completed a portion of this viaduct, constituting the eastern approach and that portion which spans the tracks of the railways, at a cost of $110,000. The street-car lines and all interurbans entering Dallas from the west and south now use this overhead crossing. Mr. Lowd announced that work on the extension of this viaduct will begin soon after the Dallas franchise traction problems are settled and will be pushed to completion. It is estimated that the work will cost something more than $300,000.

San Antonio, Gonzales & Houston Interurban Railway, Houston, Tex.—This company proposes to erect the following bridges in connection with its proposed line from Houston to San Antonio: Across Brazos River at Richmond; Colorado River at Garwood; Lavaca River; Guadalupe River at Gonzales; iron span with trestle approaches. Steeve Holmes, Leesville, president. [Oct. 28, '16.]

Marlin-Temple Interurban Company, Marlin, Tex.—William Ginnuth announces that the right-of-way for the Marlin-Temple Interurban Company has been secured through Bell County. Construction work is now under way on the bridge that is to span the Colorado River between Temple and Marlin. [Sept. 16, '16.]

Charleston (W. Va.) Interurban Railroad.—This company reports that it expects to construct an extension from Cabin Creek Junction to Montgomery, 10½ miles, in 1917.

Wisconsin Interurban System, Madison, Wis.—It is reported that work on this company's proposed line from Madison to Portage, Prairie du Sac and Janesville will be begun in the spring of 1917. J. E. Jones, Madison, president. [Sept. 2, '16.]

SHOPS AND BUILDINGS

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.—This company is considering the erection of a new depot at its Washington Street terminal in Paris.

Reading Transit & Light Company, Reading, Pa.—This company plans to erect two passenger shelters for people awaiting street cars in the middle of Penn Square at Fifth Street, providing public sentiment is not against the improvements and the City Council grants the necessary permission. The shelters would be lighted and heated and provided with seats, with an announcer to call out the arrival of cars. The cost would be about $5,000.

Wisconsin Interurban System, Madison, Wis.—It is reported that this company, which proposes to construct a line from Madison to Portage, Prairie du Sac, and Janesville will construct some small passenger stations in the spring of 1917. J. E. Jones, Madison, president.

POWER HOUSES AND SUBSTATIONS

Aurora, Plainfield & Joliet Railway, Joliet, Ill.—This company reports that it is moving its substation from Joliet to Plainfield.

Albia Light & Railway Company, Albia, Iowa.—A report from the Albia Light & Railway Company states that it might rebuild its power house within the next three months. The company has purchased three 250-hp. Murray water tube boilers and expects to purchase one 400-kva. generator, one 100-kva. generator and one 300-kw. railway machine.

Kentucky Traction & Terminal Company, Lexington, Ky.—Announcement has been made by Kentucky Traction & Terminal Company that arrangements have been made for the installation of a 4000-kw. turbine generator in the local powerhouse. This will supplement the two 2500-kw. turbines installed some months ago.

Vicksburg Light & Traction Company, Vicksburg, Miss.—This company plans to install a 15,000-kw. turbo-generator and auxiliary equipment.

St. Johns (N. B.) Street Railway.—This company is building a brick and concrete pumping station at St. Johns.

Toledo Railways & Light Company, Toledo, Ohio.—A new 20,000-kw. turbine has been purchased by the Toledo Railways & Light Company for its Water Street power house. The installation of this unit will bring the capacity of the station up to 85,000 kw.

Quebec Railway, Light & Power Company, Quebec, Que.—This company has ordered a 2000-hp. motor generator from the Canadian Westinghouse Company.

Galveston (Tex.) Electric Company.—This company announces it will install a 300-kw. motor generator in its plant at Galveston.

Ashland Light, Power & Street Railway, Ashland, Wis.—This company will increase the capacity of its power house at Ashland from 3000 to 10,000 hp. An addition will be made to the boiler room and four 600-hp. boilers will be installed. A new concrete stack will also be built.

INDUSTRIAL NEWS

Review of Trade and Market Conditions

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

EXTREME CONDITIONS CONFRONT THE MANUFACTURER

Shortage of Materials and Labor—Criticisms from Purchasers on Account of Slow Deliveries—Patience the Keynote

Never before have manufacturers in the electric railway industry been confronted with problems so serious as those now being faced. The chief trouble in their production departments has been shortage of raw materials and skilled labor. A secondary situation, developed in the sales department, is that of strained relations with customers due to slow deliveries. This latter situation should not have been as general as it now is had more patience been exercised by both buyer and seller and had the actual manufacturing conditions been set before the buyers in a more convincing way.

It is now, and for some time it has been, practically impossible for manufacturers to get deliveries of raw materials with any degree of certainty. High premiums have helped but little, and conditions seem to be growing worse rather than better. Some of the prominent manufacturers in the electric railway industry deeply resent being criticised for not having done the impossible. The manufacturers as a class feel that they have been doing heroic work in order to meet the requirements of their customers, yet it is stated that occasionally the railway purchasing agent seems to overlook or disregard the existing market conditions and unduly charges the manufacturer for delay in shipments, when it has been absolutely impossible to fulfill contracts made in normal times.

Expressing Raw Materials

Manufacturers have put enormous pressure on the producers of raw materials and have gone to the extra expense of having their raw materials expressed into their factories in order to accelerate delivery. In fact, it has not been uncommon for deliveries of very heavy materials to be shipped by express in order to save a few days' time for the benefit of the railway company. Raw materials must be paid for now at top-notch prices, and, as freight service is unusually slow, there are daily illustrations of express shipments between raw material producers and manufacturers paid for by the manufacturers which in ordinary times would be regarded as an economic waste. For example, the transportation by express of a carload of special steel from central New York to a factory in Illinois in order to save a comparatively small time on the delivery of the finished product illustrates but one of the extremes to which the manufacturers have gone in their endeavors to make more prompt deliveries.

When a manufacturer goes to such expense it should be quite evident to the purchaser that everything has been done to accelerate delivery which could reasonably be expected under existing conditions. It has been pointed out, however, that sometimes purchasing agents consider these heroic efforts on the part of the manufacturer as a part of his obligation to the purchaser, and therefore the manufacturer gets little credit for his extra effort. In fact, if the deliveries are greatly delayed the manufacturer, it is said, may consider himself lucky if he retains the good-will of such customers.

Steel and Copper Deliveries Unreliable

The manufacturer's real problem right now is with the producers of his raw material. As pointed out recently in the *Iron Age*, "Never have producers of iron and steel had so many delicate questions to settle as to what is right in allotting deliveries to their customers. In ordinary affairs the distinction between what is right and what is wrong is supposed to be quite clearly defined, but when mills are behind in deliveries there is simply a choice of evils. The ambition of the average steel maker is to allot the delivery so that all customers will be equally served, that such inconvenience as must be suffered shall be equally distributed."

The iron and steel industry is becoming seriously embarrassed by a shortage of coke and coal, due to the shortage of labor and of cars. The pig-iron situation is becoming strained, and with an increasing consumption it looks as though the furnaces might not be able to take care of the demand. Stocks have become low and prices are stronger, with some talk that there may be a scarcity of ore another season.

Of any one raw material, however, the most difficult for the electric railway manufacturer to obtain at the present time is copper. The shortage of copper for delivery before July, 1917, has caused some of the large sellers to announce that they will be out of the market for the first quarter. One authority estimated that there was only 5 per cent, or approximately 50,000,000 lb., of 1917 copper remaining unsold for delivery before July. These figures are said to be based on a refining capacity next year of 2,000,000 long tons.

Malleable-iron parts are almost impossible to obtain in some sections of the country, and in all sections the price per pound for a given pattern has advanced 200 or 300 per cent. Every conceivable means has been taken to accelerate and stabilize malleable deliveries. One manufacturer has made duplicate patterns and places his malleable-iron orders with more than ten different foundries. Thus, if one foundry has a strike or is so overcrowded that it cannot possibly approach delivery promises the order can be quickly shifted to any one or more of the others on a reliable working basis, and the earlier established relations prevent a waste of time in preliminary negotiations.

The foregoing shows the conditions with regard to some of the raw materials. There are so many others upon which the manufacturers of electric railway equipment depend that it would be out of the question to review them at this time. However, it is safe to say that, so far as raw materials are concerned, the manufacturers have never before been called upon to expend so much money and effort in order to get their supplies. Most electric railway material manufacturers have greatly added to their production departments, and many have gone so far as to withdraw men from their sales organizations and send them out at a considerable expense to locate and to get deliveries of raw materials.

Sales Manager Speaks for Manufacturers

To quote one sales manager: "It is not uncommon in these times for people who furnish raw materials to tell the manufacturer that 'No definite promise of shipment can be made.' If the manufacturer were to make a similar statement to his railway customer the chances are the relation between the two would become strained, to say the least; yet the average railway customer in placing an order with the manufacturer insists upon having a certain definite promise of shipment, which is frequently extremely difficult for the manufacturer to meet with certainty. The reasons for this, of course, are the conditions of the raw materials market and existing labor questions.

"The reputable manufacturer, of course, bases his promises with the railway company upon shipping promises which he has received from the people who supply him with raw materials, and he does his utmost to secure promises of shipment upon which he can rely. The raw material man does not sacrifice profit to keep delivery promises, as does the average manufacturer when dealing with railway companies. In short, the point to be emphasized is that the manufacturing companies are working under the most trying conditions in industrial history; and railway buyers should hesitate to condemn them for delays in shipment,

particularly where there is evidence to the effect that the manufacturer has done his utmost to make good."

In the larger plants production has been such a task that it has been physically impossible to fulfill orders in a routine way. Therefore it has been necessary frequently to deliver to one customer part of the material manufactured in advance for another customer. In this way the emergencies of the various customers have been met as best could be done.

Future Conditions Doubtful

The conditions in the manufacturing field to-day warrant much thinking and the exercise of much patience on the part of both buyer and seller before either is condemned by the other for failure to fulfill promises made but a short time ago. The situation changes very rapidly. No one can tell what new condition will confront the manufacturing industry a month or even a week hence, and things in industrial circles are moving so fast that any noticeable change in the raw material situation one week seems to affect the dependent industries almost immediately.

A spirit of mutual helpfulness has always been prevalent in the electric railway industry. The manufacturers serving that industry are credited by the railways with having done their full share toward the development of improved mechanical and engineering equipment. And it is fair to presume that in the trying times of the last few months promises have been made for deliveries of material that strictly could not be fulfilled. Allowances for most of such failures have been made, and it is to be hoped that in the future nothing will happen to mar the fine spirit with which the buyers and sellers have formerly co-operated.

LARGE DEMANDS FOR PORCELAIN INSULATORS CANNOT BE MET

Scarcity of Skilled Labor as Well as of Malleable Fittings —Railway Buying Normal—Higher Prices Probable—Buying Heavy for 1917

Porcelain insulator manufacturers have large orders on hand and are experiencing difficulty in getting sufficient men and material to keep production in pace with orders. The material shortage is not one of clay, but of the metal fittings for suspension insulators. The insulator manufacturers are also embarrassed by a shortage of skilled labor in the potteries. Buyers are actively seeking increased quantities of insulators, but owing to the difficulties mentioned some manufacturers are not soliciting orders for the suspension insulators as actively as for those of the pin type.

Inquiries are coming from all sections of the country except the South and the Pacific Coast states; from these sections some manufacturers report good business, while others report it only fair. In the mining field the demand is 50 per cent greater than that of last year. In fact, insulator purchases in all divisions of the electrical industry except railways are far above normal. In the electric railway business inquiries for insulators are said to be about normal.

While the prospects for orders are excellent, conditions inside the factory are not all that the manufacturer could desire, as it is difficult to accelerate production. One factory, for example, is stated to be 500,000 suspension-type and 75,000 pin-type insulators behind in its orders, and ninety days is absolutely the best delivery that can be promised. Conditions in other plants are quite similar, and it would not be surprising if deliveries of four months will be quoted in the near future.

Insulator prices have advanced four times during the past year, the total increases being about 30 per cent, and, due to the general increase in the cost of manufacture, even higher prices are anticipated unless there should be some remarkable change in industrial conditions. Labor, more than any other item, is said to be responsible for the increased prices. On account of the location of many insulator factories near munitions plants, it is only with great difficulty that the insulator manufacturers can keep their mechanics from being enticed by extraordinary wage offers into the war material factories. Generally speaking, the insulator manufacturers state that they have plant facilities to operate at about 50 per cent above normal. Not many, however, are running at that rate, because they cannot obtain men to operate the equipment satisfactorily; and the trade does not have a large following of skilled workmen such as is found in most other industries.

Owing to large demands and uncertain manufacturing conditions, salesmen are advising their customers to place orders in advance of present requirements. The prospects are good for heavy buying until at least the middle of 1917, and the problem now is one of manufacturing and making deliveries rather than that of getting orders.

JOHN B. KILBURN ON FOREHANDEDNESS IN BUYING

Manufacturers Have Difficulty in Placing Orders with Steel Mills for Delivery Within Six Months

Among the comments received on the article mentioned above, which appeared in the ELECTRIC RAILWAY JOURNAL for Oct. 21, 1916, on page 915, was one from John B. Kilburn, vice-president, Hale & Kilburn Company, Philadelphia, Pa., which is as follows:

"We have noted with interest your articles on the subject of "Forehandedness Desirable in Buying," and believe the comments are very timely. Probably we cannot add much in the way of suggestion to what has already been offered, unless it is to say that in the case of a large number of the materials entering into our manufactures the cost has advanced enormously, and the chief difficulty is in securing material within any reasonable time at any price. In the case of steel, as you are probably aware, the principal mills refuse to accept orders—particularly for sheet metal—for delivery inside of six months, and it has been the custom this fall to take all the orders offered and divide their tonnage proportionately among the customers.

"Another feature is that where it was possible heretofore to place contracts for probable requirements with the provision that regular monthly quotas not used could be canceled, mills now refuse to accept a provision of this kind and require customers to take what they contract for.

"Therefore, manufacturers are more cautious and are unable to provide as fully as heretofore for future requirements, unless by carrying an enormous stock to insure early delivery of their product. All of this, with many similar changes from standard methods of doing business, emphasize the necessity for placing car contracts long in advance of requirements in order to secure reasonable delivery and most favorable prices."

CAR ENAMELS AND VARNISHES

Langdon B. Valentine Comments on the Use of Varnish and Enamel

An article entitled, "Car Painting Materials Are High," which appeared in the ELECTRIC RAILWAY JOURNAL of Oct. 14, 1916, page 859, set forth in a brief way a review of the trade conditions in the paint, oil and varnish field, so far as it has to do with the construction and maintenance of electric railway equipment.

The article stated that there was a growing tendency among electric railways to change the outside painting of cars from paint and oil coats with varnishes to enamel.

Langdon B. Valentine, second vice-president, Valentine & Company, New York, N. Y., commenting on the earlier article, said in part:

"You are correct in stating that the prices of raw materials entering into the manufacture of paints and varnishes are now very high. Since your article was written there have been further advances.

"In regard to the use of enamels for finishing the outside of electric railway cars, we believe that this is not the correct method of finishing to insure the most permanent as well as the best looking job. Some roads are using enamels on their old equipment where they do not wish to spend the time and money for a first-class job, as there is no doubt but what there is a saving in first cost by the use of enamels.

"We have made hundreds of experiments testing out the relative durability of enamels and clear finishing varnish over flat color. There is absolutely no doubt but the clear finishing varnish will hold its luster much longer and outwear any enamel."

COPPER AND OTHER METAL PRICES RISING

Copper for December Delivery Is Quoted at 30 Cents and Iron and Steel Gradually Advancing

Again the swing of the pendulum of the metal market is felt and prices are advancing. Early this week electrolytic copper was quoted nominally at 29.5 to 30 cents for immediate delivery with December delivery but 0.25 cent lower. This is an advance of 1 cent per pound during the week, and several very heavy inquiries at these prices have been received. Holders of the red metal, however, are not particularly eager to sell at these quotations, anticipating as they do to dispose of their holdings at much better prices.

Nor is the spot market alone in this condition. Reports from producers indicate as a conservative estimate that 80 per cent of the copper to be produced during the first quarter of 1917 has been sold, while of that to be produced during the first six months of 1917 from 60 to 70 per cent has been contracted for. Under such a strain the market advanced to 28.75 cents for first quarter electrolytic and 27.75 for first half 1917 electrolytic.

According to reports, brass manufacturers have been the biggest buyers of late.

Pig iron and steel prices are steadily advancing. During the first week in November billets advanced by around $5 a ton. Rods, bars and plates were the same, but shapes advanced about 4 per cent. Black sheets advanced slightly and galvanized sheets from $4.75 to $5. Large buying by manufacturers is reported to be the reason for the advancing market.

ROLLING STOCK

New York Municipal Railway Corporation, New York, N. Y., is reported to be asking for bids on 100 subway cars.

South Bethlehem & Saucon Street Railway, South Bethlehem, Pa., has placed an order for one single-truck freight car.

Springfield, Troy & Piqua Railway, Springfield, Ohio, has purchased a new trailer car and one freight car from the Barney & Smith Car Company.

New York Central Railroad, New York, N. Y., is reported to be preparing to order eighteen 70-ft. multiple-unit cars for the Hudson River electric division.

Hammond, Whiting & East Chicago Railway, Chicago, Ill., are in the market for two four-motor, semi-steel, monitor-deck, double-truck, pay-as-you-enter cars.

Morristown & Erie Railroad, Morristown, N. J., has leased from the Railway Storage Battery Company a 50-ft. combination baggage and passenger Edison storage battery car to be used temporarily until new cars can be supplied by this company. The seating capacity of the car is 45.

TRADE NOTES

Perry Ventilator Company, New Bedford, Mass., has received an order to equip with ventilators the fifty cars recently ordered by the Boston Elevated Company from The J. G. Brill Company.

Carbo Company, Chicago, Ill., has moved its office to the factory at Chicago Heights, Ill., which will enable it to keep in close touch with factory operations and to fill orders with greater promptness in the future.

H. H. Lytle has been appointed representative west of the Mississippi River for the National Safety Device & Manufacturing Company, Chicago, Ill., to sell this company's air rectifier, which is designed to prevent frozen air-brake troubles.

The Valentine-Clark Company, Minneapolis, Minn., whose entire plant was reported destroyed by fire, did not suffer as badly as was reported. The company was fortunate in not losing its buildings, tools, and treating plants, nor a substantial part of its stock, and it is now prepared to fill orders for Northern or Western red cedar from its Minnesota transfer yard.

The Johnson Fare Box Company, Chicago, Ill., is placing forty-four equipments of its fare boxes for metal tickets, which is a complete equipment for the system, on the cars of Public Utilities Company at Evansville, Ind.; fifty-four boxes, which is a full equipment for the pre-payment type cars of the Mobile Light & Railroad Company, Mobile, Ala., and thirteen equipments for as many new cars in Wilmington, N. C. Orders have also been received for these boxes for some of the lines of the Holyoke, Mass., and Watertown, N. Y., properties.

ADVERTISING LITERATURE

Detroit Fuse & Manufacturing Company, Detroit, Mich., has issued Bulletin 37-A on its "Square D" steel inclosed switches.

Pyrene Manufacturing Company, New York, N. Y., has issued a pamphlet on metal boxes and vehicle brackets for fire extinguishers.

Safety Car Devices Company, St. Louis, Mo., has issued a sixteen-page bulletin on the safety car brake with safety control features.

Smith-Ward Brake Company, New York, N. Y., has issued an illustrated pamphlet describing a brake-lever strut for use on slack adjusters.

R. D. Nuttall Company, Pittsburgh, Pa., has issued bulletin No. 15 on trolley poles, trolley wheels, harps, sleet cutters and trolley bushings.

Ohio Brass Company, Mansfield, Ohio, agent for Crouse-Hinds headlights, has issued a folder on "Imperial" incandescent headlights for city service.

Wheel Truing Brake Shoe Company, Detroit, Mich., has issued a pamphlet showing sections representing some of the different styles of its grinding shoes.

Collins Metallic Packing Company, Philadelphia, Pa., has issued a pamphlet on wheel flange lubrication showing the use of the Collins wheel flange lubricator.

Chicago Pneumatic Tool Company, Chicago, Ill., has issued bulletin 34-Z describing and illustrating the type N-SS automatic high speed steam driven compressors.

Differential Car Company, New York, N. Y., has issued Bulletin D3 setting forth the advantages of its differential electric dumping car with traversing tilting body.

Ohmer Fare Register Company, Dayton, Ohio, has issued a pamphlet descriptive of its fare box system. The pamphlet bears the title, "A Basis of Better Business."

Cobb Shockless Railroad Crossing Company, Los Angeles, Cal., has issued a report of the operating tests that have been made with this type of railroad crossing. The report covers an installation which was made in 1914 and which is still in operation at the present time.

Root Spring Scraper Company, Kalamazoo, Mich., has issued a thirty-two-page pamphlet on the "Passing of the Sweeper." This pamphlet describes and illustrates the scrapers made by this company, which include both hand and air-operated types for double-truck cars.

NEW PUBLICATION

Electrical Railways, by Henry M. Hobart, M.I.C.E., reprinted by the Institution of Civil Engineers, Great George Street, Westminster, S. W., London, England. Eighty-eight pages. Paper.

This is a reprint of the "James Forrest" lecture prepared by Mr. Hobart and delivered for him in his absence by J. A. F. Aspinall at the meeting of the Institution held on Dec. 14, 1915.

In this lecture Mr. Hobart first gave a brief résumé of the subject of power supply for heavy electric railways, illustrating the discussion by reference to the Butte, Anaconda & Pacific Railway electrification. He compared the performance of the steam locomotive with that of the electric locomotive, illustrating his comparison by reference to the Chicago, Milwaukee & St. Paul and the Norfolk & Western electrifications. The experience of the New York Central Railroad was also mentioned. He concluded with a comparison of the d.c. and a.c. systems, his conclusions being summarized thus: "The author is satisfied that the high-pressure direct-current system is so distinctly superior in essential respects as ultimately to insure its general use on main-line railways in preference to the single-phase system or any of its modifications."