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TRAFFIC SURVEY CHARACTERISTICS

This week we are beginning a valuable series of articles by Mr. Doolittle on the subject of traffic survey characteristics and practices. We say valuable, for it is highly important that every electric railway operator should thoroughly understand the purpose and the possible results of traffic studies in their relation to the provision of maximum accommodation for passengers. Under the existing complexity of operation, with its restricted margin of profit, the circumscribed personal relation between the management and the public and the wider commission and public interest in utility service, it is apparent that systematic and scientific methods are necessary to a proper adjustment of service to traffic. For the present, the point most worthy of emphasis in Mr. Doolittle's admirable analysis of traffic characteristics is the fact that in dealing with diversity of loading during non-rush hours two phases of the subject must be considered—passengers without seats and seats without passengers—not the former only. After a study of the diversity factor, additional service to a certain degree can be furnished at reasonable cost in order under normal conditions to furnish seats for all, but always the important figures concerned are the seat-miles and the passenger-miles and not the seats and the passengers. In other words, the demand of passengers for passenger-miles can be advantageously granted by a railway only to such an extent as the inelasticity of the unit of seat-miles per round trip does not cause an expensive burden on general traffic because of idle seat-miles. The value of measuring service according to the ratio of seat-miles to passenger-miles cannot be overestimated.

UNINTENTIONAL HEAT TREATMENT

An interesting article was published in the issue of this paper for April 10 describing an experiment in building up worn wheel flanges by welding. The author invited co-operation in connection with further experiments, as the plan was economical and seemed to be promising. In this issue a communication is printed giving valuable information on the metallurgy of the process and indicating that unfortunate conditions may be produced within the metal by a non-uniform heat distribution. We all know from general observation how sensitive steel is to temperature changes, particularly to sudden changes, chilling or quenching producing in general a hardening effect. This effect depends upon the temperature from which, and the rate at which, the quenching occurs, as well as the chemical composition of the steel. It follows, as a matter of course, that in a locally and highly heated mass, such as occurs in spot welding, different zones are heated and cooled very differently. Hence we should expect some such effect as to that which Mr. Hayes refers. Moreover an analagous condition has been found in other welding operations. Fortunately, the experiment described is one easily repeated. It is to be hoped that others of our readers will investigate the subject in the same rational manner. There are, it seems to us, three questions to be answered. First, if wheel flanges and treads can be built up without serious injury to the structure of the metal, would such building up be profitable? Assuming an affirmative answer for the sake of argument, then, in the second place, is it possible to build up worn or broken sections without the formation of the hard and the soft zones described by Mr. Hayes? Finally, assuming a negative answer for the same reason, is such stratification a dangerous condition under some conditions of railway service, and if so under what conditions? The subject is one on which further light could profitably be thrown.

POLICIES WITH EMPLOYEES

As a succinct, clear and forceful exposition of the policies pursued by a railroad in the handling of its employees, the statement presented last week to the federal commission on industrial relations by W. W. Atterbury, vice-president Pennsylvania Railroad, is a remarkable document. The analysis of the company's view of unionism is worthy of note. While recognizing the propriety of union organizations for the betterment of conditions, the company in carrying out its supreme duty of insuring safety of operation feels justified in resisting all union activities tending to undermine discipline, and in maintaining continuity of operation follows the plan of opposing labor organizations addicted to sympathetic strikes and other devices not concerned with intra-company affairs. This is a good platform, but with this word of commendation we pass to the general fact back of it—that the ideal characteristic of employment on the Pennsylvania Railroad is permanency. Through training, liberal wages and welfare provisions this carrier has achieved an exceptionally high figure for average length of service; in fact, the majority of its employees work until pensioned or dead. While we recognize that a system like the Pennsylvania Railroad can offer attractions of employment not possible of attainment by electric railways, particularly the smaller lines, yet we believe that the latter carriers could profit by carrying out more fully the Pennsylvania Railroad's conception of one big family.

REGENERATION AND ELECTRIC BRAKING

The recent revival of interest in energy regeneration for electric traction calls attention to the fact that the idea is not new even when applied to direct-current motors. In fact, it was one of the first ideas that suggested itself to the pioneers in electric traction, and considerable inventive skill was devoted to devising means for accomplishing this end. Electric braking, which might be considered as a modification of the idea of regeneration in that it uses the momentum of a train when stopping to generate current, has been applied more extensively to direct-current motors than regeneration, especially abroad. But while the electrical equipment required for electric braking is much more simple than that required to make a railway motor send back current into the line when the train is coasting, both services impose on the motor an added load. This means that motors of larger capacity than would otherwise be required have to be used, and in the past this has been considered sufficient of a handicap to prevent the adoption of the plan.

On a mountain division of an electrified steam railroad, however, a different situation is presented, and all of the three-phase installations of this kind, so far as we now recall, have been equipped with regenerating motors. This fact indicates that if regeneration can be secured easily from a direct-current motor, as is predicted in the case of the Chicago, Milwaukee & St. Paul locomotives, the advantages seem to be worth while.

Manifestly the conditions under which regeneration is most desirable are those under which it can be made permanently to reduce the peaks on the powerhouse and thus reduce the investment required in generating apparatus. Where this cannot be done, any saving effected by regeneration in kilowatt-hours only is of considerably less value and in the case of a hydroelectric power station, may be of no value at all. But an installation with a small number of locomotive units, in which kilowatt-hours only are saved, may become later an installation with a large number of locomotive units in which the extent of the regenerated energy will be reflected in the reduced kilowatt capacity of the station.

So far as other possible savings are concerned, strictly speaking, there is hardly anything cheaper than brakeshoes. Nevertheless, if the work of stopping a long train or of holding a long train at a predetermined speed on down grade can be transferred from the brakeshoes to electrical apparatus, cheaply and effectively, a distinct gain is no doubt obtained, even if its full effect is not shown in a saving in brakeshoe metal, wheels and track.

No one who has not actually observed the effect of regenerative braking on a three-phase mountain railway can realize the great ease of control over the brakes possessed by the locomotive engineer, and this must have its effect in operating economies through the maintenance of better schedule speed. Any steps looking forward therefore to improved methods of regeneration as applied to direct-current apparatus are of interest.

HIGHER FARES AND THE WAGE EARNER

At public hearings before commissions sitting in jurisdiction upon street railway fare increases one of the chief arguments against higher rates is usually based upon the effect of the additional charge upon the wage earner. It is constantly claimed that even an additional fare of 2 cents per person riding per day is a serious burden to impose upon the workingman or shop girl, both of whom, it is often contended, find it next to impossible to make both ends meet under present wage conditions. As for a 7-cent fare, with its per riding capita additional toll of 4 cents per day, where two trips are made inside a single-fare zone, this is anathema to the opponents of the proposed increase.

Now we heartily approve of the philanthropic thought behind these suggestions, but we must also remember that it is very easy for anyone to be charitable when other people pay the bills. In this particular case it is especially unfair to ask the railway company to bear the expense because, if it does so, it must also carry at the same fare a great many people who are amply able to pay for their transportation. In other words, these well wishers are asking the railway companies to give the benefit of low fares not only to the poorly-paid wage earner but also to the well-to-do. If wages are so low that transportation must be rendered to the employees of various industrial and mercantile establishments at less than its fair cost in order that they exist in decency, the proper line of attack is not upon the street railway fare but upon the inadequate wages themselves.

There is still another side to the question. No careful student of modern sociological conditions can overlook the daily and weekly expenditures for pleasure which enter the budget of the average city wage earner, even where the weekly income is, say, between $8 and $12. Is there much question that the "movies" find their supporters largely from the wage-earner class? Then there are expenditures for tobacco, liquor, gum, confectionery, petty luxuries in dress and what not, many of them doubtless unnecessary, but none the less enjoyed by wage earners of both sexes. No doubt there are some who cannot "raise" the price of admission to a "movie" show once a week, but if a somewhat searching study of the faces, clothing and "set-up" of the devotees of the screen both in city and in country tells anything, it indicates that somehow or other the workingman and his family manage to attend these shows with a pretty fair degree of regularity. In fact, complaints have not been lacking from saloonkeepers that the popularity of the "movies" has diverted a substantial amount of revenue from the bar to the box office, and the patronage of these shows, even during the period of business depression which seems at last to be leaving the country, has been nothing less than amazing to the average person.

If the wage earner, then, finds it possible to spend money pretty frequently for petty luxuries, does not the contention that a 6-cent or 7-cent fare in place of an existing 5-cent tariff will bring him to penury look a

bit forced? No one need begrudge the workingman or the shop girl plenty of harmless enjoyment to realize that the fair cost of service should be met by the wage earner, even if it involves some curtailment of his or her outlays for pleasure. People in the salaried and professional walks of life have to adjust their outlays for pleasure and luxuries in accordance with their net incomes, and if they do not do this somebody has to suffer for it.

It is well also to realize, in thinking about this subject, that frugality is not a present characteristic of the American people, that the tendency for inclination to overrule obligation is very strong in private life to-day, and that from 2 cents to 4 cents a day is little likely to "break" the average man or woman engaged in business or industrial pursuits. And it is further to be realized that transportation service is really cheap at 6 cents or 7 cents a ride in many thinly-settled communities with scanty resources for getting about.

Probably no adjustment of fares ever can be made which will not be a hardship to some persons, but by and large there appears to be very little present reason on which to found justifiable opposition to rates of fare which only adequately meet the fair cost of the service rendered.

THE JITNEY AS A GOLD BRICK

The baneful influences of the jitney bus are by no means confined to the railway company, to the jitney passengers who are crowded promiscuously in a car never intended for public transportation and to the public in the street who are put in danger by a large number of irresponsible drivers. The jitney owner himself is entitled to a great deal of sympathy because he is undoubtedly being beguiled into the purchase of a gold brick whose gilding will soon wear off. So far as we know, the large manufacturers of automobiles have not encouraged the jitney movement, but this has not prevented automobile supply dealers and others who would profit from an increase in the number of jitneys from making all sorts of absurd claims of the profits of jitney operation to encourage the unsophisticated to invest their savings in cheap cars to carry passengers at 5 cents each.

To quote some examples, it was only a few weeks ago that we reproduced in our reading pages the advertisement of a supply dealer in Chicago which read, "Be the first to operate a jitney bus line. Why work for $25 a week when with an investment of a few hundred dollars you can start in business and make $100 a week?" Another popular article published during the past month carries the head: "The jitney bus gold mine. The new means of public transportation opens up a virgin field for the automobile"; and ends: "dependable cars can be operated at such a low cost that they can be used for transportation purposes at a profit that makes the trolley car magnates shake in their shoes." The truth about the cost of jitney operation has been reiterated in these columns many times, but a specific instance now and then is not without its value. The following, obtained directly from the jitney driver whose experience it describes, by one of our own staff, may be enlightening.

Mr. Leviten, once a waiter at the Grunewald Hotel, New Orleans, is one of that city's pioneer jitney drivers. In fact, he entered the business some three months ago, purchasing a new Ford car for just $531. The car seats four passengers, one comfortably alongside the philosophical owner and three more or less crowdedly on the rear seat.

Promptly at 12 o'clock noon Mr. Leviten begins his essays in personal transportation, and he does not quit until 3 a.m.—a stretch of fifteen hours which he avers no employer other than himself could drag out of his much-abused system. A jitney a ride is Mr. Leviten's modest fee up to midnight, but those who would jitney in the wee sma' hours pay 10 cents. His usual run is from the busiest part of Canal Street to Jackson Avenue Ferry, the round trip being made in eighteen or twenty minutes according to the condition of the pavement or traffic regulation. "Layover" is a word not in Mr. Leviten's lexicon. However, he is not only an unusually careful driver, but also a most obliging one. He will gladly go out of his way to land a passenger at his doorstep. In one instance three passengers were so overcome at being carried two blocks beyond the station of this Jehu that they presented him jointly with an extra 25 cents.

Coming now to the factors that make up the income statement, Mr. Leviten was asked what his fifteen hours' incessant labor every day in the week brought him: "About $8 to $9 a day," he said, and added that of this he spent $2 a day for maintenance, fuel and lubrication costing another $1.50 a day. As business on rainy days was practically zero, his average daily earnings could hardly exceed $7. Therefore his income, less current maintenance, fuel and lubrication, was $3.50 a day. But Mr. Leviten estimates that at the end of nine months' service he will have to buy a new car. Hence his summary of the jitney business goes no further than the statement: "One makes a living and no more." In fact, he believes that a $5,000 bond and regulation as to fixed routes would drive the jitney out of the field at once. The 250 odd jitney drivers of New Orleans, he said, were forming an association, not to give service on some co-operative plan but to fight proposed legislation of the character described.

Mark, then, that a hustling, aggressive jitney driver, operating under the extremely short-haul conditions of a twenty-minute round trip, with no restrictions or obligations of any character, finds it necessary to work fifteen hours for net earnings (after the cost of a future car is allowed for), less than those of a motorman. Mr. Leviten may be a good waiter, but he is evidently not a great success as a traffic financier. Yet his case is typical of thousands. How many more misguided workmen will invest their savings in this hopeless quest before New Orleans and other communities pass ordinances that will save these men from their own inexperience and do justice to the companies which have developed electric railways in good faith?

New Power Station for Havana

The Havana (Cuba) Electric Railway, Light & Power Company Has Just Placed in Operation a New Power Station to Replace Its Three Existing Plants—Unusual Conditions Due to Location and Climate Have Involved Special Treatment of Details in Design and Operation

BY C. W. RICKER, ASSISTANT GENERAL MANAGER AND CHIEF ENGINEER RAILWAY DIVISION, HAVANA ELECTRIC RAILWAY, LIGHT & POWER COMPANY

The consolidation of the Havana Electric Company and the Havana Gas & Electric Company some two years ago made it evident that a new electric generating plant should be built to take the place of the three old and inadequate power stations then in operation. The new station was needed not only to reduce the cost of producing power, which alone would have fully warranted the investment, but, what is more important, to meet the constantly increasing need for electric energy in the company's many and varied activities.

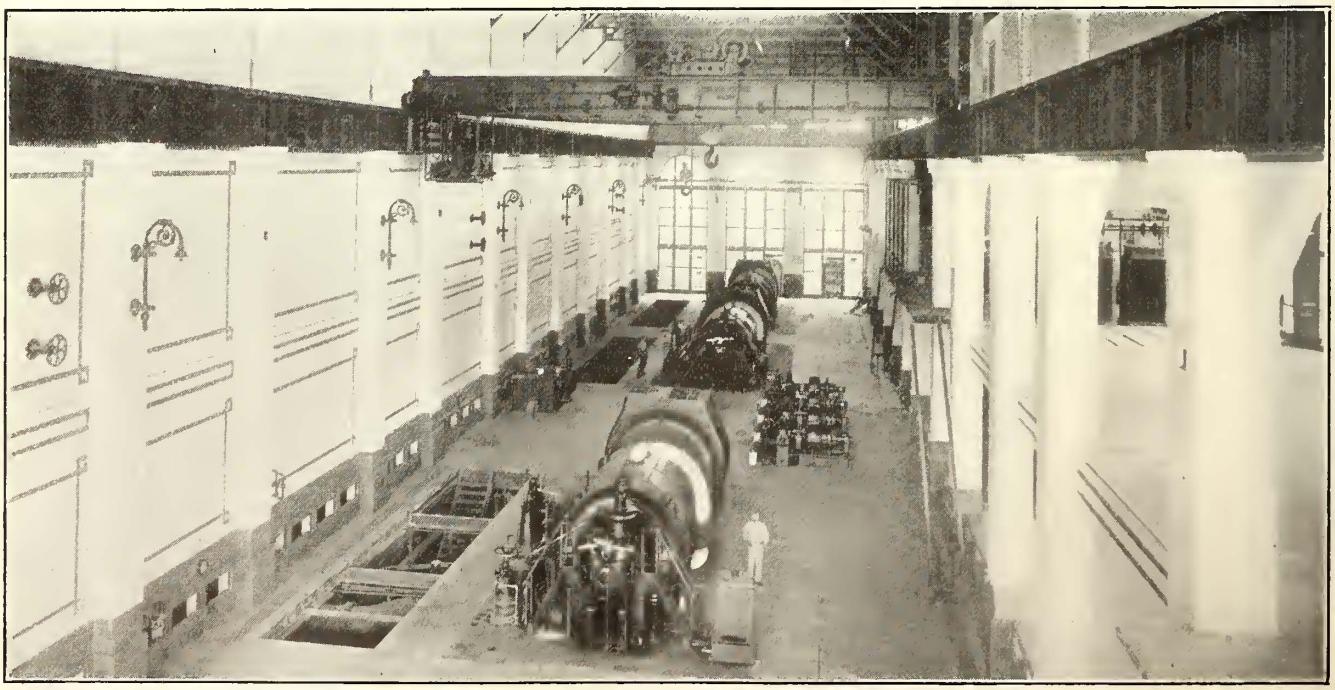
In consequence a contract for equipment was made early in February, 1913, with the Westinghouse Electric & Manufacturing Company. This covered three 12,500-kw turbo-generators, together with condensers, boiler-feed pumps, automatic stokers, exciters, transformers, electrical switch-gear, and control apparatus, the limited capacity of each generating unit being due to the fact that no single piece exceeding 100,000 lb. in shipping weight could be transported without excessive difficulty and expense. Shortly after placing this order a contract was made with the Babcock & Wilcox Company to furnish and install twenty-four 6000-sq.-ft.. horizontal water-tube boilers with internal Foster superheaters, and with the selection of the principal features of apparatus the plans for the power house building were rapidly developing, work being begun on the foundations on March 17, 1913.

The first of the generating units was started on Oct. 1, 1914, and began to carry load regularly on Oct. 3. On the first day of December, 1914, two main units were in regular operation and the old plant, which had supplied the larger portion of the lighting and commercial power loads, was finally shut down. On Dec. 11 the third generating unit was put into regular operation, and on Dec. 31 all of the railway load was transferred to the new station, with the exception of that which was to be carried by a new substation then under construction.

Mechanical and Electrical Equipment

In general the new station is divided into three sections or panels, each consisting of one generating unit complete with its condenser, condenser pumps, boilers, and connecting piping. The general auxiliaries for the station, consisting of exciters, boiler-feed pumps, plant-service and heater-supply pumps, feed-water heaters and meters, constitute a fourth group. This is located between the second and third of the main units. The steam piping of the three sections is connected by an equalizer or tie-line header, to which the auxiliary group is connected so that the general auxiliaries may be supplied with steam directly from any section or sections of the boiler plant in operation. All condenser pumps and general auxiliaries are steam-driven and they exhaust into a bank of open feed-water heaters.

As the only water available for boiler feed must be purchased from the city water supply system at a very high price, and is heavily charged with scale-forming matter, it is important to save all the condensate possible and to keep it free from oil. Consequently, all auxiliaries are turbine-driven except the three house-service pumps, the stoker engines and a few small pumps. These exhaust through oil separators, and in this way only a very small part of the steam condensed in the main feed-water heaters or the condensers ever comes in contact with cylinder oil. The only known



HAVANA POWER PLANT—VIEW OF TURBINE ROOM SHOWING LOCATION OF MAIN UNITS AND EXCITERS

losses of water evaporated in the boilers are due to leakage from pipe and boiler joints and the steam blown into the stoker grates.

The steam piping was laid out in accordance with the general plan of three main sections and an auxiliary section all tied together by an equalizer or tie-header with sectionalizing valves. This general scheme is followed also in the exhaust piping of the auxiliaries, the drain piping and the circulating water system of the main condensers. The drainage of the high-pressure steam piping flows through groups of traps which discharge to the main heaters, the low-pressure drains lead to the outside water service.

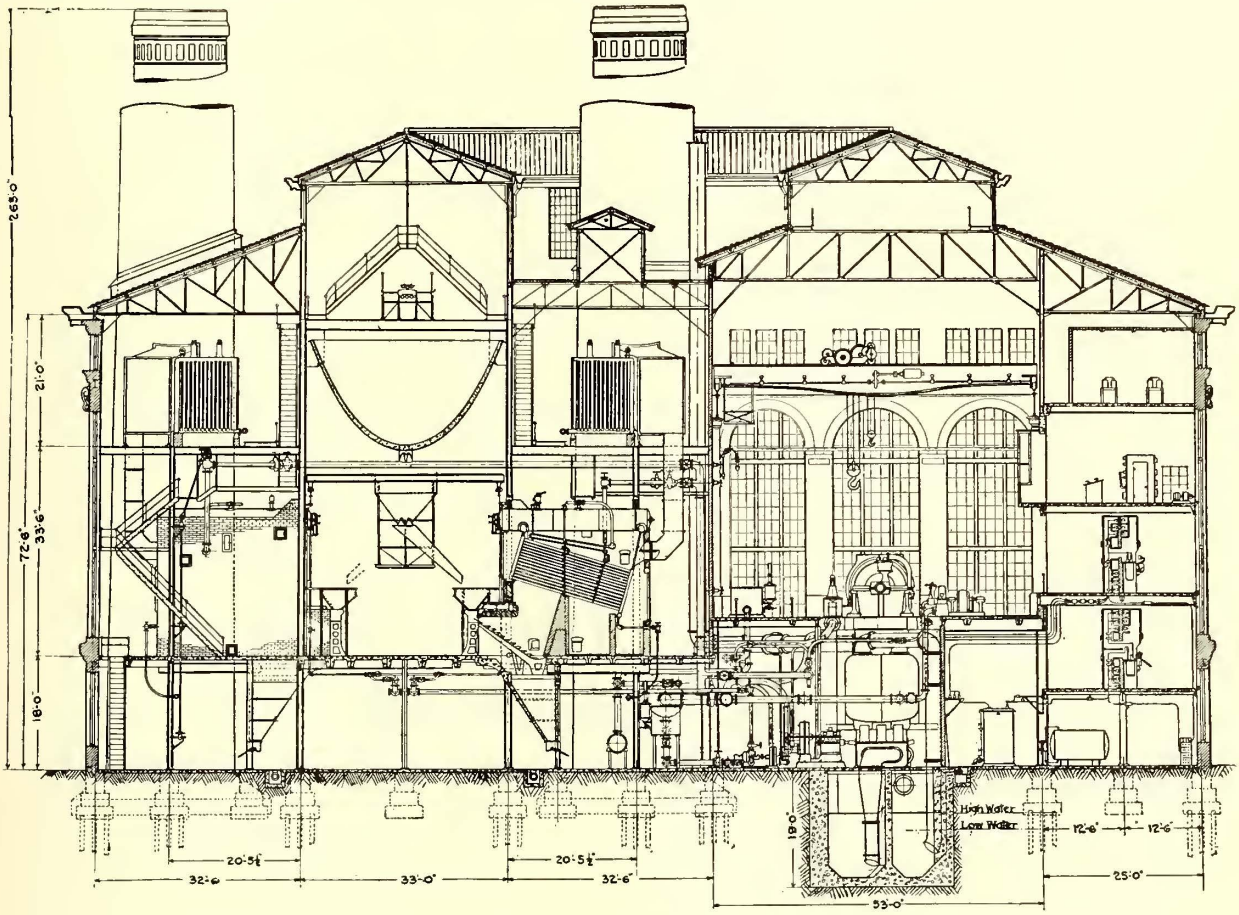
Owing to a city ordinance which forbids the connection of pumps which draw water directly from the city main, a storage tank has been provided outside the building into which water flows under normal pressure. For this the pit of an old gas holder formerly used by the gas department was repaired and covered and another similar pit is under construction. The combined capacity of the two pits will be about fifteen days' supply of water for the make-up and for general plant service with the present equipment fully loaded. If the plant is operated non-condensing, however, the supply would last for only a few hours. All rain water from roofs and other clean surfaces will flow into the storage tanks.

This large fresh-water supply is of great importance, as the city water is subject to variation of pressure and even to occasional interruptions which in the past have threatened the constancy of service very seriously. In addition, if the plant had to run non-condensing under heavy load for even a few minutes, the flow from the city pipes would be quite inadequate to keep the boilers supplied.

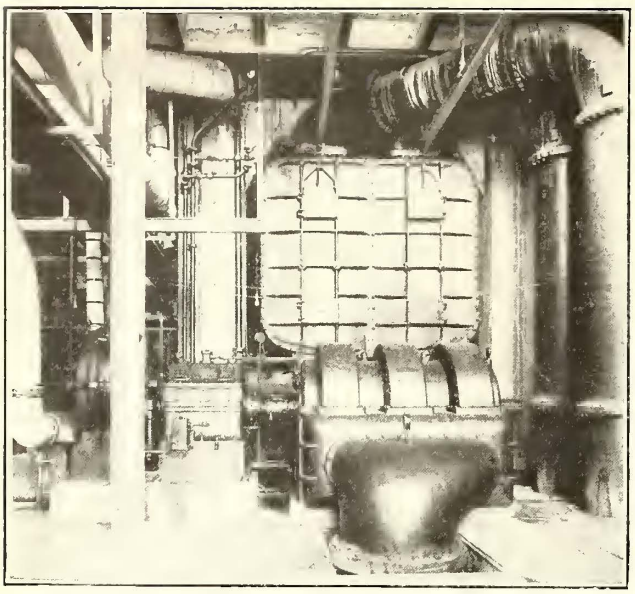
The electrical characteristics of main generators were selected on the basis of the various systems of distribution already in use, such matters as climate, character of available station labor, and distance from the base of supplies being also considered. Distribution to the railway substations is made at 13,200 volts by aerial lead-covered cable. About three-fifths of the lighting and power loads is made at 2200 volts by overhead single-wire lines, while two-fifths is made at 6000 volts by underground lead-covered cables. All of the three systems are three phase and at a frequency of sixty cycles. While both lighting and power systems cover the whole city the greater part of the load in the vicinity of the plants is transmitted at 2200 volts.

The determination of generator voltage was based upon the fact that 6000 volts offers no advantages as compared with 13,200 volts and has the disadvantage of much higher copper cost. This left the choice between 2200 volts and 13,200 volts, both being entirely practicable for the generators purchased, but mainly on account of the constant high humidity and also the distance in both space and time from the base of supplies and the difficulty in getting station attendants in Cuba who were used to such high-tension winding, the lower of the two voltages was selected. This involved some serious difficulty due to the great size of the generator leads and generator circuit breakers, but these objections were considered easier to overcome, under the circumstances, than the local difficulties with high tension.

Three sets of single-phase raising transformers for 13,200 volts with a capacity of 6000 kva per bank were purchased as an initial equipment. These have divided secondary coils and sub-voltage taps so that one bank may be used to supply the 6000-volt distribution as



HAVANA POWER PLANT—CROSS-SECTIONAL ELEVATION SHOWING ARRANGEMENT OF MACHINERY



HAVANA POWER PLANT—VIEW IN BASEMENT SHOWING TWIN CONDENSER

long as that continues in service. The main generators are provided with automatic oil circuit breakers having positive time-element and reverse-energy trips, designed especially for the protection of the lead busbars and station wires, because the large current in case of a short-circuit could do very serious damage.

A fourth generating unit of the same capacity as the first three can be installed in the present building with only relatively slight expense for modifications in the piping system, and additions of corresponding sections to the busbar and switch structure and the control switchboard. Further extensions with similar or larger generating units can be made at either end of the present building, and these can be completed ready for use before removing the present end walls without interfering with regular operation in any way.

Steam Generating Equipment

The tract of land on which the power plant is located has 600 ft. of waterfront on an arm of the harbor of Havana, and a reinforced concrete wharf designed for 30 ft. of water has been built across the whole frontage. A track is laid along the face of this wharf and this connects with the yard system in the power plant track and with the double-track freight line of the Havana Terminal Railway, which crosses the property in the public streets between the wharf and the power plant. The principal object of the wharf is the receipt of coal, and for this purpose a complete unloading and conveying apparatus has been installed. This can take coal from barges or ships and deliver it to the storage bunkers of the plant, which hold about 3000 tons, or to the railroad cars for transport either to the present coal-storage yards located near by or to any other point reached by the connecting tracks. Coal can also be received in cars from the storage yard or elsewhere and delivered to the plant bunkers. This extra precaution was taken because all coal must be imported and it may be necessary or convenient to receive and store larger quantities of coal than the plant bunkers can hold. The storage yard has a normal capacity of 6000 tons and in emergency double that amount.

The 6000-sq.-ft. boilers are equipped with improved Roney stokers which provide for the evaporation of at least 40,000 lb. of steam per hour per boiler with the best efficiency at rates between 23,000 lb. and 28,000 lb. of steam per hour. Based on the customary rating of boilers this is equivalent to a maximum of 200 per cent of nominal rating, with best economy between 130 per cent and 150 per cent. As each main unit with its auxiliaries requires about 180,000 lb. of steam per hour at the most economical load and 225,000 lb. at the maximum continuous load, eight boilers are allotted to each main group, this being enough to support the maximum load at best economy and still supply full load safely with two boiler units out of service for cleaning or repairs.

The boilers are of the Babcock & Wilcox standard all-wrought-steel type set in brick with the front headers 12 ft. above the floor.

These stokers have flat suspended tile arches 6 ft. long projecting out in front of the boiler setting in a half Dutch-oven. In consequence the stokers do not extend inside the combustion chamber or obstruct the gas passages.

Because of the high transportation cost it has been found most economical to use only the best grade of coal produced in the eastern part of the United States. At present New River semi-bituminous coal averaging about 14,800 B.t.u. per pound is being purchased.

All of the boilers are placed upon one level and are arranged in two lines of twelve boilers each, extending parallel to the long dimensions of the turbine room. They are set in batteries and face each other across a wide aisle. This arrangement was selected as offering the maximum space and coolness with a minimum of ground occupied, the consideration of climate involving the need for ample ventilation. The length of the building was determined by that of the two rows of twelve boilers with two chimneys for each row. This length corresponds with that required for the generating and electrical equipment, leaving room for a fourth main unit to be added when the load reaches the capacity of the original installation.

The four chimneys are 268 ft. high above the basement floor and 250 ft. above the grate. They are built of reinforced concrete with walls 19 in. thick at the

HAVANA POWER PLANT—VIEW IN BOILER ROOM SHOWING TRAVELING COAL HOPPER OVER FIRING FLOOR

bottom and 6 in. at the top, and they taper from 20½ ft. in external diameter at the bottom to 15 ft. at the top. A separate self-sustaining concrete lining extends to a height of 104 ft. above the ground. The smoke flues are built of sheet steel stiffened with angles. They are 7 ft. wide x 12 ft. high and are placed over the aisles behind the boilers. Space has been left over each row of boilers for the installation of economizers in future.

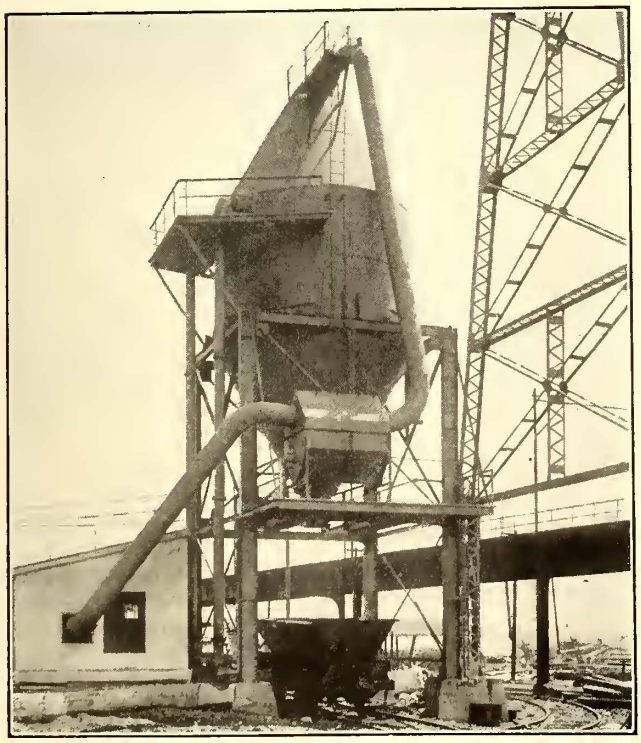
Above the level of the boiler and over the wide aisle between them is a parabolic reinforced concrete bunker of 3000 tons capacity. Beneath this is a traveling larry with a weighing hopper of 10 tons capacity which can receive coal from gates placed at intervals of 10 ft. along the bottom of the bunker. After the coal is weighed on the larry it is discharged into steel receiving hoppers of 4 tons capacity which are set just over the usual feeding hoppers of the stokers. By this scheme coal can be drawn from any desired portion of the bunker, thus preventing bunker fires from becoming serious.

The boiler-room floor is 18 ft. above the basement or ground level, and underneath each stoker is extended a large concrete-lined steel ash hopper with a dump gate which drops the ashes into the vacuum ash-handling system or else into small cars in case the present system is out of service.

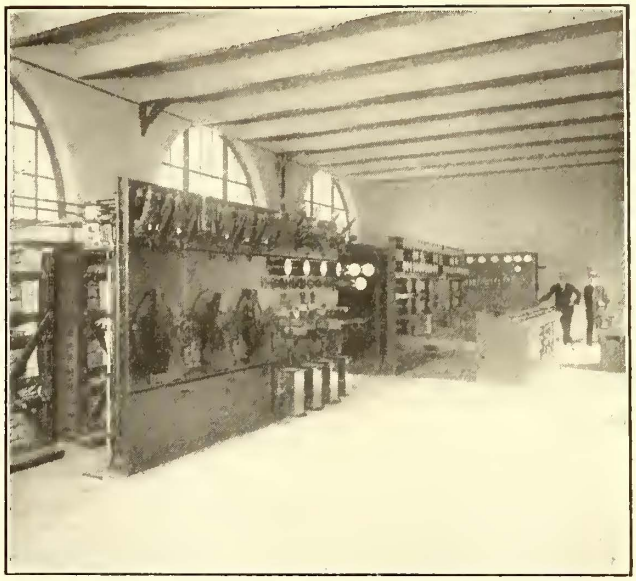
General Arrangement of Equipment

As the turbine room is placed alongside of the boiler room with the turbines in a line parallel to the two rows of boilers, the three turbine units are located so that each is approximately opposite to a corresponding group of eight boilers, four on each side of the center aisle in the boiler room. At the same time room is left at one end for an additional generating unit as well as about 40 ft. of clear space in the center of the turbine room, along one side of which are placed the four 100-kw exciter units.

A brick wall extending from the boiler-room floor to the roof divides the boiler house from the turbine room, but the basement is open and continuous to the further side of the turbine foundations. The main generating units are set on longitudinal steel beams supported on concrete piers transverse with this wall, thus leaving spaces under the unit and between the piers open for auxiliary apparatus and ventilation. In order to avoid having pumps below ground level, the main units and the turbine room floor were set 24 ft. above the ground, thus affording ample head room for the condensers and auxiliaries. Directly below each main turbine is placed a 30,000-sq.-ft. surface condenser with the circulating pump at the boiler-room end and the air and hot-well pumps at the side, all set on the ground floor. The other turbine auxiliaries are set along the wide aisle running the length of the basement on the side that is nearest to the boilers, the boiler-feed, service and heater pumps being in the central space between the second and third turbine foundations under the exciters on the floor above.



HAVANA POWER PLANT—VIEW OF SUCTION TANK FOR ASH-HANDLING SYSTEM



HAVANA POWER PLANT—VIEW OF CONTROL SWITCHBOARDS IN OPERATING GALLERY

Large openings are left in the turbine-room floor so that all the auxiliaries in the basement are in plain view from above, and all except the condenser circulating pumps and the feed-water heaters can be reached directly by a crane of 50 tons capacity which runs the length of the turbine room.

At the side of the turbine foundations opposite to the boilers a brick wall divides the basement from end to end but leaves full-size openings into the spaces under the generator ends of the main units. Each of these spaces is closed off at the boiler-room end of the piers so that one side of the basement serves as a ventilating duct or aisle and is completely separated from any part of the building containing steam machinery or piping. In this space the raising transformers are set and the main generator and exciter leads are run in the open between their respective generators and the bus and switch structures. Over the large transformers are removable hatches in the turbine-room floor, through which the crane can lift the transformers complete.

The entire side of the building opposite to the boiler room is divided by four galleries about 26 ft. wide in which are placed all the station busbars, switch-gear and electrical-control apparatus. This arrangement separates the electrical switching and control apparatus and the steam equipment almost as completely as if they were in separate buildings. At the same time it preserves the unity of the plant and the accessibility of each part of the equipment.

The first electrical gallery is open to the ventilating aisle but is shut off from the turbine room, while those above are separated from the turbine room only by the building columns and railings, except the operating room which is fully inclosed.

Circulating Water Supply

Extending for the length of the building directly under the turbine foundations is a double canal for condenser circulating water which is drawn from and returned to the harbor. The top of the canal is covered with a 9-in. reinforced-concrete slab, upon which the circulating pumps are set, directly over the center wall which divides the entering water from the discharge. The turbine foundation piers are carried on the walls of the canal, across which they extend over steel girders.

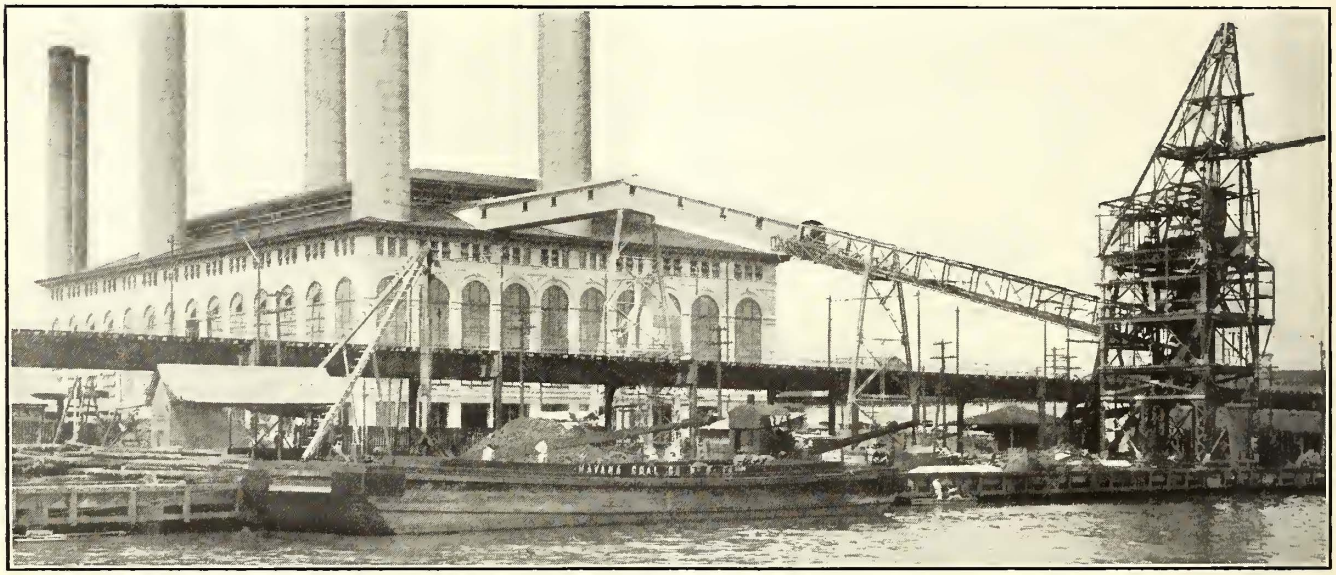
Outside of the building the canal divides into two lines of cylindrical reinforced-concrete pipes. One of these connects the discharge canal to the harbor at the down-stream end of the wall and the other runs parallel to the end of the building to a screen basin built for one of the old plants of the company located at this point. The screen basin is connected to the harbor by a tunnel 5 ft. square. In this basin are located four baskets made of copper frames covered with heavy wire screen. These are arranged so that flat screens may be dropped in front of them and the baskets then removed one at a time, carrying the material they had strained out of the water. Any matter that lodges against the flat screens is washed into the basket when it is replaced and the flat screen removed. The screens are now lifted with a chain block which will later be replaced by compressed air hoists. The material removed consists largely of jellyfish, which clog the screens of the condenser tube if admitted, but when exposed on land soon vanish in an odor which is anything but sanctified.

Over the water level in the discharge canal and just below the cover is placed a 30-in. cast-iron water line which connects the inlet chambers of the three condensers so that, if necessary, any circulating pump can supply a limited amount of cooling water to any other condenser.

The water boxes, covers, and circulating piping of each condenser are so divided that the circulating water can be cut off from one-half, leaving the other half of the condenser in service. By means of this arrangement half of the tubes may be cleaned at a time with a loss of only 1 in. or 2 in. of vacuum during the process. This rather unusual arrangement was made because at times the harbor waste holds in suspension a great amount of very sticky matter which coats the condenser tubes and reduces their heat-transmitting capacity very seriously. It is, however, easily washed out with a brush and a small stream of water. The condensers slope about 8 in. from the horizontal so that the tubes may drain empty when not in use. This diminishes the corrosion which is unusually severe because of the high temperature and impurity of the salt water used for cooling.

Steam-Driven Auxiliaries

To supply the various steam-driven auxiliaries there are two loop headers, one for the exciters and one for the pumps. Both headers are connected into the 10-in. equalizer main on both sides of the middle boiler header and both are provided with valves so that exciters, boiler-feed pumps and house-service pumps can be fed from whichever section of the boiler plant is in service, leaving the remaining boiler group headers and the other two sections of the equalizer header entirely cold. The auxiliaries of each generating unit, comprising the condenser pumps, oil pump and gland pump, are connected directly to the equalizer or tie-line just opposite the main turbine.



HAVANA POWER PLANT—GENERAL VIEW OF PLANT FROM WATER FRONT

With this piping arrangement it is possible to operate any main generating unit, with a full complement of auxiliaries, from any of the boilers, although of course there would be considerable drop in pressure under extreme conditions. Full loads can be carried on one turbine when supplied with the maximum length of steam piping, and a large saving in cost of piping is effected by the use of a small tie-line instead of a connected header system.

The exhaust steam from all the turbine-driven auxiliaries passes into a header running the length of the turbine and located about 11 ft. above the floor. At the center, connections are made with two open boiler-feed-water heaters of 300,000 lb. per hour capacity each. At suitable points connections are made between the header to inlet valves on the low-pressure stage of each of the main turbines. These admit steam to the turbines at constant pressure, so that when more steam

flows into the exhaust header than can be condensed in the feed-water heater, these valves admit the surplus steam into the main turbines, where it does useful work. It is estimated that under normal conditions 1 lb. of this exhaust steam saves from 0.3 lb. to 0.4 lb. of high-pressure boiler steam, and then, as it is condensed, it becomes available for boiler feed instead of being wasted to the open air as is usual. The exhaust header is, of course, provided with outlets to atmosphere through automatic back-pressure valves which are set to open at a slightly higher pressure than is needed to lift the constant pressure valves into the low-pressure stages of the main turbine.

In order to allow the escape of air and other gases which are always present in steam the feed-water heaters are provided with vent pipes to a small surface condenser through which the cold water passes on its way to the main heaters. Each heater, then, discharges through the vent a mixture of air and steam, the steam being condensed and the air escaping through a suitable opening. Owing to the arrangement of outlet valves of the exhaust system the heaters are under slight pressure and therefore no pumps are needed to draw the mixture of air and steam to the vent.

Electrical Operating Facilities

The operating room for the plant is in the middle of the third gallery just opposite the exciters in the space between the second and third generators. The front of the room projects about 4 ft. beyond the gallery and is inclosed with wireglass set in steel casement sash. The lower panes are clear, giving a full view of the turbine room. One end of the operating room is closed by a concrete wall. Beyond this are the station-auxiliary transformers, but the other end is covered by a wood and glass partition which is movable to provide more space when it is required. From the projecting front of the room two flights of stairs run to the turbine-room floor. These are set close against the gallery and one leads toward each end of the building.

The control and instrument switches and indicator lamps are mounted on an inclined desk which is divided into sections, one for each generator, exciter, transformer bank, and group of six feeders. These are arranged in the same order as the apparatus. On the desk is mounted a copper strip diagram of the station buses and connections. In this the control handles, signal lamps and model disconnector switches are placed to correspond with the real circuit breakers and switches so that the operator has a plan of the station connections always before him with indications of the actual condition of all switches. The circuit breaker controllers, ammeter switches and synchronizing switches are of rotary drum type. The latter have detachable non-interchangeable handles of different colors to show the generator in operation and the incoming generator, together with interlocking circuit contacts which make it impossible to close the incoming generating circuit breaker unless the right switch and handle are used in synchronizing. Each generator desk panel has also control switches for the corresponding field switch, motor-operated field rheostat and governor adjusting motor of the steam turbines.

The indicating and recording instruments are mounted on a vertical board 3 ft. 6 in. behind the desk, the panels of the board being placed opposite the corresponding panels in the desk. The Tirrill voltage regulators are on the same vertical board.

Standing back to back with the instrument board and about 4 ft. behind it is a similar board containing the relays, circuit-breaker contactors and other small auxiliary devices. The exciters are controlled from a switchboard of seven panels standing in line with the instrument board. The exciter-control apparatus, consisting of knife switches for the positive, negative and equalizing leads, with a carbon circuit breaker in each negative lead, is hand-operated, and the cables come direct from the exciters and generator fields to the switchboard. The exciter bus is in duplicate.

In connection with maintenance of the electrical equipment it should be remarked that an outfit for dielectric stress trials has been installed. This consists of a 150-kva, single-phase, testing transformer, 2200 = 14,000 volts, with a separate regulating transformer which, when operated in conjunction with a small induction regulator, produces a smooth voltage curve from zero to the maximum. This outfit is to be used to test the insulation of new apparatus, cables and repair work before putting it in service. All electrical apparatus is to be tried out from time to time to find the weak places without needless damage and so forestall and prevent breakdown when in actual service.

Ample locker and toilet rooms are provided for the different divisions of the operating force. These are situated in the basement of the boiler house, in the turbine room and in each of the four electrical galleries. This portion of the equipment has seldom received adequate attention in Cuba, and it is intended to make this a model installation.

In conclusion it should be said that all machinery and apparatus except the boilers and the turbines, the contract for which included erection, was received by the railway company at the port of export and, after being landed in Havana by the steamship company, was taken to the plant and installed by a force employed directly by the Havana Electric Railway, Light & Power Company. The installation was subject in some cases to the advice and supervision of erecting engineers sent from a native works, but all special foundations, structures for electric busbars and switches and the like were designed and carried out directly by the regular force of the railway company.

Officers and Engineers

A list of some of the officers and engineers of the company most closely related to the power development follows: President and general manager, Frank Steinhart; assistant general manager and chief engineer, railway division, C. W. Ricker; chief engineer, lighting division, D. Lombillo-Clark; superintendent of power, W. B. Flanders; electrical engineer, C. S. Sanderson; commercial engineer, E. W. Barron; engineer of power plant, R. L. Nelson.

Real Significance of Taxation

The Boston *Herald* recently published an editorial upon taxation under the caption "A Typical Instance," which is of more than local interest to public utilities and their customers. The writer stated that Stone & Webster, whose varied public service enterprises are of nation-wide scope, report that 5.5 per cent of the gross earnings of the companies under their management are immediately paid over in taxes, chiefly to the municipalities in which they do business. In several Massachusetts cities this proportion rises to 10 per cent of the gross revenue. The source of this money is the customers of the public utility companies, the editorial states. It is one of the costs of the service, and it is necessary to charge enough more for electricity to carry this expense, or, where the price of the commodity sold is fixed by statute, as in the case of a 5-cent car fare, the service is either reduced to a corresponding extent or else improvements are withheld.

Traffic Characteristics*

Peculiarities of the Public Demand for Service—Importance to the Utilities of Knowing the Riding Habit of Patrons—Statistical Measurement of Traffic

BY F. W. DOOLITTLE, DIRECTOR OF THE BUREAU OF FARE RESEARCH, AMERICAN ELECTRIC RAILWAY ASSOCIATION

The American Electric Railway Association, in its Code of Principles, has declared that "quality of service must primarily depend upon the money received in fares." The cost of urban passenger transportation service and the extent of the service rendered are interrelated. Traffic characteristics are the controlling factor of the cost of carrying a passenger, and, conversely, the adequacy of earnings is an important if not controlling factor in the traction company's policy with respect to providing transportation facilities. The extent of this interrelation has not been generally appreciated. It is the purpose of these articles to describe the relation of studies of traffic characteristics to service, leaving to future articles the relation of service and traffic characteristics to the cost of passenger transportation service.

With the limitations of earnings, the objective point of every transportation official is to provide the maximum amount of accommodation for passengers. Traffic studies are an important means to this end. It is only by a full knowledge of the riding habits of its patrons that an electric railway can furnish this maximum service. The day has passed when any individual, by his personal observation, can have sufficient knowledge of the demands for service at each point along the line to enable him to allocate service where it will serve the best purpose.

Unused Accommodations

As will be evident from the study of typical traffic characteristics, traction companies supply on an average greater accommodations than the traffic will warrant. In a typical twenty-four hour period more seats are supplied than there are passengers demanding transportation. The occurrence of some of this superfluous transportation is due to the physical impossibility of creating such facilities immediately and where such facilities are called for and the necessity of maintaining a regular headway and completing a trip to its destination irrespective of the number of patrons accommodated. Some superfluous transportation at certain points and times with deficiencies at other points and other times is due to misplaced service. The development of the modern traffic study has taken place in order to secure information of the traffic demand in such detail and with such accuracy as will give the necessary information for the construction of time-tables properly adjusting the service to the traffic.

In the following article it is proposed to give some idea as to the necessity and results of typical studies, when such studies may be undertaken with profit, and how they should be carried out.

General Characteristics

It is not many years since operating men first felt the need of a more accurate knowledge of the distribution of traffic over their lines and throughout the day, than their general knowledge gave them, and from a still more recent period dates the development of systematic and scientific traffic counts.

With the growth in magnitude and complexity of urban transportation, there has come about a less personal relation between the operating officer and the employees and patrons of his company.

With the increased cost of labor and materials and the increased quantity and quality of service given for an unvarying fare, there has resulted a decreased margin of profit.

With the growth in numbers and powers of regulatory bodies, there has arisen a more intensive study on the part of the public of the service rendered by public utilities.

Development along these three lines has rendered necessary in recent years, for many companies, traffic studies that in the earlier stages of the industry would have been an extravagance. And to-day, however great the necessity for such studies, they still remain an extravagance—in the sense that all inefficiency is extravagant—if they fail to provide the maximum amount of useful information for a minimum expenditure.

In the last few years many studies have been made by consulting engineers, public commissions and operating officers. It is of interest to examine rather briefly the methods employed and the results obtained, and to see what, if any, progress has been made toward the development of a simple standard method of procedure.

In general, two purposes are to be served by obtaining traffic data. The first is to enable the company to fit its car-miles to the passenger-miles of its patrons in such a way as to minimize costs in so far as is consistent with the comfort of passengers and the development of new business.† The second purpose is one that exists because of the necessity of meeting complaints preferred in good faith, and arising from observations of varying accuracy, or preferred from an ulterior motive, and made the basis of an attack against the company before a body of great power which, if not in possession of the truth, may impose severe penalties.

In so far as the revenues of a company and its track capacity will permit, the comfort of patrons will be cared for, but it is not always obvious just where and

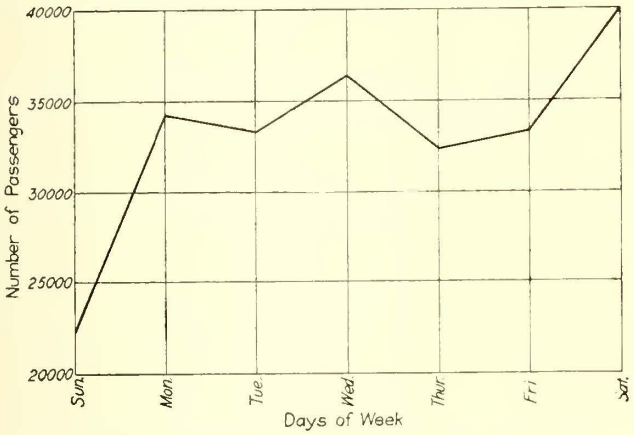
*This is the first of a series of reports dealing with the practical uses of traffic survey, compiled by the bureau of fare research of the American Electric Railway Association. The succeeding reports will discuss the traffic survey from its organization to the application of its results to time-tables and will be entitled: "Organizing the Traffic Survey—Mapping Out the Work of Traffic Observation in Large and Small Companies;" "Traffic Observations—Extent and Frequency of Collection of Data;" "Changes in Cost of Operation, Due to Shifts in Service," and "Applying Traffic Studies to Time-tables."—EDS.

†The following abstract of a decision rendered Jan. 28, 1915, by the Georgia Railroad Commission, in re: Application by Georgia Railway & Power Company illustrates a well-defined tendency on the part of the regulatory bodies to take into account conditions as a factor which must be considered in regulation. P. U. R. 1915 A., page 901: The syllabus of this decision is, in part, as follows: "A street railway company, upon showing a large decrease in its revenues, owing to a general business depression, is entitled to relief from expense of all service in excess of the reasonable needs of the public. The commission, in investigating the question whether a street railway company is supplying excessive service, will not proceed upon the theory that a decrease in the use of all the lines of the system, as a whole, justifies less service on any individual line, but will ascertain service conditions, facilities, and uses on each individual route, and will pass upon each without reference to other routes in the system. Curtailment of expenses necessitated by decrease in travel, and consequent falling off of revenues of a street railway, owing to a general business depression, should not necessarily be made by taking off cars operated during 'rush hours,' since widespread business depression affects travel for pleasure and on Sundays and holidays more than it does travel necessary for persons to get to their work or places of business. Adequate urban street railway service does not mean that every passenger on every car operated should be furnished a seat, but that the company should provide reasonable seating accommodations in its cars for such patrons as desire them, in so far as it can reasonably anticipate and measure the volume of traffic to be taken care of."

when the car-miles that are at the disposal of an officer are most needed, and it is to meet this condition that traffic studies are necessary.

TYPICAL TRAFFIC CHARACTERISTICS

In planning a traffic study, there are three characteristics of the demand for service that must be considered and which are entirely independent of the personal element which enters into the judgment of individuals as to the quality of service rendered. They are:



TRAFFIC SURVEYS—FIG. 1—CHART SHOWING VARIATIONS OF TRAFFIC FROM DAY TO DAY THROUGHOUT THE WEEK ON A TYPICAL LINE

(*a*) The seasonal and daily variation in the riding habit of the community.

(*b*) The concentration of riding within certain hours of the day, and

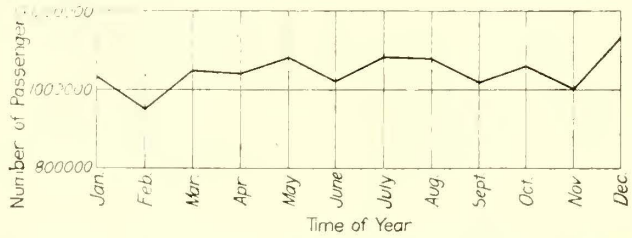
(*c*) The variation in the number of passengers wishing to ride on consecutive cars operating at an undistorted headway.

The exceptionally heavy loading of the first car to pass after an unusual delay is expressly eliminated from consideration, and there is in mind only the fact that due to causes entirely beyond the control of any company, cars passing at regular intervals of time will not be carrying the same number of passengers.

The first two characteristics of traffic demand combine to bring about regularly recurring peak loads, and their effect can be foretold with considerable accuracy. The third is largely accidental in its nature, but while the number of passengers wishing to ride on each car cannot be estimated beforehand with great precision, it is still possible to reach a fairly accurate knowledge of the diversity of loading on the cars passing a given point in any fifteen-minute or thirty-minute period.

The following figures illustrate the peculiarities of traffic demand previously referred to:

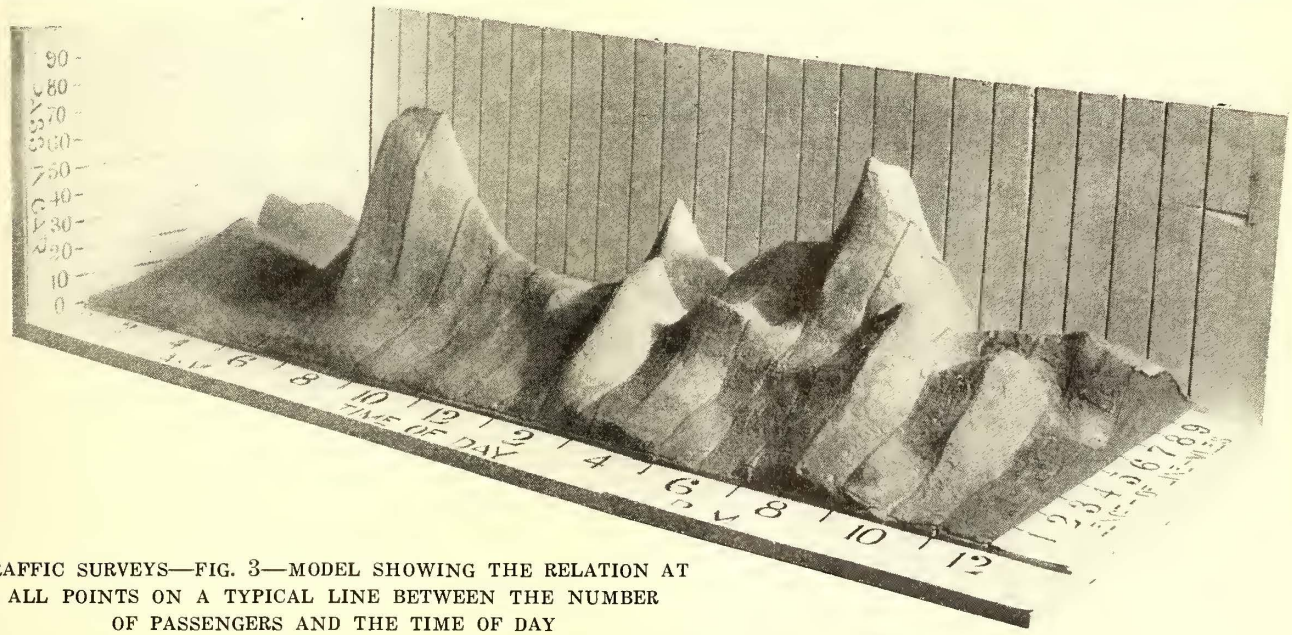
Fig. 1 shows how traffic on a typical line varied from day to day throughout a week. It would be of interest to speculate on the reasons for the fluctuations from Monday to Friday and for the 15 per cent increase in traffic on Saturday. Does this figure represent conditions fairly well maintained throughout the year, or were unusual conditions encountered at the time these data were taken? Does the Saturday increase represent travel to parks, to ball games or to steam and interurban electric railway stations, or does it represent



TRAFFIC SURVEYS—FIG. 2—CHART SHOWING FLUCTUATIONS FROM MONTH TO MONTH IN TRAFFIC ON A TYPICAL LINE

evening rides to places of amusement? Does it offer any suggestions as to means of increasing traffic and particularly traffic at times when the company's equipment is not in use? These and many other questions it is within the province of the traffic survey department to answer.

Fig. 2 represents fluctuations of traffic from month to month and will suggest inquiries of value to any company. Is the seasonal variation in riding due to weather conditions, a situation indicating a considerable competition with other means of transportation? Does hot weather, cold weather or rainy weather induce the greatest amount of riding, and does this indicate competition with automobiles as well as with walking? Does the summer increase result from ball games or public parks and beaches, and in what proportion? The traffic survey department should not only prepare data



TRAFFIC SURVEYS—FIG. 3—MODEL SHOWING THE RELATION AT ALL POINTS ON A TYPICAL LINE BETWEEN THE NUMBER OF PASSENGERS AND THE TIME OF DAY

on which to base schedules but should, as well, assist the officers of the company in the solution of the problems arising from an attempt to encourage such traffic as can be handled at a profit.

Fig. 3 is a photograph of a model constructed to show the relation between the number of passengers and the time of day, for each point of a typical line. The hourly variation in traffic is clearly indicated by the height to which the model rises above its base, and the accuracy of the use of the term "peak" in connection with traffic is demonstrated.

Fig. 4 is a photograph of a model constructed to show the variation in car loading from point to point on a typical line and indicates that since the seating capacity of each car is fifty persons, there is being run a large number of idle seat-miles, necessitated by the requirements of maximum headway and by the fact that cars cannot be put into service and taken out of service at every point on the line at the will of the operating department. These four figures are introduced primarily as illustrating conditions which the schedule maker must know, and while comment has been made on the value of knowing the causes of the traffic fluctuations there indicated, we are primarily concerned with the organization and methods best adapted to the collection of such data as are the basis of these figures.

Statistical Measurement of Daily Variation

The extent to which traffic tends to concentrate itself in certain hours of the day has an important bearing on the cost of passenger transportation service, and this concentration is measured by a number which may be called the "concentration index of traffic." Defined, the concentration index of traffic is a number which when multiplied by the number of passengers carried in twenty-four hours gives the number which would be carried if rush-hour traffic continued uniformly throughout the day.

To illustrate: A certain company carried 5500 passengers on one line in twenty-four hours, and of these 500 were handled between 5 p. m. and 6 p. m. Had this rush-hour traffic existed throughout the twenty-four hours, 12,000 passengers would have been carried. The concentration index of traffic for this line then is 2.18, for 2.18 $\times$ 5500 (the number actually carried) is 12,000 (the number which would have been carried if rush-hour traffic had existed throughout the twenty-four hours).

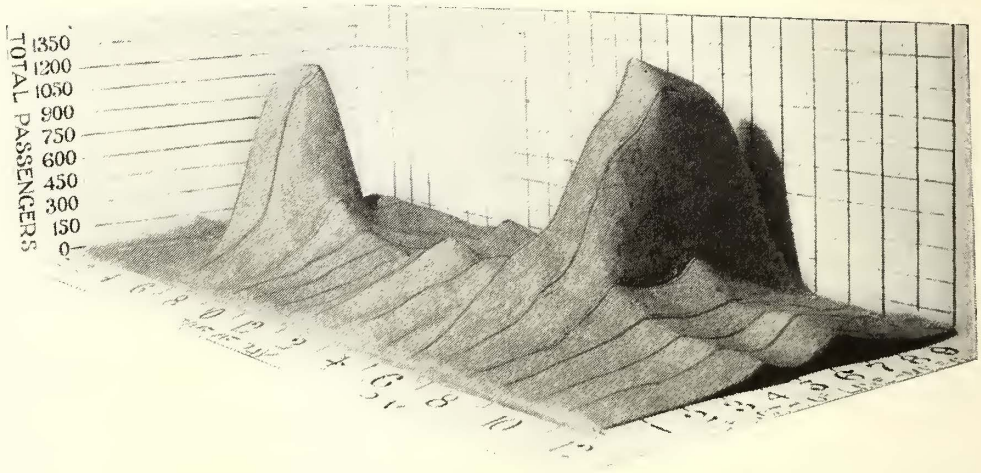
The extent to which traffic tends to vary from car to car presents one of the great difficulties encountered in the attempt to render high-grade service, and this diversity is measured by a number representing the relation of the largest number of passengers on any one car to the average number on all cars passing a given point in a definite period of time.*

For example, the five cars passing a certain point during fifteen minutes contained respectively, twenty-one, forty-two, forty-three, forty and twenty-five passengers, the average number being thirty-four. The relation of the maximum, forty-three, to the average, thirty-four, is 126 per cent, this being then the measure of the diversity of loading.

Application of Observations to Service

Eliminating from consideration those accidental variations in service which even the most carefully and conscientiously operated lines occasionally meet, and those unfortunate traits of human nature that at times lead individuals into exaggeration which amounts to misrepresentation, it will be found that the peculiarities of traffic demand which must be known and met to insure good service are those already defined, viz.: "concentration" and "diversity."

On the majority of lines, during the rush hour, there are two points fairly well defined which it is also of importance to determine. They are the point at which the maximum load is first obtained, and the point at which the loading becomes appreciably less than the maximum. Between these points occur such conditions of loading as cause complaints, and beyond the second occurs, if at all, excess car mileage, the elimination of which is the constant effort of the management.



TRAFFIC SURVEYS—FIG. 4—MODEL SHOWING THE VARIATION ON A TYPICAL LINE OF CAR LOADING AT VARIOUS POINTS

As the seating capacity of each car is fifty, the model indicates a large number of idle seat miles, necessitated by requirements for maximum headway and the impossibility of taking cars out of service at points where necessity ceases.

Particularly during the non-rush hours the lack of uniformity of the flow of traffic into and out of cars may cause a considerable variation in the number of passengers in cars moving at a uniform headway, the result of which is that certain passengers may be obliged to stand. A knowledge of this non-rush-hour variation in loading or "diversity" will assist in determining the excess of seats over passengers which it is necessary to provide under normal conditions to furnish seats for all, at a time of day when a company can best demonstrate to the public that it is acting in good faith in its attempt to serve the convenience and comfort of its patrons.

Too often in the past, however, franchise requirements and commission rules and regulations have overlooked the fact that the number of seats in a car is fixed and that it is impossible to put into service and remove from service at every point on a line cars to meet the service requirements imposed. In order that the fare paid may purchase the maximum amount of service, which is equally desired by the operator and the patron, consideration must be given to two phases of diversity of loading: (1) Passengers without seats; (2) seats without passengers.

*Unusual distortion of headway arising from a block of any sort will produce a large diversity of loading and should be eliminated from consideration.

In order to furnish ten passengers with seats for a mile trip, it may be necessary to run a car with seats for forty passengers 5 miles. The 200 seat-miles furnished for 10 passenger-miles may impose a burden on the service that is not to the best interest of the patrons as a whole.

An interesting example of the difficulties and dangers arising from an effort to fit car operation, which is inelastic because the smallest unit of service that can be rendered is the seat-miles of a round trip of one car, to an inelastic standard of service has recently come to notice.

The diversity of loading observed on a certain line was such that it was believed that the furnishing of 33 per cent more seats would insure no standing except by preference. At the time the original survey was made, the company was furnishing during each fifteen-minute period a seat per passenger at the point of maximum loading, but due to the diversity of loading some cars had vacant seats and others had standing passengers. Under the circumstances, 4.2 per cent of the passenger-miles were being made by passengers who could not find seats. After the service (seat-miles) was increased by one-third, it was found that 3.8 per cent of the passenger-miles were made by standing passengers. Thus to increase by 0.4 per cent. the number of seated passengers, it was necessary to increase the seat-miles furnished by 33 per cent.

Diversity indicates a vacant seat for every standing passenger on a schedule providing a seat per passenger, and while a passenger may stand for one block only, the vacant seat is carried through to the end of the run. Diversity in loading is accidental, and to provide completely against such abnormality in the flow of traffic is usually so expensive as to impose a serious burden upon the traffic as a whole. While, therefore, it may be impossible to take care of all diversity in loading, it is nevertheless important that this diversity should be known and that the attendant circumstance of vacant seats should be shown in connection therewith.

Up to a certain point, additional service can be furnished at certain times of the day and in certain localities at a reasonable cost, and where this is possible it should of course be done, but it should be constantly borne in mind that the figures to be considered are not seats and passengers, but seat-miles and passenger-miles. This point should be especially emphasized, and although there are attendant difficulties due to the fact that the charge for urban transportation is very generally not based on the length of ride, such data as can be obtained should be used to measure service not by the ratio of seats to passengers at any point but by the ratio of seat-miles to passenger-miles within a given district and during a definite period of time. This last ratio measures the relation between what the passenger wants and what the company provides. It should be possible to determine then the diversity of loading and the points between which maximum loading exists, from the data taken in any traffic study, in addition to the information usually determined as to the number of passengers passing points of heaviest traffic at different hours of the day.

In 1909 for a period of twenty-four hours a count was made of every passenger entering and leaving every car of one of the largest companies, at every point on the line. Frequent observations have been made by many companies of the number of passengers passing some point of heavy loading during thirty minutes or an hour in the evening rush. Between these two studies lies the practical mean, and if the fact be borne in mind that the simpler the plan the more frequently the observations can be made, the question involves the determination of the point, for each of the following items, where increased expenditure is not accompanied by data which is sufficiently greater in value to justify the outlay.

(*a*) Type of man and organization to be employed on the work.

(*b*) Frequency of collection of data.

(*c*) Extent of data to be taken.

These features of traffic studies will be discussed in later articles dealing with the organization to be employed, and the extent and frequency of data to be taken.

Tramways in the United Kingdom

A. J. Lawson Analyzes the Operating Results for the Year 1912-1913

An analysis, prepared by A. J. Lawson, of the operating results of the tramways in the United Kingdom for the year 1912-1913, was published in two issues of recent date of the London *Engineer*. The analysis was based on the Board of Trade report noted in the London Letter in the Electric Railway Journal of Feb. 6, page 301. The capital expenditures during the period were £79,359,758 on 2661 route-miles, equal to an outlay of £18,229 per mile of single track. The added track during the year was only 25 route-miles, the largest amounts being 10 miles in Birmingham, 7 miles in Belfast and 4¼ miles in London. It is stated that tramway construction seems practically at an end, unless the London County Council should add a few more miles to complete its present unfinished network. The total number of cars ordered during the year was 338, all electric.

In Greater London the number of passengers decreased more than 22,500,000, but throughout other parts of the United Kingdom the number of passengers increased not less than 92,500,000, making the total number 3,319,857,293. The tramway passengers outnumbered the steam-railroad passengers nearly two and one-half to one. On an average fare of 1.065*d.* per passenger they produced £14,282,651, which, with revenue from other sources, made an aggregate of £14,972,919. The working costs were £9,384,798, leaving a net income of £5,588,121. The average working costs amounted to 6.70*d.* per car-mile, and the total costs, including interest, sinking fund charges and rentals, to 9.86*d.* per car-mile.

Power costs ranged from 0.442*d.* per car-mile for Glasgow car operation to 2.629*d.* per car-mile for Burnley. For seven interurban lines, traffic expenses averaged 2.463*d.* per car-mile, ranging from the high mark of 3.144*d.* for the Birmingham & Midland Company to the low point of 2.163*d.* per car-mile for the Lanarkshire Tramways. For ten small provincial lines the average was 2.826*d.* per car-mile, running from 3.462*d.* per car-mile in Derby to 2.315*d.* per car-mile in Stockport. Car repairs rose to an average of 0.748*d.* per car for all tramways. The average cost per car-mile for track maintenance was 0.53*d.*

For all tramways the number of people carried per car-mile averaged 9618 and the fare 1.065*d.* per passenger. With three exceptions, the passenger fares on all the London tramways were below the passenger expenses, the all-around average deficiency being 0.012*d.* for each of the 796,235,110 passengers carried. The average fare for the twenty-seven largest municipal undertakings ranged from 0.776*d.* in Glasgow to 1.269*d.* in Dublin. Five trackless trolley car systems in the United Kingdom showed a deficit for the year's operation.

New Carhouse and Shops at Holyoke

The Novel Features of This Fireproof Structure Include Roof Trusses Incased in Concrete and Crane Service, in Addition to Wheel Hoists and Car Hoists

The new carhouse recently built by the Holyoke (Mass.) Street Railway Company possesses a number of features which differ materially from the approximate standards that have been largely established by custom. The most prominent of these is the use of partly-inclosed special work, the three tracks of each bay branching from the ladder-track lead just outside of the building line and entering the building on a curve. This arrangement necessitated a bend in each partition wall of the carhouse to provide clearance at the inside of the curved track but permitted the use of sliding doors which are entirely concealed when open. In general the special work was designed first and the building was made to conform to it on account of the desire to attain the maximum value from the ground space notwithstanding the limited width of street in front of it.

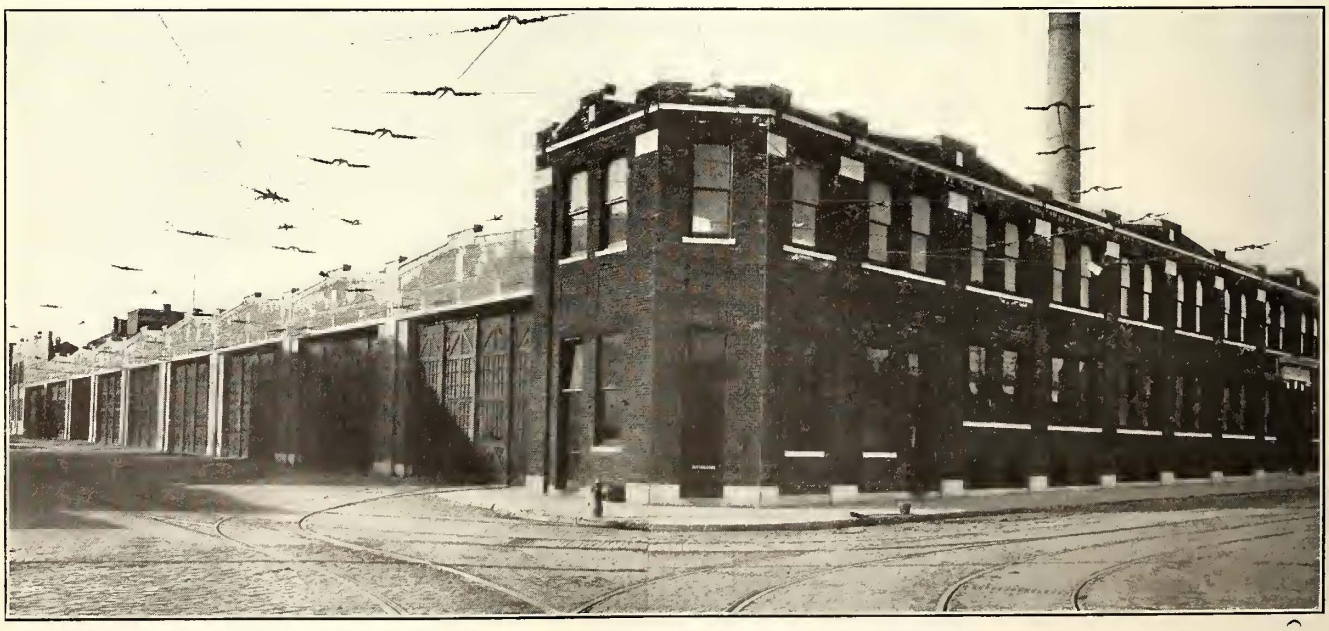
The building covers the entire tract owned by the company, which consists of a rectangular piece of land 400 ft. x 190 ft. At one side of the building is a two-story section devoted to the offices, the dimensions of this section being 26 ft. x 190 ft. On the ground floor are located the executive offices of the company, a waiting room for the public and a headlight room. On the second floor are located the engineer's office and drafting room, offices for the heads of departments, and locker and recreation room for the uniformed men. In the basement underneath this section are located the boilers for heating the entire building, the coal storage bin and a sand-drying system, which delivers sand to spouts in the adjoining carhouse.

Adjacent to the office section are four operating bays, each 190 ft. x 36 ft. 9 in., and containing three tracks placed on 11-ft. centers. Each bay can accommodate eleven double-truck cars 45 ft. long and still leave a 3-ft. passage at each end of the bay. Pits are arranged under the tracks in the operating bays, so that nine of the eleven cars in each may be inspected without shifting. Adjoining the four operating bays are three storage bays arranged in similar manner to the operating bays except that they are not provided with pits. The foundations, however, have been carried low enough so that pits may be installed in the future.

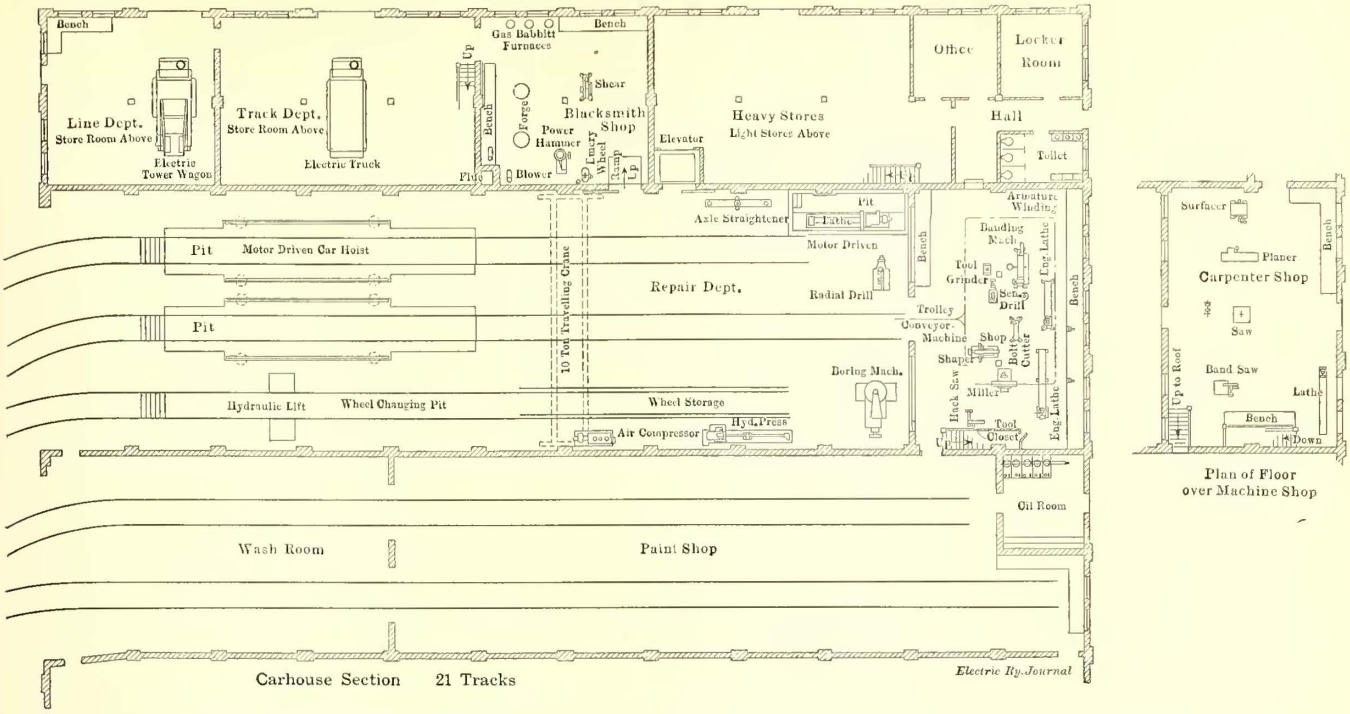
Adjoining the storage bay is the paint shop, which has two tracks placed on 15-ft. centers. The end of the bay next to the entrance is arranged for a washroom and will accommodate two 45-ft. cars at a time, and this is separated from the paint shop by dustproof glass doors. At the extreme end of the paint-shop bay is located the storage room for oils and paints.

Next to the paint shop is the repair bay which is 45 ft. 8 in. wide and 190 ft. long. For the first 150 ft. from the entrance this bay is one story in height, there being 22 ft. clear under the bottom of the roof truss. This portion of the repair-shop bay is provided with three tracks spaced on 15-ft. centers, two of these being provided with motor-operated screw hoists for lifting car bodies from the trucks. The third track is provided with a hydropneumatic pit hoist for changing wheels. The screw hoists were furnished by the Columbia Machine Works, and the hydropneumatic pit hoist by the Watson-Stillman Company.

Over this portion of the bay runs a 10-ton, floor-operated, Niles electric crane which serves the large machine tools located in the shop. The 30-ft. space at the end of the shop is of the same exterior height as the first 160 ft. but is separated from it by steel and glass partitions and has two floors. On the bottom floor are located the small machine tools and on the second floor are the wood-working tools. The small machine tools on the first floor of the machine shop are served by a 1-ton trolley hoist running around the shop and through the doors to a point that connects with the traveling crane. This crane is supplied with energy direct from the overhead trolley through a home-made trolley-pole about 3 ft. long, which is provided with a jumper cable run from the contact wheel to the switch terminals on the frame of the crane. The arrangement made it unnecessary to install the usual horizontal bare contact wiring on insulators mounted against the wall near the



HOLYOKE SHOP—EXTERIOR VIEW SHOWING TRACKS AND DOORS



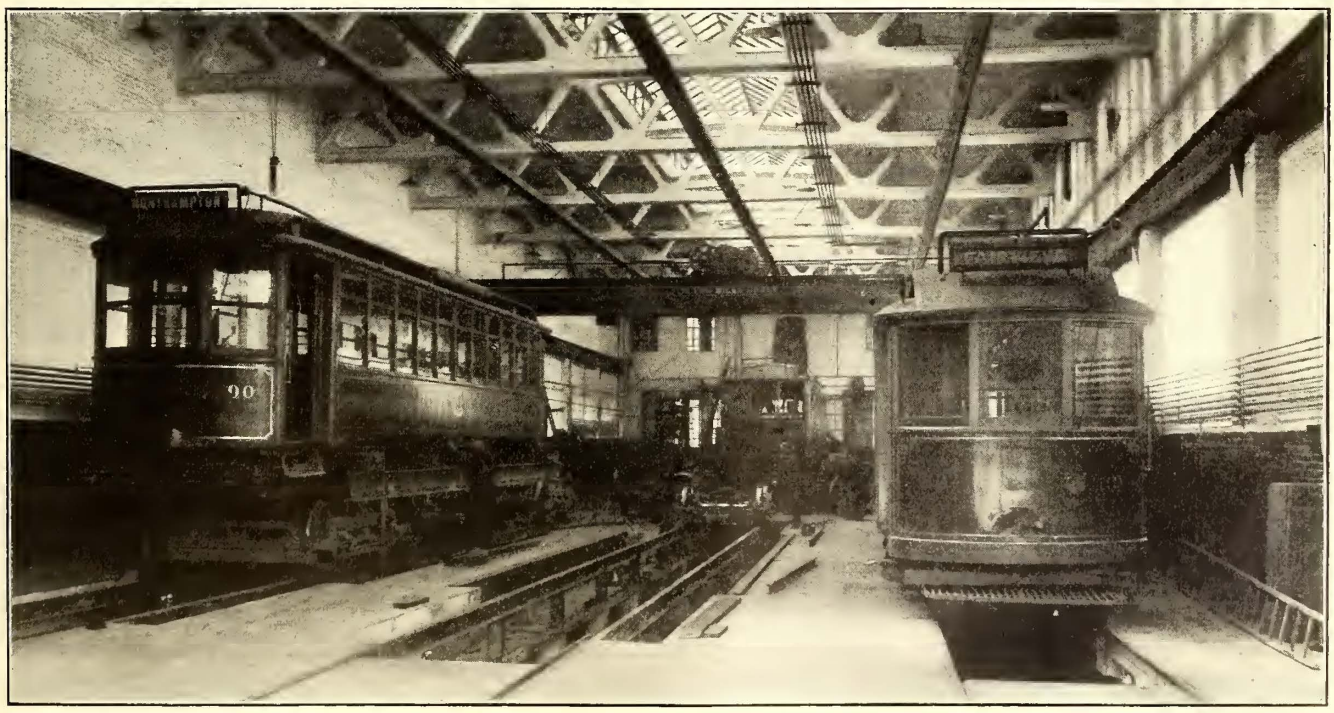
HOLYOKE SHOP—PLAN OF REPAIR SHOP SECTION ADJOINING CARHOUSE, SHOWING TOOL ARRANGEMENT

crane rails. No operator's cage is required on the crane, as the controllers for the various horizontal and vertical movements are provided with pendant cords running near the floor.

Adjoining the repair-shop bay is a section in which is located the line and track department, and blacksmith's shop, the storeroom, the master mechanic's and storekeeper's offices, the upholstery shop, the stock room, etc. This portion of the building is two stories high.

The construction of the building is generally standard, the walls being of brick and the roof having reinforced-concrete girders resting on brick pilasters. The two-story portions of the building, however, are framed with structural steel, all of this being fireproofed by surrounding it with not less than 2 in. of concrete. The roof trusses, as shown in the accompanying illustration, have the separate members incased in concrete for the double purpose of reducing the weight and improving the lighting. The floors in the offices are of reinforced concrete with a maple top flooring, and those in the repair shop and the room for heavy stores consist of creosoted wood blocks laid on a concrete base. All other floors are concrete with granolithic surface.

All preliminary studies for the building design were made by G. E. Pellissier, consulting engineer, Springfield, Mass., who also had charge of the design and installation of the track special work, machine-shop equipment and the lighting and overhead work. Mr. Pellissier also acted in an advisory capacity during the construction of the building.



HOLYOKE SHOP—VIEW IN REPAIR SHOP, SHOWING CAR HOISTS AND OVERHEAD CRANE AND CONCRETE-COVERED TRUSSES

Steel Parlor Cars for Waterloo-Cedar Rapids Line

A Description of One of the Parlor-Observation Cars Built of Structural-Steel Shapes—An Unusual Lighting System Is Installed, and as the Cars Are to Be Used Always in the Rear of Two-Car Trains, Controllers Are Omitted Although Motors Are Provided

To furnish its patrons a standard of service equal to that of the two steam roads with which it connects, the Waterloo, Cedar Falls & Northern Railway has just placed in service three all-steel, parlor-observation cars. Aside from this demand for the service, the cars are intended to cater to that class of the public which desires the best accommodations and is willing to pay for them. Moreover, the attractive appearance of this new equipment will, it is believed, help to make this road's service popular. A buffet service will be provided, the menus being attractively printed cards which will be distributed through the mails to advertise the line.

The new cars compare in length and width with the standard steam railroad equipment used for this purpose. They are also among the first all-steel cars of this type to be built for an electric interurban railway. The principal dimensions are as follows:

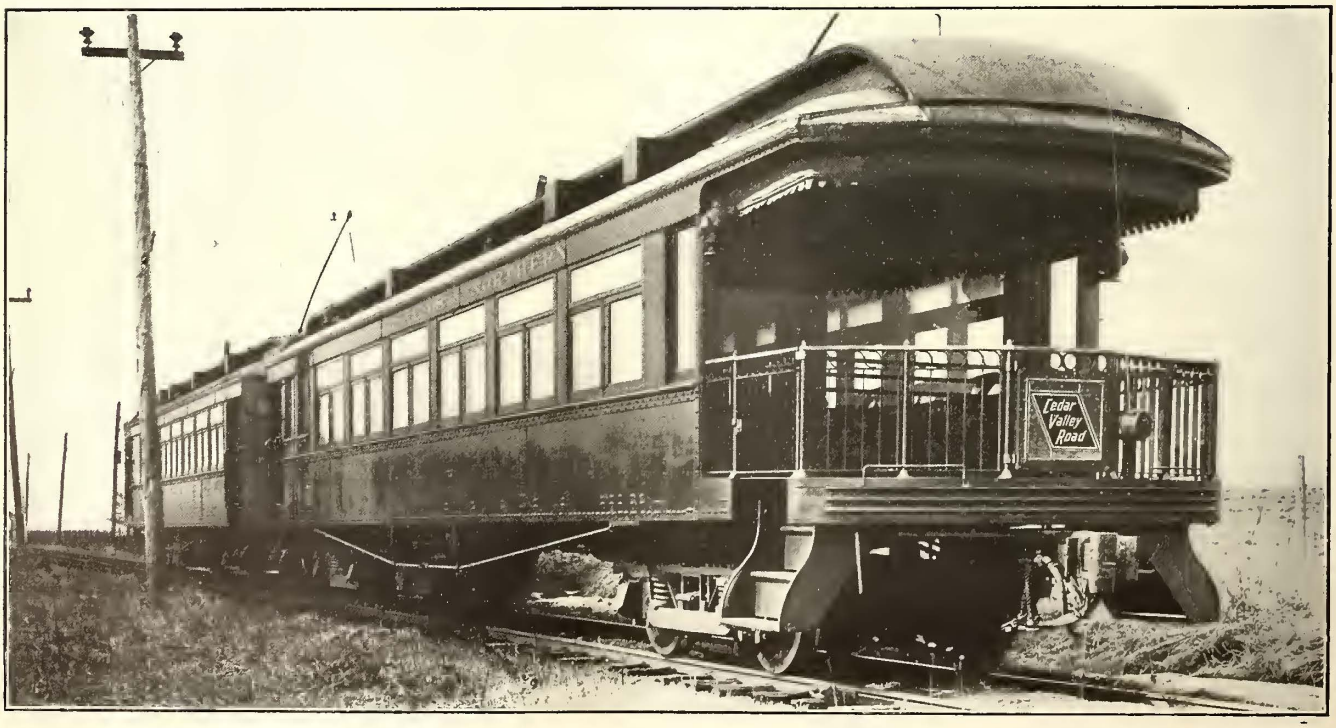
Length over all	60 ft. ⅜ in.
Truck centers	38 ft. 4⅜ in.
Wheelbase	6 ft. 10 in.
Width over belt rail	10 ft. 3 in.
Inside width	8 ft. 10½ in.
Diameter of wheels	36 in.
Seating capacity	30

The body is divided into a main passenger compartment and an observation compartment, and opening off the latter is a commodious observation platform. A kitchenette, 6 ft. x 3 ft. 2 in. in size, occupies a space in the partition between the two main compartments. portable tables being provided for the buffet service. At the front end of the main passenger compartment are two toilets, one on each side of an inclosed passageway, and also an inclosed space provided for a Peter Smith Heater Company's hot-water heater. Fourteen leather-upholstered wicker chairs are arranged along the sides and at the end of the observation compartment, and twelve chairs of the same design are located in the main passenger compartment. A built-in writing desk and a desk chair occupy one corner of the main passenger compartment, patrons being furnished with envelopes and letter paper bearing the company's trademark, "Cedar Valley Road." A leather-upholstered davenport is located beside the partition between the two main compartments.

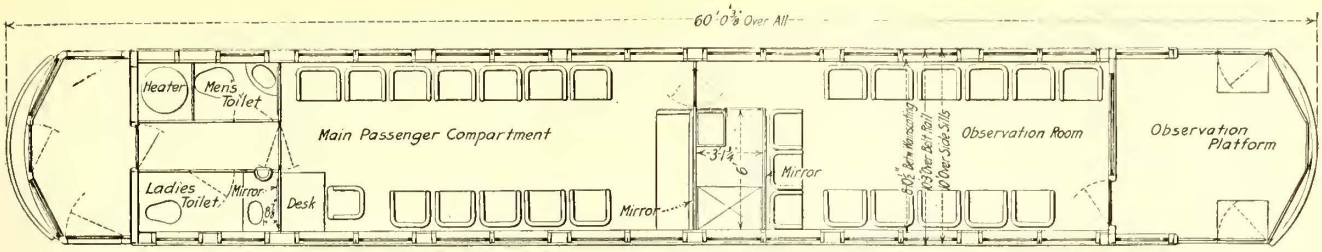
Details of Construction

Essentially the body framing of these cars was built as a truss side frame designed to carry the load transmitted to it by the cross-bearers in the underframe. The underframe is stiffened against buffing and pulling strains by two 8-in., 18-lb. I-beam center sills which extend between buffers. The compressive stress in the top chord of the side frame is taken up by the 4-in. x 3-in. x 5/16-in. deck plate, which is reinforced by the 3/16-in. letterboard, this being stiffened at its base by a 1-in. x 1-in. angle. This compressive stress is in turn absorbed by the panel and intermediate posts between the windows, which are riveted rigidly to the side girder. The last-named member is formed of a 3/16-in. web, a 6-in. x 3½-in. x ⅜-in. bottom flange, a 3½-in. x 3-in. x ⅜-in. top flange, which is reinforced by the 3-in. x ⅜-in belt rail. This girder is 2 ft. 10⅜ in. in depth and the intermediate and panel window posts serve as angle stiffeners.

Intermediate window posts are formed of 2¼-in. x 2¼-in. x ¼-in. tees, and the panel posts, which vary in width depending on the arrangement of window openings, are formed of 2-in. x 3-in. x 5/16-in. angles separated at proper intervals by 3/16-in. plates. At the partitions between compartments the steel carlins are tied together by web plates which are neatly housed and



WATERLOO-CEDAR RAPIDS CAR—REAR VIEW OF PARLOR CAR SHOWING OBSERVATION PLATFORM



WATERLOO-CEDAR RAPIDS CAR—FLOOR PLAN, SHOWING ARRANGEMENT OF SEATS

finished where they are exposed to the view of passengers in the car body. The intermediate sills in the underframe are formed of 4-in., 8½-lb. I-beams, and these are arranged so that the 4-in., 5-½-lb. channel cross-bearers rest on their upper flanges. Outside of the body bolsters the intermediate and center sills are of the same sections, namely, 8-in., 18-lb. I-beams. The body bolster is built of structural steel angles and plates, being 12 in. wide x 15 in. high and in the form of a box girder.

The construction is of steel throughout with the exception of the flooring and roof sheathing. Although this is a monitor-roof car, the side-post members are made continuous from side sill to side sill, being bent to the contour of the roof to form the principal carlins. The car-body flooring is formed of two layers of yellow pine with one thickness of building felt paper between them, and an insulating medium, consisting of mineral wool, is packed in the 4-in. space between the bottom of the sub-floor and a plate which rests on the bottom flanges of the cross-bearers.

EQUIPMENT

As will be noted in the views of this car shown in the accompanying illustrations, the observation platform is provided with an ornamental brass hand rail and is sheltered by the projecting hood of the car-body roof. The side framing provides for six double windows and three single windows. The double window openings are fitted with single sashes, above which are rectangular sashes continuous over each window opening. These upper fixed sashes are glazed with pressed-prism plate glass. The floors in the few main passenger compartments are covered with a green Wilton carpet. The observation platform floor as well as that in the vestibule at the opposite end of the car is covered with an interlocking rubber tile.

The car-body equipment includes Utility automatic ventilators, Lindstrum improved ratchet brake handles and Peacock geared brakes, Curtain Supply Company's ring fixtures, Hedley anti-climbers and American-La France fire extinguishers.

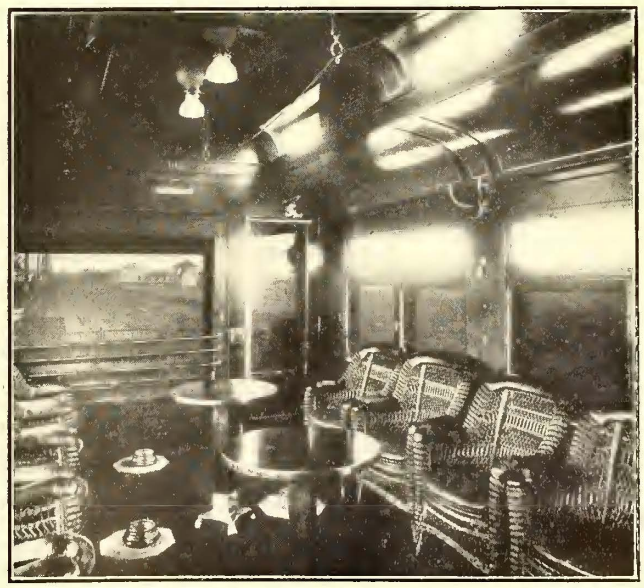
The bodies are mounted on McGuire-Cummings Company's No. 70 high-speed interurban trucks, equipped with 36-in. M. C. B. rolled-steel wheel pressed on A. E. R. A. standard axles. Since the car is to be operated only as a trailer in two-car trains, no controllers are provided, but four Westinghouse 333-E-7 commutating-pole motors insulated for 1500 volts have been installed, these being controlled by jumpers from the leading car. The motors have a rating of 120 hp at 650 volts and a gear ratio of 25 to 52. The control equipment on the leading car and the switch group on the trailer are of the HL non-automatic type, which provides for full speed on 1200 volts and half speed on 600 volts.

LIGHTING SCHEME

Ten 56-watt, 130-volt lamps in series on 1200 volts and five in series on 600 volts were provided in the car lighting scheme. Each car is wired in conduit installed along the monitor deck with circuits passing between the carlins above the transom board to condulet tees and thence to the conduit boxes concealed behind the headlining. The complete installation includes two circuits of ten lamps each, with every other lamp connected to the circuit at the opposite side of the car. This was done so that if one circuit failed the illumination would be reduced one-half but would be uniformly distributed. Each lamp is fitted with an Alba shade set against the headlining where the conduit box is concealed, and the shade is made removable for repair work.

Energy for lighting is supplied through jumpers which connect the lighting circuits to the change-over switches installed on the motor cars. The light circuits are also fused and switched in a cabinet in the hot-water heater space at the front end of the car, but the change-over function is supplied at the leading car in all cases. The location of the change-over switch was selected so that by a single operation the motorman on the leading car could close all circuits in the two-car train when passing from 600-volt to 1200-volt propulsion current. Air for the control and the brakes on the parlor car is supplied from the compressor set on the leading car.

A novel feature of the electrical equipment is an insulated section in the trolley rope. This may be observed as the heavier rope section near the trolley wheel in one of the accompanying illustrations. A section of rubber hose, just large enough to slip over the trolley rope, forms the principal part of this insulation. After it is in position the ends are wrapped with rubber and friction tape and painted with insulating varnish. The section of hose is 12 in. long, and as this is sealed against moisture it furnishes a dry section of trolley rope which is equivalent to a 12-in. insulator. This method of insulating the trolley rope provides a



WATERLOO-CEDAR RAPIDS CAR—INTERIOR VIEW OF OBSERVATION COMPARTMENT

safeguard which is believed to be superior to the ordinary wood-strain insulators or other devices which have been employed on other 1200-volt d.c. equipment.

The cars were built at the Paris (Ill.) plant of the McGuire-Cummings Manufacturing Company, and they were designed under the direction of C. D. Cass, general manager of the Waterloo, Cedar Falls & Northern Railway. A preliminary description of the character of construction employed in the extension of this company's lines between Waterloo and Cedar Rapids, over which these cars will operate, appeared in the ELECTRIC RAILWAY JOURNAL of July 19, 1913.

Line Construction for C., M. & St. P. Electrification

Construction of Overhead Is Progressing Rapidly—Work on the Second Section Has Been Begun

Overhead construction for the electrified section of the Chicago, Milwaukee & St. Paul Railway is progressing at a rapid rate from Three Forks, Mont., westward to Deer Lodge, Mont., unusually thorough methods and equipment having been provided to carry on the work efficiently and with expedition. The type of construction train engaged in erecting the catenary with the twin contact wires that are to be used for this installation is shown in the accompanying illustration. The trains include four box cars, upon the roofs of which wooden superstructures have been erected, so that the linemen have a platform 160 ft. long on which to work.

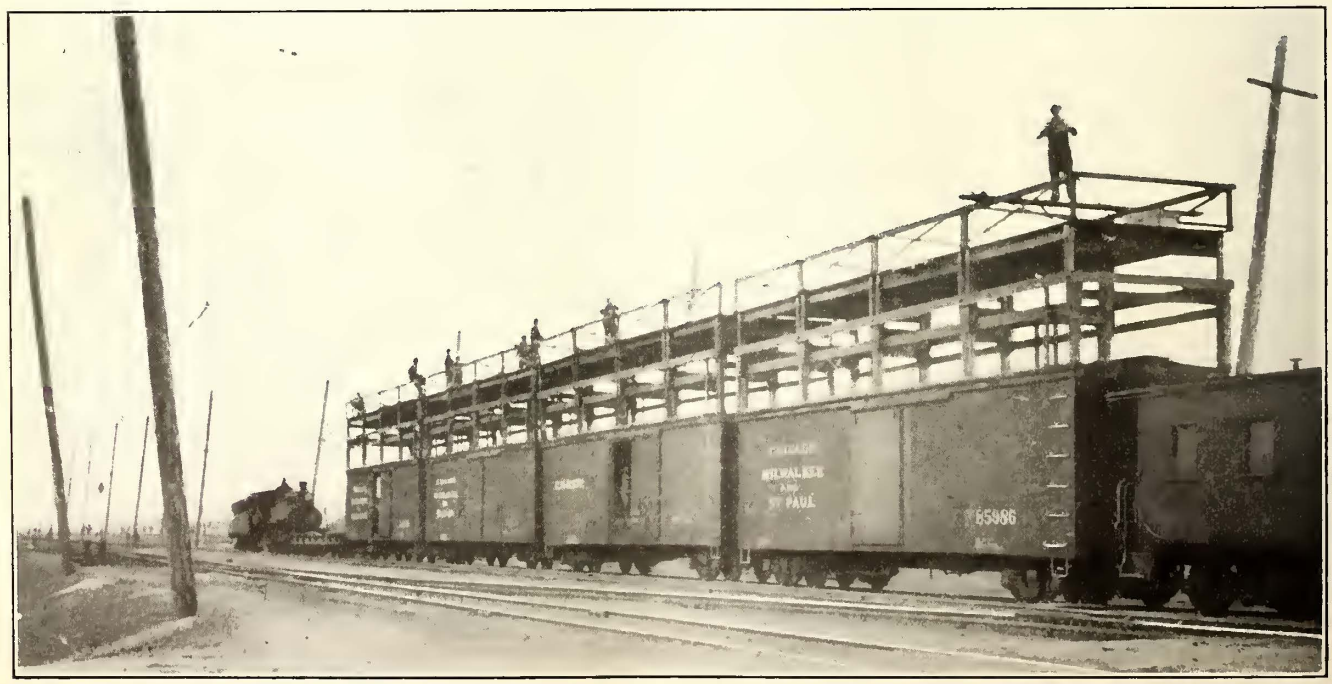
It is expected that the 113 miles of overhead construction between Deer Lodge and Three Forks will be completed early next fall, practically all of the line material for the installation being on the ground or en route at the present time. This includes more than 100,000 hangers and some 250,000 malleable-iron castings for the catenary construction, all of which were furnished by the General Electric Company. The line material, it may be said, has been sherardized throughout without exception, to eliminate the possibility of corrosion.

Work has also been started on the electrification of another engine division extending eastward from Three Forks to Harlowtown, nine electric locomotives in addition to the twelve now under construction having been ordered early in March. It is planned to start overhead construction work on an additional engine division each year until all four of the proposed electrified districts are completed, making a total of 440 miles. This is to be in service under electric operation by Jan. 1, 1918.

Continuing Interest in Safety Work

Few companies have devoted more attention to the safety movement or have given it greater permanency than the Chicago & Joliet Electric Railway, Joliet, Ill., J. R. Blackhall, general manager. Recently this company was instrumental in promoting an exhibit and lecture course on health and safety first which was attended by more than 22,000 people, largely of the laboring class. By enlarging the scope of the safety work to include public health, the railway was enabled to join forces with the Joliet Public Health Central Council, and together they have conducted an educational campaign in the prevention of accidents and disease. The exhibit and lecture course was promoted under the auspices of the company and the council at an expense of less than $500. This amount was borne by local manufacturers, public utilities and various other civic organizations. The purpose of the lecture course was principally to encourage community action, and the exhibits included machinery for carrying out the required measures. The program and exhibit were continued for nine days, the program consisting of afternoon and evening sessions and including musical entertainment and lectures by prominent speakers, some of them being of national reputation.

The railway has become quite enthusiastic about the safety movement, which has now been under way for practically a year. The management states that the results have greatly exceeded its expectations. Until about four months ago the percentage of accidents had been greatly reduced as a result of the safety work. For the past four months the company has had no accidents to report to the Illinois Public Utilities Commission. When it is considered that reports must be made of all accidents in which persons are injured and incapacitated for more than twenty-four hours, or damage is caused to property amounting to more than $150, it will be seen that this means real results.



C., M. & ST. P. LINE CONSTRUCTION—FOUR-CAR TRAIN FOR LINEMEN

Pennsylvania Association Spring Meeting

The Meeting Held in Pittsburgh on May 11 and 12 was Devoted to Workmen's Compensation, Organized Safety, Small Car Operation and Other Live Topics, and Important Committee Reports Were Discussed

The spring meeting of the Pennsylvania Street Railway Association was held at the Fort Pitt Hotel, Pittsburgh, on May 11 and 12 with an attendance of about one hundred persons. The opening session was called to order at 2:10 p.m. by C. L. S. Tingley, vice-president American Railways, who briefly welcomed the members, congratulated them upon a successful year and outlined the plan of the meeting. He then introduced J. F. Layng of the General Electric Company who read a paper on "Economies in Operating Small Cars," following its presentation with a series of lantern slides. Abstracts of this and others of the papers will appear in next week's issue. After a spirited discussion of this paper President Tingley departed from the order of the program and called upon D. A. Reed, chairman of the Industrial Accidents Commission, who spoke upon "Workmen's Compensation in Pennsylvania." This paper provoked a discussion which finally resolved itself into a friendly matching of wits between W. B. Rockwell, manager Eastern Pennsylvania Railways, and Mr. Reed. The atmosphere having been somewhat replenished by this play of "static" in the air W. A. Heindle, general superintendent Wilmington & Philadelphia Traction Company, read a list of six topics forming the question box, which were to be discussed at Wednesday's session. Before adjournment the chair appointed, as a committee on resolutions, W. E. Boileau, general manager Scranton Railway; J. E. Wayne, superintendent York Railways and W. B. Rockwell.

In discussing Mr. Layng's paper C. B. Fairchild, Jr., executive assistant Philadelphia Rapid Transit Company, said that Mr. Layng had treated the one-man car from the standpoint of the manufacturer, interested in better service and in economy. He would like to hear a discussion from the operating companies' standpoint. Where traffic was light it might be possible to put enough one-man cars on the line to offer frequent service and still show a profit. The largest obstacle to its use would seem to be the grade crossing.

W. E. Moore, vice-president and general manager West Penn Traction Company, stated that the company has twenty one-man cars, and that they showed a cost in labor of about $5 per car-day. One old car which had been redesigned had a capacity of forty-four passengers and weighed 8 tons. On the subject of grade crossings he stated that the motorman had been permitted to flag crossings or, in case a clear view of the tracks was to be had from the car, to proceed without leaving the car. The number of accidents had actually decreased to perhaps a quarter of the former number. Passengers seemed to object to the one-man arrangement at first but had come to like it. In brief, his company had found it a success.

W. B. Rockwell said that as we are all looking for means of securing economy in operation, why should not the same principles apply to electric cars as to horse cars. He quoted an incident from horse-car days which indicated at least one case in which the change from two horses, a conductor and a driver to one horse and a driver did not turn a financial failure into a success. Mr. Rockwell was somewhat pessimistic regarding the one-man car and asked for actual statistics regarding numbers of accidents with it. In reply Mr. Moore said that while he had no exact figures with him he was sure that there had been the reduction in the number of accidents stated. When the passengers board and alight at the front entrance the motorman sees that this has been safely accomplished before he starts the car, and there is no confusion of signals possible, as when the conductor controls these operations.

In introducing Mr. Reed, Mr. Tingley said that about four years ago the Pennsylvania State Legislature discussed accidents and compensation but decided not to make a jump in the dark. A commission, representing the employer, the employee and the law, was appointed and this commission presented an able report two years ago. The legislature ordered still further study of the situation. In the discussion which followed the presentation of the paper Mr. Rockwell said that it was refreshing to meet a lawyer who was not an "ambulance chaser." He believed in the compensation act, and in anticipation of such an act he had put it into practice five years before. His only criticism was that the percentage of wages paid to the injured party was too high. Mr. Reed contended that the compensation was actually less than 50 per cent in some cases. There is some difficulty in locating the blame for an accident and the conclusion is apt to be affected by the point of view of the man drawing it.

Mr. Tingley called attention to the possibility of an injured employee's drawing more money ill than well, due to the provision that no deduction should be made from the compensation on account of contributions from beneficial associations. He thought that it would be economical for the association to form a mutual benefit association to carry the railway risks although the suggestion may be premature at this time in view of the fact that the laws, if passed, do not become effective until 1916.

WEDNESDAY'S SESSION

The Wednesday morning session was called to order at 9:45 o'clock by President Tingley and a report of the committee on filing rates and tariffs was made by C. B. Fairchild, Jr. Recommendations for standard rules had been submitted to the bureau of rates of the Public Service Commission and these had been taken under advisement. The committee had been assured that the bureau would issue a new draft based upon these recommendations and this will be submitted and suggestions invited before definite action is taken. Mr. Tingley stated that he had seen the draft of the ordinance and predicted that when it reaches its final form it will be the best thing of the kind so far developed. The report was received and the committee continued.

R. P. Stevens, president New Castle & Lowell Railway, chairman of the committee on a uniform crossing agreement, reported that a joint meeting had been held with representatives of the Public Service Commission at Harrisburg on Nov. 16, 1914. Paul Spencer, United Gas & Improvement Company, Philadelphia, was appointed chairman of a sub-committee to draw up specifications and he had selected J. S. Jenks and Mr. Stevens to represent the association on the sub-committee. The sub-committee had held weekly meetings in Philadelphia throughout the winter, beginning Dec. 1. On May 1 an agreement on specifications was reached, these occupying sixty-seven typewritten pages.

As prompt action was necessary the specifications were submitted to the executive committee for approval.

The report of the treasurer, H. M. Stine, Harrisburg, was then read. It showed receipts of $2,666.68 since the last meeting, including the balance from last quarter, and expenditures of $1,269.41, leaving a balance of $1,397.27. For the executive committee Mr. Tingley reported an active membership of thirty-eight, representing 80 per cent of the mileage in the state. There was still a fine field for securing associate members from among the small companies. The association needed their interest especially regarding legislation. As an instance he cited the Jones bill which failed of passage, with fifty legislators sitting in their seats without voting.

The question box discussion next took place. This will be reported in next week's issue. An address was then delivered by Lew R. Palmer, chief inspector Department of Labor on "Organized Safety." This is abstracted below.

After resolutions of thanks to the speakers and to the Pittsburgh Railways, the Duquesne Light Company, the Westinghouse Electric & Manufacturing Company and the General Electric Company, had been passed the meeting adjourned.

In addition to the formal exercises described above the members enjoyed an informal dinner with music and moving pictures and trips to the electric works, the Homewood shops and other points of interest.

ORGANIZED SAFETY

BY L. R. PALMER, CHIEF INSPECTOR DEPARTMENT OF LABOR AND INDUSTRY, STATE OF PENNSYLVANIA

Under the above title, Mr. Palmer traced the development of the electric railway from the standpoint of the numbers of men employed and outlined the organization of the National Safety Council, of which the Pennsylvania Association is an associate member. He stated that the Department of Labor and Industry will co-operate with the association in promoting safety methods and that, as a director of the National Safety Council, Commissioner J. P. Jackson has co-operated in the organization of local safety councils in Philadelphia, Pittsburgh, Reading, South Bethlehem, York and Harrisburg. He explained the importance of the proposed street and electric railway section of the National Safety Council in view of the enormous number of passengers carried by the electric railways.

Mr. Palmer stated that 25 per cent reduction in preventable accidents can be attained by the installation of mechanical safeguards. Of the remainder 45 per cent must result from organization and 30 per cent from education. In the electric railway industry it is necessary to educate not only the workman but the public. In this the railways will be greatly assisted by the educational and public safety section of the national council.

In steam railroad operation from 1 per cent to 2 per cent of the gross receipts go for settlements and local accidents, but with the electric railways any showing under 5 per cent is generally considered good. One American city made a record of 23 per cent in one year and 19 per cent in the following year. Many cities, particularly in the Southwest and the West, have shown from 10 per cent to 12 per cent accident cost. One Pacific Coast city of moderate size after five years of publicity work reduced its accident cost approximately $250,000 per year.

Mr. Palmer then described the safety work of the Brooklyn Rapid Transit Company, complimenting that company upon the work done. He stated also that during the four or five years since the Chicago & Northwestern Railway began to work out an efficient safety organization, deaths of employees have been reduced more than 35 per cent and injuries to employees more than 25 per cent. Steam railroads having a mileage of 200,000 out of a total of 240,000 have organized safety work. The "Frisco" system reports that during the first eleven months of the safety campaign accidents were reduced 33 per cent and injuries 27 per cent, while the New York Central lines report a reduction of 37 per cent comparing 1914 with 1912. The El Paso & Southwestern system reports that for the year ended June 30, 1914, the fatal accidents decreased 41 2/3 per cent and injuries causing time loss of more than three days, 32 per cent.

The United States Steel Corporation from 1906 to 1913 saved 11,074 of their workmen from serious or fatal injuries, a serious injury being one that results in the loss of thirty-five days or more. During three years past this corporation has shown a gross saving in casualty expense of nearly $5,000,000, with a net saving of nearly $3,000,000.

In conclusion Mr. Palmer compared some costs of the present war, which he said was due to lack of the co-operation upon which safety rests, showing that the cost for this year to Great Britain alone will be much more than the total sum invested to date in all of the electric railway systems in this country.

Fire Protection Association Adopts Railway Association Standards

The National Fire Protection Association in convention at Hotel Astor, New York City, May 11, 12 and 13, adopted the report of its committee on electric railway light and power plants, C. H. Patton, Cleveland, chairman, which recommends the adoption of the American Electric Railway Association recommendations as a guide for the construction of electric railway properties in lieu of the association's recommendations of 1907 covering such buildings. The committee also recommended that additional suggestions for such buildings be published and that the association's sprinkler recommendations be modified so as to include railway properties. The various codes and other recommendations of the association were also advised to be broader, if necessary, to cover such properties. One of the recommendations made by the committee was that the same type of construction be recommended for carhouses, power plants, substations, etc. Buildings of fire resistive construction with or without sprinkler protection and buildings of mill construction with sprinkler protection, were considered preferable. Fire areas or units in such buildings were recommended to be made as small as possible, a reasonable limitation for such fire units in carhouses being given as 1800 ft. of trackage.

Buildings used for car storage should be designed for this purpose only, all other occupancies being properly separated therefrom. The fire hazards in carhouses are mainly due to the heating system and to the presence of electric wiring. Such installations should be made according to the association electrical code and its rules for heating systems. Convenient cut-off sections should be provided for cleaning, washing, oiling, repairing and other work on cars and motors when such work is done in considerable quantity. It also recommended that the Underwriters Laboratories' label service be extended to car-wiring installations.

With the exception of the recommendations made in its report the committee considers the American Electric Railway Association recommendations and the associations' building, sprinkler, heating, electrical and other codes and recommendations sufficient guides for railway property construction.

The Development of Motor Ventilation

An article on the subject of motor ventilation, by R. E. Hellmund, was published in the issue of the ELECTRIC RAILWAY JOURNAL for May 1. In continuation of this subject Mr. Hellmund has furnished a series of ten diagrammatic motor cross-sections showing graphically the progress mentioned briefly in his article.

The earliest motors were well ventilated because uninclosed, but when the inclosed motor was developed about 1893 it was necessary to provide an air circuit inside to permit circulation air and consequent convection of heat. An early inclosed motor is shown in Fig. 1. Five years or so later radial ventilating ducts were added, as seen in Fig. 2. These performed much better than the coil ends the function of fans and at the same time increased the radiating core-surface.

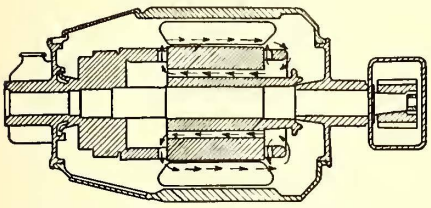


FIG. 1—INCLOSED LONGITUDINAL-DUCT TYPE MOTOR

The fan action of the coil ends causes circulation of air through ducts and field coils.

The next step in increasing the continuous rating was to provide openings to the outside air, circulation being insured by the fan effect of the spacing fingers in the ducts and the "chimney" effect of the motor. The inlet and outlet openings were protected as shown in Fig. 3. Then followed the forced ventilation of large motors by means of external blowers, leading naturally to the internal fan motor as illustrated in Fig. 4. Here a fan is mounted on the shaft at the pinion end and draws air through longitudinal ducts in the core and commutator, driving it out across the field coils.

One of the first types of ventilation used on street cars is shown in Fig. 5. This was a semi-ventilated type, the armature only being directly ventilated. Another semi-ventilated motor is shown in Fig. 6. The objections to these types are that they are subject to dirt and dampness without having the full benefits of ventilation.

An improvement was the fully-ventilated feature illustrated in the remaining figures, which show the types successively developed as described in Mr. Hellmund's article. The captions will serve as guides in recalling his statements. In the diagrams B = baffle; D = duct; F = fan; G = air gap; I = inlet; O = outlet; P = pole piece.

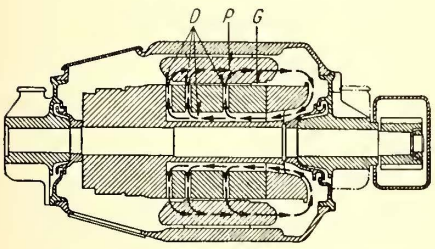


FIG. 2—INCLOSED RADIAL-DUCT TYPE MOTOR

The fan action is produced in the ducts by the spacing fingers between sections of laminations.

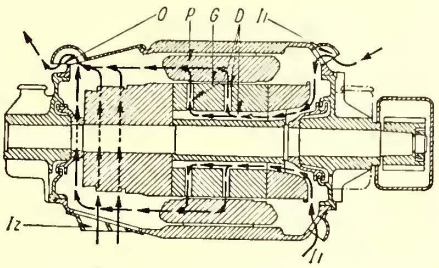


FIG. 3—VENTILATED RADIAL-DUCT TYPE MOTOR

External air is circulated through the motor by the combined fan action and chimney effect.

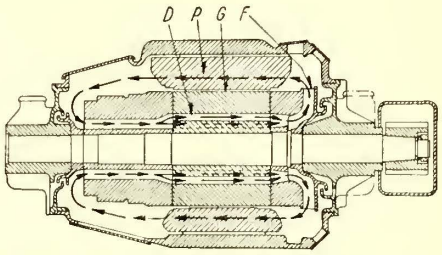


FIG. 4—INCLOSED FAN-TYPE MOTOR WITHOUT RADIAL DUCTS

Air circulation produced as in Fig. 1 except that a fan replaces the open coil ends.

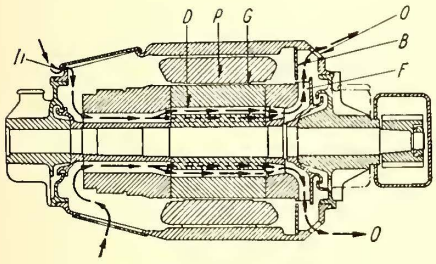


FIG. 5—ARMATURE SEMI-VENTILATED FAN-TYPE MOTOR

Outside air is circulated through the motor armature only by means of a single fan.

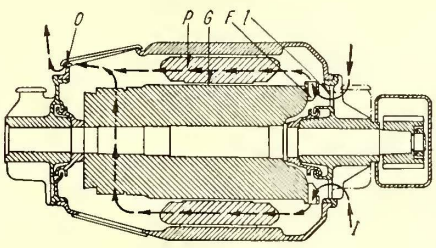


FIG. 6—FIELD SEMI-VENTILATED FAN-TYPE MOTOR

Armature core ducts are omitted and air is circulated by a single fan through the field coils.

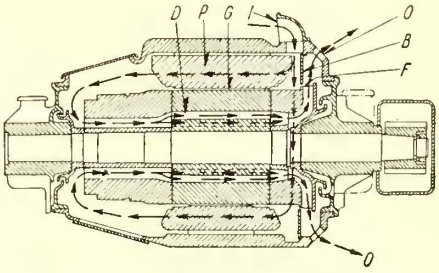


FIG. 7—SERIES-VENTILATED FAN-TYPE MOTOR

One fan circulates outside air around the field coils and through longitudinal armature core ducts.

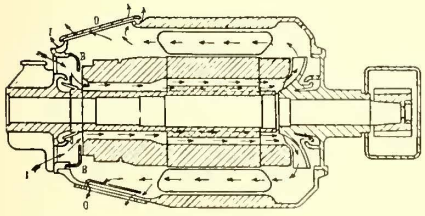


FIG. 8—REVERSED SERIES-VENTILATED FAN-TYPE MOTOR

Same principle as the preceding except that the direction of the air circulation is reversed.

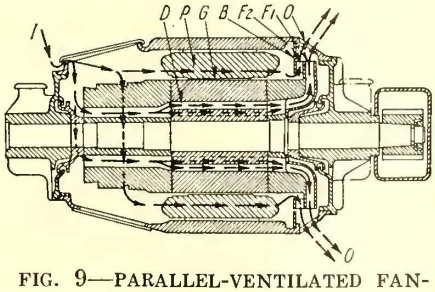


FIG. 9—PARALLEL-VENTILATED FAN-TYPE MOTOR

A double fan produces two streams of air, flowing through field coils and armature respectively.

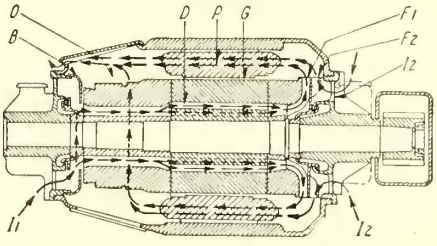


FIG. 10—COMPOUND-VENTILATED FAN-TYPE MOTOR

Like the series plan but with a second field-coil-cooling stream added by a second fan.

ANNUAL CONVENTION SAN FRANCISCO OCTOBER 4 TO 8, 1915

American Association News

ANNUAL CONVENTION SAN FRANCISCO OCTOBER 4 TO 8, 1915

Informal Executive Committee Meeting Held—Transportation Plans Announced—Power Distribution Committee Considers Revision of Specifications—Meeting of the Milwaukee Section

AMERICAN ASSOCIATION EXECUTIVE COMMITTEE

An informal meeting of the executive committee of the American Association was held in New York on May 11. The members in attendance were: C. Loomis Allen, Syracuse, N. Y., president; Charles L. Henry, Indianapolis, Ind., vice-president; L. S. Storrs, New Haven, Conn., vice-president; T. S. Williams, Brooklyn, N. Y., vice-president; M. C. Brush, Boston, Mass., president T. & T. Association; H. H. Vreeland, New York, past-president; W. Caryl Ely, Buffalo, N. Y., past-president, and E. B. Burritt, New York, secretary. The Manufacturers' Association was also represented in connection with the convention plans. The discussion covered the convention trains, of which details are given elsewhere in this issue; committee reports, all of which are due shortly, and the convention program, which will be announced as soon as a few details are completed.

POWER DISTRIBUTION COMMITTEE

As stated on page 889 of the issue of this paper for May 8, a meeting of the Engineering Association committee on power distribution was held in New York on April 29 and 30. The committee first considered the stranding of cables in connection with the new standard stranding proposed by the A. I. E. E. standards committee sub-committee on flexible stranding. The power distribution committee was of the opinion that there is no demand for a change from the existing standard. It was recommended that representatives from the power distribution and equipment committees be appointed to advise with the A. I. E. E. sub-commitee. A suggestion from the 1915 committee on wire and cable specifications of the Association of Railway Electrical Engineers regarding a slight change in the standard specifications for rubber insulated wire and cable was considered, but no action at present was recommended.

A report from the sub-committee on concrete poles was received summarizing the minutes of the meetings reported in this journal last week. The sub-committee was not yet able to report upon a formula for the deflection of concrete poles of tapered cross-section and recommended that the subject be carried over to next year's commitee for consideration and that this matter be made a subject for research. The sub-committee was instructed to formulate its report, including a description of tests which it has made on the committee's design of concrete poles, setting forth recommended changes in the constants to be used with the formulas proposed by the 1914 committee. As a matter of information the design of poles used in Rochester, Syracuse and Cleveland and the results of tests made on these poles will be included. Slight changes in the table of deflections and loads shown on pages 23 to 25, section Ds 3a of the Manual will be included.

On the subject of steel poles, the sub-committee reported that manufacturers have agreed as to the thickness of steel pipe to be used in the construction of poles and also upon the standard pole section length for each length of pole. There is still some difference of opinion as to the physical constants and the formulas to be used in computing deflections of steel poles. Some changes in the specifications for tubular steel poles, in the cantilever formula for computing the deflection of steel poles, and in the steel pole tables were approved by the committee.

The national electrical safety code as proposed by the United States bureau of standards was brought to the attention of the committee and the members were urged to forward criticisms and comments to Secretary Burritt so that they may be available to the representatives of the association who will attend the July conference in Washington. It was also suggested that those who care to do so should send communications to the ELECTRIC RAILWAY JOURNAL for publication in view of the extreme desirability of having the utmost publicity on the subject before final decisions are reached.

The report of the power distribution committee meeting will be concluded in next week's issue.

CONVENTION TRANSPORTATION PLANS

In accordance with the announcement on this page last week, circulars have been sent out by H. G. McConnaughy, director of transportation of the transportation committee of the American Association, giving details of the tours which have been arranged in connection with the coming convention. It is proposed to arrange for three or more trains, two of them making complete circular tours, including a week's stay in San Francisco and returning by various scenic routes. One tour will leave New York about September 23, stopping at Albany, Utica, Syracuse, Rochester, Buffalo, Cleveland, Chicago, St. Paul, Minneapolis, Glacier Park, Spokane, Seattle, Tacoma, Portland, Shasta Springs, San Francisco, Yosemite National Park, Los Angeles, Pasadena, San Diego, Riverside, Grand Canyon, Albuquerque, Kansas City, Chicago, to New York. This will require about thirty days, including the week in San Francisco. The second tour will leave New York about Sept. 26, stopping at Newark, Philadelphia, Harrisburg, Pittsburgh, Columbus, Indianapolis, St. Louis, Kansas City, Denver, Colorado Springs (via Royal Gorge), Glenwood Springs, Salt Lake City, Ogden, Lake Tahoe, San Francisco, then following the same route as the first train, the whole requiring about 27 days. The third train will make an especially fast run for those who cannot take part in the longer tours. It will leave Chicago to reach San Francisco on Oct. 4. This will be a going trip only. The transportation arrangements are in charge of J. H. Pardee, master of transportation, president J. G. White Management Corporation, New York; W. O. Wood, assistant master of transportation, president New York & Queens Railway Company, Long Island City, N. Y.; Bertram Berry, Haywood Brothers & Wakefield Company, New York; H. G. McConnaughy, director of transportation, Dearborn Chemical Company, New York; E. B. Burritt, secretary American Electric Railway Association, New York, and about one hundred others representing the American Association in geographical sections, and the Manufacturers' Association.

MILWAUKEE SECTION

The Milwaukee section has adopted the plan of holding joint monthly meetings with the N. E. L. A. company section, alternate meetings being in charge of each. On April 22 the meeting was conducted by the lighting section.

COMMUNICATIONS

Possible Lines of Power Plant Progress

The Johns Hopkins University
Baltimore, Md., May 12, 1915.

To the Editors:

The new Interborough turbines described in your issues of April 17 and 24 probably represent the most advanced skill of steam turbine designers to-day, and the highest efficiency thus far obtainable from steam-driven engines. It is said the thermal efficiency is about 25 per cent.

The steam turbine has been quite steadily improved in efficiency during the past twenty years, and although the curve of rate of improvement is naturally much less steep than it was some years ago, it is reasonable to expect some further gains in the efficiency of the turbine itself. I believe that designers now feel that blade angles and speeds can be so modified as to show an improvement over even these new turbines, but any such gains would probably be very small. The subdivision into high and low-pressure spindles, each with its own generator and appropriate speed, has undoubted advantages. It is possible that the efficiency of the whole machine can be increased in one or more of the following ways:

1. By reheating the steam between high and low-pressure sections.

2. By increasing the superheat from the present 100 or 150 deg. Fahr. to 200 or 250 deg. Fahr., as used in Europe.

3. By improvement of the heat transference in condensers. Data are accumulating which indicate that very considerable gains are possible in this direction, and systematic experimenting with condensers is to be encouraged.

I should, however, like to suggest consideration of the use in power stations of some of the features of the locomobile which have caused its high efficiency. This self-contained power plant, with the engine mounted on top of the boiler, with no steam-pipe losses, with the hot gases from the boiler passing through a steam superheater and then about the engine cylinders, then to the stack at about 350 deg. Fahr. (instead of 600) yields a delivered horse-power on about 1.25 lb. of coal per hour. This is accomplished with a small compound engine which would under ordinary conditions use about 20 lb. of steam or at least 2.5 lb. of coal per developed horse-power-hour.

Probably most of the features of the locomobile have been tried out or at least suggested in connection with power plants of larger size. I am told that Z. de Ferranti obtained some notable results by jacketing a turbine with furnace gases. While there may be adequate reasons for not using them in many cases, I venture to mention a type of plant which lends itself to the adoption of those features. A bluff near the bank of a river or lake offers the proper site, the face of the bluff generally requiring masonry reinforcement. The boilers would be placed about on the level of the water and the turbines on the bluff as nearly over the boilers as practicable. The condensers would be below the turbines, in recesses and at a suitable level with respect to the water supply. An economizer would be interposed, and it is possible that the gases leaving it could be passed about the turbine casings. These heat-absorbing arrangements would render assisted draft necessary. While indulging in these perhaps extreme speculations it may not be out of place to suggest that if internal-combustion engines were used in conjunction with the steam plant, the exhaust gases could be used to augment the stack draft, and the cylinder jackets as feed-water heaters. Experiments which I have recently made in the use of gas-engine exhaust lead me to expect a considerable effect as an adjunct to the stack. Of course, the substitution of gas-engine jackets as feed heaters would contemplate motor-driven auxiliaries.

A further gain in many plants may be expected from the use of improved water-purifying apparatus and the resulting cleaner heating surfaces.

Carl C. Thomas,
Professor of Mechanical Engineering.

Dr. Rosa on the Safety Code

San Francisco, Cal., May 7, 1915.

To the Editors:

I have read with interest your editorial in the issue of the Electric Railway Journal for May 1, concerning the proposed "National Electrical Safety Code," in which you raise the question whether the rules are "fair to small as well as large roads" and whether they "are practicable as well as theoretically desirable." I have also read Mr. Tingley's letter in the same issue in which he says:

"In no sense do I wish to criticize the most excellent scientific work done by the bureau of standards, but it is done purely from the scientific standpoint and without regard to practicability; it has in mind large and expensive organizations such as are used in government work, and it has proposed rules which would impose grave hardships upon the smaller companies." This statement shows that Mr. Tingley is utterly unacquainted with the work which the bureau has been doing, and could not have read the rather full statements which have been published concerning this work, the object of said statements having been to prevent just such misapprehension.

Mr. Tingley supports his statement by reference to two operating rules contained in Part 4 of the code, these rules having been issued recently as the second edition of Circular No. 49. Before speaking of these rules, however, I should like to give briefly the history of this section of the rules.

After collecting and studying about a hundred different sets of operating rules prepared and issued by electrical companies for their own use, and studying the operating rules in use in several foreign countries, the bureau prepared a first draft of a set of rules, some of which seemed of doubtful value. We then prepared a list of forty-six questions, mostly concerning the rules that appeared for one reason or another unsatisfactory, and sent the list to several hundred operating companies, including large, small and medium-sized companies. We received a large number of carefully prepared replies which were utilized in revising the rules. It was at first intended to have typewritten copies of these revised rules sent to a number of companies for criticism before publication, but we realized that criticism was needed from a larger number than it was practicable to reach with a limited number of copies, so the rules were printed and sent to several thousand companies, with a request for criticism and suggestions for improvement in the next edition.

We received several hundred letters in reply, many of them expressing grateful appreciation of our work, and many also very valuable suggestions for the improvement of the rules. Some contained rather severe criticism which led to further correspondence, and in some cases the writers admitted that the rules were better than had appeared to them at first impression.

After frequently going over and revising the rules in the light of all our correspondence and consultations they were, of course, very much more satisfactory than the original edition contained in Circular No. 49.

In the meantime the accident prevention committee of the National Electric Light Association had studied Circular No. 49 and revised it to some extent, and then printed it and sent it out to a large number of operating companies, many of which were known to be in sympathy with the idea of having safety rules, and a large percentage of whom had books of rules of their own. A large number of valuable criticisms were received by the committee, many of which were from small companies, or from large companies operating small plants. When the replies were all in the criticisms on the various rules were systematically arranged and manifolded, and every member of the committee was supplied with a copy, as were the three representatives of the bureau of standards who met with the committee. Two days were spent in going over the criticisms and revising the rules, and then at a later session two days were spent in going over the revised draft of the rules as prepared by the bureau on the basis of its study and correspondence, and of personal conference with a large number of operators and engineers. As a result of this thorough and conscientious study an agreement was reached as to every rule in the book, and they were then manifolded and sent out by the bureau and by the N. E. L. A. committee to those who had previously given criticisms, with a request that the revised rules be examined and any further suggestions or criticisms made that would make the rules more useful or more acceptable. Some further suggestions were received and another joint meeting of the committee and the representatives of the bureau of standards was held, and again an agreement as reached not only as to the substance, but as to the precise wording of every rule. In most cases the agreement was unanimous. It is hardly necessary to say that the members of the N. E. L. A. committee, all of whom represented operating companies, looked at the rules from the operator's standpoint, and their aim was to reduce the liability of accidents without unnecessary interruptions to service or needless expense, just as it had been the aim of the bureau to do. After this final revision of the rules they were published recently as the second edition of Circular No. 49. Whether Mr. Tingley's characterization of the work as "done purely from the scientific standpoint and without regard to practicability" is based on a careful study of the revised rules, or whether he assumes that, because the bureau of standards has been concerned in the matter it must be so, I do not know.

Let us now examine the two rules cited as examples of this "scientific and impractical work." The first is Rule No. 407, which reads as follows:

407. *Local Foreman.*

If more than one person is engaged in work on or about the same electrical equipment or lines, one of the persons shall always be designated as the foreman locally in charge of the work.

The explanatory note published in Circular No. 49 on this rule is as follows:

In every group of workers, however small, one should always be understood to be the leader or senior, to give and receive messages and orders for the group. He may be called boss, leader, or by any other term, but for convenience is referred to as "foreman," although not necessarily having such rank.

Mr. Tingley's objection that a workman designated as a foreman will demand increased pay does not seem conclusive. If he performs the functions of a foreman continuously over a gang of men, he will earn, and ought to receive, a foreman's pay. If he is merely the senior workman of a small group he is not likely to demand increased pay, and should not receive more than he earns. This method permits one foreman to supervise several small gangs, and yet have some one responsible in each gang. It is believed by those who have had a great deal of experience that this is a thoroughly practicable rule, and where possibility of serious injury to persons and property exists, as in work on electrical equipment and lines, and where mistakes and misunderstandings may lead to very serious consequences, it is believed to be far better to have a clear understanding as to who is the responsible foreman or leader in every group of workmen than to have several men working together and no one in charge.

The second rule is No. 434, which reads as follows:

434. *Maintaining Service.*

(*a*) When live circuits, on which "men at work" tags have been placed, are opened automatically they should be kept disconnected until the chief operator has given proper authorization for reconnection.

(*b*) When overhead circuits other than trolleys and third-rail circuits open automatically, the local operating rules shall determine how they may be closed with safety for persons on or near those circuits. The chief operator shall be advised of the conditions.

(*c*) When circuits feeding supply lines become accidentally grounded, as shown by the indication of ground detectors at stations, they shall be tested to determine where the ground exists. If the ground cannot be definitely located and removed by the operator, an immediate report of the finding shall be given to the chief operator who shall order a patrol of the lines affected to definitely locate and remove the ground as soon as practicable.

Above 7500 volts it will usually be found advisable to disconnect until the lines have been found cleared of the ground.

Fallen wires and otherwise grounded circuits are the most frequent source of fatalities to the public, and hundreds of deaths and serious accidents are thus caused every year. A few days before I left home a well-known citizen of Washington was killed on the sidewalk near his own house by a fallen wire. Within the last few weeks five deaths have been caused in California by the same cause, two only a few days ago near San Francisco (since I have been in the city), and three a few weeks ago in Los Angeles. The fallen wires belonged to two of the largest and best-managed electrical companies in the country, and these companies are willing to spend a good deal of money to be able to determine when their lines are grounded, in order that they may remove the hazard to the public as soon as possible when a ground occurs. Nobody in California has yet suggested to us that this rule is too severe. On the contrary, it has been criticised by one experienced and successful operator as too lenient. A careful reading shows that the rule suggests what should be done, but leaves almost everything to the discretion of the operator and the provisions of the company's operating rules. It would be hard to find in the whole set of rules a poorer illustration to prove that the rules are too scientific and impractical!

The three parts of the code of safety rules that deal with construction have recently been printed in a preliminary edition for discussion and criticism. We have not, however, trusted to correspondence and study with the committee of any one engineering society for the development of these rules. We realized that it was a much more serious undertaking to prepare construction rules than to prepare satisfactory operating rules. Hence we have been holding conferences, in various cities throughout the country, with representatives of

the electric light and power, railway, telephone and telegraph companies, of state industrial and public service commissions and city inspection departments, with consulting engineers, manufacturers of electrical apparatus and supplies, electrical workers and others interested in the subject. We have held such conferences in Boston, New York, Philadelphia, Washington, Cleveland, St. Louis, Los Angeles and San Francisco. In the last-named two places each conference continued two days and we had about fifty engineers and others present. The rules were read one by one and discussed as fully as time permitted. Many good suggestions were received and the rules were very highly commended. We had heard a great deal about the differences in practice between East and West, and knew something about them, but our feeling now is that it will be easier to provide in the rules for the necessary differences due to different conditions than we had supposed. Nobody out here has accused us of being academic, but many have expressed approval and satisfaction with the way we are doing our work.

We are going to Portland for a conference next Monday and Tuesday, and then to Seattle, Spokane, Boise, Denver, Omaha and Chicago. (Other representatives of the bureau are traveling in the South and Middle West conferring with representatives of the electrical utilities about the rules.) In every place we meet the responsible and experienced officers of the various companies and have the fullest and freest discussion of the rules.

By the time we return to Washington we shall have subjected the rules to an amount of study, criticism and discussion that few, if any, similar sets of rules ever received. The conferees are not scientists but engineers, business men, operators and workmen. The representatives of the bureau (except myself) were educated as electrical engineers and have had practical experience in electrical engineering. I am the only one concerned who may be suspected of being tainted with too much scientific training, but as I have had something to do with electrical engineering for twenty-five years, and in recent years have spent more time on engineering problems than on purely scientific ones, I hope I shall not be regarded as being entirely disqualified.

In the introduction to the rules of Circular No. 54 the following statement occurs:

> "Criticism is invited of the proposed rules contained in this publication, and suggestions for their improvement, either by way of changes or additions. Before offering such criticism, however, it is hoped that the statement concerning the plan and scope of the code will be read, as well as the notes on the rules. The intent of the rules will thus be better understood, and criticism will be correspondingly more valuable."

We welcome criticism, but, as Mr. Tingley says, it must be constructive and not merely destructive to be worthy of attention. We have nothing but praise and grateful acknowledgment for the frank and cordial co-operation we are receiving from the hundreds of able and experienced men who are conferring with us on the rules, and we have obtained a great deal of constructive and valuable critiscism from them.

On the other hand, criticism from those who have read the rules hastily, or who are not in sympathy with safety measures, or who judge the rules solely by their own limited experience, and think that any rule is needless if they have never killed anybody through the hazard the rule seeks to remove or reduce, is not very valuable, and, if published, it may, through misleading others, be worse than useless. E. B. Rosa,

Chief Physicist, Bureau of Standards.

National Electrical Safety Code

American Electric Railway Engineering Association

Office of the President

Cleveland, Ohio, May 5, 1915.

To the Editors:

Although the Electric Railway Journal has repeatedly called attention to the proposed "National Electrical Safety Code" which is in process of preparation by the national bureau of standards, treating the subject editorially and in the communications columns in the issues of April 3 and 17, and May 1, I believe it advisable to call the attention of the electric railway industry once again to the conference to be held in Washington on July 1 and 2 under the auspices of the bureau of standards. The object of this conference is to get the proposed safety code into final form with a view to having it adopted tentatively and the rules, regulations and practice described therein put into use for one year's trial. It is the further intention of the bureau to review and revise the rules if found necessary, and any suggestions or criticisms which experience in their use may bring out during the interim, will be carefully considered by a committee, after which they will become standard.

For the purpose of reviewing and revising the rules, it is the plan of the bureau of standards to create a committee of representatives of state industrial and public service commissions, inspection departments of cities, the National Association of Municipal Engineers, the National Brotherhood of Electrical Workers, the American Institute of Electrical Engineers, the National Electric Light Association, the American Electric Railway Association, the National Fire Protection Association, the National Safety Council, the national bureau of standards, the Workmen's Compensation Service Bureau, the telephone interests and the casualty insurance interests; the whole comprising a committee of some forty-eight members.

The American Electric Railway Association has appointed W. J. Harvie as its representative and we urgently request that as many criticisms and suggestions upon this important matter as possible be placed in Mr. Harvie's hands so that they may be used by him on July 1 and 2. In connection with this we desire particularly to call attention to an abstract of a paper by Dr. Rosa of the bureau of standards, published in the issues for April 3 and 17, of the Electric Railway Journal and a very clear and important communication by Mr. Harvie, setting forth the status of the matter as published in the issue of April 17.

Again, we are obliged to advise the electric railways that the rules of the proposed safety code when placed in use will demand a great amount of time and attention to details of construction and operation, requiring in many cases radical changes in construction and methods from those now in general use, and its application is bound to result in considerable expense. While it is the intention of the bureau of standards to have one year's experience with the code as it will be revised before the conference on July 1 and 2 before final adoption as standard, nevertheless, it is highly desirable that the rules be placed in such shape as to become, from the very beginning, as practical as possible. L. P. Crecelius, President.

[Note—Circular No. 54, "Proposed National Electric Safety Code—Preliminary Edition Submitted for Discussion and Criticism, Not for Adoption," is now available in printed form. Copies can be secured at 25 cents each from the superintendent of documents, Government Printing Office, Washington, D. C.—Eds.]

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

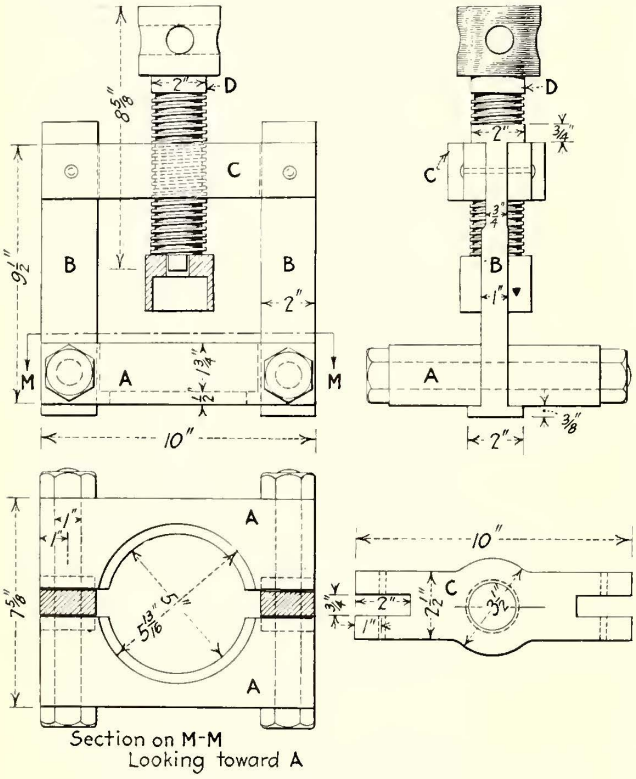
(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Notes on Gears and Pinions

BY R. H. DALGLEISH, ELECTRICAL ENGINEER CAPITAL TRACTION COMPANY, WASHINGTON, D. C.

I have been very much interested in the articles in recent issues of the ELECTRIC RAILWAY JOURNAL on methods of mounting and removing pinions. This subject is very much in the minds of railway men at the present time, and on it, unfortunately, we do not all agree. I hope that our friends will take advantage of the columns of this paper to tell us their experiences with heat-treated gears and pinions.

In the article by A. A. Ross in the issue of April 24 the writer takes exception to the use of a gas ring in removing pinions. This exception is well taken, and I



PINION PULLER—CAPITAL TRACTION COMPANY, WASHINGTON, D. C.

agree with Mr. Ross in the statement that heat should not be applied to heat-treated pinions, as there is a possibility of applying enough heat to destroy the value of the heat treatment. Pinions may be heated in boiling water before mounting, but should not be subjected to the action of a flame. With the use of heat-treated pinions more care must be taken in handling them than was necessary in the past with the untreated material.

In Mr. McAloney's article in the same issue of the ELECTRIC RAILWAY JOURNAL he shows the results of using a soft pinion with a hard gear. The result is as would be expected. His sketch also shows that the car was probably run in one direction only, which is not good practice if it can be avoided, as very much better wear will result if it is run in both directions. This company has made a number of tests by mating gears and pinions of different grades of hardness and has reached the conclusion that the best results are obtained when gears and pinions are of the same degree of hardness.

The life of a gear or pinion in railway service is dependent upon so many conditions that it is difficult to say just what it should be. Lubrication, axle-bearing wear, and the care used in mounting and removing the pinions, are some of the practices which must be watched carefully by the consumer.

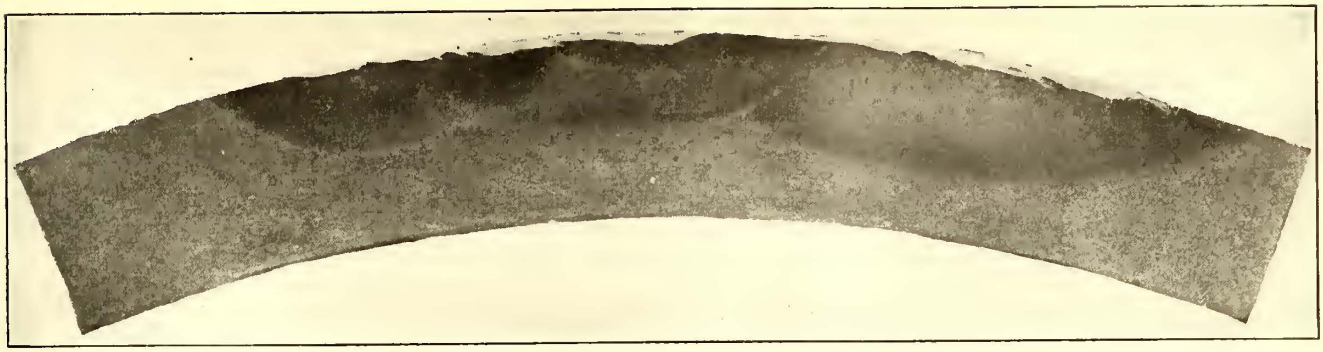
This company has for some years been using a pinion puller, illustrated in the accompanying drawing, which gives a bearing on most of the pinion teeth and has proved very satisfactory. This puller was designed by W. H. McCarty, master mechanic of the company. The puller illustrated was designed for use with the Westinghouse 101-B motor. As will be seen from the drawing, it consists of a pair of yokes, *AA*, hollowed out to fit around the pinion and clamped together by a pairs of bolts. Between the two yokes a pair of tension members, *BB*, are clamped by the same bolts. The other ends of *BB* are connected by a cross-piece, *C*, having an enlarged central portion drilled and threaded to receive the jack screw *D*. This screw carries on one end a washer hollowed out to fit over the end of the axle. While this puller takes a little time to adjust to the pinion, once in place it cannot slip and it gives an even pull all around. It is made of fairly hard steel so that it will keep its shape.

Danger of Welding Processes as Applied to Tires and Wheels

BY MORGAN D. HAYES, MIDVALE STEEL COMPANY, PHILADELPHIA, PA.

We have noticed in the issue of the ELECTRIC RAILWAY JOURNAL for April 10 an article under the caption "Restoring Steel Wheel Flanges with a Welder," written by F. A. Murphy of the Chicago, Ottawa & Peoria Railway. In connection therewith we beg leave to comment upon the same from our standpoint as steel tire and steel wheel makers.

During the past two years on several occasions our attention has been called to various experiments with oxy-acetylene and electric welding apparatus for the purpose of repairing certain parts of car equipment. These experiments started with the filling in of small blowholes or cavities in tires or wheels to smooth over evident defects in manufacture. Later, the process was used to fill in cavities or flat spots in tires and wheels, due to operating conditions which resulted in their being shelled out or skidded flat. In Mr. Murphy's article we notice that the electric welding process is now being used for filling in the hollow spaces of worn flanges, thereby restoring them to full contour. As the uses of this process seem to be progressive, and may eventually lead to the restoring of a section of a flange or rim, we think it well to call attention to the very positive dangers attending the use of this system by showing some illustrations which our research laboratory has recently furnished us on tires repaired by this process.



DANGERS OF WELDING—FIG. 1—SECTION OF BUILT-UP TIRE WELDED BY SEVERAL FLAME APPLICATIONS

In this investigation we selected three flaked tires, of the following chemical composition:

Tire Number	Heat Number	Carbon	Phosphorus	Manganese	Silicon	Sulphur	Nickel	Chromium
485813	13/759	0.63	0.040	0.697	0.237	0.035	0.14	0.10
448057	10/2695	0.70	0.016	0.704	0.232	0.023	0.34	0.15
300083	8/3026	0.68	0.016	0.738	0.296	0.018	...	...

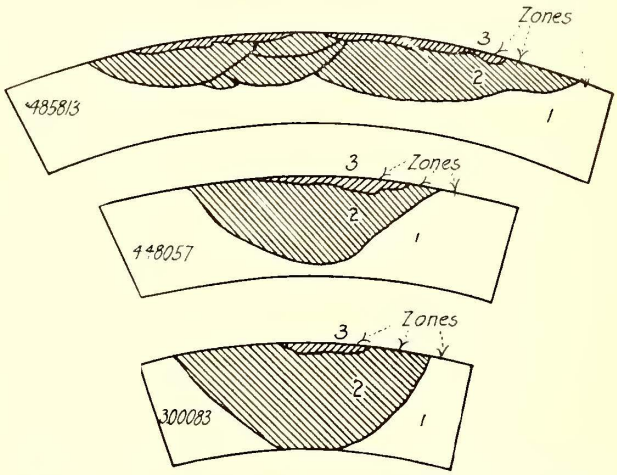
Pieces from 8 in. to 12 in. in length, in which there were comparatively deep defects caused by flakes or shells, were cut from the tires, and these pieces were sent to an oxy-acetylene plant and welded according to their approved railway methods. In the plant where the welding was done the following explanation was given as to the method of welding: "Pieces were put in a furnace and heated all over (to save oxygen), then filled and allowed to cool, not heated after being filled. After being filled in, and still at a welding heat, we hammered them down."

Upon the return of the pieces to our plant, a section ½ in. thick was cut longitudinally from each piece, and one side of each was polished and etched to show the condition of the metal.

From the above, and after examination of the sections, it appears that they were heated to a point below the critical temperature in the furnace, fusion afterwards taking place under oxy-acetylene flame, at a necessarily much higher temperature on the tread of the tire. In order to show fully the results of this welding, the accompanying illustrations should be consulted.

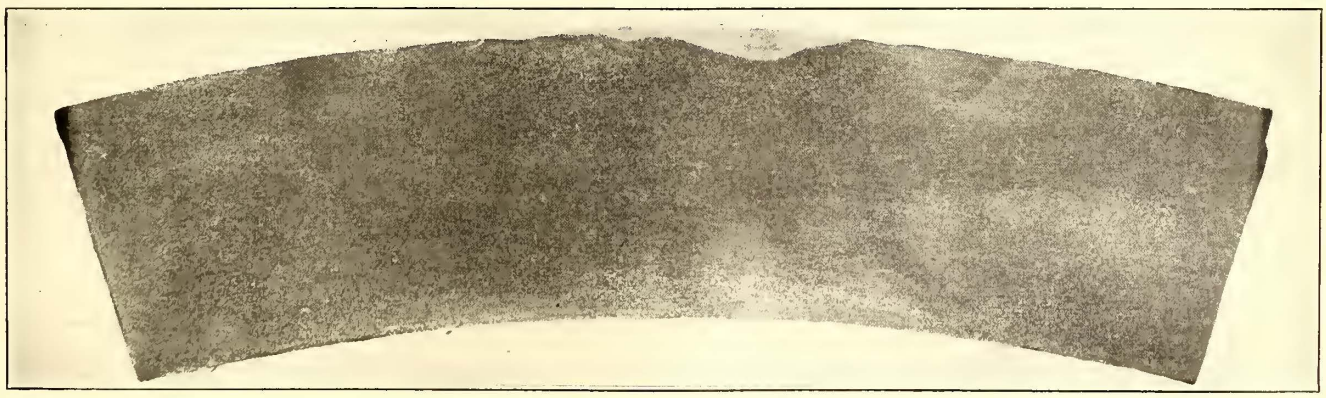
Of these illustrations Fig. 1 is from a photograph of the piece of tire outlined in the upper diagram in Fig. 3, and demonstrates clearly to the naked eye the changes that have taken place under the welding process. Fig. 2 is from a photograph of the tire section represented in the middle diagram in Fig. 3. Fig. 3 was made from the three sections of tire in order to show more graphically the wave lines which appear in the photographs.

In Fig. 3 it will be noticed that each tire section shows three characteristic zones which might be described as follows: Zone 1—That part which remains in the original state of grain size, but in which the scleroscope readings indicate that the metal is probably softened by the anneal considerably below *Ac* (the critical temperature), which it has reached during this process. Zone 2—This is closer to the fused metal, and is the original tire metal which has been heated to a point above *Ac* during the fusion, and which when



DANGERS OF WELDING—FIG. 3—DIAGRAMS OF ZONES IN TIRE METAL AFTER WELDING

cooled has taken on a condition similar to that of a quench as the heat has been rapidly withdrawn from this section by the surrounding metal. The line of demarcation between Zones 1 and 2 shows the isothermal line which has been that of the critical temperature of the material. It is a characteristic of all steels that when cooled from such a temperature they are in the very poorest conceivable condition. Thus along the line between Zones 1 and 2 we have a condition which is



DANGERS OF WELDING—FIG. 2—SECTION OF BUILT-UP TIRE WELDED BY ONE FLAME OPERATION

the weakest that can possibly be obtained in tire metal. Zone 3—The new metal actually fused into the tire by the oxy-acetylene flame.

In Zone 1 the metal gives scleroscope readings of about 34 to 35; in Zone 2, 38 to 40, there being a sharp line of demarcation between the two zones; and in Zone 3, about 22, indicating a low-carbon material. All three zones appear very distinctly to the naked eye, side by side, on polishing the sections and etching them with nitric acid.

In Fig. 3 it will be noted that the line of demarcation runs diagonally across the tire, showing a zone of weakness directly across the tire. Since Zone 3 is soft over hard metal, the only action that could take place is a rapid wearing away of Zone 3 and its subsequent "shelling out." But between Zones 2 and 1 we note that there is a difference of five points in the scleroscope hardness in favor of Zone 2. There is thus a hard shell pressing on a soft one, a condition exactly similar to that which caused shelling in the original tire. Therefore, summing up, we see that the method of building up tires by welding produces two weaknesses, either of which might be fatal to the tire. That is, there is a zone of maximum poor condition running diagonally across the section of the tire in some cases; and, second, there is hard metal placed above soft metal.

Referring to the uppermost diagram in Fig. 3, it will be noted that the several successive fusions are shown by wave lines. They were caused by the moving of the flame along the tire to fuse it at several different but connected points, the flame being too small in area to heat the tire sufficiently and at one time throughout the entire length of the fused portion. The middle and lowermost diagrams in this figure show that a single contact of the flame, without motion, was sufficient to fuse in the new metal at the points desired, hence the absence of the many wave lines referred to above.

A careful study of the tire sections illustrated should convince the average railway man that something very radical has happened to change the uniformity of the material in these tires, and furthermore, it does not need an expert metallurgist to make the claim that the wave lines, showing separate and distinct zones, represent in themselves potential lines of weakness in these tires. Should failure occur it would no doubt be along these surfaces of cleavage which separate the zones of different hardness, as well as of different grain size.

Only through a complete heat treatment of the whole tire (a quench from a temperature above the critical, and an anneal at a temperature below the critical) after it had undergone such a welding process, could the metal be restored to a safe condition, but we take it that where this system of welding is being used, no such process follows. Therefore, the dangers which we have pointed out above are ever present. No reputable tire manufacturer would consider that a tire in the condition shown by these sections from tires which have gone through the welding process, are in a proper condition for shipment.

We understand that further experiments are being made with different kinds of welding steel, that is, steel of different carbon content, the idea being to approach more nearly the hardness of the original tire itself by using a higher carbon welding material. Even here the dangers of the process cannot be eliminated, for the reason that the welding flame used, whether electrical or oxy-acetylene, cannot be controlled in its decarbonizing effects and, even if the danger of decarbonizing could be eliminated, the fact that a high carbon metal is quenched in surrounding metal from its melting temperature, leaves this higher carbon metal in a condition even worse than that which we have tried to describe above. It is evident that this line of experimentation with various carbons but accentuates the danger of the tire completely breaking down when returned to use after being repaired by the welding process.

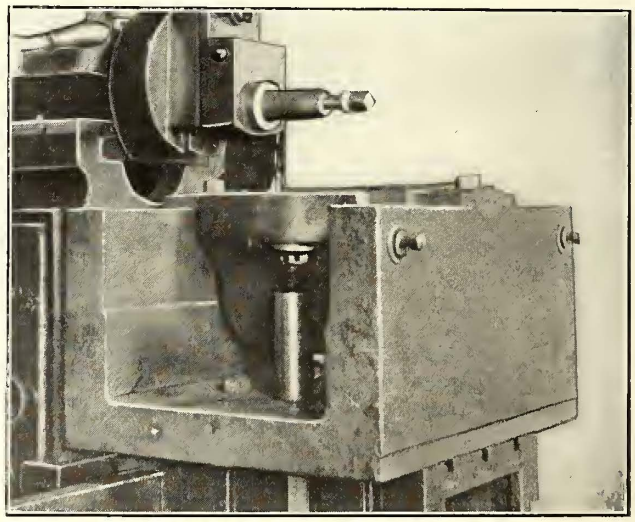
Much might be written on this subject in studying the metallography of tires or wheels subjected to this process, but we believe that in giving the illustrations above mentioned, a sufficiently graphic demonstration has been made to make the motto "Safety First" loom very large in the eyes of the cautious railway man, and before applying these methods of repair to a tire on a passenger engine, or the flange of a steel wheel under a passenger coach, we would ask him to "Stop, Look and Listen."

Tri-City Railway Bearing Practice

BY JOHN SUTHERLAND, MASTER MECHANIC TRI-CITY RAILWAY & LIGHT COMPANY, DAVENPORT, IA.

Unusual bearing mileage is being obtained on the cars of the Tri-City Railway & Light Company, Davenport, Ia. Motor-axle and armature bearings have averaged 100,000 miles and recent refinements indicate that this mileage will be greatly increased. This company's mechanical department now has a few bearings that have given 150,000 miles and show no wear. This success is attributed largely to care exercised to obtain accurate bearing fits and to the manner of fastening the bearings in position.

In one of the accompanying illustrations is shown a babbitting mandrel for motor-axle bearings, and a jig used for boring the bearings after they have been babbitted. The feature of both the mandrel and the boring jig is their simplicity. One-half of a motor-axle bearing is fastened to the mandrel by a stud belt which clamps a metal form into the oil-box opening. A ring with a thumb screw fits over the collar and clamps the bearing accurately in position. All babbitting is done by a shop laborer, who, after a bearing has been poured, fits the two halves into the boring jig. It is estimated that the labor cost per bearing complete is approximately 12 cents. When the laborer is not babbitting he is engaged in cutting bushings of seamless steel tubing which are shrunk on worn armature shafts. An allowance of 1/64 in. of wear is permitted before an armature shaft is turned down and bushed to the standard size adopted for that type of motor.

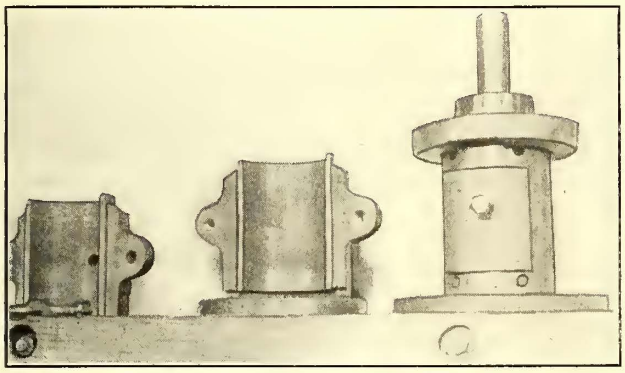


TRI-CITY BEARING PRACTICE—JIG FOR PLANING CAPS

A bearing boring jig is also shown in one of the accompanying illustrations. It is made in two parts which bolt together to clamp the bearing securely and accurately in position. There are fifteen of these boring jigs, and all are made interchangeable on the face plate

of one lathe. All of these jigs and mandrels have been accurately machined to insure first quality finished bearings. This company also believes, from past experience, that all bearings should be machine bored to obtain the maximum service.

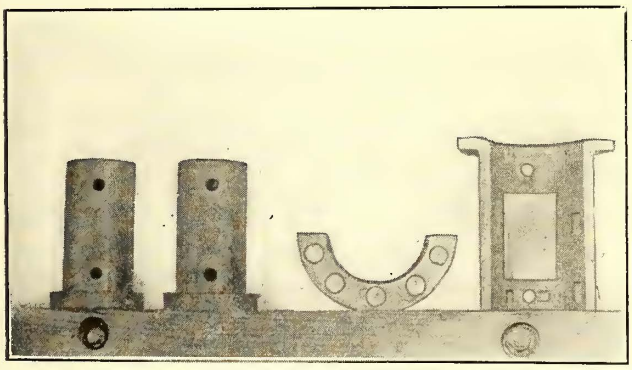
Home-made, cast-iron axle bearings have also been used by this company with much success. To reduce to a minimum the machine work necessary on the cast-iron shells before babbitting, tapered rectangular holes on the inside of the shell and tapered round holes on the



TRI-CITY BEARING PRACTICE—MANDREL ASSEMBLED AND JIG IN PARTS

collar are provided in casting. This method of keying the babbitt to the shell also permits an increase in the amount of taper, in both the rectangular and the round holes. Samples of these cast-iron shells are shown in one of the illustrations.

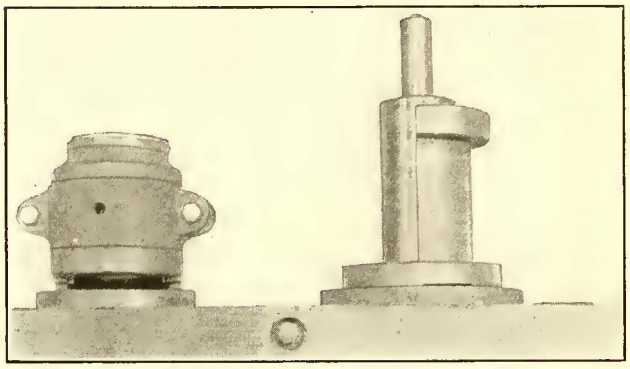
Accuracy in the preparation of bearings for service is not all that is necessary to obtain good results. Experience with bearings fastened in position only by dowels has led the mechanical department of this company to discontinue their use. For a number of years this company has fastened bearings in position by planing all axle and motor caps so that one diameter is slightly scant. After this is done the bearing is set in the cap, the halves of which are drawn tightly together with an



TRI-CITY BEARING PRACTICE—WORN DOWELLED BEARING, CLAMPED BEARING AND HALVES OF CAST-IRON SHELL

18-in. wrench. The bearing is thus clamped securely in position and a uniform grip over its entire surface is insured. This manner of fastening has produced a uniform bearing wear and there is little or no wear on the surface in contact with the cap. One of the accompanying illustrations shows one bearing which was fastened only by the dowels, and in another a bearing which was fastened by planing the axle cap is shown. The large dowel-pin openings in one of the bearings are clearly evident. This bearing also shows wear on the outside of the shell where a 1/16-in. ridge has formed at the end opposite the collar. The worn bearing had been in service one year, while the bearing fastened by planing the caps had been in service for seventeen years and shows no wear. The uniformity of bearing wear resulting from this method of fastening has also greatly increased bearing mileage. It has been made a rule, however, that new bearings shall be fitted to all armatures removed from service for repairs. It is also interesting to note that this company uses all split bearings to make it unnecessary to pull the pinion when a bearing is renewed.

A jig for planing armature and axle caps is shown in



TRI-CITY BEARING PRACTICE—MANDREL WITH BEARING REMOVED AND BORING JIG ASSEMBLED

the illustration on the preceding page. This comprises two small screw jacks used to hold the cap firmly in position, a small wedge-shaped wooden block employed to hold the cap against the mandrel until the jacks are placed, a set of mandrels, and a special bed-plate casting. Interchangeable mandrels are provided with this jig to fit the different types of motor and axle caps. All armature and axle caps are planed so that the diameter at right angles to the halves of the cap is between 3/64 and 3/16 in. scant, depending upon the amount of planing necessary to secure the bearings firmly in position. The amount of metal planed off is usually sufficient, however, to allow a small gap between the halves of the cap when the bearings have been clamped tightly in position. In this way the pressure on all bearings may be made approximately the same.

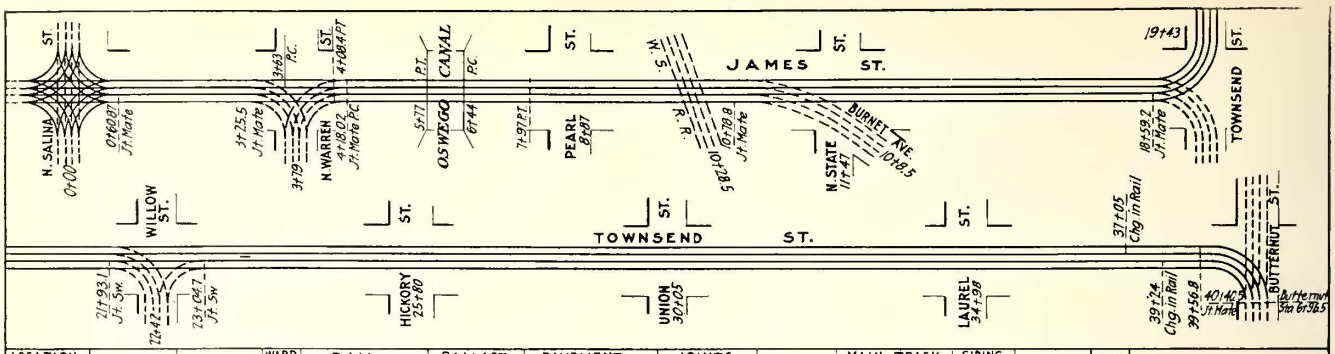
Way Records

BY E. P. ROUNDEY, ENGINEER MAINTENANCE OF WAY NEW YORK STATE RAILWAYS—SYRACUSE LINES

The article on "Way Records on a Cost per Section Basis" by Frank W. Hulett, which appeared in the issue of the Electric Railway Journal for April 3, is interesting. I believe that Mr. Hulett has adopted a first-rate system.

On this division of the New York State Railways we have used a similar track record, a copy of which is shown on the chart on page 946. This record requires about thirty-five sheets like the sample and is, of course, corrected every year.

We have another track and pavement report which is practically a history of the track and pavement construction for the past twenty years. In this report each street is given two pages, one showing all original track construction and reconstruction, the other all original paving, construction and reconstruction. The items listed in the "original track" record are: Location of section; length of section; kind of track; which track is covered by record; sidings; distance between track centers; kind of rail used; kind of ties used; kind and location of tie-rods used; kinds of joints; kind and depth of ballast; paving; year of installation, and remarks. The items in the "original pavement" record are: Location of section; length; kind of track; track



LOCATION STREET OR R. OF W.	FROM	TO	WARD OR TOWN	RAIL SECTION	RAIL DATE	BALLAST KIND	BALLAST DATE	PAVEMENT KIND	PAVEMENT DATE	JOINTS KIND	JOINTS DATE	TIES	MAIN TRACK 1ST	MAIN TRACK 2ND	SIDING ROVER ETC.	TOTAL	TILE DRAIN	REMARKS
James St.	N Salina	Townsend St.	4	L.S. 103-426	1913	Concrete	1913	Sandstone	1913	Continuous	1913	Steel	1920'	1920'	640'	4480'	4"	
Townsend St.	James St.	Butternut St.	4	P.S. 90-200	1900	Stone	1900	Brick	1900	12 Hole Std.	1900	Pine	2181'	2181'	—	4362'	—	

SUMMARY OF MATERIAL

RAIL SECTION	RAIL FEET	RAIL SECTION	RAIL FEET	BALLAST KIND	BALLAST FEET	BALLAST KIND	BALLAST FEET	PAVEMENT KIND	PAVEMENT FEET	JOINTS KIND	JOINTS FEET	TIES KIND	TIES FEET	REMARKS
L.S. 103-426	3340'			Concrete	3340			Sandstone	4480	Continuos	4480	Carnegie Steel	3340	
L.S. 119-341	1140'			Stone	1140			Brick	4362	12 Hole Std.	4362	Pine	1140	
P.S. 90-200	3886'			Stone	4362							Pine	4363	
L.S. 117-228	476													

WAY RECORDS—SAMPLE TRACK RECORD CHART, NEW YORK STATE RAILWAYS

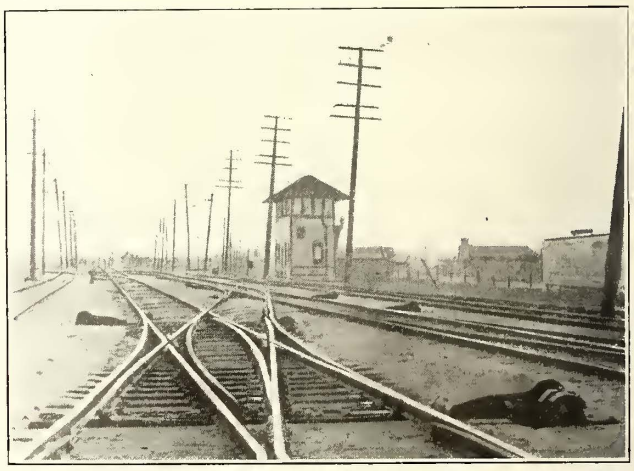
covered by the record; kind of pavement; kind of paving in devil strip; distance between track centers; sidings; year of installation, and remarks.

As regards maintenance costs I would say that several years ago we had the system divided into about 150 different sections, each section having a job order number. This made a great amount of work for the auditing department and we finally decided that the information accumulated was not worth the cost of getting it, as it had in most instances no real practical value. At the present time we carry about twenty-five different sections, each with a job order number. These are selected sections chosen in each case for some particular reason on account of special conditions or construction regarding which we wish to keep maintenance costs for a series of years. The sections do not coincide with those in the track report and they may be changed from time to time as we complete the necessary information for the different sections.

Interlocking Installation on Pacific Electric

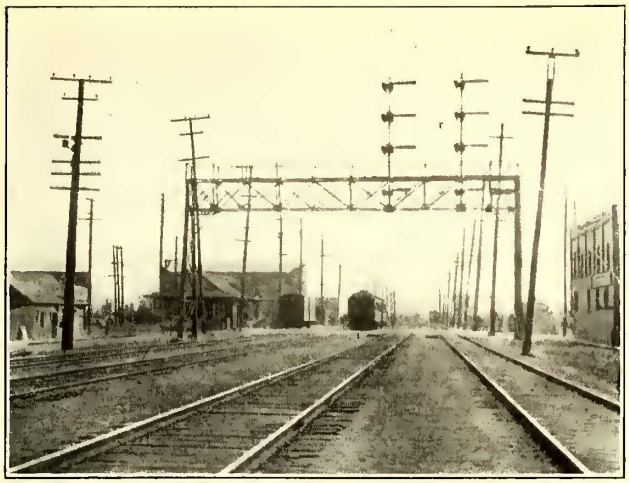
One of the largest, if not the largest, interlocking plants in the United States for controlling electric interurban traffic was put in service Sept. 14, 1914, at Watts, Cal., an important junction on the Pacific Electric Railway. The location is at the end of the four-track line out of Los Angeles, where a junction of the double-track lines to Santa Ana, Redondo and Long Beach is effected and where the Los Angeles local cars terminate their runs.

The installation is of the General Railway Signal Company's all-electric type and includes a source of electrical energy in the form of storage batteries, which, with suitable switchboard and control appliances, are located in the lower floor of the tower. There is an eighty-eight-lever frame, Model 2, unit-lever-type electric interlocking machine equipped with sixty-four working levers which control seventy-five functions—switches, derails and signals. The switch and derail operating mechanisms are actuated by 110-volt electric motors. These operate the switches and derails to normal or reverse position, and lock them in such position, when the proper lever in the machine is manipulated. High signal operating mechanisms of the semaphore type are provided, which are also actuated by 110-volt electric motors, and which move the semaphore arms to positions corresponding with the position of the levers in the interlocking machine. High signals are semi-automatic, that is, they are controlled by their respective track circuits, also by their respective levers in the interlocking machine. The dwarf signal mechanisms are of the semaphore type, but are actuated by a solenoid arrangement. These signals govern low-speed movements, also movements against the current of traffic. Automatic protection is given by a.c. track circuits which, in connection with suitable control appliances, prevent the display of a proceed indication unless the track is clear and switches in proper position.



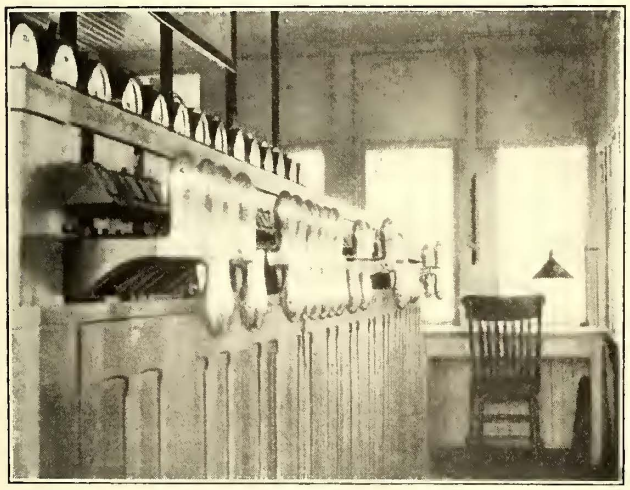
VIEW AT END OF FOUR-TRACK LINE FROM LOS ANGELES, SHOWING MAIN CROSS-OVER AND INTERLOCKING TOWER

In this plant the operation of each switch, derail or signal mechanism is effected by electric energy, and in accordance with the demands of safety provision is made to determine whether the switch, derail or signal have responded to the manipulation of their respective levers, and have operated to the proper position. This



HIGH SIGNALS NEAR JUNCTION GOVERNING DIVERGING ROUTES IN ADVANCE

is accomplished by the following "indication": In order to move a switch from normal to reverse position the leverman pulls toward him the proper lever, which makes only part of its complete stroke. This preliminary movement of the lever locks mechanically all con-



INTERIOR VIEW OF TOWER SHOWING INTERLOCKING MACHINES AND INDICATORS

flicting levers, and closes a circuit which allows battery current to flow to the switch machine which operates and unlocks the switch, then moves the switch to the reverse position, and finally (provided the switch has been moved to its full reverse position) makes the switch motor, operating as a generator, send into the interlocking machine a dynamic current, or "indication." This energizes the indication magnet and informs the leverman that the switch has moved to its full reverse position and that the lever can be pulled out to its full reverse position. The final stroke of the lever unlocks such levers as do not conflict with the reverse position of the operated lever.

The entire operation requires but a few seconds, if no abnormal condition interferes, but if a bolt or other obstruction prevents the switch from operating to its full reverse position, the dynamic "indication" could not be generated, all conflicting levers would be locked, and the leverman would know that something was wrong. The operation of signals is indicated in the same manner as switches and derails except that signals do not indicate in the clear position as there would be no sacrifice of safety if a signal failed to operate to the clear position.

Daily traffic through the plant is very heavy and consists of 362 main-line trains, 260 local trains, and forty freight trains, making a total of 662 trains every twenty-four hours.

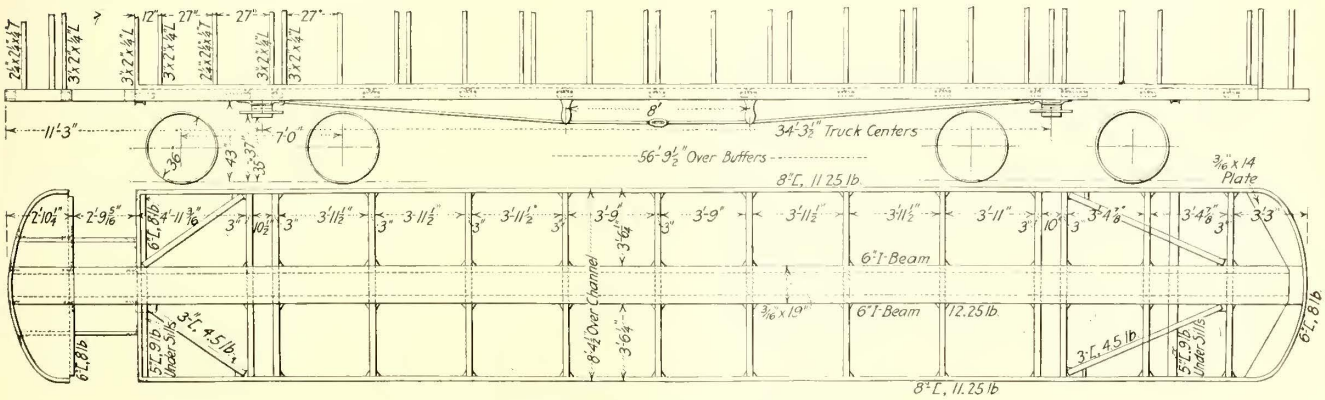
The total number of lever movements per 24 hours is 5716. During the period from Sept. 14, 1914, to Jan. 20, 1915—128 days—there was a total of 731,648 lever movements. It is reported that during this period no train was stopped on account of any defective failure of the signal system.

Light-Weight Steel Interurban Car

The new, all-steel interurban passenger cars of the Toledo, Fostoria & Findlay Railway are of unusually low total weight for high-speed passenger cars notwithstanding the use of standard commercial steel sections throughout. These cars were built for single-end, single-unit operation in a high-speed interurban service, the bodies being divided into passenger, smoking and baggage compartments. A feature of the specifications was that countersunk rivets were not allowed where round-head rivets could be used. The railway required this because round rivet heads would advertise to the public the fact that the new cars were not made of wood. As a matter of fact, the cars are of all-steel construction except for the inside finish, the insulation and the flooring. The general dimensions and weights are as follows:

Length over buffers	56 ft. 9½ in.
Distance between post centers	32⅝ in.
Width over all	8 ft. 6½ in.
Seating capacity	60
Weight of car body	29,550 lb.
Weight ready for service	68,000 lb.

A comparison between the 1913 all-steel car built for the Union Traction Company of Indiana, the 1914 all-steel car built for the Elevated Railroads of Chicago and this car shows the unusually low total weight:



FOSTORIA CAR—FRAMING PLAN AND ELEVATION

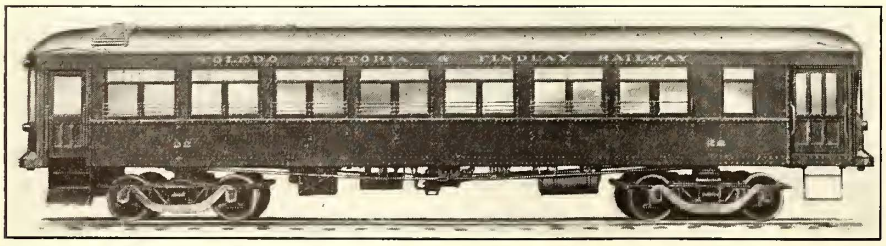
	Fostoria Car	Union Traction Car	Chicago Car
Over all length	56 ft. 9½ in.	61 ft.	48 ft.
Over all width	8 ft. 6½ in.	8 ft. ½ in.	8 ft. 8 3/16 in.
Weight of body	29,550 lb.	45,200 lb.	35,600 lb.
Weight of trucks and equipment	38,450 lb.	40,400 lb.	34,900 lb.
Total weight	68,000 lb.	85,600 lb.	70,500 lb.

The under and side framing of the car were designed to aid in supporting the structure, the box-girder center sill providing for unusual buffing and pulling strains. The center sill is formed of two 6-in. I-beams with 3/16-in. by 19-in. cover plates. Riveted to the sides of this center sill and to the 8-in., 11¼-lb., channel side-sills are 3-in., 4½-lb., channel cross-bearers spaced approximately 4 ft. apart. The cross-bearers are riveted with flanges up. The body bolsters are composed of two 3-in. channels spaced on 10½-in. centers. The end sills are made of one 6-in. channel reinforced with a 5-in., 9-lb. channel that is riveted to the side sills with the flanges down.

Body framing above the side sills is formed of 3-in. x 2-in. x ¼-in. angles at the panel posts and 2¼-in. x 2¼-in. x ¼-in. T-beams at the intermediate posts. These, together with the steel sheathing below the belt rail, on the panel posts and in the letterboard are designed to act as a riveted girder with a depth equal to the height of the car side. The steel side walls are insulated with compressed cork ¾ in. thick and the body is sheathed on the inside with ¼-in. Agasote finished to correspond with the rest of the interior. Two thicknesses of 13/16-in. yellow pine with two layers of waterproof tar paper between were used for the car body flooring. The lower floor was laid crosswise and the upper floor lengthwise of the car. The aisles in each passenger compartment were fitted with removable corrugated rubber mats having metal ends.

Steel carlines at each panel post support the roof and the T-beams at intermediate posts are made continuous from side sill to side sill. This roof is sheathed outside with ½-in. cypress and is covered with canvas. The headlining is 3/16-in. Agasote finished in light buff. All cross bulkheads are made of 14-gage steel riveted to the side and door posts. The bulkhead between the smoking and passenger compartment is glazed in the upper portion and fitted with a swinging door at the center. The bulkhead between the baggage and smoking room is solid and is provided with a sliding door.

The main passenger compartment of the car is equipped with nineteen Hale & Kilburn, stationary-back, leather-covered, 40-in. seats. The smoking room is fitted with eight similar seats upholstered in rattan. In the baggage room are two wooden slatted seats which are hinged to the sides of the car and used only when the car is crowded. Two five-light circuits for 94-watt Mazda lamps with Alba shades and one circuit for the 23-watt lamps in the toilet, the vestibule, the baggage-room and for the signal lamps make up the lighting system. A Peter-Smith hot-water heater is installed in one corner of the baggage compartment and eight Nichols-Lintern automatic ventilators, four on each side of the roof, supply the necessary ventilation. The equipment includes also Peacock hand brakes, Nichols-Lintern air sanders, Hedley anti-climbers, and M. C. B. radial couplers. The body is mounted on Baldwin Class AA trucks with 36-in. rolled steel wheels on 6-in. hammered steel axles with 5-in. x 9-in. journals. Westinghouse No. 304-A motors are mounted on these trucks and the cars are equipped with automatic air brakes and Providence interurban-type fenders. These cars were designed and built by the Niles Car Manufacturing Company, Niles, Ohio, under the direction of E. Smith, general manager of the Toledo, Fostoria & Findlay Railway.



FOSTORIA CAR—VIEW SHOWING TWIN-WINDOW ARRANGEMENT AND DOOR LOCATION

Recorder for Passenger-Mile Earnings

An example of the ingenious and useful mechanical devices that have been developed to meet the recent insistent demand for automatic aids for the conductor and accountant will be found in the Bonham traffic recorder. This machine produces a printed slip upon which is recorded the boarding and alighting points of each passenger on the car, and in addition totals the number of cash or ticket fares and the passenger mileage made upon each trip. As a result traffic statistics of a most elaborate character are available at all times for every run, and the necessity for guesswork or expensive traffic counts to adjust the service to the requirements of the traffic is absolutely eliminated.

Division 5. Train No. 24. Cond. G. B. Smith. March 15.

Station No.	Name	Passengers On: Cash	Ticket	Passengers Off
1	Anderson	3	7	..
7	Country Stop	1		..
9	Alexandria	4	1	3
13	Summitville	2	3	3
15	Country Stop	..	..	1
17	Fairmont	23	4	2
19	Jonesboro	4	1	14
21	Marion	5	4	22
25	Country Stop	..	..	4
29	LaFontaine	..	2	..
33	Treaty	7	..	..
34	Country Stop	..	..	2
37	Wabash	..	..	20
	Total	49	22	71

Cash Fares	49
Ticket Fares	22
Total Passengers	71
Amount Cash Fares	$5 80
Amount Ticket Fares	9 40
Train Earnings	$15 20
Passenger Miles	837
Earnings per Passenger Mile	.018
Miles per Passenger	11.8
Through Passengers	3
Passengers from:	
Town to Town	63
Town to Country	7
Country to Town	1
Country to Country	0

RECORD SLIP AND CALCULATED RESULTS FROM TYPICAL TRIP

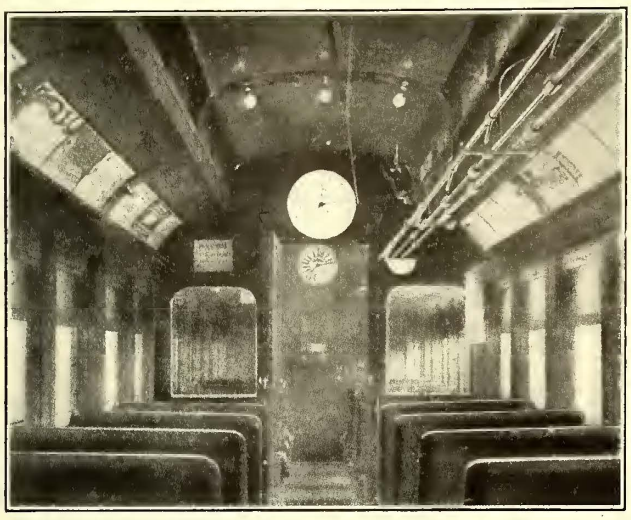
At the same time the recorder affords economy in auditing and gives a basis for checking reports of special-service men. It classifies each fare and enables the auditor to determine accurately the earnings of every train and the earnings per passenger-mile. To the operating department it supplies a tabulated statement of traffic between stations by trains and does away with the necessity for counting passengers at terminal points and ringing them all up at once upon a city register. A typical record slip and the tabulated results for a single trip are shown in the accompanying illustration.

Inherently the machine is easily and rapidly operated, and as an example of this feature the manufacturers point to the experience on the Anderson-Wabash division of the Union Traction Company of Indiana. In this case the trains leaving the town of Marion in the rush-hour carry an average of about 100 passengers to a number of outlying towns. These variable fares, however, are always collected and recorded before the train arrives at the first outward-bound stop, which is reached within ten or twelve minutes after the start.

The operation of the recorder is

based upon the mileage traveled by the person paying fare. Instead of setting the register in terms of money, the machine is set in terms of stations or fare points, and the act of setting the pointers to any two given stations automatically computes both the distance traveled by the passenger and the amount of the fare.

The recorder proper is located at the rear end of the smoking compartment of the car, and two dial cases, one at the front end of each compartment, carry the dials on which are printed the names of the stations on the division over which the car is operating. Four dials are provided within each case, with stations of a division marked on each side, so that a different dial is available for any one of eight different divisions if necessary, the change of dials being easily made. Each dial is divided into half-mile sub-divisions covering 100 miles of run. The dials carry three pointers, one indicating



VIEW SHOWING RECORDING DIALS MOUNTED IN SEPARATE COMPARTMENTS

the starting point and another the destination. The third is provided for arbitrary fares, being moved backward or forward to make the deductions or additions involved by the change from the standard rate per mile.

Movement of the pointers is effected by two rods running the length of the car, and fares are recorded by slightly rotating a register rod in the usual manner, a movement in one direction recording cash fares and in the other direction recording tickets. Half-fares are recorded with equal readiness, and the only operation involved by a change in direction of the car is the turning of a knob on the recorder case. The printed record, which is completed by the automatic printing of the total number of cash passengers, ticket passengers and passenger-miles, as well as the total cash collected, the date, the train, and the division, may be made up either at the end of each trip or at the end of each conductor's run, the conductor being identified by signing his name on the record through an opening in the recorder case. The records may be removed either by the conductor or by an inspector, at the option of the operating department, and they are in such form that they can be easily filed as permanent statements of the operation of each train. The device is manufactured by the Bonham Fare Recorder Company, Hamilton, Ohio.

Woodchoppers in the town of Hampton, N. H., felled a tree across the high-tension wires of the Massachusetts Northeastern Electric Railways on April 2, cutting off the power which operated trolley cars in six cities and more than twelve towns in southern New Hampshire and northeastern Massachusetts.

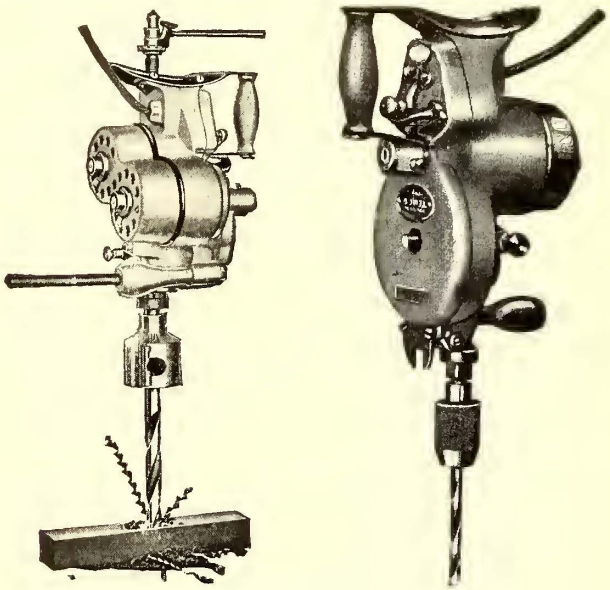
Rustless Steel Tanks

The Dover Boiler Works of New York City, through an agency contract with the manufacturers of the preservative material known as bitumastic enamel, have placed upon the market a line of rustless and leakproof tanks, which are actually guaranteed to remain in that condition for a period of not less than ten years. Bitumastic enamel is not a paint, but a natural product, which, applied to metal under correct conditions, impregnates its pores and becomes an integral part of it, in the sense that it will not peel or flake. Rust cannot attack the metal as the enamel completely protects it, the substance being resistant and water-repellant. The effects are really the same as if the tank was porcelain-lined. The material, however, appears to have ability to withstand reasonable mechanical abrasion.

New Portable Electric Drills

The Western Electric "Temco" portable drills are especially designed to give long and efficient service under severe conditions and hard usage and are essentially all-around tools. They have the general shape of an ordinary breast drill, are compact in design and unusually light. The weight is well balanced, making handling easy, and the electric switch is most conveniently placed near the handle.

A special feature is the ease with which the motor may be reversed when the drill sticks. Whether working at high or low speed, a touch of the switch reverses the motor, loosening the drill or sending it ahead as



NEW PORTABLE ELECTRIC DRILLS

required. These drills will also tap holes, the reversing feature being of great advantage for this work. They are, of course, particularly valuable where the material cannot be carried to a drill press, as the tool can be easily carried to the job.

The motors are built to operate on either direct or alternating current at 110 volts or 220 volts. Connection is made to the nearest lamp socket by means of a flexible cord and attachment plug. There are two principal sizes, of which one has a capacity up to and including ⅜-in. holes in steel, cast iron or similar substance, and weighs only 12 lb. complete. The other has a capacity of ½ in. in steel, has two speeds and, without the chuck, weighs about 19 lb. It is equipped with two motors. The Western Electric Temco line also includes a tool-post grinder, a valve grinder for automobile engines, and a buffer and polisher.

News of Electric Railways

JITNEY AND FRANCHISE DEVELOPMENTS IN DES MOINES

Important and interesting developments in the Des Moines situation are the plans of the Des Moines (Ia.) City Railway to supplement its present service with a motor-bus system, and overtures by the City Council for a reopening of franchise negotiations. Important also is the passage by the City Council, on its first reading, of a jitney bus ordinance which, if finally adopted, will regulate the operation of jitneys as provided in the law passed by the Iowa Legislature which adjourned recently.

The jitney ordinance will come up for final reading during the week ending May 22. It was drawn and presented to the City Council by J. B. Wiley, business agent of the Street Car Men's Union. It requires that each jitney driver provide a $5,000 indemnity bond and limits the number of passengers to be carried. It provides also that only one passenger may ride in the front seat with the driver. Provision is made for the regulation of routes, fares, and schedules. Councilmen German, Mitchell and Leonard voted for the ordinance. Mayor Hanna and Councilman Myerly opposed it.

As to the installation of motor-bus service by the railway company, which is favored by the city, Emil G. Schmidt, president of the company, says he is willing to put in auxiliary motor-bus service in congested districts, as feeders, and as connecting links between car lines.

Mr. Schmidt is understood to look with favor on the proposal of the City Council to compromise the franchise controversy. The Council has sent a note outlining concessions to the company. These are: To permit the company to operate motor buses; to make liberal concessions on the question of net income as affecting fares; to change certain provisions in the city draft objectionable to the company; to fix the capitalization at the actual amount invested in the system by the present owners. The note of the City Council in closing says:

"It is also proposed to make such changes in other provisions of the franchise which may be objectionable to you as can be made with due regard to the real interests and rights of the people of the city. We earnestly invite your co-operation in a sincere effort to adjust the transportation question in this city."

Regarding the question of capitalization, Mr. Schmidt says the proposal of the city would be acceptable were the Council willing to add interest on the money invested by the present owners since the time of such investment.

In spite of the arrival of better weather the jitney bus business does not seem to be thriving as well as at first. Within the last few weeks more than twenty of the 100 jitney drivers licensed in the city have called upon the city treasurer to refund their license fees. This refund could not legally be made.

SPRINGFIELD LABOR DIFFICULTY

As a result of conferences with the local board of trade the Springfield (Mass.) Street Railway dispute over the discharge of three conductors for alleged appropriation of fares will be taken to the courts. The company will sue the three conductors involved for recovery of the funds in a jury-waived sitting of the Superior Court or else in the police court. If proved guiltless, a conductor will be reinstated and if found guilty, discharge will follow without further argument. Both the company and the local union agree to abide by the finding of the court. C. V. Wood, vice-president of the company, said that there will be little delay in carrying the case to the courts. Resort to the police court can be had in case the company feels that the respective amounts affected do not warrant demanding damages sufficient to give the Superior Court jurisdiction. The new agreement holds that determination of the issue by a single justice of a court rather than by court and jury seems nearer by analogy to the methods of arbitration provided in industrial contracts. As a result of the agreement the hearing scheduled for May 12 by the State board of arbitration was cancelled. The danger of a strike is averted.

Commenting editorially upon the agreement the Springfield *Republican* said in part:

"That this proposal (criminal action) as a substitute for arbitration was a clever, even masterly bid for public favor was instantly apparent, and the company's real reason for rejecting the proposal was not to be seen on the surface probably. It is now clear why the company was reluctant to appeal to the courts. The settlement eliminates a jury trial. Juries are liable to be biased against corporations. Whoever marked out the process of an appeal to the courts in a civil action merits the congratulations and praise of the entire community. The conductors will get a fair trial and the company will not be denied justice because it is a corporation."

MAY ELECTRIFY FRISCO SUBURBAN LINES

E. N. Sanderson, president of the Federal Light & Traction Company, New York, N. Y., which controls the Springfield Railway & Light Company, Springfield, Mo., recently accompanied E. D. Levy, general manager of the Frisco Lines, and about twenty prominent citizens of Springfield on an inspection trip over the Springfield-Chadwick line, and it is stated that as a result of the inspection arrangements may be made for leasing from about 30 to 50 miles of each of the five radiating lines of the steam railroad through the Springfield Railway & Light Company for the purpose of suburban electrification at possibly an overhead d.c. line voltage of 1200. At the office of the Federal Light & Traction Company in New York it was stated that the proposition was strongly favored by the citizens of Springfield, and that negotiations for the lease of the lines may be entered into with the Frisco system, and the electrification carried out provided the plan is acceptable to the receivers of the Frisco and the lease can be made on suitable terms. Mr. Sanderson, who returned to New York last week, expects to revisit Springfield in about two weeks to make further investigations.

THE PENNSYLVANIA'S ATTITUDE TOWARDS LABOR

The Pennsylvania Railroad has presented to the Federal Commission on Industrial Relations a frank statement of its policies with employees. The management believes that the company's greatest asset is the loyalty and efficiency of its men. Its labor policies are described as an effort to protect that asset. It early realized the importance of training its own officers. To make the service attractive it was essential that employment as far as possible be permanent. As a result the majority of those who enter the service of the company continue with it until they die or are pensioned. The company believes that railroad employees should be paid liberal wages and that every feasible safeguard should be provided for the personal safety of employees and passengers. The management recognizes the propriety of men organizing for the purpose of bettering their condition, subject only to such restrictions as may protect the elemental essential of safe and continuous operation. In dealing with organizations among its employees the company has felt that the employees themselves were the best judges of the forms of organization into which they desired to go. There has therefore been no interference in the employees' choice in this matter. The employees have always been given full opportunity to redress their grievances whether associated with labor organizations or not. The company is opposed to employees affiliating themselves with an organization which might call a sympathetic strike. If there is to be a strike on the road the management believes that it should be the result of the choice of its own employees and because of some difference between the company and its own men, and for no other reason. In normal times the Pennsylvania system has 250,000 employees. The management believes that the best test of the sincerity of its interest in the welfare of its men is the fact that so large a percentage of its employees have made the service of the company their life work.

CLEVELAND EXTENSION SUBSIDIZED

Peter Witt, street railway commissioner of Cleveland, Ohio, agreed recently to a 3-mile extension of track on what is known as State Road on a basis that he believed to be correct and which he felt would come into general use sooner or later. He said that in the past railway companies had built their tracks into allotments and into country districts where they would be compelled to operate for several years at a loss. The managements felt that they were doing a civic duty in aiding the development of the cities, and this would be all right if the people in general did not foot the bill. Mr. Witt believes that extensions make land values and that those who profit by them should help pay the cost of such extensions. That was the idea he advanced when the land owners on State Road asked for the extension. Two other routes could have been taken, but this one will serve the greatest number of people. Mr. Witt said that he would recommend the 3-mile extension if the property owners, in return for the advance in the value of their property which would follow, would pay $1.50 a front foot toward the cost of the extension, or 75 cents a foot on each side of the street. They have agreed to this and the company will receive about $24,000 as a result.

B. I. BUDD ADDRESSES CHICAGO JOVIANS

At the regular Monday luncheon of the Chicago Jovian League, on May 10, Britton I. Budd, president of the elevated railroads of Chicago, gave an illustrated talk on Chicago's transportation facilities. This address was devoted largely to the development of the elevated railroads and its effect upon the growth of Chicago. Some interesting figures relating to the increase in real-estate values were presented. Property in some localities that had sold for $40 a foot front in 1892 was now selling for $2,000 a foot front. Without a rapid-transit system the increase would have been but little. Mr. Budd also stated that one of the lines recently extended was showing an increase in traffic of from 12 to 14 per cent per year. A check of the service furnished to the employees of eight large plants during the past winter showed that it was 98 per cent perfect, although at times the weather was exceedingly severe.

Mr. Budd also described briefly the new all-steel cars and what the company expected them to accomplish and the loading and unloading schemes adopted on the loop platforms, since through-routing of all cars was effected. As anticipated through-routing had increased the loop track capacity 60 per cent. His comments on traffic conditions were illustrated by charts and tables comparing conditions in Chicago with those on elevated lines and in subways elsewhere.

In closing, Mr. Budd remarked that too often transportation problems had been solved on a basis of return to the company rather than on the service to be rendered. This was diametrically opposed to the public point of view, which must ultimately be accepted. The best service the art can afford should be furnished, and for elevated and subway systems the highest speeds consistent with safe operation should be attained. Mr. Budd believed that the merger of the surface and elevated lines would improve service conditions in Chicago.

NEW ORLEANS POWER IMPROVEMENT

The southern office of the United Gas & Electric Engineering Corporation is busily engaged under the direction of Samuel J. Dill, vice-president, in important improvements for the New Orleans Railway & Light Company. In addition to providing the fifty new cars, described in the ELECTRIC RAILWAY JOURNAL of Feb. 6, 1915, the company is undertaking an extensive modernization of the power generating and distribution system. At this time the company has four power stations, namely, Claiborne, Edison, Magazine and Market. As far as practicable, generation will hereafter be confined to the Market station, while the outlying Claiborne and Edison stations will be used chiefly as rotary converter substations.

The company has already bought a 15,000-kw turbine from the General Electric Company, additional Babcock & Wilcox boilers and Westinghouse underfeed stokers for the same. Six 1000-kw rotary converters will be ordered. Other changes required are the rearrangement of the piping at the Market station and the rebuilding of transmission lines because of changes in the centers of power distribution.

STRIKE IN DETROIT

The conductors and motormen in the employ of the Detroit (Mich.) United Railway went on strike on the morning of May 13 after an all-night session following the refusal of the company to reinstate Motorman Peter Whaling, who was dismissed recently for carelessness in car operation. Whaling is a member of the executive board of the local union. The men declare that they will stay out until he is put back. The company says it will not yield, but will stand by the agreement, which calls for a board of review and arbitration in such cases. W. D. Mahon, president of the Amalgamated Association, says that the association will stand behind the union.

COURT MODIFIES ALBANY ORDER

Appellate Division justices on May 5 modified, in several instances, the orders of the Public Service Commission for the Second District of New York compelling the United Traction Company, operating in Albany, to improve its equipment and service. The court holds that the company should have a rehearing on the order of the commission requiring the immediate purchase of forty-two modern cars of the type of the new Pine Hills cars. All the provisions are affirmed with the exception of this one and another relating to the underground feeder system of the company. All the justices concurred in the opinion written by Presiding Justice Smith.

The matter was thrown into the courts through the securing from Supreme Court Justice A. V. S. Cochrane at Hudson of a writ of certiorari and a temporary stay to the inforcement of the commission's orders. Through this the traction company secured the right to review the utilities board's orders and its refusal to grant the company a rehearing. Application for a rehearing was made by the company on the ground that the European war prohibited the raising of money to carry into effect the provisions of the commission's orders. As to a rehearing, the opinion of the Appellate Division justices is that the company's plea should have been considered.

The third and fourth provisions of the commission's order, compelling the purchase of six new cars for use on the Belt lines, must be obeyed. In this particular the court says: "We are of the opinion that the commission was justified in making the direction and that the cost of the cars is not sufficient to justify a stay pending the application and determination of a rehearing."

The fifth provision of the order, which provided that the United Traction Company should arrange with the Schenectady Railway for giving transfers within the city, is a reasonable one, according to the justices. The court added further: "And it is difficult to see why transfers should not be given. If the Schenectady Railway objects, the Public Service Commission must take the necessary steps to effect such an arrangement."

The Appellate Division annulled one of the provisions of the commission's order. This related to an order making it compulsory for the company to notify the commission on April 1 of each year as to material yearly extensions to be made by it to the underground conduit feeder system. The court decided that the right to order wires placed underground should be left to the municipality.

Some slight modifications tending to simplify the order of compelling the company to install a telephone system exclusively for its own use before April 1, 1915, were made and the modified provision affirmed. The temporary stay secured by the company delayed the consummation of these provisions.

A summary of the original order of the commission was published in the ELECTRIC RAILWAY JOURNAL of Dec. 19, 1914, page 1365. In the issue of this paper for Jan. 16, 1915, page 156, the objections of C. S. Sims, vice-president of the company, to the order were summarized. The commission subsequently denied the company a rehearing, and in the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 30, 1915, reference was made to the order secured by the company through Supreme Court Justice Cochrane at Hudson for a writ of certiorari and a stay of the order.

Pennsylvania Full-Crew Law Repealed.—The Pennsylvania Legislature has repealed the full-crew law of that State and has sent to the Governor a bill providing that the Public Service Commission shall regulate the manning of trains.

Accident at Power Plant Suspends Service.—The Highland Park & Lake Burien line, Division "C," of the Seattle (Wash.) Municipal Railway, was forced to suspend operation on May 5 as a result of the burning out of one of the rotaries at the Lake Burien substation. Several days elapsed before service was restored.

Kansas City, Kan., Obligations Cleaned Up.—The street railways, commonly called collectively the Metropolitan, operating in Kansas City, Kan., had a general clean-up of contract obligations recently, the period covered dating back to 1904, the accounts between the street railways and the city being started fresh, by the payment of $30,000 to the city by the Metropolitan.

City's Attorneys Working on Detroit Purchase.—Except for the statement that the city's attorneys are working on the terms of a contract to be submitted to the directors and stockholders of the Detroit (Mich.) United Railway, no information has been given out during the week regarding the proposed new plan of municipalizing the Detroit street railway lines, under which the purchase price will be fixed by the Circuit Court of Wayne County sitting in chancery.

Stone & Webster to Have Executive Representation at Dallas.—Announcement has been made in Dallas by Stone & Webster that it has been thought wise for the owners of the street railway and electric lighting properties of that city to be directly represented locally and Charles F. Wallace, who has been one of the Stone & Webster organization for more than twenty years, is to live in Dallas and will be at the head of the affairs of the companies. No other changes are in view.

Gasoline Car in Interurban Service.—A gasoline motor car with seats for forty passengers built by employees of the Hutchinson (Kan.) Interurban Railway is being tested on the Anthony & Northern Railway between Pratt and Byers, Kan. The car has a six-cylinder engine, developing 54 hp, and on the initial trip made the 52 miles from Hutchinson to Pratt in two hours and ten minutes. It will make two round trips a day between Pratt and Byers. It is lighted with electricity by a small independent unit.

Tax Suit in Kentucky.—Suit has been filed by the State of Kentucky against the South Covington & Cincinnati Street Railway asking for $18,250 penalty at the rate of $50 a day for the delay incident to the railway company's suit to enjoin collection of taxes on the amount of the franchise assessment as increased by the State Board of Equalization. The suit was dismissed on May 1, 1914, having concerned the action of the board which sat in 1912. The company paid the taxes of $2,100 and the State now seeks to collect the penalty.

Some New York Bills Signed.—Governor Whitman of New York has signed the bill giving the Public Service Commission of the First District of New York power to enter into an agreement with the Long Island Railroad whereby subway trains of the Queens extension may be run over the tracks of the Long Island Railroad from Corona to Bayside and Whitestone Landing. The Governor has also approved the bill authorizing changes in uncompleted sections of a rapid transit road, after contracts have been made, with the consent of the Board of Estimate.

Another Company Publication.—The Chicago (Ill.) Elevated Railways has distributed the first edition of *Elevated News*, a publication issued to acquaint the people of Chicago with the elevated system. This pamphlet will be published monthly, and will be distributed from the elevated stations. The first issue of the *Elevated News* contains only four pages of printed matter regarding service and complaints, but subsequent issues will contain eight pages. To give these booklets permanent value to the public, the inside two pages of the eight-page form will contain a map of the elevated system on which the stops will be indicated.

Electrical Prosperity Week Meeting at Toledo.—Electrical men and retail merchants of Toledo and other northern Ohio cities gathered at the Commerce Club, Toledo, on May 6 to hear of the plans for the "Electrical Prosperity Week" campaign. E. R. Kelsey, publicity manager of the Toledo Railways & Light Company, acted as chairman of the evening. J. M. Wakeman, general manager, and Harry W. Alexander, director of publicity of the Society for Electrical Development, Inc., were the principal speakers. Frank R. Coates, president of the Toledo Railways & Light Company, made a brief speech indorsing the work of the society and the plans for the sales campaign.

New Wage Demands in Chicago.—The present contract between the Chicago Surface Lines and its employees expires on May 31, 1915, and the employees have formulated their new demands. These are said to include a demand for 33 cents an hour during the first year and 36 cents an hour during every year thereafter, and a maximum day of ten hours in twelve. Motormen and conductors are now paid 23 cents an hour for the first three months, with increases every six months until the maximum of 32 cents an hour is reached after five years of service. The existing contract also provides that the men shall not work more than ten hours in sixteen.

Pennsylvania Constabulary Attacked.—At the hearing before the Industrial Relations Commission in Washington on May 6 James H. Maurer, a member of the Pennsylvania State Legislature and president of the Pennsylvania State Federation of Labor, cited a recent street railway strike in that State in his argument against the State constabulary. He told of an appeal made by him to a former Governor in connection with the strike mentioned and the investigation that followed, in which he said it was shown that members of the constabulary resorted to unduly offensive tactics. He said that the desire of New York, Illinois and Virginia to establish State constabulary forces was not based on any history of industrial troubles that would justify the creation of such organizations.

Philadephia Loan Plan Before Legislature.—The Pennsylvania House has adopted the Vare-Taylor resolution to amend the constitution so as to increase the borrowing capacity of the city of Philadelphia by 3 per cent for the purpose of transit and port developments exclusively. This resolution was adopted in the 1913 session of the Legislature. The action in the House on May 6 marks its final passage through the Legislature. The people will vote next November upon the amendment. This increase of the borrowing capacity on assessed realty from 7 to 10 per cent means that the borrowing capacity will be enlarged by about $66,000,000, which may be devoted to a realization of the plans for transit development advocated by A. Merritt Taylor, director of city transit of Philadelphia.

Chicago Surface Lines Club.—The Surface Lines Club, an organization of the employees of the Chicago Surface Lines in executive, supervisory and clerical capacities, was formed on May 4, 1915. More than 600 employes have expressed their desire to join. For the present the members will devote their attention chiefly to athletics. The club is the result of a spontaneous "get-together" movement which had its first expression in the formation of a bowling league. At the Trophy Night dinner given by the employees, the club movement was inaugurated. All the company officials have expressed their intention of becoming members. The following have been elected officers for the first year: Joseph V. Sullivan, president; Herbert Wheeler and W. E. Nemits, vice-presidents; C. R. Manzer, secretary; Henry Nordin, assistant secretary; M. V. Morton, treasurer; Walter Jones, assistant treasurer. The management of the company will provide headquarters for the organization.

Commission Disapproved Abandonment of Line.—The Public Service Commission for the First District of New York has refused to approve the declaration of abandonment filed by the New York & Queens County Railway as to a portion of its franchise route in Flushing Avenue, Queens, between Ehret Avenue and Jackson Avenue. The company's failure to construct the line was made the subject of a complaint upon which the commission held formal hearings. It was shown that the route was covered by the company's franchise and the commission directed its counsel to apply to the Supreme Court for a writ of mandamus to compel the company to construct and operate the line. The proceeding was instituted, but before it was argued the company filed with the commission a declaration of abandonment and the court proceeding was held in abeyance

pending action upon this declaration. The commission's opinion says that the evidence would support a declaration of abandonment as to other portions of the company's route except as to this part of the Flushing Avenue route.

Increasing New York's Elevated Facilities.—Within seven or eight months the third-tracking of the elevated roads in Manhattan and the Bronx will be partially completed and the new express service will be begun on some parts of the system. The lines to be enlarged are the Second, Third and Ninth Avenue roads, of which the Second Avenue has no third track at all. On the other hand the Third Avenue line is now provided with a third track from Forty-second Street north and the Ninth Avenue from Christopher Street to 116th Street. It has been found necessary for a complete third-track system to reconstruct a large part of the existing lines, and this has had to be done without in any way interfering with the operation of the train service. The work was designed by George H. Pegram, chief engineer of the Interborough Rapid Transit Company, New York, N. Y., and has been approved by Alfred Craven, chief engineer of the Public Service Commission for the First District of New York. It is being carried out under the supervision of C. V. V. Powers, division engineer of the commission, by T. A. Gillespie & Company, Snare & Triest, and Terry & Tench. More than 50,000 tons of new steel are to be built into the old structures.

Composite Cars on New York Elevated.—The Public Service Commission for the First District of New York has sent to the Interborough Rapid Transit Company a letter stating that its recent order requiring the removal of 478 composite cars from the subway and the release of such cars from the lien of the original subway operating contract has no bearing upon the company's proposal to use the composite car bodies for operation on its elevated railroads. The company had stated that if such car bodies were not to be used upon the elevated railroads there was no necessity for the action taken by the commission "as we cannot acquiesce in the elimination of these car bodies from the equipment account under Contract No. 1 until some saisfactory agreement has been reached with the city as to their ultimate disposition." In reply the commission stated that the composite cars were ordered out of the subway operation under the authority of the public service commissions law in order to conserve the safety of the public traveling in the subway and that the order is not and cannot be made in any way dependent upon the question of whether the commission, acting under the provisions of the rapid transit act and of the elevated extension certificate, will or will not permit the utilization of these car bodies for elevated service.

PROGRAMS OF ASSOCIATION MEETINGS

Railway Signal Association

The Railway Signal Association will hold its second stated meeting of the year at the Hotel Astor, New York, on May 26 and 27, 1915. On Wednesday, May 26, the business session will last from 9 a. m. to 2 p. m., and the reports of the committees on power interlocking, manual block and electrical testing will be discussed. A boat trip on the Hudson has been arranged for the members and guests who attend the meeting on Wednesday, the trip being to West Point and return. On Thursday there will be a session from 9 a. m. to 12:30 p. m. and another session from 2 p. m. to 5 p. m. Reports will be presented of the committees on standard designs, electric railway and a.c. signaling, storage battery and charging equipment, and on lighting protection.

Missouri Public Utilities Association

Arrangements have practically been completed for the ninth annual convention of the Missouri Public Utilities Association to be held on board the *S. S. Quincy* on May 27-30.

Among the papers on the program of direct interest to electric railway operators are the following:

"Financing and Valuation of Public Utilities," by C. F. Enright, St. Joseph, Mo.

"Power House Economics," by E. J. Billings, results engineer Doherty Operating Company, St. Joseph, Mo.

"Relation Between Our Association and the Public Utility Commission," by J. H. Van Brunt, vice-president and general manager St. Joseph Railway, Light, Heat & Power Company.

"A Brief Talk on the Subject of Appraisal and Rate Regulation," by R. E. McDonnell, of Burns & McDonnell, Kansas City, Mo.

"The Effect of Jitney Service on Transportation Companies," author not announced.

West Virginia Public Utility Association

The public utility companies of West Virginia held a meeting at Huntington on April 26 and effected a temporary organization to be known as the West Virginia Public Utility Association and elected the following to hold office until the meeting for permanent organization, which is to be held on June 8 and 9 in Charleston: President, Herbert Markle, general manager of the Appalachian Power Company, Bluefield; vice-president, G. O. Nagle, general manager of the Wheeling Traction Company, Wheeling; secretary and treasurer, W. C. Davisson, general manager of the West Virginia Water & Electric Company, Charleston. The following directors were elected: W. L. Foster, manager of the Beckley Water & Light Company, Beckley; W. G. Mathews, president of the Virginian-Western Power Company; M. A. Maxwell, general manager of the Logan Light & Power Company; H. E. Wyatt, superintendent of the Huntington Water Company; O. B. Welch, manager of the Williamson Light & Power Company; Herbert Markle, Bluefield, W. Va., and G. O. Nagle, Wheeling, W. Va. A committee has been appointed to draft a constitution and by-laws to be submitted to the meeting to be held on June 8. The membership of the association is to include representatives of gas, traction, electric light and power, and water companies.

Southwestern Electrical & Gas Association

The convention of the Southwestern Electrical & Gas Association will be held at Galveston, Tex., on May 19, 20, 21 and 22, with the Galvez Hotel as the association headquarters, and the place where all meetings, sessions, etc., will be held. The opening session will be held at 9 a. m. on May 19, followed immediately by the morning railway session at 10 o'clock. There will be a second railway session at 2 p. m. or 2:30 p. m. On the second day, May 20, there will be an electric light and power session at 9:30 a. m. and the same at 2 p. m. or 2:30 p. m. On the third day, May 21, there will be a "general" session at 9:30 a. m., and an afternoon session of the same at 2 p. m. or 2:30 p. m. The session on Saturday morning, May 22, will be the business and executive session of the convention, when reports of the various committees will be received, nominations made, election of officers and committees held. The accountants will also have separate sessions on May 20, at 9:30 a. m. and again at 2 p. m. or 2:30 p. m.

Among the interesting papers and addresses scheduled for presentation at the convention is an address by Charles B. Scott, manager of the bureau of safety of the Middlewest Utilities Company, and the secretary of the accident prevention committee of the National Electric Light Association. His address will be on the subject "Important Factors in Accident Prevention."

The following papers of interest to electric railway operatives are being written for the convention:

"Four Interesting Points in Track Work and Paving," by B. R. Brown.

"Economies in Repair Shop Work and Maintenance," by V. W. Berry.

"An Absolutely New Type of Street Car for City Operation," by C. O. Birney.

"A Study of the Jitney," by R. T. Sullivan.

"What the Southwestern Electrical & Gas Association Can Do for Me," by A. V. Wainwright.

"The Advertising Influence of the Employee," by F. R. Slater.

"Welfare Work and Education of the Employee," by Richard Meriwether.

"Positive and Negative Elements in Trade," by Fred Johnson.

Several other papers and addresses have been promised. The executive committee has ordered that the question box be repeated. A number of entertainments have been arranged.

Financial and Corporate

ANNUAL REPORTS

American Cities Company

The statement of income, profit and loss of the American Cities Company, New York, N. Y., for the year ended Dec. 31, 1914, follows:

Income	$1,928,676
Operating expenses and taxes	$85,724
Interest advances from subsidiary companies	9,144
Total	$94,868
Net earnings	$1,833,808
Interest on collateral trust gold bonds	500,000
Net income	$1,333,808
Dividend on preferred stock at 6 per cent	1,233,210
Surplus for the year	$100,598
Surplus at the beginning of the year	$194,994
Less expenses applicable to prior period	4,127
	$190,867
Surplus at end of the year	$291,465

The American Cities Company owns in the aggregate 85.83 per cent of the preferred stock and 95.79 per cent of the common stock of the New Orleans Railway & Light Company, the Birmingham Railway, Light & Power Company, the Memphis Street Railway, the Little Rock Railway & Electric Company, the Knoxville Railway & Light Company, and the Houston Lighting & Power Company. If the American Cities Company's proportionate share of the undivided surplus earnings over dividends of these companies were included in the foregoing statement, the surplus would be increased to $222,419 for 1914.

The gross earnings from all sources of the combined constituent companies were $14,822,105 for 1914, an increase of $141,803 over 1913. The operating expenses and taxes totaled $9,133,582, an increase of $15,596, while deductions, including interest charges, totaled $3,480,973, an increase of $133,174. The net income for the year amounted to $2,207,550, a decrease of only $6,967.

The operating expenses of the New Orleans Railway & Light Company were increased approximately $100,000 on account of the advanced price of coal and gas oil. New contracts for these commodities, however, were entered into in December, 1914, at prices which it is estimated will effect a saving in 1915 of approximately $90,000. The operating ratio of the constituent companies was 52.77 per cent in 1914 as compared to 53.67 per cent in 1913.

Duluth-Superior Traction Company

The comparative statement of income, profit and loss of the Duluth-Superior Traction Company, Duluth, Minn., for the years ended Dec. 31, 1913 and 1914, follows:

	1914	1913
Operating revenues:		
Revenue from transportation	$1,289,917	$1,260,061
Other revenue	23,647	23,853
Total revenues	$1,313,564	$1,283,914
Operating expenses:		
Way and structures	$50,441	$52,627
Equipment*	76,816	65,577
Traffic	901	655
Conducting transportation	469,632	463,266
General and miscellaneous	162,202	166,039
Total operating expenses	$759,992	$748,164
Net operating revenue	$553,572	$535,750
Taxes	$66,520	$66,537
Depreciation	100,000	74,100
Total taxes and depreciation	$166,520	$140,637
Surplus for fixed charges and dividends	$387,052	$395,113
Total fixed charges and dividends	377,372	388,276
Net income to surplus account	$9,680	$6,837

*Equipment expense for 1914 includes $9,645 to cover depreciation of equipment for the last six months, as required by the Interstate Commerce Commission.

The total revenue of the company increased $29,650, or 2.3 per cent during 1914, as compared to 1913. The total operating expenses increased $11,828, or 1.5 per cent during the same period, so that the net operating revenue increased $17,822, or 3.3 per cent. The total of taxes and depreciation increased $25,883, or 18 per cent, giving a decrease in the surplus available for fixed charges and dividends of $8,061, or 2 per cent. The fixed charges decreased $2,154 and the common stock dividends $8,750, however, so that the net income increased $2,843.

During 1914 there was expended for renewals and charged against the depreciation reserve an amount of $58,498. The appropriation to this reserve for 1914 was $100,000, the increase of $25,900 being considered necessary to provide adequately for depreciation during the current year and make the comparison less unfavorable with the future depreciation that will be required under the I. C. C. system of accounts. A sum of $18,000 was expended to meet sinking fund retirement of $20,000 par value of bonds.

The amount expended for new construction and expenses during the year was $41,913, the two largest items of which were $28,414 for track and roadway and $12,646 for conduit and feed wire. The total amount expended was $49,233, but deduction of $7,320 was made for equipment sold. The total single-track mileage of the company is 82.51. The gross passenger earnings per single-track mile were $15,623.

WASHINGTON-OREGON REORGANIZATION

Bondholders' Committee Submits Plan to Be Declared Operative by Depositing Holders Before July 1

The committee representing holders of the first and consolidated mortgage bonds of the Washington-Oregon Corporation, Vancouver, Wash., consisting of C. M. Brown, J. Crosby Brown, L. J. Morris and J. D. Winsor, Jr., has submitted a reorganization plan which may become operative unless it is dissented from by the holders of the majority of the deposited bonds. Further deposits may be made on or before June 15. The plan must be declared operative, if at all, before July 1.

The proposed reorganization plan, carrying no assessment, provides for the organization of the new corporation with the following capitalization: Prior lien mortgage twenty-year 6 per cent bonds, authorized, $350,000; to be issued now, $200,000; general lien mortgage twenty-five-year 6 per cent bonds, authorized, $2,500,000; to be issued now, $675,000; Twin City Light & Traction Company first mortgage 6 per cent bonds, authorized, $350,000; outstanding, $342,000; 6 per cent cumulative preferred stock, authorized and to be issued, $1,200,000; common stock, authorized and to be issued, $550,000.

The first and consolidated mortgage bondholders will receive for each $1,000 deposited: (1) $400 of 6 per cent general lien bonds; (2) $600 of 6 per cent cumulative preferred stock; (3) an additional amount of preferred stock equal at par to the accrued interest to the date of foreclosure sale on the deposited $1,000 bond and to the interest on the $400 of general lien bonds for one year; (4) a provisional equal proportionate interest in 51 per cent of the common stock. Second mortgage bondholders and other junior creditors have an option up to April 15, 1920, to purchase the common and preferred stock for the par value of such preferred stock, with all accrued dividends. If the option is not exercised, they will still receive 49 per cent of the common stock. The preferred stockholders would then receive all unallotted preferred stock and dispose of the remaining 51 per cent of the common stock. The $200,000 of prior lien mortgage 6 per cent bonds provides for reorganization expenses, the repayment of taxes advanced by the Fidelity Trust Company, foreclosure and receivership expenses, and repairs and improvements recommended by the engineers.

The Washington-Oregon Corporation operates a street railway in Vancouver, and connects Vancouver and Sifton (Vancouver division) and Centralia and Chehalis (Twin City division). E. M. Hayden was appointed receiver in July, 1914. The earnings of the property under receivership for the seven months ended March 31 were as follows: Gross earnings, $168,537; operating expenses, $93,714; taxes, $12,833, and net earnings, $61,990.

TRAMWAYS AND LIGHT RAILWAYS IN CHOSEN, COREA

According to the annual report of the railway bureau of the governor-general of Chosen, Corea, for the year ended March 31, 1913, the tramways and light railways at the end of the year were six; namely, the systems operated by the Nikkan Gas & Electric Company and two other companies and three operated as private enterprises. The aggregate capital of these companies totaled yen 9,876,600. The miles of line open to traffic numbered 22.3, consisting of 14.6 miles of electric tramway in Keijyo operated by the Nikkan Gas & Electric Company, 5.8 miles of light railway operated by steam and 1.9 miles of manual tramway. The mileage to be opened hereafter consists of 150.3 miles, which includes 7 miles of electric tramway to be operated by the Chosen Gas & Electric Company. The passenger traffic of the Nikkan Gas & Electric Company during the year amounted to 10,031,402, and the freight traffic to 1810 carloads. The total receipts were yen 302,351 and the total expenses yen 163,824, leaving a profit of yen 138,527. This company operates sixty-one electric cars and twelve wagons. During the year under review it had one collision, eighty-one derailments, sixteen injuries to passengers and fifteen injuries to the public.

Barcelona Traction, Light & Power Company, Barcelona, Spain.—The holders of the first mortgage 5 per cent bonds of the Barcelona Traction, Light & Power Company were to vote on May 11 in London in regard to the suspension of coupons due from Dec. 1, 1914, to June 1, 1918, and their discharge by the issuance of 5 per cent ten-year notes, such notes not to constitute a charge upon any property. The notes would be redeemed in five installments at 20 per cent during the last five years of their term, either in cash or, at the option of the company, by the issuance of an equivalent amount of the 5 per cent bonds. Previous items relating to this company were published in the Electric Railway Journal of Feb. 27 and May 1.

Birmingham Railway, Light & Power Company, Birmingham, Ala.—Announcement has been made that E. H. Rollins & Sons, New York, have sold the $1,150,000 of two-year 6 per cent notes dated May 1, 1915, which they recently offered at 99½, as noted in the Electric Railway Journal of May 1. The total authorized issue is $2,000,000, the remaining $850,000 being reserved for future capital purposes.

Boston (Mass.) Elevated Railway.—In regard to the recent decrease in the Boston Elevated Railway dividend, as noted in the Electric Railway Journal of May 1, President W. A. Bancroft says: "As the last dividend of the year is payable on May 15 to stockholders of record on May 6, we were obliged to estimate the earnings for the last three months of the fiscal year to June 30 and base the final dividend upon that estimate, having in mind the usual provisions for maintenance. Last year we paid 5 per cent, but the earnings thus far during the current fiscal year and the estimate for the remainder do not justify us in declaring more than 4½ per cent for this year. The demands made upon the company have been and are so great as to require an increase in income as an offset. We believe that the public recognize the situation, and we hope that they will be ready, in the not far distant future, to meet it."

Buffalo, Lockport & Rochester Railway, Rochester, N. Y.—In regard to a report of a proposed merger of the Buffalo, Lockport & Rochester Railway with the International Railway, C. D. Beebe, president of the former company, states that the matter of bringing the two lines under one control has been discussed for more than a year but the proposition is no further advanced now than at the beginning. If a merger should ever develop, it might work with either company assuming control. Mr. Beebe stated, however, that it was certain that there would be no action for some time to come and he doubted whether there ever would be any merger between the two companies.

Butte (Mont.) Electric Railway.—In the matter of the March 1 interest default of the Butte Electric Railway, noted in the Electric Railway Journal of April 3, *The Commercial & Financial Chronicle* quotes James H. Anderson, treasurer of the company, to the effect that no receiver has been appointed and no reorganization is contemplated. The reason for the default is stated to be the reflection in the company's earnings of the number of men out of employment in Butte. Conditions are now somewhat improved, however, and the officials are hopeful that earnings will warrant meeting the bond interest due on Sept. 1.

Chicago (Ill.) Railways. — The Chicago Railways has declared a dividend of 4 per cent on Series 1 certificates, payable on June 5 to holders of record on May 22. The directors also declared out of accumulated earnings, a dividend of 2 per cent on Series 2 certificates, the distribution being for no particular period, but payable as above. This is the second distribution made on Series 2 certificates. The other was 2 per cent paid on Feb. 10, 1914.

Cleburne (Tex.) Street Railway.—The property of the Cleburne Street Railway was sold on May 4 at public auction to John W. Floore, Sr., who holds the first mortgage of $12,500 on the property. The sale price was $7,500. Mr. Floore stated that he would have cars running on the line within thirty days. The appointment of a receiver for the company was noted in the Electric Railway Journal of Jan. 23.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.—The Ohio Public Utilities Commission has authorized the Cleveland, Southwestern & Columbus Railway to issue $119,875 of twenty-year 5 per cent first consolidated mortgage bonds to be sold for not less than 85. The proceeds are to be used to reimburse the treasury for money expended from income during 1913 and 1914 for capital purposes. Pending the sale of the bonds, the company is authorized to pledge them as security for loans at not less than 65. The application for this issue was noted in the Electric Railway Journal of March 20.

Dry Dock, East Broadway & Battery Railroad, New York, N. Y.—The Appellate Division of the Supreme Court has decided in favor of the Public Service Commission for the First District, the certiorari case instituted by the Dry Dock, East Broadway & Battery Railroad upon the action of the commission in refusing to approve an issue of $2,800,000 of refunding bonds. The commission had held that the proposed issue would make the capitalization greater than the actual physical value and that the company had not shown the money to have originally been expended on capital account. The court now holds that the commission was right in withholding its approval. The value of the property was not material, but the company should have proved that the original expenditure was made for capital account.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—The Elmira Water, Light & Railroad Company has called for redemption on July 1, at 105 and accrued interest, the $1,661,000 of purchase money 5 per cent bonds due on Jan. 1, 1949. The cash for the redemption of these bonds was secured mostly from the payment on May 1, by the city of Elmira, of $1,500,000 for the water supply plant of the company. The balance is to be secured by the issuance of $232,000 of 5 per cent fifty-year first consolidated mortgage bonds, which the Public Service Commission has authorized to be sold at not less than 90. Already, however, cash for the redemption is on deposit with the United States Mortgage & Trust Company, New York, and bonds may be deposited at any time.

Fairmount Park Transportation Company, Philadelphia, Pa.—Judge Thompson in the United States District Court has filed an order directing Samuel M. Clement, Jr., and Frank Silliman, Jr., receivers of the Fairmount Park Transportation Company, to sell at auction the property and assets of the company. This order is a formal step in connection with the reorganization plan recently effected. By inventory the value of the property, including the buildings in Woodside Park, has been fixed at $1,018,188. The entire property is subject to a first mortgage of $750,000. References to the reorganization plan were made in the Electric Railway Journal of Jan. 16 and Feb. 27.

Fresno (Cal.) Interurban Railway.—The Fresno Interurban Railway has asked the California Railroad Commis-

sion for authority to issue 250 shares of capital stock at 80 and $70,000 of bonds at 90. The proceeds are to be used in constructing an extension to Gould Colony, an extension into the business district of Fresno and a spur track to the Larton winery.

Interborough-Metropolitan Company, New York, N. Y.—It is reported that the plan to unite the Interborough-Metropolitan Company and the Finance & Holding Corporation into the Interborough Consolidated Corporation, as outlined in the ELECTRIC RAILWAY JOURNAL of May 1, is assured of success. More than 60 per cent of the preferred stockholders, including nearly all of the small holders, have sent in proxies, and many of the large holders have assented within the last few days. It is believed that practically the unanimous consent of all stockholders will be voted at the special meeting called for June 1.

Interstate Railways, Camden, N. J.—The stockholders of the Interstate Railways at a recent meeting approved the plan to issue new irredeemable preferred stock to take the place of the former preferred issue. Previous references to this change were made in the ELECTRIC RAILWAY JOURNAL of Jan. 23 and April 10.

Jersey Central Traction Company, Keyport, N. J.—A committee composed of F. Eichelberger, C. H. Koppleman and H. R. Taylor is endeavoring to unite the minority stockholders of the Jersey Central Traction Company. The stock control of this company was recently purchased by Laird Brothers, Wilmington, Del., as mentioned in the ELECTRIC RAILWAY JOURNAL of April 3.

Lehigh Valley Transit Company, Allentown, Pa.—E. G. Grace has been elected a director of the Lehigh Valley Transit Company to succeed Charles M. Schwab, resigned.

Long Island Railroad, New York, N. Y.—Mayor Mitchel on May 1 approved the bill authorizing the Public Service Commission to contract with the Long Island Railroad for trackage rights to Whitestone Landing and Little Neck in connection with the proposed Flushing-Bayside route of the new subways.

Metropolitan Street Railway, Kansas City, Mo.—In view of the interest and franchise situation in Kansas City, as described in the ELECTRIC RAILWAY JOURNAL of May 8, the committee of holders of the consolidated mortgage 5 per cent bonds of the Metropolitan Street Railway has issued a circular explaining the causes of the recent non-payment of interest and stating that it may become necessary to carry through to a speedy conclusion the foreclosure of the mortgage. It is said that a very large majority of the bonds has already been deposited. A report from the receivers shows passenger receipts for December, January and February as follows: December, $518,598; January, $486,508, and February, $439,863. Miscellaneous receipts in these months added to the balance on hand made the available amounts as follows: December, $1,104,173; January, $801,381, and February, $864,113. The total available during the period was $2,207,171. The total expenditures were $1,915,440, leaving a balance on March 1 of $291,731. The statement does not include among disbursements current liabilities, incurred previous to March 1, but due, amounting to $220,924; unvouchered accounts of $13,720, unsettled personal injury claims, and deductions for interest and taxes coming due.

Northern Electric Railway, Chico, Cal.—F. M. Clarke, attorney for holders of the sundry overlying bonds of the Northern Electric Railway, has issued a letter opposing the proposed bankers' agreement for the reorganization of this company and stating that a new plan will soon be submitted.

Northern Texas Electric Company, Fort Worth, Texas.—A quarterly dividend of 1 per cent has been declared on the common stock of the Northern Texas Electric Company, payable on June 1 to holders of record on May 15. The payment compares with 1¾ per cent quarterly from September, 1913, to March, 1915, inclusive.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—The board of directors of the Oakland, Antioch & Eastern Railway has been increased in number from nine to eleven, H. P. Scott and H. A. Mitchell being again elected to the board. The names of the other directors were published in the ELECTRIC RAILWAY JOURNAL of April 17.

Ocean Shore Railroad, San Francisco, Cal.—The delinquent date for an assessment of $3 per share on the stock of the Ocean Shore Railroad has been set for June 2, with the sale date on July 7. This assessment was mentioned in the ELECTRIC RAILWAY JOURNAL of April 24.

Pacific Gas & Electric Company, San Francisco, Cal.—An application has been filed with the California Railroad Commission requesting that H. A. McClelland and the Mercantile Trust Company be granted authority to convey and transfer to the Pacific Gas & Electric Company all their interest in the street railway line extending from the J Street extension, owned by the Pacific Gas & Electric Company, to the tract of land known as "Elmhurst."

Petaluma & Santa Rosa Railway, Petaluma, Cal.—The California Railroad Commission has rendered a decision relative to the value of the property of the Petaluma & Santa Rosa Railway. The commission finds the reproduction cost as of June 30, 1912, to be $1,610,607, and the present value $1,438,485. These figures are for operative and non-operative property. The total main track mileage is 31½ miles. The company operates steamers between Petaluma and San Francisco.

San Francisco (Cal.) Municipal Railways.—The operation of the municipal railway system of San Francisco for March produced a record in earnings, the excess of receipts over expenditures being $74,102. The gross receipts for March were $188,434, while the expenditures were $114,332. Of this latter amount the largest single items were $23,533 for power purchased, $27,621 for wages of motormen and $29,630 for wages of conductors.

Seattle (Wash.) Municipal Street Railway.—Seattle's two municipal car lines, Division "A" and Division "C," were operated during April at a loss of $1,870, estimating the cost of power at $400 for each line as in March. Division "C" lost $466 and Division "A" $1,404. For the first time the revenues of Division "A" exceeded the actual cost of operation. The revenues amounted to $1,368 and operating cost to $1,246, exclusive of $400 for power and $1,125 for interest.

Southeastern Ohio Railway, Light & Power Company, Zanesville, Ohio.—W. A. Wilson, president Southeastern Ohio Railway, Light & Power Company, has been appointed receiver on the application of J. M. Brown, Wheeling, W. Va. Judgments for $14,080 in five suits have been secured against the company. Mr. Wilson states that the receivership was caused by the loss of revenue following the destruction of the Sixth Street bridge in Zanesville during the flood of 1913, which interrupted the through traffic.

Toronto (Ont.) Railway.—Wood, Gundy & Company, Toronto, have purchased $100,000 of Toronto Railway 4½ per cent first mortgage bonds, due on August 31, 1921, at a price of 94.6 and accrued interest, to yield 5½ per cent.

Twin City Rapid Transit Company, Minneapolis, Minn.—Owing to a mistake in compilation, the statement of the March monthly earnings of the Twin City Rapid Transit Company in the ELECTRIC RAILWAY JOURNAL of May 8 did not contain any notation regarding other income and omitted rentals and interest from the fixed charges. The correct figures follow: operating revenues, $785,582; operating expenses, $529,704; operating income, $255,878; other income, $2,541; fixed charges, $137,644, and net income, $120,775.

United Railways Investment Company, San Francisco, Cal.—D. B. C. Catherwood, Philadelphia, has been elected a director of the United Railways Investment Company.

Wilkes-Barre & Hazleton Railroad, Hazleton, Pa.—The local County Court has handed down a decision in regard to the necessity of the Wilkes-Barre & Hazleton Railroad paying a tax on corporate loans in Pennsylvania. This company, a New Jersey corporation, is a holding company owning practically all of the capital stock of the Lehigh Traction Company, the Wilkes-Barre & Hazleton Railway and the Wilkes-Barre Terminal Railroad, all doing business in Pennsylvania. The holding company has no office or agent in Pennsylvania and has used none of its property and invested none of its capital there. Upon an appeal from a settlement for the tax on the company's bonds held by residents of the State, it was held by the court that the mere owning and holding of the stock and the bonds of the three operative corporations and the receiving of divi-

dends and interest thereon was not "doing business" within the meaning of the law. Even if it were held that such activities did constitute "doing business," then such was done outside of Pennsylvania, for the situs of the securities is in New Jersey, the domicile of the holding company.

York (Pa.) Railways.—The gross earnings of the York Railways for the year ended Nov. 30, 1914, were $796,645 as compared to $767,161 for the preceding year, an increase of $29,483. In 1914 the operating expenses increased by $10,612 to a total of $408,142, allowances for depreciation increased by $179 to a total of $16,916 and taxes decreased by $145 to a total of $39,755, so that the net earnings showed an increase of only $18,837 to $331,833. With an increase of $6,260 for interest and bond discount, the net income amounted to $108,494, an increase of $12,576 over 1913. This, combined with the surplus for the preceding period of $76,806 and decreased by dividends of $80,000, made a balance at the end of the year of $105,300. The capital expenditures during the year amounted to $196,762, of which $47,453 was for the railway property. The railway lines were extended 0.67 mile, and 1.38 miles of track were reconstructed.

DIVIDENDS DECLARED

Central Arkansas Railway & Light Corporation, Hot Springs, Ark., quarterly, 1¾ per cent., preferred.

Illinois Traction System, Peoria, Ill., quarterly, three-quarters of 1 per cent, common.

Northern Texas Electric Company, Fort Worth, Tex., quarterly, 1 per cent, common.

Washington Railway & Electric Company, Washington, D. C., quarterly, 1¼ per cent, preferred; quarterly, 1¾ per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
ATLANTIC SHORE RAILWAY, SANFORD, MAINE					
1m., Mar., '15	$24,780	$20,249	$4,530	$621	$3,909
1 " " '14	23,196	20,519	2,676	674	2,002
AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.					
1m., Mar., '15	$139,636	*$134,846	$4,790	$4,213	$577
1 " " '14	154,393	*140,872	13,521	364	13,157
9 " " '15	1,511,809	*1,323,297	188,513	31,872	156,641
9 " " '14	1,578,134	*1,331,483	246,652	3,141	243,511
BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, MAINE					
1m., Mar., '15	$63,222	*$28,927	$34,295	$17,695	$16,600
1 " " '14	62,498	*31,047	31,451	17,470	13,981
12 " " '15	783,153	*373,088	410,065	209,713	200,352
12 " " '14	776,310	*354,444	421,866	207,782	214,084
CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.					
1m., Mar., '15	$83,439	*$59,227	$24,212	$29,338	†$5,126
1 " " '14	87,550	*56,490	31,060	27,676	3,384
12 " " '15	1,052,266	*704,083	348,183	344,499	3,684
12 " " '14	1,202,708	*715,389	487,319	308,253	179,066
CLEVELAND, PAINESVILLE & EASTERN RAILWAY, WILLOUGHBY, OHIO					
1m., Mar., '15	$29,914	*$17,198	$12,717	$10,918	$1,799
1 " " '14	30,310	*16,154	14,156	11,167	2,989
3 " " '15	82,887	*50,861	32,025	32,818	†792
3 " " '14	83,937	*49,181	34,755	32,785	1,970
COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO					
1m., Mar., '15	$254,656	*$150,327	$104,329	$39,225	$65,104
1 " " '14	250,185	*160,251	89,934	39,494	50,440
12 " " '15	3,075,551	*1,863,999	1,211,552	475,816	735,736
12 " " '14	3,017,220	*1,960,830	1,056,390	487,843	568,547
COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.					
1m., Mar., '15	$1,138,211	*$610,462	$527,749	$367,264	$160,485
1 " " '14	1,133,415	*612,191	521,224	349,991	171,233
12 " " '15	14,031,558	*7,523,913	6,507,645	4,261,763	2,245,882
12 " " '14	13,829,419	*7,701,971	6,127,448	3,952,884	2,174,564
LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO.					
1m., Mar., '15	$102,222	*$70,438	$31,784	$35,991	†$4,207
1 " " '14	105,452	*70,868	34,588	35,299	†717
3 " " '15	289,759	†210,984	78,775	107,909	†29,133
3 " " '14	300,961	*203,169	97,793	105,642	†7,849
SOUTHERN UTILITIES COMPANY, NEW YORK, N. Y.					
1m., Mar., '15	$83,149	*$60,444	$22,705	$17,243	$5,462
1 " " '14	80,275	*66,564	13,711	15,684	†1,973
12 " " '15	1,068,531	*778,032	290,499	205,013	85,486
12 " " '14	938,719	*707,884	230,835	176,117	54,718

*Includes taxes. †Deficit.

Traffic and Transportation

THE JITNEY BUS

A Summary of Recent Significant Developments Covering Various Phases of the Problem

No intimation has come from Governor Whitman of New York in regard to the action likely to be taken by him with respect to the Thompson bill to regulate the operation of the jitney in New York State. At the hearing at Albany before the Governor, Ex-Senator W. W. Armstrong, representing the Rochester Jitney Association, said the bill was a bludgeon to remove competition. He described the jitney as a poor man's taxi and said that if the minimum fare was fixed at 10 cents there would be no opposition. Senator Thompson, sponsor for the bill, said that Ledyard T. Hale, of counsel for the Public Service Commission of the Second District of New York, prepared the original draft of the bill. David Robinson, secretary of the Broadway Association, New York City, favored the bill because it would tend to regulate traffic and protect life. Frederick H. Elliott, secretary of the Safety First Society of New York City, favored the bill in the interest of safety. William Nottingham, Syracuse, favoring the bill, said that the transportation companies now in the field were called upon to bear heavy burdens in serving the public. Mayor Schoolcraft of Schenectady favored the bill as a step in the direction of home-rule for the city. These who opposed the bill characterized as a joker the clause reading "the consent of the authorities as defined by the railroad law." Among the others who spoke in favor of the Thompson bill was H. M. Addinsell, of Harris, Forbes & Company, New York, bankers. He said that if unregulated jitneys were allowed to take the cream of the street railway business, investors would not receive the protection to which they were entitled. While street railways had no legal right to expect perpetual freedom from competition they did have every right to expect freedom from unregulated and practically untaxed competition of the character being offered by the unregulated jitney.

The hearing before the Georgia Railroad Commission on the petitions by the Georgia Railway & Power Company and a number of citizens that it take supervision over jitney buses was set for May 12. The answer of the jitney-bus men was filed with the commission on May 10. In it they admit they are hauling passengers along the streets, but deny they are in any sense common carriers as contemplated by the Georgia statute. They contend that if supervision is extended over them it should be extended over hacks, drays, furniture vans, delivery wagons and all other conveyances for hauling passengers and freight. Answering that paragraph of the company's petition which recites that the jitneys do not furnish transportation to all alike, regardless of race, condition, or color, they say it is true, and that moreover they do not intend to furnish such impartial transportation. If this be discrimination, they contend that it is up to negroes and others affected to complain to the commission, and that it is not for the electric railway to concern itself with the matter. The jitney men claim that inasmuch as they cannot exercise the right of eminent domain, they are not common carriers within the meaning of the law, and that this distinction, not the fact that they haul passengers for hire, controls the question before the commission. The application of the commission ruling in this case will be State-wide, so the hearing will affect the jitney situation not only in Atlanta but in Savannah and Macon, in both of which cities the jitneys are in use.

The permanent injunction against the city, sought by the jitney-bus operators in the Fulton Superior Court at Atlanta, to prevent enforcement of the recently enacted ordinance requiring licenses, bonds, etc., was denied several days ago by Judge W. D. Ellis, and the attorneys for the jitneys have appealed from his ruling. Meanwhile the temporary restraining order issued by Judge Ellis remains in force. The ordinance is of no effect in the interim, and it may be midsummer before the higher courts announce their conclusion.

The service of the Mahoning & Shenango Railway & Light Company in Youngstown, Ohio, has been affected by

the jitney buses on only two lines. The jitneys operate almost exclusively during the rush hours parallel with these lines, but during the non-rush hours there are comparatively few automobiles in use. The company has practically doubled its service during the rush hours, but has decreased it during the non-rush hours when the jitneys are not running. As a result the rush-hour business has increased materially, while the non-rush business has not changed materially. A very strong and persistent sentiment has started among the patrons of the lines demanding that the Council pass a jitney regulatory measure requiring continuity of jitney service throughout the day and night.

Judge King Dykeman, in King County Supreme Court, at Seattle, Wash., has upheld the legality of the law passed by the Legislature requiring jitney owners to file a bond with the Secretary of State in the sum of $2,500, to indemnify passengers against accident. On May 5, immediately after the ruling, it was estimated that of the 395 jitneys operating in Seattle daily, only about 100, the ones that filed their bonds, were carrying passengers.

The Puget Sound Traction, Light & Power Company has declared open warfare against the unbonded jitney operators. A. L. Kempster, manager of the company, said: "We will ask for the arrest of unbonded operators as fast as violations of the State law are brought to our attention. We are prepared to press these cases, as a matter of self-protection. In addition to the enormous loss caused by the advent of the nickel chasers, we shouldered a heavy loss through continued operation of regular service, sometimes with almost empty cars. I may say, also, that the jitney driver will not be the only one to find himself confronted with the necessity of obeying the law, as the 'We Go Anywhere' cars have been included in the investigations that we have made."

I. M. Howell, Secretary of State, of Washington made the following statement in regard to the jitneys: "There are 177 cars licensed by the State of Washington, to do 'for hire' business, all being jitney buses in cities of the first class, as follows: Seattle, 103; Spokane, thirty-five; Tacoma, twenty-six and Everett, thirteen. The cars holding the State licenses range from Fords, which are in the majority, to $5,000 cars. Eight women drivers now hold jitney licenses. Beginning June 10, the jitney drivers will have to take out new licenses under the motor code, which will cost at the rate of 50 cents per horsepower. This charge will run from $11.50 for a Ford, up to twice that sum for the higher powered makes. As a surety bond costs the jitney driver between $95 and $100, depending whether it is sold for cash or on terms, and the State license, under the jitney law is $5, this will make it necessary for the jitney drivers to spend at least $111.50 for each car before they can begin operating."

More than 150 of the 400 employees of the Middlesex & Boston Street Railway appeared before the Board of Aldermen of Newton, Mass., on May 10 in opposition to the establishment of a jitney service between Newton and West Newton. Arthur A. Ballantine, who represented the company in the rate proceedings before the Massachusetts Public Service Commission last fall which resulted in the establishment of the 6-cent fare unit on the system, appeared on behalf of the men, stating that if jitney service should be authorized in Newton, the earnings of the railway company's employees would probably be lessened.

The Aldermen of Providence, R. I., have been holding secret sessions to consider amendments to the jitney ordinance enacted recently.

One of the newest things in jitney service in Kansas City is the baggage transportation enterprise in which Mrs. C. M. Gibson, secretary of one of the Kansas City jitney associations, is interested. The company has three Overland trucks which are to respond to calls to carry baggage to or from the stations. A plan is being developed to extend the service to parcel delivery. Kansas City has now nearly fifty buses in service, with more coming. These now ply on regular routes between the business and residence sections. A new company has ordered a string of buses, however, that will be put into cross-town service, on regular schedule. There are many street railway lines that are partially "cross-town" lines, but in most cases long detours are necessary to cross the city in the residence districts—but by transfers the street railway passenger can arrive fairly close to any place to which he wishes to go, for a nickel.

The suit brought at Memphis, Tenn., to enjoin the enforcement of the state law requiring jitneys to furnish a $5,000 bond has been dismissed in the Chancery Court on the ground that the chancellors had no jurisdiction. Under the ruling all jitneys not bonded will be kept off the streets.

H. T. Pierce, Ashtabula, Ohio, who was placed on trial recently on the charge of operating a motor bus without a license was discharged by Acting Police Judge A. B. Ullman in the Police Court at Ashtabula on May 6. The Judge held that the $100 license fee was excessive, and that the ordinance in that respect was invalid. The judge said that the city charter, as far as the passage of the jitney ordinance was concerned, was in effect, and that while the city has a right to regulate motor bus traffic in a reasonable manner, a license fee of $100 a year was excessive. The court held that had the fee been fixed at $25 or even $50 it would have had no hesitancy in upholding that part of the ordinance. The Council, acting under the charter, did have a right to pass the ordinance as an emergency measure. The opinion prevails in Ashtabula that the decision handed down is not in accord with the laws of the State. It is expected that the case will go to a higher court for a further decision. The terms of the Ashtabula ordinance were reviewed in the ELECTRIC RAILWAY JOURNAL of May 8, 1915.

An ordinance to regulate jitneys has been introduced into Philadelphia Select Councils. The bill states that each jitney must be provided with a license issued by the Department of Public Safety, and that certain policemen be detailed to act as inspectors. The owner of each car shall furnish a $5,000 bond, as possible indemnity against accident or failure to pay fines or licenses. The license for each car is fixed at $75 a year, and $1 a year for the driver. Drivers must be registered by the police department, must bear identification cards, and must not overcrowd their cars. Each driver or owner must file with the police department the route he follows, and if he changes must pay a fee of 50 cents. Approval of the police to change of route must be obtained.

A franchise has been granted by the city of New York to the Far Rockaway Transportation Company to operate a motor bus line between Rockaway Park and Woodmere in accordance with the terms outlined in the ELECTRIC RAILWAY JOURNAL of April 3, page 691. Double-deck buses will be used. The service will be established on July 4 with a schedule calling for the operation of cars on a half-hourly basis.

The Fidelity Trust Company, Baltimore, Md., has printed in pamphlet form for free distribution a summary of the activities of the jitneys in various parts of the United States, based on reports received from 138 cities in forty-five States and the District of Columbia and including eight of the principal cities of the Dominion of Canada. Of the 138 cities from which reports were received the information indicates that jitney buses are operating in 106, leaving thirty-two in which the street railways have as yet escaped this form of competition. Seven of the cities report that jitneys had appeared there, but had been discontinued after a fair trial because the owners found that they were unprofitable.

The cars of the Vincennes (Ind.) Traction Company bear signs "Two Rides For 5 Cents To-day." This follows the reduction in the rate from a straight 5-cent fare to six tickets for 25 cents and the move has been taken in an effort to overcome the diversion of the traffic to the jitneys. The City Council is working on an ordinance designed to control the jitneys. S. S. Bush, president of the street railway, has been invited to attend a conference that is soon to be held on the measure.

In company of the board of directors and officials of the company, counsel for the Paducah (Ky.) Traction Company recently waited on the city adminstration to protest against the unrestricted manner in which jitney buses are operating in Paducah, without being required to take out licenses, give bonds or otherwise submit to regulation. It was intimated by counsel that unless some action in that direction was taken the railway company would be forced to cut its schedules on all lines and perhaps reduce service to an hourly basis on some of the less important lines.

NEW BEDFORD & ONSET FARE HEARING

The Massachusetts Public Service Commission heard the petition of the New Bedford & Onset Street Railway on May 5 for authority to establish a 6-cent fare unit in place of the present 5-cent rate, and a 3-cent unit in place of the existing 2½-cent scholar's ticket. Henry H. Crapo, president of the company, supported the petition. He submitted a brief reviewing the history of the road in considerable detail. The company operates 40.6 miles of track. For the nine months ended March 31, 1915, the gross earnings were $116,423; operating expenses, $81,723; net earnings, $34,700; deductions from income, $22,999. During the entire period of thirteen years the company has had four full years in which a dividend of 3 per cent was paid on its stock. No dividend was paid in 1914 and under present conditions none can be paid in 1915. The total average annual return to the stockholders has been 0.92 per cent. The original rates of fare were 5 cents in each town except in Wareham. For through travelers from New Bedford the first fare zone included transportation on the Union Street Railway between any point in New Bedford on the latter system and the Fairhaven-Mattapoisett line. This fare zone has not been changed and no change is sought. A single-fare zone included the towns of Mattapoisett and Marion each, and two-fare zones were in the town of Wareham.

The through fare from New Bedford to Onset, excluding transfer privileges in New Bedford, was originally 25 cents, the distance being 21.1 miles, a rate of 1.18 cents per mile. In 1904 the number of fare limits for the through trip was increased from five to seven, with the approval of the Railroad Commission. This increased the total fare to 35 cents, or to 1.66 cents per mile. On the Middleboro, Wareham & Buzzards Bay road the through fare from Middleboro to Bourne, 25.36 miles, was originally 25 cents, or about 1 cent a mile. During the receivership this rate was 40 cents, or 1.57 cents a mile, and since 1905, the rate has been 35 cents, or 1.38 cents a mile, barring slight changes in the length of the line due to the construction of the Cape Cod Canal. Since 1905 reduced rate tickets at twenty-four for $1 have been sold at the company's offices. A system of overlaps, making center to center fares, has gradually been worked out to the general satisfaction of the communities served. It is not proposed to change either the fare zones or the overlaps. With the proposed substitution of a 6-cent fare unit, a corresponding adjustment is to be made in the sale of tickets. These will be marketed at the rate of twenty for $1.

The proposed increase will make the rate of a cash fare for the through passenger from New Bedford to Onset 41 cents, or 1.94 cents a mile, and to the passenger riding on reduced-rate tickets, 35 cents, or 1.66 cents a mile. The through fare from Middleboro to Monument Beach, a distance of 24.825 miles, will be 42 cents, or 1.69 cents a mile, and by tickets the rate will be 1.41 cents a mile. The average cash fare on the system on a 6-cent fare will be 1.92 cents a mile, and on the reduced rate tickets, 1.60 cents a mile. Mr. Crapo stated that although the zones and overlaps differ in length, making the per mile rate vary within the zones, the proposed plan works out somewhat after the Milwaukee zone system, giving a 5-cent fare in New Bedford and in the zones outside roughly 2 cents a mile. The New Bedford & Onset road is strictly a suburban property.

Mr. Crapo said that the investment in the property was prudent at the time it was made, but judgment was mistaken in the amount of summer excursion riding. Fifteen years ago there was a distinct demand for trolley pleasure riding which has largely disappeared, in no small degree due to automobiles. The receipts of the road have increased only 1.5 per cent per annum in its life, and this increase is almost entirely from local riding in one or two zones. Practically none of the railway was permitted to be built in the existing highways, except by widening these to the full width of the track space, involving land and roadbed costs out of proportion to the usual outlay for suburban railways. The cost of the system per mile, taking into account the fact that the Taunton & Buzzards Bay portion was purchased at $8,833 per mile at the receiver's sale, was $25,075, compared with $50,103 for all Massachusetts roads except the Boston Elevated. Since the railway was built wages of conductors and motormen have increased in rate about 35 per cent and the actual amount paid per car-hour, more than 50 per cent. In 1905 the wages of conductors and motormen were 2.71 cents per car-mile operated, compared with 4.24 cents for 1914, partially due to the increased number of long-service men employed and to the payment of wages for layovers.

Important renewals are necessary. To cover these properly and at the same time take care of the depreciation on equipment now required would take several times the annual surplus of the last year or two. The proportion of funded debt to capital stock is less than that of most other railways. In the life of the road the taxes it has paid have totalled $86,981, compared with dividends of $66,000. It is estimated that if the increase in fares yields 50 per cent of the theoretical revenue, $15,000 a year may be added to the road's income. The case has been taken under advisement.

REDUCTION IN CITY FARE

The British Columbia Electric Railway Has Announced the Sale of Eight Tickets for 25 Cents on City Lines Without Transfer—Statement of General Manager Kidd

On May 3 announcement was made by the British Columbia Electric Railway, Vancouver, B. C., that on and after May 10 the company would offer a special non-transfer ticket, good only within the city limits of Vancouver and Victoria, at the rate of eight for 25 cents. The issue of all types of tickets previously used by the company will be continued at the old rate to cover travel where transfers are demanded. These rates are straight 5-cent fare, a strip of five tickets for 25 cents being provided for the accommodation of passengers. Workingmen's tickets are sold at ten for 40 cents, consisting of five white tickets, which can only be used before 8 a. m., and five green tickets, which are good at any time, and the usual arrangement of school-children's tickets at ten for 25 cents. The new eight-for-a-quarter tickets are not good on any interurban cars.

George Kidd, general manager of the company, in announcing the change, stated that the serious decrease in the company's receipts made it necessary for the company to choose between reducing expenses by cutting down the service and endeavoring to increase travel by lowering the fares. He said that it must be apparent to every citizen in Vancouver and Victoria that the present service could not possibly be maintained with the present patronage. To cut down the service would mean that a portion of the plant would lie idle and a large number of men be laid off. According to Mr. Kidd it was impossible for any one to predict with anything approaching accuracy the effect of an alteration in fares. Actual experience alone could prove whether it was economically possible for the company to sell eight tickets for 25 cents. If it could be done the company would do it. Asked if in adopting the low fares the company had been influenced by the policy of other street railways throughout the States and Canada, as shown by their attitude in dealing with the jitney, Mr. Kidd said:

"No! Many of the street railways in the United States, fortunately for them, are receiving assistance in solving their jitney problems by the strong action of the municipalities and State Legislatures, in enacting special regulations to meet the dangerous conditions arising out of a new form of ill-regulated and irresponsible competition. The British Columbia Electric Railway has taken no part in fostering antagonism to the jitney, believing that the common sense of the citizens and the authorities will sooner or later result in adequate regulations being enforced. The public who ride in our cars are protected by the most stringent Government regulations under the 'Tramway Inspection Act' and also by the terms of franchises granted to it in mutual good faith by the various municipalities, franchises which have always been liberally interpreted by the company. To give effect merely to those clauses in the 'Tramways Inspection Act' alone, clauses devised for the protection and safety of the public, more than $300,000 has been spent by the company in the last three years, a sum more than equal to the value of

all the jitneys that are at present competing unfairly against the company.

"Now contrast the exacting obligations we have to meet with the conditions prevailing upon our public thoroughfares to-day with the jitney service in its present unregulated condition, so that our streets are becoming a menace to every citizen. All the company asks is that it shall not be subject to unfair competition. We do not fear jitney competition. We have carried the public in Vancouver almost from the foundation of the city, through the many years of its wonderful progress, a progress in which the company has played a conspicuous part, and our business is to continue in bad times as well as in flourishing times, to satisfy the public in all its reasonable demands, and by acting fairly to it we propose to continue as the transportation company throughout our territory.

"The unfair jitney competition, the absence of even the most reasonable regulation of that extraordinary traffic, has certainly affected the credit of the company in the London money market, and until conditions improve any further expenditure on the system will be altogether out of the question. In England the investing public is hard hit by the present war, and nothing would contribute more to maintain their confidence in British Columbia enterprises than strong and speedy action by the authorities resulting in regulations being passed placing the jitneys on the same competitive footing as the street railway company.

"I have intimated that the reduction of fares at the present time is an experiment, an experiment which we hope will be a success if our patrons give us their loyal support. This they have done for so many years, and if they will continue to do so, and also use their influence to prevent our competitors having unfair advantages, then Vancouver will be able to boast, and that boast will not be an idle one, that here we have the cheapest, safest, cleanest and quickest service in North America. The matter now rests with the public, who must be the final arbiters."

In connection with the introduction of its new special ticket the company decided to make it popular with the general public. As tickets were to be printed on cardboard of tango color, the name tango ticket was chosen and an extensive publicity programme was carried on by the company during the week May 3-10 to bring this name before the public as well as impress upon them the benefits which would accrue to the traveling public from the standpoint of economy and the good to the city as a whole as a result of using tango tickets. Half-page advertisements were taken throughout the week in all the daily papers in Vancouver and Victoria as well as considerable space in weekly publications circulating throughout the cities. Extensive use was also made of news articles, written from a local standpoint, as to the advantages which the public would derive from the use of the tango ticket. One very striking illustration used in both advertisements and news articles pointed out that thirty-two rides at a 5-cent fare meant an expenditure of $1.60, while thirty-two rides on tango tickets cost only $1, the result being the saving to the individual of 60 cents on an investment of $1. The company also inaugurated a word competition, prizes of $50 being offered both in Victoria and Vancouver—the first prize being $20 and eight other prizes ranging down to $2—for the largest lists of words which could be formed from the letters in the words tango ticket.

Throughout the entire week every car in Vancouver and Victoria carried a striking fender sign noting the sale of tango tickets on May 10. Eight sheet posters were also displayed on billboards along the tram lines. As a result of the publicity methods adopted the words tango ticket became during the week the general talk of the public both in Vancouver and Victoria. The company planned to have May 10 known as tango ticket day in both cities where the new tickets will be accepted. The conductor of each car was to wear a white satin badge on which is printed in tango color "Ask me for tango tickets, eight for 25 cents." Tango pennants, 12 in. by 16 in. in size on which is printed the words "Use Tango Tickets" were arranged to be floated from the trolley pole of each city car. One of the daily newspapers proposed to recognize the day as tango ticket day and offer to the readers of its Sunday issue prizes in a guessing contest as to the number of tango tickets that would be disposed of by the company on the first day of sale.

THE JITNEY CONVENTION

Permanent Organization of Jitney Bus Operators Effected at Meeting in Kansas City

Although the attendance at the jitney convention in Kansas City on May 4, 5 and 6 was small, organization was effected of the International Jitney Association, and plans were laid for a careful study of jitney problems.

The name International Jitney Association was chosen with a view to including Canadian associations. Kansas City was made headquarters, and E. K. Carnes, formerly traffic manager, then secretary of the first jitney association there, who arranged the national convention, was elected secretary-treasurer, at a salary of $1,500 a year. The other officers are Perry T. Allen, Springfield, Mo., president; E. F. Maxwell, Topeka, Kan., vice-president; Ross B. Gilluly, Kansas City, general counsel; Dr. Gordon A. Beedle, Kansas City, surgeon. The president and vice-president, with the following chairmen of committees, constitute the board of directors: William Haensler, San Antonio, ways and means; Rex Means, St. Joseph, Mo., insurance; C. F. Morphew, Kansas City, good roads and equipment.

A bureau will be established by the general counsel to collate data on jitney legislation. The surgeon will manage a bureau for advice and the distribution of information on physical qualifications of drivers, and on such other matters as may be properly referred to him. These bureaus and the committees will co-operate with the secretary, so that information on the operation of jitneys may be collected and analyzed.

The committee on good roads and equipment will carry out investigations and report by bulletins to member associations.

The insurance committee will continue investigations begun by a convention committee on the same subject, of which the chairman was W. H. Miller, originator of the jitney enterprise in Kansas City. What was characterized as a preliminary report was made by Mr. Miller to the convention. It recommended that only one insurance proposal, that of the National Indemnity Exchange, seemed complete, and that this exchange be patronized by members (without prejudice to other insurance concerns) if it complied with the new Missouri law effective on June 18. The National Indemnity Exchange is the result of the efforts of John N. Trout, a local fire insurance agent in Kansas City, to provide jitney insurance. The plan is that of inter-insurance, and was developed by O. A. Reifel, manager of the automobile and liability department of the agency. One "old line" company had authorized the agency to write jitneys, but its rate was seemingly prohibitive. The rates of the exchange will be in the neighborhood of half of the stock company rates, and with additional coverage. For instance, a rate of about $250 by the stock company on a bus covering fire and theft and property damage compares with an estimate of about $130 with the additional covering against collision, by the exchange. The last-named item has, however, not been thoroughly worked out, and at the beginning only public, passenger and chauffeur liability; fire and theft and property damage will be covered. The managers of the exchange say that they have business of nearly $10,000 in premiums, with hundreds of cars in immediate prospect. Branch offices are now being opened in St. Louis, Joplin, Springfield and St. Joseph, Mo., and arrangements are being made to handle mail orders.

The most serious problem of the convention was in reference to insurance, and it was pointed out that ruin for the industry would result from inability to meet obligations growing out of the hazards of the service.

Another point emphasized was the necessity of the continuance in the business of the individual owner of the small car. W. H. Miller spoke as a bus owner on the subject, declaring that bus-line service must be supplemented by the small car during rush hours. Another speaker, warning against action prejudicial to the small-car owners, declared that the jitney industry would soon fall if the small car were eliminated. He said that as the jitneys were concentrated in a few hands, they could more easily be absorbed by street railway companies and other large interests.

ST. LOUIS SERVICE ORDER

Missouri Commission Fixes Service Standards, Defining Rush-Hour Periods, Transition Periods and Non-Rush-Hour Periods

The Public Service Commission of Missouri on May 4 handed down its findings in the cases of the complaints of the West End Business Men's Association and the Tower Grove Heights Improvement Association against the United Railways, St. Louis, Mo., in regard to service. The cases have been before the commission about a year, and the testimony at the hearings which have been held in connection with them has been summarized previously in the Electric Railway Journal. The order of the commission is of particular interest on account of the requirements which it fixes in regard to service standards. An abstract of the conditions sought to be imposed follows:

Sufficient cars are to be operated from 5.30 a. m. to 12 o'clock midnight so that there shall be supplied during any half-hourly period the average number of seats for each 100 passengers demanding transportation in a given direction at any point on the line, specified in the following table, except where the application of this standard would result in a headway in excess of six minutes within the district bounded by the Mississippi River, Arsenal Street, Grand Avenue and its prolongation to the river; and a headway in excess of seven minutes in that portion of the city not included in the district mentioned. This provision relative to headway is not to apply to the Chouteau, Spalding, Marcus and Tiffany lines. The requirement of the order regarding seats per 100 passengers follows:

Headway in Minutes	Non-Rush Period	Transition Period	Rush Period
1 and less	121	100	71
2	124	100	72
3	127	100	73
4	130	102	74
5	133	104	75
6 and over	136	106	76

The term "headway in minutes" is defined as the time spacing between cars on a line, expressed in minutes. For the application of the standards of service, the rush periods are designated as follows: For week days, including Saturday, the morning rush period is considered to exist from 6:30 to 8:30 a. m. For week days, Monday to Friday, inclusive, no mid-day rush period is recognized, but on Saturday the mid-day rush period is considered to exist from 12 m. to 2 p. m. For week days, including Saturdays, the evening rush period is considered to exist from 5 to 7 p. m. The transition periods are designated as follows: For week days, including Saturday, from 6 a. m. to 6:30 p. m., from 8:30 a. m. to 9 a. m., from 11:30 a. m. to 12 m., from 2 p. m. to 2:30 p. m., from 4:30 p. m. to 5 p. m. and from 7 p. m. to 7:30 p. m. Sundays and other periods not included in the above specified rush and transition periods are considered non-rush periods, except holidays and special occasions.

The standard of loading for each of the specified periods is to be applied by half-hourly periods, consisting of any two consecutive fifteen-minute periods, beginning on the hour or any fifteen minutes thereafter. The demand for service is to be determined separately for week days, Monday to Friday, inclusive, Saturdays and Sundays. The average count of passengers for two consecutive week days, excluding Saturday, is to be considered as the demand for service on week days, exclusive of Saturdays. The average count of passengers for two consecutive Saturdays is to be considered as the demand for service on Saturdays. The average count of passengers for two consecutive Sundays is to be considered as the demand for service on Sundays. These averages are to be drawn from the actual count of passengers for corresponding fifteen-minute periods during each of the specified rush, non-rush and transition periods. The demand for service is to be determined by actual count of passengers twice a year by the United Railways on all of its city lines. The commission is to notify the company when these checks are to be made. For holidays and special occasions, at such times as the traffic is distinctly greater than the normal, the company is to use all reasonable efforts to supply such service as will meet the standards of service specified for rush periods. During rush hours traffic supervisors with authority over trainment are to be stationed at important transfer intersections and such other points as will materially assist in the movement of traffic and the maintenance of schedules, and it is made the duty of the supervisors, as far as practicable, to limit the loads on individual cars to the maximum comfortable carrying capacity.

The commission also sets forth work of track construction to be completed by the company during 1915, 1916, 1917 and 1918.

The commission further orders that all cars must be equipped with forced ventilation heaters, or other equally satisfactory heating device, ready for service not later than Oct. 15, 1915. When the outside temperature falls to 35 deg. Fahr., or lower, a temperature is to be maintained, as near as may be, of from 45 to 70 deg. Fahr. inside the car while the same is carrying passengers or about to receive passengers. The temperature inside the car is to be ascertained by the reading of a Fahrenheit thermometer suspended at the middle of the car, at such height that the bulb of the thermometer shall be substantially 7 ft. above the floor of the car. The company is to keep such thermometer in the position described, and to see to it that the same is in working order and to have the 45-deg. point thereon marked in a conspicuous manner. All cars must be heated during the winter season before being placed in service. Air for heating and ventilating is to be taken from outside of the car and the ventilating device or means must provide and insure a complete change of the air contained in the car not less than from six to ten times per hour, when the car is moving at a rate of speed not less than 7 nor more than 8 m.p.h.

All cars with monitor type roofs must be equipped with not less than four 6-in. Globe ventilators or other equally satisfactory device. All cars with arch-type roofs must be equipped with not less than eight 6-in. Globe ventilators or other equally satisfactory device. The dampers in such ventilators must be kept open. All superisors and inspectors kept at the terminus of any line are personally to inspect each car on arriving or leaving the terminus, and report on the heating, ventilation, cleanliness and general condition of the car. All cars are to be fumigated on the inside, at least once a week. No passenger is to be permitted to stand or remain within the inclosure or space provided for the motorman. All cars in service are to display separate route and designation signs on the front and a route sign on the side of the car. Plans for all new passenger cars and for the remodeling of all old passenger cars are hereafter to be submitted for the approval of the commission.

The company is directed to prohibit smoking or the carrying of lighted cigars, cigarettes and pipes in or upon the cars or platform of the cars, except when the weather is sufficiently mild to keep the windows open. Smoking may then be permitted on the three rear seats on either side of the cars.

The order is to take effect on June 1, 1915, and the company has ten days in which to accept the conditions that are prescribed.

Car Capacity Order Extended—The board of health of New York has adopted resolutions prohibiting the carrying of more than one and one-half times the seating capacity in the cars operated by the Interborough Rapid Transit Company on its subway divisions except during the rush hours.

Temporary Single-Truck Trailers in Detroit.—The Detroit (Mich.) United Railway is now operating a small number of open single-truck trailers on Woodward Avenue. These trailers are a temporary measure and will not be used after the company's equipment has been increased by fifty modern trailers, orders for which the company is about to place.

Complying with Car-Step Order.—The Bay State Ctreet Railway, Boston, Mass., has asked the Public Service Commission of Massachusetts for an extension of time in which to comply with the order of the board in regard to lowering the steps of its cars. The work is well under way, but the company says it cannot be entirely completed within the time limit specified. The cost is put by the company at $200,000.

Near-Side Stop in New Jersey.—The Public Service Railway, Newark, N. J., has sent out notices to all the municipalities through which it operates that beginning on May 15 the near-side stop will be made by all of its cars at all street crossings. This is in accordance with a State law enacted recently. The near-side stop will be designated by a white band around the trolley poles and by signs reading "Station—Cars Stop Here."

Hearing in Regard to Packages on Cars.—A hearing was held before the Public Service Commission of the First District of New York on May 5 to consider protests lodged against the Interborough Rapid Transit Company in regard to restrictions placed by that company with respect to the size of packages to be permitted to be carried by its patrons in the subway. The case for the company was handled by A. D. Peacock, of counsel, who said that certain restrictions were absolutely necessary for the convenience of regular patrons of the company. The hearing was adjourned.

Fare Modification Sought.—The State Public Service Commission of Washington has decided to take under advisement the application of the Seattle, Renton & Southern Railway, Seattle, for a rate modification which would permit the company to do away with the transfer system and with commutation and school tickets. Last October the company applied for an increase of rates under the zone system. The city of Seattle resisted the application, and the Public Service Commission denied the increase, holding that the present rates were just and reasonable.

Cleveland Wage Adjustment.—On the night of April 4 the motormen and conductors of the Cleveland (Ohio) Railway decided by practically unanimous vote to accept the compromise offer of J. J. Stanley, president of the company, of an increase of 2 cents an hour in their wages. The men had demanded a flat rate of 35 cents an hour, but under the compromise one-year men will receive 29 cents an hour and the older men 32 cents an hour. The company will probably not insist on an open shop, and other questions that may come up will be submitted to arbitration. The City Council will be asked to approve the increased expenditure for this purpose, about $140,000 a year, and it is believed that Peter Witt, street railway commissioner, will urge favorable action. The increase will probably make the 1-cent transfer charge necessary for some time to come.

Additional Cars for Detroit.—The Detroit (Mich.) United Railway is taking steps to place orders for 100 center entrance motor cars for use in the Detroit city service. The motors of the new cars will be of sufficient capacity to pull trailers, fifty of which the company expects to place upon the lines this year. When the company and the City Street Railway Commission were negotiating for the assumption of the company's bonded indebtedness by the city in exchange for the lines within the one-fare zone, it was the desire of the commission that the company avoid expenditures for cars, additions and extensions. Under the new plan proposed for the municipalization of the lines, by which the price will be fixed by a court in chancery if desired by the electors, the company finds that objection to expenditure for cars and betterments has been removed. Consequently it has indicated its intention of increasing its rolling stock.

Printed Tariffs for Massachusetts Electric Railways.—The first official printed tariff of street railway fares and transfer privileges in Massachusetts has been filed with the Public Service Commission by the Middlesex & Boston Street Railway. The tariff has been worked out by C. Peter Clark, head of the rate bureau of the board, along lines applicable to the electric railways of the State generally. The Middlesex & Boston tariff is made up from the schedule of fares and transfers established in the decision of the board last October. The printed schedule eliminates the indefiniteness of previous blue-printed records, accurately describing the limits of all zones and overlaps. A valuable feature of the inside cover is the rules and regulations as laid down by the commission. The various classes of tickets, conditions of sale, territory covered by the different lines, class of ticket available for each territory, etc., are given in detail. The tariff folder contains eight pages.

Personal Mention

Mr. Carl N. Martin has been elected president of the Trenton, Bristol & Philadelphia Street Railway, Philadelphia, Pa., to fill the vacancy caused by the death of Mr. Edward D. Toland.

Mr. John T. Kelly has resigned as eastern publicity manager of the Panama-Pacific International Exposition, to become editor of the "Electrical Prosperity Week" Campaign News Bureau. He will handle the general news service, besides assisting in the co-operative work with chambers of commerce. Before becoming an exposition official Mr. Kelly was a political writer on the New York *Evening World*. He had previously served in an editorial capacity on the Buffalo *Courier*, St. Louis *Republic* and Washington *Post*.

Mr. William A. Gilman, of the bureau of transportation, and Mr. George Sabin Brush, of the eighth division superintendent's office, Boston (Mass.) Elevated Railway, have returned from a 12,000-mile trip through the South and Pacific Coast, after an absence of ten weeks. The route included Florida, Louisiana, Texas, the San Diego and San Francisco expositions, with a side trip to Seattle, returning via the Grand Canyon, Denver, the Twin Cities and Great Lakes. Although the trip was for vacation purposes, much of the time was utilized in the study of traffic conditions on electric railways. Mr. Gilman expressed the opinion that the jitney bus cannot remain permanently in service at present rates, judging from observations on the Coast.

Mr. Norman S. Alexander has been appointed manager of the Fairmont Park Transportation Company, Philadelphia, Pa., which operates about 8 miles of electric railway in Fairmount Park and a pleasure resort, Woodside Park, in connection therewith. Mr. Alexander was born on March 30, 1888. He has been associated with Mr. A. H. Ford, now vice-president and general manager of the Cumberland County Power & Light Company, Portland, Maine, for about eleven years, serving in the capacity of secretary to Mr. Ford for the last eight years. Mr. Alexander was in Mr. Ford's office in New York in connection with Ford, Bacon & Davis and the American Cities Railway & Light Company and was with Mr. Ford during his entire connection with the Birmingham Railway, Light & Power Company, Birmingham, Ala. From January, 1905, to November, 1907, he was employed in a clerical capacity with Ford, Bacon & Davis in New York and New Orleans. The companies in which Mr. Alexander has been associated with Mr. Ford have controlled electric railway, electric light, transmission and gas properties, and he has shown unusual ability in grasping the problems presented in all of these various public utility interests.

N. S. ALEXANDER

Mr. Charles F. Wallace, who, as noted elsewhere in this issue, will reside in Dallas, Tex., as head of the Stone & Webster interests there, was born in California about forty-five years ago. He entered the Massachusetts Institute of Technology in 1888 to prepare himself for the profession of electrical engineer. In 1892, immediately after graduation, he entered the employ of Stone & Webster. For the last twenty-three years he has been engaged in designing, building and managing electric light plants, water-powers and street railways. He has had broad supervision over the affairs of the public utilities in Savannah and Columbus, Ga., Tampa, Pensacola and Jacksonville, Fla., and Baton Rouge, La., and several of the larger water-power developments under the management of Stone & Webster.

OBITUARY

David McLean Parry, formerly president of the National Association of Manufacturers, died on May 12 at his home in Indianapolis, Ind., in his sixty-fourth year. He was a prominent carriage and automobile manufacturer and besides had extensive traction interests. Mr. Parry was president of the Indianapolis, New Castle & Toledo Electric Railway, operated under lease by the Union Traction Company of Indiana.

Walter L. Sawtelle, manager of the lighting department of the Bangor Railway & Electric Company, Bangor, Maine, died at his home at Bangor on May 4, at the age of thirty-eight. Mr. Sawtelle was a native of Boston and was formerly in the employ of the Old Colony Railroad. Later he joined the staff of the Lewiston, Augusta & Waterville Street Railway. Mrs. Sawtelle is the daughter of Mr. John R. Graham, president of the Bangor company.

Thomas A. Leach, superintendent of the Blackstone division of the Worcester (Mass.) Consolidated Street Railway, died suddenly at his home in Worcester on May 5. Mr. Leach was born in Boston on April 12, 1852. He was educated in the public schools of Boston, and his first position in Boston was as a horse-car driver in the employ of the old Metropolitan Street Railway. Mr. Leach was one of twenty-four men who went to Worcester in 1887 at the instigation of former General Superintendent John Ackerman and entered the employ of the Consolidated Street Railway as a horse-car driver. Later he was made an inspector. Shortly after the Worcester Consolidated Street Railway electrified its system he was made superintendent of Division 1, which included the Worcester district. When the divisions were consolidated he was made superintendent of employment. A few years ago he was made superintendent of the Blackstone Valley division.

Dr. F. S. Pearson, who with Mrs. Peason was among those lost on the *Lusitania*, was the active head of the Pearson-Farquahar Syndicate and was one of the most prominent engineer is the United States. Dr. Pearson was born in Lowell, Mass., in 1861. He was educated in the public schools in that city and at Tufts College, from which he was graduated in 1879 as chemist and mining engineer. Later he re-entered Tufts and in 1883 was graduated as a civil and electrical engineer and for the next three years was instructor of mathematics and applied mechanics at the college. From 1886 to 1888 Dr. Pearson was engaged in mining engineering in various parts of the United States and Brazil, and in the latter year accepted a position as manager of the Somerville (Mass.) Electric Light Company. In 1889 he was appointed chief engineer of the West End Street Railway, Boston, Mass., then being equipped with electricity. The Brooklyn Heights Railroad, now included in the system of the Brooklyn Rapid Transit Company, shortly afterward decided to adopt electricity and Mr. Pearson was chosen as consulting engineer. For that company he designed the eastern district power station, the first large direct-connected plant in America in street railway service. In 1893 Dr. Pearson organized the Dominion Coal Company. As chief engineer of that company he had charge of the reconstruction of the shipping piers at Sydney and Louisburg, the coal-handling apparatus at Montreal, the building of the Sydney & Louisburg Railway and the operation and equipment of the company's mines at Cape Breton. In 1894 Dr. Pearson accepted the position as chief engineer of the Metropolitan Street Railway, New York, and supervised the equipment of this system with electricity and designed the electric power station of the company at Ninety-sixth Street and East River. He resigned from the company in 1898 to take a long trip abroad. Acting for Canadian capitalists, Dr. Pearson a few years ago went to South America to develop a railway, light and power scheme at Sao Paulo, Brazil, now controlled by the Sao Paulo Tramway, Light & Power Company. He also acted in an advisory capacity for the Mexican Light & Power Company. He was retained at various times as consulting engineer by the Toronto Railway, the Montreal Street Railway, the Winnipeg Street Railway, the St. Johns Street Railway, the Halifax Electric Tramways and the Montreal & St. Lawrence Light & Power Company. He was also chief consulting engineer for the Electrical Development Company of Ontario at Niagara Falls. Extending his foreign interest he took over a few years ago from Wernher, Beit & Company, London, control of the Mexico Tramways. Dr. Pearson was president and director of the Barcelona Traction, Light & Power Company, Ltd., Barcelona, Spain; president and a director of the Mexican Tramways, president and director of the Mexican Light & Power Company, Ltd., president and director of the Mexico Southwestern Railway and a director of the Sao Paulo Tramway, Light & Power Company, Sao Paulo, Brazil. He was a member of the Institute of Civil Engineers, London, the American Society of Civil Engineers, the American Institute of Electrical Engineers, the American Institute of Mining Engineers and the American Society of Mechanical Engineers. He maintained residences at Great Barrington, Mass., Surrey, England, and Barcelona, Spain.

E. P. Shaw, Jr., general manager of the Boston & Worcester Street Railway, Framingham, Mass., with which company he had been connected since 1904, died on May 8 at the Carey Hill Hospital, Brookline, after an illness of about five weeks. Mr. Shaw was born in Newburyport, Mass., forty-six years ago. He attended the public schools there and entered early in life the employ of the Thomson-Houston Company, Lynn, now the General Electric Company. His first street railway experience was as manager of the Plum Island Company in Newburyport. He was manager successively of the Haverhill & Amesbury Street Railway, the Salisbury Beach Street Railway and the Citizens' Electric Street Railway Company, Newburyport. Later he represented Tucker, Anthony & Company, Boston, in various lines, notably the Norwich (Conn.) Street Railway and the New London (Conn.) Street Railway. Mr. Shaw organized and superintended the building of the line between Norwich and New London. He eventually became connected with the Worcester & Marlboro Street Railway and the Pawcatuck line between Watch Hill and Westerly, R. I. He was treasurer of the New England Street Railway Club. He is survived by his widow, two sons, E. Payson Shaw, third, and Randolph P. Shaw; two brothers, James F., now a resident of New York, and Samuel J. of Boston, and three sisters.

COURT HOLDS SEATTLE SERVICE REQUIREMENTS UNREASONABLE

The State Public Service Commission of Washington has been enjoined by the Federal Court from inforcing its order directing the Puget Sound Traction, Light & Power Company, Seattle, to furnish seats for all passengers on the Alki Point and Fauntleroy Park lines of the company. The injunction was granted on the ground that the commission's order was unreasonable. The court declared that "the furnishing of seats for passengers on street railway cars is an unsolved problem and will perhaps remain so as long as a considerable part of the population is habitually attracted in the same direction at the same time in the pursuit of business or pleasure." The commission's order was issued on March 24. It provided for taking effect immediately. The company at once obtained a temporary injunction against the commission inforcing the order, and because of the constitutional questions raised by the company the case was heard by United States Circuit Judge William B. Gilbert and District Judges Frank H. Rudkin and Jeremiah Neterer, sitting en banc. Regarding the furnishing of seats on the Alki and Fauntleroy lines the court said: "The order in this respect is unreasonable and void, in view of the severe penalty imposed by law for failure to comply therewith." On the parts of the commission's order directing that the company continue the operation of through service on the Ballard Beach line and requiring that the Alki Point and Fauntleroy lines be operated on First and Second Avenues as far north as Virginia Street, the court denied the petition of the company for an injunction. The opinion of the commission in this case, in which it held that the convenience of the public was limited only by the constitutional limit of confiscation, was quoted at length in the Electric Railway Journal of April 17, page 776.

Construction News

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

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

RECENT INCORPORATIONS

Houston, Richmond & Western Traction Company, Houston, Tex.—Application for a charter has been made by this company in Texas to build an electric railway from Houston to Richmond, 25 miles. Surveys are to be begun immediately. Capital stock, $50,000. Incorporators: W. S. Jacobs, T. C. Dunn, Jr., Edward Kennedy, Chester H. Bryan and others, all of Houston. [April 10, '15.]

***Fulton & East Richmond Railway, Fulton, Va.**—Chartered in Virginia to build an electric railway from State Avenue and Williamsburg Avenue, Fulton, to Montrose Heights, about 5 miles. Capital stock, $50,000. Officers: Dr. E. F. Atwood, president, and R. B. Allport, treasurer, both of Richmond.

FRANCHISES

Edmonton, Alta.—The Edmonton, Stony Plain & Wabamun Railway has received from the Alberta Legislature an extension of time on its franchise to build the projected line to connect Edmonton, Stony Plain and Lake Wabamun. E. S. McQuaad, Edmonton, is interested. [May 24, '13.]

Los Angeles, Cal.—The Council has authorized the sale of two franchises in Los Angeles. One franchise to be offered will extend from Thirtieth Street and San Pedro Street, out San Pedro Street and South Park Avenue to Slauson Avenue, and the other will extend over the same line to Manchester Avenue.

Los Angeles, Cal.—Col. Lewis Ginger has received a franchise from the Council to build an incline railway in Griffith Park. The ordinance provides that the right shall extend over a period of fifteen years, but that the city may take it over at an appraised valuation at any time after the expiration of five years. The line will be 2300 ft. long. [Feb. 13, '15.]

New Haven, Conn.—The Connecticut company has asked for a franchise to double track its line on George Street from Norton Street to Broad Street, New Haven.

West Hartford, Conn.—The Connecticut Company has asked the Council for a franchise to double track its line in West Hartford on Farmington Avenue from the end of the present double track near Troop "B" Armory to West Hartford Center, a distance of about 3000 ft.

Fort Wayne, Ind.—The Fort Wayne & Northern Indiana Traction Company has asked the Council for a franchise to extend its line on State Street, Fort Wayne, from the St. Joe River to the eastern terminus of the line.

Brockton, Mass.—The Bay State Street Railway has asked the Council for a franchise to extend its line from Perkins Avenue to East Street, Brockton.

Buffalo, N. Y.—The International Railway has received from the Council one year's extension of time on its franchise in which to begin work on its line on Delavan Avenue in Buffalo, and three years' extension of time in which to begin work on its Bailey Avenue line.

Oakwood, Ohio.—The Oakwood Street Railway has received a twenty-five-year franchise from the Council to build an extension of its line in Oakwood. The line will follow the Lebanon Pike about one-half the distance, and from the southern border of Lebanon Pike it will be constructed on private right-of-way now owned by the company.

Springfield, Ohio.—The Ohio Electric Railway has accepted the franchise granted by the Council to build an electric railway in Springfield.

Toronto, Ont.—The Toronto Eastern Railway has received from the Dominion Parliament an extension of time on its franchise in which to build the line from Toronto easterly to Cobourg, Ont., with branches as follows: From Cobourg or Port Hope northerly to Peterborough; from Scarborough to Markham, Stouffville or Uxbridge; from Oshawa northerly via Lake Scugog to Lindsay; from Oshawa southerly to Lake Ontario. [Feb. 6, '15.]

Windsor, Ont.—The Sandwich, Windsor & Amherstburg Railway has asked the Council to extend its franchise for twelve years. It is reported that the company has offered to build a line via Lincoln Road and Ottawa Street, to be in operation by Oct. 1, if the franchise is granted.

Montreal, Que.—The Montreal & Southern Counties Railway has received an extension of time on its franchise from the Dominion Parliament to complete various lines in Montreal. The extension from St. Cesaire to Granby, 16 miles, is nearing completion, and it is expected the line will be placed in operation during the summer.

Corpus Christi, Tex. — J. H. Caswell, San Diego, and associates have asked the Council for a thirty-year franchise to build an electric railway over certain streets in Corpus Christi and interurban lines to extend to Ward Island, Oso, Portland and Calallen. [Oct. 3, '14.]

Vancouver, Wash.—The Washington-Oregon Corporation has received from the Council a one year's extension of time on its franchise to build an extension of its line on Main Street, Vancouver, from a point where Third Street intersects Main Street, southerly on Main Street to the approach of the interstate bridge.

TRACK AND ROADWAY

***Lynn Haven, Fla.**—Plans are being considered for an electric railway from Lynn Haven to Panama City, via St. Andrews. Richard Tillis, Montgomery, Ala., is interested.

Atlanta & Carolina Railway, Atlanta, Ga.—Plans are being considered by this company to resume work soon on its line between Atlanta and Augusta. About 20 miles of grading has been done and several miles of track have been laid. Practically all the necessary rights-of-way have been given and the necessary surveys made. Work was suspended on account of financial conditions. [March 20, '15.]

Chicago (Ill.) Surface Lines.—This company has contracted with the Lorain Steel Company for 20,000 tons of rail for its 1915 requirements.

Aurora, Elgin & Chicago Railway, Wheaton, Ill.—Plans are being made by this company to double track its line on North Lake Street. A stretch of double track will be laid at once from the end of the present double track to a point north of Illinois Avenue.

Union Traction Company of Indiana, Anderson, Ind.—New ties are being placed by this company on East Lynn Street and on South Meridian Street, Anderson. The track is being entirely rebuilt along Lynn Street near the intersection of the Belt line.

Brandon (Man.) Municipal Railway.—The Council of Brandon has decided to extend this railway on Twenty-second Street, Brandon.

Bay State Street Railway, Boston, Mass.—Plans are being contemplated by this company to build a line between Lawrence and Lowell along the new river front boulevard.

Michigan Central Railroad, Detroit, Mich.—This company, which has been negotiating without success with the London & Port Stanley Railway Commission of London, Ont., to secure running rights over the newly electrified railway, now proposes to build a side line, west of the Michigan Central bridge at St. Thomas to connect with the line of the London & Lake Erie Railway & Transportation Company.

Muskegon Traction & Lighting Company, Muskegon, Mich.—New track is being laid by this company on its Pine Street line. A 73-lb. rail has been substituted for the light rail previously used.

Electric Short Line Railway, Minneapolis, Minn.—This company has placed in operation its line from Minneapolis to Winsted, 40 miles.

Metropolitan Street Railway, Kansas City, Mo.—Operation has been begun on this company's new crosstown line on Prospect Avenue from Fifteenth Street to Independence Avenue, Kansas City. The line will eventually be extended north to Lexington Avenue, connecting with the northeast tracks.

United Traction Company, Albany, N. Y.—This company plans to retrack its line on South Pearl Street in Albany at once.

New York, Westchester & Boston Railway, New York, N. Y.—Preliminary surveys have been completed and work will be begun soon on the extension of this company's line from White Plains, N. Y., to Danbury, Conn. The new line will extend from White Plains through Harrison, North Castle, Bradford, Pound Ridge and Lewisboro, Westchester County, to Greenwich, Ridgefield and Danbury, where it will connect with the main line of the New York, New Haven & Hartford Railroad.

Durham (N. C.) Traction Company.—This company reports that during the next few weeks contracts will be placed for material for its 2-mile extension in Durham.

Cleveland, Alliance & Mahoning Valley Railroad, Alliance, Ohio.—This company has placed in operation its 7-mile line from Leavittsburg to Newton Falls.

Cleveland (Ohio) Electric Railway.—This company has been authorized by the Council to expend $500,000 for operating stations, tracks and overhead work in connection with its new carhouses and repair shops.

Springfield (Ohio) Railway.—This company will build an extension of its lines in Springfield on Kenton Street between Burt Avenue and Belmont Avenue, and on Belmont Avenue between Kenton Avenue and Sunset Avenue. An extension will also be built on East High Street.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—Work has been begun by this company laying its tracks in Warren, East Youngstown and Struthers. The double track is also being extended in East Youngstown 1 mile eastward from the present city limits.

Lake Erie & Northern Railway, Brantford, Ont.—Work has been begun by this company south of Brantford, on its line to Port Dover. Track is being laid at Simcoe and Mount Pleasant.

Morrisburg & Ottawa Electric Railway, Ottawa, Ont.—Work will soon be resumed by this company on its line from Morrisburg to Ottawa. Construction will be begun about 3 miles south of Billings' Bridge and continue south to Morrisburg, leaving the 3 miles into Ottawa as the last link in the chain, the point of entrance of the line into Ottawa not having been definitely decided upon. [Jan. 23, '15.]

Portland, Ore.—A company has been organized and financed in Portland to build the proposed electric railway between Nicolai Street and the northern limits of Linnton and Portland. Richard Shepard, Portland, is among those interested. [May 1, '15.]

South Fork & Portage Railway, Johnstown, Pa.—Material has been received and work will be resumed at once on this company's line between South Fork and Portage, 7 miles. It is expected that work will be completed within six months. [June 6, '14.]

Chester & Lancaster Railway, Phoenixville, Pa.—Preliminary surveys have been made on this company's line for about 6½ miles. It is expected that the survey to Phoenixville, 16 miles from the Lancaster County line, will be completed in a short time. Plans are also being made to build an extension from Pughtown to Pottstown, 8 miles. John F. Shea and John J. Deery, Philadelphia, are interested. [April 17, '15.]

Somerset (Pa.) Street Railway.—This company reports that surveys have been made on its line from Johnstown to Rockwood, 36 miles, and grading will be begun within the next two months. G. C. Winslow, general manager. [May 1, '15.]

Three Rivers (Que.) Traction Company.—Work will be begun at an early date on this company's line in Three Rivers, Que. [March 20, '15.]

Newport & Providence Railway, Providence, R. I.—Plans are being made by this company to extend its line to Coaster's Harbor Island.

Texas Traction Company, Dallas, Tex.—This company has under consideration plans to extend its lines from Waco to Austin and San Antonio.

***Price, Utah.**—A proposition to construct an electric line from Price to various towns in Emery County will soon be presented to Eastern capitalists by J. H. Manson. The plan also contemplates the lighting of the towns of Emery County and the furnishing of power for various purposes.

Petersburg & James River Corporation, Petersburg, Va.—Surveys are being made by this company for a railway to be built between Petersburg and City Point. The company was recently refused a franchise by the Board of Supervisors of Prince George County to construct an electric railway between Petersburg and City Point along the county roads, but the company plans to build the railway on private right-of-way. Messrs. Plummer and Bohannon, Petersburg, counsel. [April 24, '15.]

Virginia Railway & Power Company, Richmond, Va.—This company plans to begin work at once on repairing its line on East Broad Street between Twenty-fourth Street and Thirty-second Street, Richmond.

West Virginia Traction & Electric Company, Wheeling, W. Va.—Material has been received and work has been begun on improving this company's tracks at Pleasant Valley. The track will be reballasted and new ties will be laid.

Marinette & Menominee Light & Traction Company, Marinette, Wis.—Plans are being considered by this company to extend its line from Pierce Avenue to Eleventh Street, Marinette.

SHOPS AND BUILDINGS

Iowa Railway & Light Company, Cedar Rapids, Ia.—Among the improvements planned by this company during this year is the building of a passenger station at the northwest corner of the intersection at Fourth Avenue and Second Street, Cedar Rapids.

Northern Massachusetts Street Railway, Athol, Mass.—This company has decided to close its carhouse at Westminster and make the headquarters of the Gardner division in the carhouse at East Templeton. It is also planned to close the carhouse at Orange and store the cars at East Templeton. The Westminster carhouse will be used for storing the summer cars in winter and the winter cars in summer. The dispatcher's office and the paymaster's office will be transferred to East Templeton.

Interborough Rapid Transit Company, New York, N. Y.—This company is preparing designs for six additional extending safety platforms for the downtown express track of the Fourteenth Street subway station. The plans will be ready for the approval of the Public Service Commission in about a month. Estimates also are being prepared for similar platforms for the Times Square station, though it is undecided as yet as to whether they will be installed at that station.

Virginia Railway & Power Company, Richmond, Va.—A one-story building will soon be erected by this company at Main Street and Vine Street, Richmond. The cost is estimated to be $3,750.

POWER HOUSES AND SUBSTATIONS

New Orleans Railway & Light Company, New Orleans, La.—Plans are being made by this company to enlarge its power plant on the river front at Market Street. It is estimated that the extension will cost about $25,000 and new machinery $100,000.

Cumberland County Power & Light Company, Portland, Maine.—This company is building a new substation on its branch that extends from Dunstan's Corner to Old Orchard.

Hagerstown & Frederick Railway, Hagerstown, Md.—This company has entered into a contract with the city of Walkersville to furnish electric lighting and to construct a transmission line from Frederick to Walkersville, 5 miles. The cost is estimated to be $4,000.

Wahpeton-Breckenridge Street Railway, Breckenridge, Minn.—This company plans to build a new power plant in Wahpeton. The plant will be located at the east end of the line.

Lynchburg Traction & Light Company, Lynchburg, Va.—This company has authorized an expenditure of $85,000 to rehabilitate its wire systems. Other appropriations to provide for enlarging its power house at Blackwater Street in Lynchburg have also been made.

Manufactures and Supplies

ROLLING STOCK

Easton (Pa.) Transit Company is reported as having ordered three cars from The J. G. Brill Company.

Halifax (N. S.) Electric Tramway has ordered six closed city cars from the Nova Scotia Car Works, Halifax, N. S.

Jackson Railway & Light Company, Jackson, Miss., has ordered five 25-ft. single-truck steel cars from the Southern Car Company.

Interborough Rapid Transit Company, New York, N. Y., has issued inquiries for 974 motor trucks for elevated line service.

Connecticut Company, New Haven, Conn., has issued specifications for ninety-two new all-steel cars of a convertible type, over all length 43 ft. 4 in., body length 30 ft., with six transverse seats on each side in the middle of the car, and longitudinal seats at the ends.

Minneapolis, St. Paul, Rochester & Dubuque Electric Traction, Minneapolis, Minn., noted in the ELECTRIC RAILWAY JOURNAL as having ordered twelve trailer cars from The J. G. Brill Company, has specified the following details for this equipment:

Seating capacity.....72
Bolster centers, length..38 ft.
Length of body.....49 ft.
Length over platforms, 57 ft. 4 in.
Width over sills.....10 ft.
Width over all..10 ft. 4¼ in.
Height, rail to sills, 3 ft. 7¾ in.
Height, sill to roof, 8 ft. 11⅞ in.
Body .....semi-steel
Interior trim, bronze, ozidized black
Headlining..3-ply whitewood
Roof.....plain arch
Underframe .....metal
Air brakes.....West.
Car trimmings..J. L. Howard
Couplers, McConway & Torley
Curtain fixtures..Nat. L. W.
Curtain material...Pantasote
Hand brakes.....Lindstrom
Journal boxes....Symington
Paint .....Sherwin-Williams
Sash fixtures.O. M. Edwards
Seats.....Brill "Winner"
Seating material, frieze plush
Springs .....Wason
Step treads....Mason safety
Trucks .....trail
Varnish .....Murphy
Wheels..Midvale Rolled Steel
Ventilators .....Globe

TRADE NOTES

Diamond State Fibre Company, Elsmere, Del., manufacturer of vulcanized fiber and insulating papers, has moved its Chicago factory to 619-631 West Washington Street.

Ellcon Company, New York, N. Y., has received an order from the Pullman Car Company for more than 140,000 castings of aero metal for use as interior car trimming in the 478 car bodies which are being built for the Interborough Rapid Transit Company.

Prest-O-Lite Company, Indianapolis, Ind., recently conducted a test at the Indiana State Fair grounds on April 19, where it demonstrated the practicability of illuminating a mile race course as bright as day for automobile racing at night, by means of lights generating more than 2,000,000 cp.

Westinghouse Lamp Company, New York, N. Y., announces a recent development in its incandescent lamp. The company has now put on the market Mazda C lamps in sizes from 200 to 1000 watts for 220 to 250 volts. Heretofore these Mazda C lamps have been supplied only for 105 to 125 volts.

Whiting Foundry Equipment Company, Harvey, Ill., has taken over the foundry equipment business of the Central Iron Works, Quincy, Ill., adding to its line of material the dust arresters and water cinder mills formerly manufactured by the latter company. The Whiting company has retained one of the engineers of the Quincy Iron Works on exhaust system equipment and will be prepared to furnish repairs for this equipment.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has received a repeat order from the Oklahoma (Okla.) Railways for eight double No. 306-D motor equipment with Type K-35 control. The company has also received an order from the Dibert, Van Croft & Ross Company, Ltd., for two storage-battery locomotives for hauling and shipping in and about its sugar mill in Camaguey, Cuba. These are said to be among the largest storage-battery locomotives which have ever been built.

J. W. Macdonald has resigned as assistant transportation supervisor of the department of public service of Chicago, Ill., to devote his entire time to marketing the products of the National Formed Metal Products Company, 636 McCormick Building, Chicago, Ill. This company manufactures and sells the light-weight, threadless-flange conduit which was described in the ELECTRIC RAILWAY JOURNAL of Nov. 21, 1914, page 771. Mr. Macdonald is the inventor of this conduit, as well as a number of other metal car fixtures, also manufactured by this company.

ADVERTISING LITERATURE

Beaudry & Company, Inc., Boston, Mass., has issued a folder on its motor-driven hammers.

John Lundie, New York, N. Y., has issued a reprint from the *Railway Review* which contains an article by Warren Moore Osborn entitled "The Relation of Wheel Coning to Rails and Tie Plates." The reprint is supplemented with diagrams which clearly show the construction and principle of the Lundie tie plates. Owing to its camber, or concave under-surface, this plate presents an adjustable bearing in place of the rail as a wheel load passes over it. This construction is said to minimize tendency to accident by so-called track spreading and to reduce internal stresses in the rail, thus tending to eliminate rail fractures.

Kellogg Switchboard & Supply Company, Chicago, Ill., has issued Bulletin No. 82 on its railway telephone and electric signaling apparatus. The catalog aims to present these devices in sufficient detail so that the engineer and technical expert can form accurate impressions and to put the information in such form that the non-technical reader can readily determine the type of instrument best suited to his particular needs. This selective signaling system is designed to fall in line with the following requisites: (1) for a dispatcher to call and talk to all stations separately; (2) for any station to communicate with the dispatcher; (3) for a dispatcher to be sure that the bell is ringing at the station called, and (4) that the system shall provide a factor of absolute reliability and speed. The selector and telephone equipment for accomplishing the above requirements is carefully described in detail.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued a pamphlet entitled "Radiator Type Transformers for the New Haven System," which is a reprint of an article in the *Electrical World* describing this newly-developed type of transformer which has recently been put into service on the New York, New Haven & Hartford Railroad. The transformer installation was called for by the increase in load on the Cos Cob power station of this system. For reasons of economy additional energy is being supplied the New Haven System by the United Electric Light & Power Company, New York City, and this transformer is used to transform the voltage of this supply to that suitable for the railway. The banks of the step-up transformers in the 201st Street station are each made up of a large unit rated at 5000 kva, connected in "T" with a similar unit of 1000 kva, rating connected as a "teaser." This bank receives energy at 66,000 volts, three-phase. The secondary winding steps up the voltage to 24,600 while the "teaser" steps it up to 12,300. This gives an unsymmetrical three-phase transmission voltage having the higher potential across the principal phase, and 17,400 volts across the other two phases.

Philadelphia Toboggan Company, Germantown, Philadelphia, Pa., has issued an attractive catalog illustrating its carousels and coaster cars for use as amusement features of electric railway parks. The carousels, as shown in the catalog, are artistically designed and decorated. The pole, framework, rods and machinery are entirely hidden from view by elaborate decorations, such as the dome ceiling. The company has also issued a booklet for the special benefit of carousel operators, which describes the Auchy friction drive and improved pole cap. The friction drive is designed to eliminate the possibility of stoppages on busy days. The pole cap permits the operation of the machine to continue in case it is necessary to get at the discs and roller bearings on top, instead of having to stop and jack up the machine.