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IMPERIUM IN IMPERIO

The late remarkable strike on several electric railways of central New York is not without its moral for other operators. Here existed a condition that must have been considered ideal by the men. They had been organized for collective bargaining, their unions had been recognized and their rights and privileges had been signed and sealed in formal contracts. Not a man had uttered a complaint concerning his wages, hours or discipline. Yet, in spite of these undisputed facts, one of the unions had the assurance to declare a strike because, forsooth, the railways would not violate their written pledge with another union organization. A strike for more money or better working conditions is always understandable, but a strike which is instigated for no better reason than a jurisdictional clash between labor factions in which both employer and public suffer is absolutely inexcusable. It is certainly detrimental to the best interests of labor.

NOT A CONFESSION OF INCOMPETENCY

Prof. Charles Zueblin of Boston considers any suggestion for a 6-cent fare in Boston to be a confession of incompetency and feels it to be perfectly easy to demonstrate that a street railway in a metropolitan city which cannot operate profitably on a 5-cent fare is grossly mismanaged. To him the fact seems to be of no significance that the railways are paying higher wages than formerly, that the general high cost of living has affected them as much as other enterprises and individuals, and that the public is getting not only a much longer ride than it did when the 5-cent fare was established but a much higher grade of transportation in every way. In his own city of Boston, for example, the public demands in the way of subways and other improvements have been so great that whereas ten years ago the capital investment on which the company had to pay interest was only four times its annual gross revenue the investment has now grown to six times that amount. These facts are matters of record, but it is much easier to ignore them and say that the railway company ought to charge no more for transportation than it did formerly. But in spite of Professor Zueblin the 6-cent idea is spreading in Massachusetts, the reason being that the companies have at last been able to convince the authorities that they have the right to transfer to the riding public a part of the burden imposed upon them by the latter's legislative and arbitration representatives. Far from being a confession of incompetency, the movement is rather a proof of a better realization of public responsibility for higher railway costs.

ENFORCED EXPENSES AND ADVANCED RATES

The foregoing situation reminds us of a recent address by William A. Glasgow, Jr., before the Law Association of Philadelphia, in which the speaker made some thoughtful comments regarding the increasing of rates in proportion to enforced increases in operating expenses. Back of all the rate struggles of the last few years has been the regrettable but undeniable fact that legislative and arbitration bodies have an indiscriminate and irresponsible power to impose increased expenses on carriers but that the latter are devoid of direct power to protect their net revenues by increased rates. Fundamental justice requires that some method be found for holding the creators of such expenses to a reasonable responsibility. As Mr. Glasgow observes, England found the solution for this question in 1913, so far as freight traffic is concerned, when, by parliamentary enactment, it was provided that whenever railways showed legitimate increases in cost of operation they might recoup their finances by increasing the rates, which should be considered by the railroad commissioners as justified. A similar act by Congress would insure investors against loss from the continuously imposed charges of to-day, and also, through the automatic transfer of such charges to the public, create a wholly desirable direct responsibility to the shipping and riding public on the part of lawmakers and arbitrators. Under such a plan we cannot but wonder to what extent a great deal of the recent legislation and arbitration decisions would have been modified.

ELECTRIC RAILWAY EARNINGS FOR 1914

While the business done by electric railways last year was poor, the losses were not so great as with steam railroads. In fact, an extended study by *The Commercial and Financial Chronicle* indicates that while electric railways did not show their usual annual gain, the gross earnings of 270 reporting companies actually increased 0.72 per cent for the year as compared to 1913. The gross earnings of steam railroads for the same period, however, showed a loss of 6.55 per cent. In the case of net earnings, the electric railways suffered the almost nominal decrease of 0.58 per cent, whereas the net earnings of the steam lines fell off 8.39 per cent. If adjustments are included for fourteen electric railways reporting only gross earnings and forty-eight reporting for the year ended June 30, 1914, the total of 332 lines showed an increase in gross earnings of 0.87 per cent and a decrease in net earnings of 0.53 per cent. Owing to the difficulty of securing reports from all electric carriers and the resultant

exclusion of a few of the large companies, the foregoing figures do not cover the entire industry, but it is probably true to say that they reflect the general conditions during 1914. It is true that a total of 120 electric railways showed decreases in earnings, but except under special local conditions these decreases were slight and were outweighed by the increases of others. It is satisfactory to note that during a year full of practically the most unfavorable business conditions in a decade, the electric railways were more than able to hold their own and again to prove themselves more immune to business depression than the steam railroads. While they have many financial problems still to solve in connection with their net earnings, their gross during the coming year should reflect the general resumption in this country of easier business and financial conditions.

THE WANE OF THE JITNEY BUS

Evidence from different sources in Los Angeles shows that the number of jitney buses in service in that city has been decreasing steadily for some time, and as no restrictive ordinance has ever been actually established by the community the condition appears to possess considerable significance. It may not warrant the singing of a formal requiem, but it does demonstrate beyond a doubt that the extent of the movement is distinctly limited. Truly, the jitney bus constitutes one of the most interesting fallacies of modern times. It is even entitled to a niche in the cellar of the Hall of Fame alongside of the Keeley motor and the Albertsen magnetic car, because its success has been due to spectacular features that appealed to the inexperienced and unthinking part of the population. Generally speaking, it is the extraordinary decrease in the cost of the automobile that has made the jitney possible, for the possession of a passenger-carrying vehicle is now within the reach of a vast number of people, among whom are certain to be found individuals who are absolutely unfamiliar with business problems and cannot grasp the principle of overhead charges, depreciation and similar invisible costs. By neglecting these realities, the jitney operator deceives himself into thinking that the business is profitable, but after a few months of operation, when the invisible charges begin to take tangible form, he drops out, only to be replaced by some one with less experience.

This has been shown clearly in Los Angeles, where, according to a communication in last week's issue, the average jitney driver stays in the business only for sixty days. In Los Angeles the jitney cars have hardly been running long enough to wear themselves out completely. In fact, the crest of the jitney wave was reached after the expiration of only five months' time, approximately the same result having been obtained in San Francisco. Consequently, it would seem that the life of the movement is going to be measured, not by the ultimate life of the machines as was originally feared but rather by the number of drivers who can be induced to enter jitney service. Publicity, therefore, is clearly the most effective means for quickly ending the death struggles of this Frankenstein of transportation.

PUBLIC UTILITY TAXATION

The March number of *The Annals* of the American Academy of Political and Social Science contains a summary by Delos F. Wilcox on the complicated subject of public utility taxation. After a preliminary description of the public agency theory of utility operation, the writer raises the interesting fundamental question as to the basis on which the charges for public utility service should be established. To assist in a better understanding of the general subject he mentions several different stages or theories of public utility operation, beginning with (1) public utilities operated for profit and, in the case of private ownership, accompanied by various forms of municipal taxation or partnership agreements intended to give the city a share in the profits; extending through (3) public utilities operated at cost (taxes and interest charges but no amortization included) and (4) public utilities operated at cost (interest but no taxes or amortization charges included), and ending with (7) public utilities operated free at the expense of the taxpayers.

It is apparent, of course, that the question of private or public ownership is not necessarily involved in any of these forms of operation. For example, a municipally-operated public utility might follow the policy of charging a fare sufficient to return a profit, which would go to the city treasury, while a private corporation, subsidized by the city, could probably give service at cost or even free more economically than the city itself could perform this service. The fundamental question in this consideration, therefore, is not whether a utility is privately or publicly owned, but whether it should be regarded primarily as an enterprise for profit, or, if not, in what proportion the cost of the service should be divided between patrons and general taxpayers.

Dr. Wilcox takes the point of view that public utility service is a matter of interest to the general taxpayer on account of the present universality of such service and its fundamental and far-reaching influence upon the organic development of the community. Upon this premise he bases his conclusion that governmental bodies should not seek to make any profit out of utilities in order to relieve the general taxpayer, for such a procedure would mean the taxation of "public property" and "public agencies." While not going so far as boldly to throw down the gage for the operation of utilities at less than cost or free at the expense of the general taxpayers, Dr. Wilcox believes that as the public-agency theory becomes more widely recognized and established, the tendency will be to diminish and finally eliminate public utility taxes and contributions, and even to subsidize utilities by taxation so as to secure better service at a fixed or diminishing rate.

To the advisability of such a plan we wish heartily to dissent. One of the most striking characteristics of modern municipal governments has been the growing burdens of general taxation, and the effort at present should be to lighten these charges rather than materially to increase them. We agree with Dr. Wilcox that the public utility rates should not be so high as to create an abnormal profit at the expense of the patrons.

Such a practice would be comparable to high taxes on the consumption of necessities, like the salt tax of oriental countries. But Dr. Wilcox's premise, based on the universality of utility service—that the interests of the patrons of a public utility are identical with those of the general taxpayers—seems to us fallacious. Transportation service in particular is not used by all citizens alike, and the patrons include many non-taxpayers and even non-residents, for whom the general taxpayer should not be penalized. Many municipal activities, such as the maintenance of the streets and of charitable institutions, schools and the like, cannot be made self-supporting, and the cost of these will always have to be carried by the general taxpayer. But if at a reasonable rate, say at a 5-cent fare, the city, through taxes or a partnership agreement, can gain a profit from a public utility within its boundaries, it will relieve the burden on the general taxes. We should certainly view with disfavor any plan for loading up taxable property with large charges for services which by their special nature and by custom seem properly subject to support by their actual users.

LOSSES IN STEAM TURBINES

In last week's issue the steam turbines now under test in the Seventy-fourth Street Interborough power plant in New York were briefly described. Their installation and testing render timely a brief examination of the energy changes and losses in them.

The thermal efficiency of the Interborough turbines will, in the first place, be about 25 per cent, under the conditions of pressure, superheat and vacuum selected, about 200 lb. gage, 120 deg. Fahr., and 29 in. respectively. That is, of the energy in a pound of steam referred to the temperature of the condensate, one quarter can be taken out and turned into electrical form.

In this transformation from thermal to electrical energy two factors are involved. One is the relation of the pressure and temperature range of the steam to the mechanical energy produced from a pound of steam. The entering superheated steam contains a certain amount of heat energy per pound. In expanding through the turbine it transforms some of this into mechanical form but there is still a great deal of heat energy exhausted into the condenser. The hotter the entering steam and the higher its pressure, and the cooler the exhaust steam and therefore the lower its pressure, the greater will be the proportion of energy transformed. The second factor is the additional loss of thermal, mechanical and electrical energy due to friction, leakage, radiation, etc. The thermal loss first mentioned is unavoidable once the working temperature and pressure range is selected; the other losses are under control to some extent.

The working pressure and temperature range have practical limits in both directions. In the Interborough turbines they are approximately 215 lb. to ½ lb. absolute pressure and 508 to 80 deg. Fahr. respectively. The upper limits are set by the cost of keeping boilers and piping steam-tight against high pressure and the ability of apparatus to withstand the destructive effects of high temperature, especially of temperature changes. The lower limits are set by the temperature of the available condensing water and the mechanical difficulties of providing space in turbines and condensers for excessively low-pressure, and correspondingly large-volume, steam. The steam must therefore cease to do work while it still has in it a large proportion of the energy added to it in the boiler, and this energy is removed and wasted in the condenser circulating water. With the ranges mentioned above about two-thirds of the entering-steam energy is lost in the condenser in this way. At present it does not appear practicable very greatly to decrease this waste.

Suppose, however, that a turbo-generator could be built to turn into electrical form all of the remaining third of the heat theoretically available within the ranges mentioned. It would, of course, need to be free from friction in the steam passages, mechanical friction and windage, heat conductivity, leakage, electrical resistance, and hysteresis and other magnetic-circuit losses. Moreover, the steam would have to lose all of its velocity before leaving the turbine. Such could properly be termed a perfect or ideal unit. In the Interborough turbines the losses mentioned have been brought down to less than 25 per cent of the power that would be generated in the ideal turbine, leaving over 75 per cent of it available for useful work. This 75 per cent of 33 1/3 per cent is the 25 per cent thermal efficiency mentioned in the second paragraph. At full load, therefore, the entering steam carries 120,000 kw of which 80,000 is lost due to the exhaust temperature and pressure, leaving 40,000 kw for possible use. Of this 30,000 kw appears in electrical form, the balance being lost in leakage, radiation, etc. This balance does not include the loss in condenser and condenser-pump friction and condenser-pump radiation which is customarily not charged against the turbine. The condenser-pump exhaust is, of course, not wasted as the heat is absorbed in the feed-water heater. About 900 kw is chargeable to the electric generator. The remainder is largely carried off in the steam in thermal and kinetic form, for bearing friction is a small loss, and radiation is small also, due to the careful lagging and the small exposed surface.

As all other forms of energy tend to degenerate into heat the struggle to produce the higher forms of energy from it is, and must continue to be, an uphill fight. Heat can be produced in simple apparatus at 100 per cent efficiency, but a far lower percentage in efficiency of transformation must be expected when an attempt is made to reverse the process. The figures of heat input and electrical output of the Interborough turbine, quoted above, show that it is very far to the front in thermodynamic progress. Further improvement along standard lines must be slow, for existing losses cannot be materially reduced and the working temperature range can be changed only gradually. Unless therefore an energy-changing process commercially new is developed, no sensational energy savings in the transformation of heat into electrical or mechanical energy are to be expected.

Repair-Shop Procedure at Milwaukee

An Account of the Shop Organization and Its Methods, Including Details of the Permanent Instructions Issued to Inspectors and Repair Men, Together with a Brief Outline of the Departmentalized System for Overhauling Cars

Economy in repair shop operation depends largely upon the care with which the repair and overhauling procedure is planned so that the successive steps are in proper sequence, and important changes, which always entail more or less confusion and delay, are not made frequently. As a part of such a working schedule The Milwaukee Electric Railway & Light Company has adopted an intermediate inspection and general overhauling system of shop work on a predetermined mileage basis. In connection with the shop inspection and overhauling, a definite plan of procedure is followed regardless of the type of car, but when work of an extraordinary nature is contemplated a set of specifications is drafted setting forth just what is to be done to each type of car.

The Milwaukee system requires approximately 685 cars to operate the city, suburban and interurban schedules, the rolling stock consisting of 565 city cars and 120 motor and trailer interurban cars. The total number of city cars allows approximately 6 per cent to be out of service, undergoing repairs or overhauling. Practically all the interurban equipment is required during the summer rush period, but during the winter months only about 75 per cent of the motor cars and 50 per cent of the trail cars are needed to meet the service demands.

The company's public service building, which provides trackage for housing a large number of interurban cars, is situated at the approximate center of the system and forms an important part of the arrangement of carhouses and shops for repairing and storing cars. Prior to the construction of the general shops at Cold Spring Avenue and Fortieth Street, 3 miles northwest of the Public Service Building, this company adopted a general scheme which provided for five carhouses and storage yards in the outlying districts of Milwaukee. By this plan cars in bad order could be transferred to the Cold Spring shops by way of cross-town lines, and if an accident occurred to rolling stock in the downtown district, it was but a twenty-minute run to the repair shops.

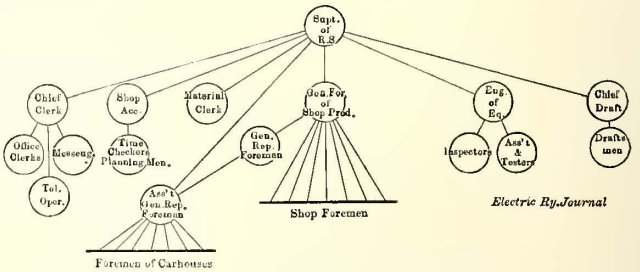
The shop buildings cover an area of about 4 acres, with a total floor space of about 5 acres. The blacksmith and machine shops occupy two sections of the repair shop, each adjoining the building devoted to general repair work. Truck and iron work on car bodies is done in the repair-shop space adjoining the partition separating it from the machine and blacksmith shops. Armature and controller work is handled on the gallery above the truck repair space, which is reached by a system of freight elevators. The wood shop and paint shop are in a separate building but connected with the repair shop by a transfer table.

To facilitate the handling of heavy repair parts in the machine shop and blacksmith shop there are electric cranes spanning each bay. Car lifting cranes also span the two bays adjoining the aisle between the repair shop entrances and the truck repair bay. Two small cranes occupy runways in the two bays over the truck repair space, and two pneumatic hoists on I-beam bridges serve the armature repair department.

Shop Organization

All work handled in the general shop, including both repairs and production, is under the supervision of the superintendent of rolling stock. As shown in the organization chart, he in turn is assisted by a shop accountant, an engineer of equipment, a material clerk, a general foreman of shops and production, a general repair foreman and a chief draftsman. It is the duty of the general foreman of production to see that all material required either for the manufacture or repair work, is delivered promptly from the storeroom after it has been requisitioned by the material clerks. Since the introduction of the premium system, which was described in the Electric Railway Journal of March 21, 1914, added importance has been attached to the prompt and complete deliveries of material, as well as to the inspection of the finished products. The general repair foreman devotes his entire time to car maintenance, both at the carhouses and shops. He is held to strict account for the number of cars in condition for service. In connection with his supervisory duties at the carhouses, he has an assistant who is in direct charge of the carhouse repair forces. On all matters of service the assistant reports to the superintendent

MILWAUKEE SHOP PROCEDURE—GENERAL VIEW OF SHOPS



MILWAUKEE SHOP PROCEDURE—ORGANIZATION CHART

of rolling stock, but everything regarding repairs is taken up with the general repair foreman.

The shop force is largely made up of men who have been with the Milwaukee company for a number of years. The average wage begins at a minimum of 17½ cents per hour and increases to a maximum of 35 cents per hour. The regular shop force is approximately 300 men, but during periods of heavy construction or overhauling this force is increased to about 600 men.

INTERMEDIATE INSPECTION PROCEDURE

Two crews of trainmen are maintained in service at the Cold Spring shops to handle all transfers of cars between it and the carhouses. These two crews keep in touch with the general repair foreman for instructions regarding all car transfers. Cars are not shopped between the intermediate inspection periods unless unusual repairs are necessary. At the outlying city carhouses, as well as at the two carhouses on interurban lines, all light repairs that can be handled economically in conjunction with the daily inspection work are made. These light repairs include largely brake and controller troubles, as well as work in connection with the car body, consequently only a few small machine tools such as grinders, drills, forges and vises are required.

All cars are lubricated on a 1000-mile basis and, as a rule, the average run per week is 750 miles. Consequently a general inspection of the car at the time it is lubricated is considered frequent enough to check up all ordinary defects. After service of about twenty weeks, or when 15,000 miles have been run, each car is sent to the Cold Spring shops for an intermediate inspection. At this time the only repairs made are those necessary to keep the car in running condition. The work done at this time on some of the more important parts of the equipment is shown by the following instructions for inspection:

"Inspection and Repair of Trucks

"1—The trucks in all cases should be run out from under the car.

"2—The wheel flanges are to be checked by a wheel gage supplied for the purpose. If any wheel shows excessive or unusual wear, the pair of wheels should be replaced.

"3—If thin flanges are developing upon any wheels, the trucks should be trammed to see that they are square. If out of square, other trucks in good condition should be supplied in their place.

"4—Axles should be carefully inspected to discover flaws.

"5—Truck side and center bearings should be rigidly attached to the bolster. The height of the bolster should be checked by the standard gage supplied for that purpose.

"6—The bolster should be in good condition, otherwise the car should not leave the shop. The bolster and springs should be replaced where they are broken.

"7—Journal boxes should be inspected, but removed only in case they are either broken or in very bad condition. The covers should make a reasonably tight fit, and the bearings and check plates should be replaced if it is thought that they would not operate safely for an additional 1000 miles. If the wheels and axles are replaced, it should be seen that the dust guards are in first-class condition.

"8—Truck-brake levers, pins, bushings and brakeheads should be replaced providing they are sprung or badly out of line. Unless the pins and bushings show extreme wear they should not be replaced at this time.

"9—New brakeshoes and turnbuckles should be supplied if they are badly worn, or if the latter have not sufficient stock remaining to complete one day's operation.

"10—Adjust brake release springs.

"11—Care must be taken to have all truck bolts in place and pulled up tight. All truck castings are to be inspected and replaced if the same are cracked or broken.

"Inspection and Repair of Motors

"1—Gage armature clearance with special gage for the equipment being inspected. If the proper clearance is not found the bearings should be removed.

"2—Remove inspection covers and examine brushholders to see that they are properly mounted and that the shunts or pigtails are in good condition, also that the brushes have a remaining life of approximately 1000 miles.

"3—Check motor bolts for tightness with particular reference to motor-axle caps and gear-case bolts.

"4—See that the motor leads, bushings and connectors are in first-class condition, otherwise replace.

"5—Examine gear cases and axle collars. The opening between the axle collars and the motor bearing should be checked with the gage supplied.

"6—The wear on gear and pinion should be checked and they should be replaced providing there does not appear to be 15,000 miles of useful life remaining.

"7—See that all oil-box covers fit tightly, and that all dirt is removed from the motor that would prevent the cover from making a good fit.

"8—All motors are to be thoroughly blown out by means of compressed air.

"Inspection and Repair of Control Equipment

"1—Motor connection boxes should be thoroughly blown out. See that all terminal blocks are tight and make good contact. Motor lead bushings should be in place.

"2—Controllers are to be inspected closely and thoroughly blown out. All badly worn fingers, segments or other parts are to be replaced.

"3—All charred surfaces are to be scraped and shellacked. Tighten all control connections.

"4—Dirt accumulations on resistance grids should be removed and then blown out. Terminals should be tightened.

"5—Trolley bases, poles and wheels should be closely inspected. Trolley wheels to be removed providing they do not show a remaining wear sufficient for a full day's run.

"6—Trolley base connections should be tight, and the tension on the trolley rope should approximate 26 lb. when the pole is at a height of about 18 ft.

"7—Contactors to have the tips filed and adjusted or renewed. They should be fully blown out with compressed air and all parts wiped off.

"8—Lightning arresters are to be gaged and tested to assure their being in working condition. This is to begin in January and continue through September.

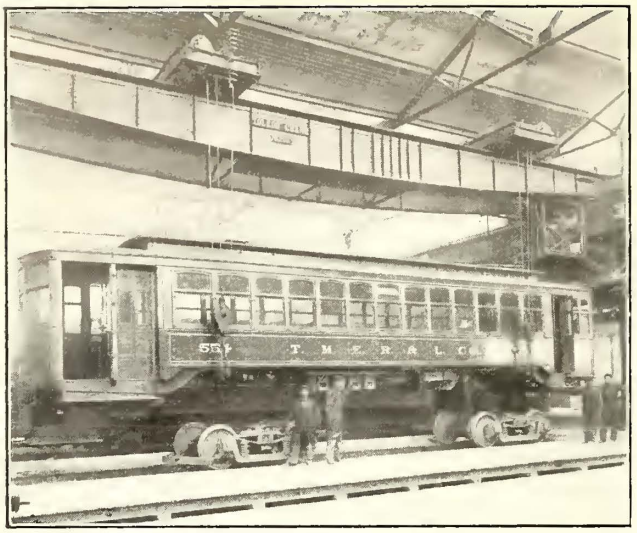
"9—Check and verify all light circuits, switches, door signal devices and stove motor circuits. Stove motors should be brushed, and brush connections inspected.

"10—Push button circuits are to be checked.

"11—Examine circuit breakers and blow out with compressed air. Clean and lubricate carefully.

"Inspection and Repair of Air Brakes

"1—With pressure in the system, the gages in the two ends of the car should not vary, one with the other, 5 lb. Check the pop-valve and adjust so that it will operate at approximately 100 lb. The governor should be adjusted to cut in at 55 lb. and out at 70 lb.



MILWAUKEE SHOP PROCEDURE—CAR BODY BEING LIFTED BY TRAVELING ELECTRIC CRANE IN REPAIR SHOP

"2—The governors, whistles, air cocks, engineering valves and triple valves should be in first-class condition and given an operating test. Emergency air equipment is to be tested.

"3—Inspect the dust collectors, removing all dust deposits.

"4—Examine air switch and fuse.

"5—With pressure on the system, check for leaks.

"6—Inspect dash-hose connections and hose couplings.

"7—Inspect compressor brush-holders and see that they work freely and are clean. Brushes that do not show a remaining life of 900 car-miles should be removed.

"8—Remove all dirt accumulations from compressors with compressed air.

"9—Take armature clearance with gage provided.

"10—Operate pump with inspection doors open and check for unusual sounds which would indicate worn bearings or valves sticking.

"11—The compressor pinions and gears should be examined to insure their being in condition to operate for 15,000 additional car-miles.

"12—The full air pressure should be applied to the brake cylinders in order to check the piston travel, which should be limited to 2½ in. at each end.

"13—The brake levers and pins should be inspected, and badly worn pins replaced."

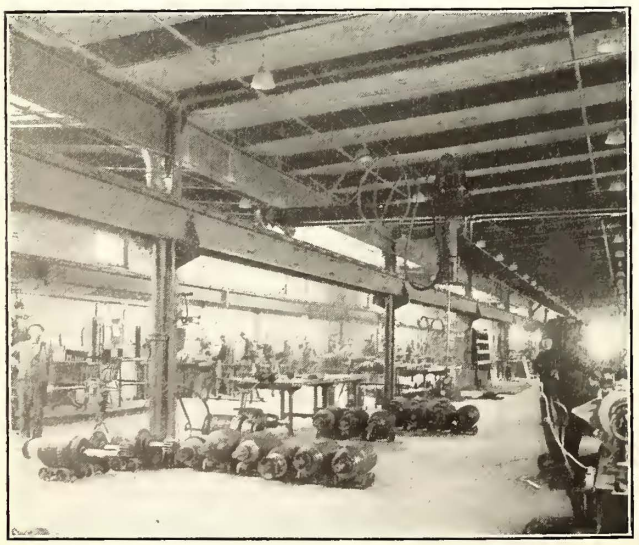
Inspection of Cars

As the various cars reach this intermediate inspection stage, or when they have made approximately 15,000 miles, a general car inspection order is sent out by the shop mileage clerk. On this order the car number, the mileage made since the last shop inspection, and a statement as to whether the work includes an intermediate or a general overhauling, are noted. From this the repair-shop office makes a general car inspection report, which also contains the car numbers and the dates the cars were shopped. The dates are also entered when the cars are completed.

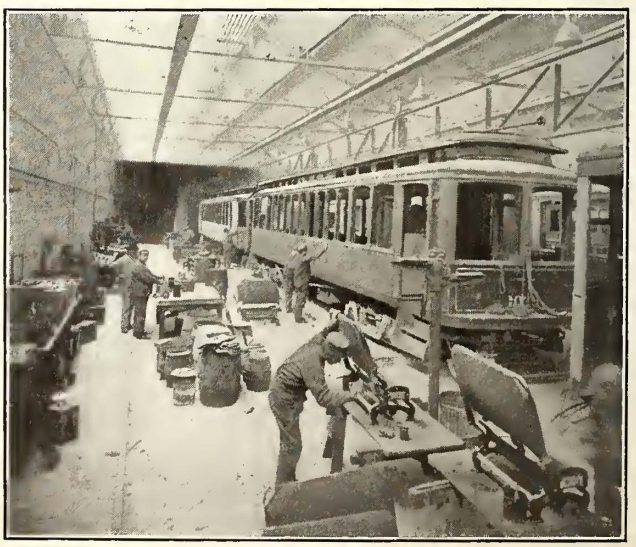
As soon as cars reach the shop, cards which state briefly the general items of work to be covered are inserted in the holders attached to the body. One or more items are assigned to the various sub-foreman or gang leaders, who do the work assigned to them in the manner indicated in the detailed inspection instructions. After completing the assignment, the man responsible for each item signs or initials the work card. It is assumed that when cars have been put through the intermediate inspection they are in condition to be operated from the various stations in a safe and satisfactory manner for not less than 15,000 miles. In other words, such items as gear, wheel and armature changes, which require the use of general repair-shop facilities, must be so taken care of as not to cause the car to be shopped before the scheduled mileage is covered. Also, when a car leaves the shop at the close of this inspection it is in condition to continue in service without attention until the next 1000-mile lubrication period. In order to fix responsibility for slighting any part of this repair work, the initialed cards are retained for record.

General Overhauling Procedure

In addition to the repairs at intermediate inspections, all cars are given a general overhauling at the end of a 45,000-mile period. At this time the cars are carefully inspected in a manner similar to that outlined for the intermediate inspection, with the addition of repainting and varnishing and a thorough overhauling of trucks and electrical equipment. The average time required for this overhauling is from ten to twelve days, whereas only two or three days are required at the



MILWAUKEE SHOP PROCEDURE—GENERAL VIEW OF ARMATURE ROOM



MILWAUKEE SHOP PROCEDURE—INTERIOR VIEW OF ERECTING AND PAINT SHOP

intermediate inspections. When this work has been done the car should again be in condition for operation without equipment failure or reshopping until the next intermediate inspection after 15,000 miles have been covered.

When a car is brought to the shop for a general overhauling it is set on one of the tracks in the repair shop, after which the car body is raised off the trucks, lowered on dummy trucks and sent to the carpenter shop. The work of overhauling the body in the carpenter shop is assigned to different gangs of men or individuals, who repair the parts needing attention. Any work of a special nature to be done by another department, such as the forge shop or machine shop, is requested on a memorandum order. In the department doing repair work each workman is given a unit time-slip, which indicates the character of work to be done and the account number to which it is to be charged. This card permits his time to be distributed accurately for each day's work. The foreman is required to check the information shown on the slip before the distribution is finally sent to the office of the superintendent of rolling stock.

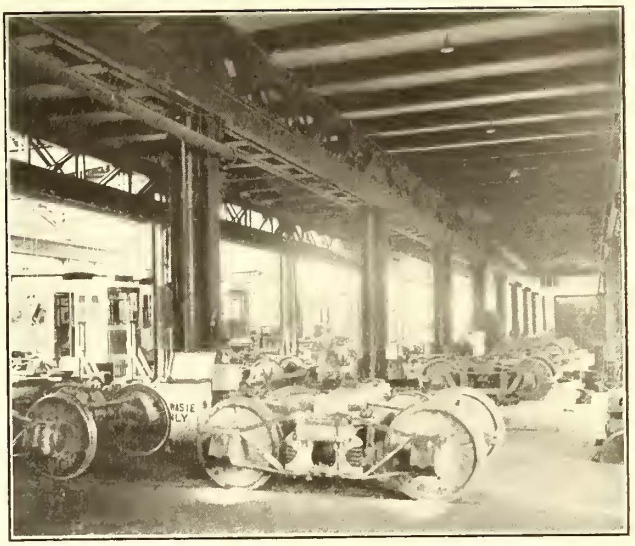
CARPENTER-SHOP AND PAINT-SHOP PROCEDURE

The procedure followed in general repairs in the carpenter shop is about as follows: As a car body is dismantled a list is made of the new parts needed. When this list is complete it is sent to the department clerk, who requisitions the storeroom for the new material required. Since all wooden repair parts are made on storeroom orders and carried in stock, only the exact quantity of material is given out on requisition. Under ordinary conditions the workmen go to the storeroom for this material, but during heavy reconstruction periods special "material chasers" are detailed to do this work. When the repair work has been completed in the carpenter shop a car-body inspector carefully examines the quality of the work, and if it is satisfactory the car is moved to the paint shop.

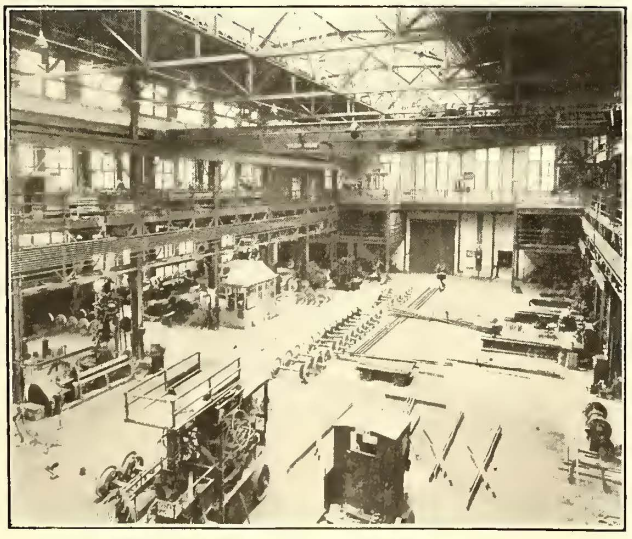
TRUCK AND MOTOR REPAIRS

After the car body has been removed from the trucks the latter are transferred to the truck bay where the motors and wheels are taken out, the wheels being set on wheel wagons and sent to the machine shop. In order to identify each wheel the car number is written with chalk on the inside of the web. The machine shop requires no written order to do wheel work, and as fast as the wheels are removed from the trucks they are set on the storage tracks in this department. When both motors have been removed from the truck, they are taken apart and all worn armature bearings are removed. Defective bearings are cleaned periodically and sent to the sub-storeroom in the truck department, from which they are removed daily for rebabbitting. Following the rebabbitting process the bearings are again returned to the storeroom, where the storekeeper receipts for them on a delivery slip made in duplicate, one being retained by the storeroom and the other being returned to the foreman as his record of delivery.

Armatures are removed from all motors and taken to the armature room on small dollies. Each armature at the time it leaves the car trucks is marked with the car number for identification, the car number being used by the armature-room foreman in compiling his record. A card record is made out for each armature at the time it is received, to indicate the date received and the date the armature was returned in good order. Repaired or rewound armatures are removed from the portable horses to small dollies and assembled on the armature-room floor. Before being returned to service, however, all armatures are given a potential test at 1200 volts a.c. for repair work and 2000 volts a.c. for all new work.



MILWAUKEE SHOP PROCEDURE—TRUCK OVERHAULING SECTION UNDER BALCONY IN REPAIR SHOP



MILWAUKEE SHOP PROCEDURE—GENERAL VIEW OF MACHINE SHOP

MILWAUKEE SHOP PROCEDURE—GENERAL VIEW OF FORGE SHOP

At the present time all armatures on which repairs have been completed are fitted with bearings on the machine-shop gallery, which is on the same floor as the armature repair room. Babbitted bearings are drawn from the storeroom, the shaft of each armature is callipered and the bearings turned to fit them. This method is to be discontinued, however, and one substituted in which all armature shafts will be graduated to 1/16-in. variance in diameter. If a shaft wears 1/32 in. it is turned to the next 1/16 in. lower. According to this new method, bearings will be babbitted to the graduated armature shaft diameter so that machining will be unnecessary. All repaired armature shafts will be stenciled to show the size of the bore.

The repair work for trucks includes stripping off the brake rigging, which is sent to the blacksmith shop to be overhauled, all holes usually being bushed with cold-rolled steel tubing. Truck frames are tested for square and such readjustments as are necessary are made. Each truck is also stripped of its bolster, which in turn is sent to a bolster repairman, who puts it in good order and paints it. At the completion of this general overhauling the trucks are reassembled and made ready for the repaired car body. Overhauled motors also are assembled on the truck-shop floor, but before mounting in the trucks they are sent to the testing rack, where they are tested and inspected. City car motors are loaded at from 75 amp to 90 amp, the tests being made by coupling two together, operating one as a generator and the other as a motor.

While the trucks and car body are being repaired in the different departments, the controller is sent to the armature room if it is in need of repairs at the time the car is in for overhauling. In case the car wiring is also in need of an overhauling, defective parts are replaced when the car body is being repaired in the carpenter shop. Before the wiring is accepted as ready for service, however, it is given a potential test at 2000 volts.

Compressors are always removed during a general overhauling and replaced by repaired ones, the old compressors being sent to the air-brake department, where they are inspected and tested. If compressor-armature trouble has developed, the armatures are sent to the electrical department. Any mechanical repairs necessary in the compressor are made by the air-brake department.

The final steps in the process of general overhauling are taken when the car body is returned to the repair shop from the paint shop. At this time the body is replaced on the trucks and equipped with fenders before being given final inspection. If it meets with approval, the finished car is then swept and otherwise made ready for service.

Results with Women Conductors

The *Tramway & Railway World*, London, England, published the following paragraphs in its issue of April 10:

James Dalrymple, general manager of Glasgow Corporation Tramways, reports that the experiment of employing women as tramcar conductors has been quite successful, but he points out that the two women who are at present on the cars are members of the tramways staff. Although nothing has been decided by the tramways committee, it may be taken that, should it be decided to employ women, it will only be as a temporary measure to tide the department over the present difficulty of getting men to carry on the work.

J. B. Hamilton, general manager of Leeds Corporation Tramways, in a recent interview with a local press representative, alluded to many obvious disadvantages to the employment of women as tramcar conductors. There is no suggestion that they could not punch tickets and take coppers as well as male conductors, or that they would not be as industrious as men. But there is always a danger of an unruly or amorously-inclined passenger. Mr. Hamilton adds, if conscription were to come about many people might have to revise their views.

Central Electric Committees

A Number of Changes in Personnel of Committees Is Noted—List of Members of New Committees Is Given

The annual Brown Book of the Central Electric Railway Association has just been issued. It shows the officers for the ensuing year elected at the annual meeting of the association on Feb. 25-26, as already published in this paper. It also shows the committees which have been appointed by President Henry for the ensuing year. There are two less committees than last year, five being discontinued and three added. The new committees are those on registration, track and roadway and uniform charges for interchanged equipment. Those discontinued are the committees on claims, insurance, compensation for carrying mail, wood preservation and joint weights and inspection bureau.

A number of changes have been made in the personnel of the committees continued. These changes are as follows: In the committee on constitution and by-laws, E. F. Schneider takes the place of C. L. Henry; in the committee on publication L. E. Gould takes the place of E. M. Haas, and in the supplymen's committee W. D. Hamer takes the place of T. H. Henkle. The finance committee and the standardization committee have each one less member than last year through the omission of the names of C. M. Hawley in the first case and F. J. Stevens in the second case. In other respects the list of the committees as published on page 879 of the Electric Railway Journal for April 18, 1914, is the same. The membership of the new committees follows:

Meeting Registration Committee—W. D. Hamer (chairman), Electric Service Supplies Company; H. C. DeCamp, Westinghouse Electric & Manufacturing Company; J. H. Drew, Drew Electric & Manufacturing Company; W. A. Carson, general manager Evansville Railways Company; T. J. Brennan, general superintendent Dayton, Covington & Piqua Traction Company.

Track and Roadway Committee—T. R. H. Daniel (chairman), chief engineer Terre Haute, Indianapolis & Eastern Traction Company; T. H. Sundmaker, chief engineer Ohio Electric Railway; W. A. Carson, general manager Evansville Railways Company; E. Smith, general manager Toledo, Fostoria & Findlay Railway; L. A. Mitchell, superintendent track and roadway Union Traction Company of Indiana.

Committee on Uniform Charges for Interchanged Equipment—S. W. Greenland (chairman), general manager Fort Wayne & Northern Indiana Traction Company; H. B. Cavanaugh, auditor Cleveland, Southwestern & Columbus Railway; S. R. Dunbar, purchasing agent Union Traction Company of Indiana.

The Brown Book also contains the annual report of the secretary-treasurer, the charges for interchange of equipment, the rules governing annual transportation, the new committees of the Central Electric Traffic Association with several of the important bulletins of that association and list of members, and the officers of the Central Electric Railway Accountants' Association.

Deferred Maintenance

The Writer Presents Several Instances from Practice, with Costs, to Prove the Financial Folly of the Short Bond and Neglect in Joint and Special Work Maintenance

BY CARL H. FULLER, FORMERLY ENGINEER MAINTENANCE OF WAY MACON (GA.) RAILWAY & LIGHT COMPANY

There is no place in the complex organization of the modern electric railway where the old saw, "Out of sight, out of mind," may be more aptly applied than to way matters. The railway manager must not blame the valuation commissioner, who is seldom a railway man in any sense of the word, for ignoring the depreciation of "permanent way" when, forsooth, he himself treats his track as a permanent structure undeserving of attention until some morning he finds his cars bobbing along a worn-out groove in the paving, or an interurban car overturned in the ditch because the dirt would no longer hold the rails to gage.

Why are such conditions tolerated? Because the manager who makes it a point to discount his bills for fractional percentages or to figure interest for each twenty-four hours, frequently fails to realize that suspended maintenance, if you choose to consider it in that light, instead of being a conservation of resources is not only an extravagant waste but criminal neglect as well. It is not the purpose of this article to expose any individual's sins, but it is hoped that the citation of a few concrete comparisons will prove that the failure to take the "stitch in time" often increases the cost of maintenance out of all proportion to the temporary saving effected.

Cost of Neglecting Joints

Low joints with their clackety-clack of loose plates and churning ties are perhaps the most persistent of track defects. If on private right-of-way or in dirt roads where the joint is exposed or is easily accessible, a little attention to the tightening of bolts and the shuffling of joint ties persistently given at regular intervals will keep this evil down to the minimum at a reasonable cost. Even here, however, deferred maintenance may become a costly proposition as shown by the following case: On a certain 3-mile stretch of track, the new trackman had been led to believe that he would have a chance to relay the old 40-lb. rail with new 60-lb., but owing to pressure of work on other lines this track was practically neglected for some eighteen months, during which time the new rail became a vision of the future. In addition to the resulting rough track, five broken axles occurred on this section in as many months, each time tying up traffic from two to five hours. Complete resurfacing was resorted to with the result that on the first 1000 ft. of track so treated eight rails were broken close to the ends in trying to remove the cupped joints, forty-two out of the sixty joints had to be renewed because of broken or worn-out plates, forty-seven bonds were replaced and one-third of the ties had to be renewed at a labor cost of 42 cents per foot of track. Experience on a similar piece of track which had been maintained in good shape indicated that a small gang continuously employed could have kept this section in good condition, making a 20 per cent tie renewal per year at a labor cost of 9½ cents per foot, so that deferred maintenance in that instance cost practically 300 per cent, exclusive of the car repairs traceable to bad track.

In a similar case but with 75-lb. rail, the joints had been allowed to pound for so long that when the time came to make repairs it was necessary to remove this rail from the track, a few bars at a time, haul them to the shop where from 6-in. to 1-ft. lengths were sawn from the ends, and then to redrill and to restore them to the track with new splice plates and bonds. The labor cost for this work was $5.30 per rail. As the ties in this piece of track were fairly good and the track ballasted, the trouble could have been prevented if the joints had been kept up during the previous summer.

In paved streets the problem of low joints becomes increasingly complex, and where radical treatment is necessary often proves very costly, as is illustrated by the following case: In a city track eighteen joints of 7-in. T-rail were laid in granite block paving on a concrete base. These joints had been allowed to pound until a more convenient time, about five years later, when the repeated breakage of pilot boards at the low joints aroused the manager to action. The engineer of way was fully justified in desiring to relay this rail, but his proposition was turned down in favor of an application of a patented joint. However, the ends of the rail were so badly battered down that when these plates were applied the tightening of the bolts in nearly every case resulted in the shearing of the head from the web. This necessitated the hacksawing of 18 in. from the end of each rail and the insertion of a 3-ft. piece between the two ends, using two pair of plates instead of one and bedding three new ties under each joint. Labor, joints, bonds, ties, concrete and paving incidentals brought the cost of these repairs to $18.62 per joint. Had this work been done when the low joints first developed, it is probable that the application of one pair of the patented joints, costing $3.05, and the expenditure of $1 for labor would have saved at least $14. Not counting broken pilot boards and a truck frame, this neglect accumulated 100 per cent interest a year for nearly five years. Further, the repairs, when finally made, were only temporary, as the rail was so badly worn that only three or four more years of service could be expected from it, after which it would have to be relaid at a cost of approximately $4 per foot of track.

The Cost of Bond Neglect

Let us consider the bond. In some quarters there has been a tendency to use the shortest bond obtainable or one containing the least copper, the desire for economy readily securing an audience for the firm which had the cheapest bond to sell. The writer has always favored the longer bond, but on reading H. H. George's article in the Electric Railway Journal for Sept. 12, 1914, he realized to its full extent the mechanical superiority of the longer bond. In this article Mr. George shows that a 14-in. stranded bond will stand nearly 200 times as many vibrations as a 7-in. bond. But someone says, "In paved streets you have a rigid track and the joints are not subject to vibration as in dirt roads." Perhaps not to so great an extent, yet the vibrations are there just the same. Hence if the life of the bond proves less than that of the paving, an expensive renewal will have to be made. On a certain hill the railway lost several armatures, and the writer was requested to investigate the bonds. The track was laid in brick paving on a concrete foundation which had been down for five years. So far as could be determined by a superficial examination all joints appeared to be in good condi-

tion, but when the paving was removed from around the joints and the bonds were exposed to view, three-fourths of them were found broken mechanically in the stranded portion. The splice plates had been drilled 4 in., 6 in., 4 in., leaving the end hole 3 in. from the end of the rail. The bond, 3 in. long between terminal centers, had a stranded length of about 1 in. Installed, these bonds probably cost not more than 50 cents each. A 9-in. stranded bond could have been installed originally for something like 65 cents and under favorable conditions would have lasted as long as the paving; or a 36-in. bond might have been installed at that time for not more than $1, with still greater assurance of remaining perfect. Yet to effect this small saving in the primary cost of bonds the company had to renew more than 300 of them at a cost of $2.17 each, for bonds, labor and repaving.

Compare the foregoing record with a 5-mile stretch of track composed of 45-lb. rail, spliced with old-fashioned fish plates using ⅝-in. bolts and bonded with No. 00 solid wire bonds having pin-driven terminals but with an over-all length of at least 3 ft. As the track was laid on a loamy soil there was no question of the vibration under the heavy double-truck cars, yet after sixteen years of service fully three-fourths of these bonds were in service unbroken, the stiffness of the solid copper being counterbalanced by a length which was sufficient to withstand the vibrations.

Special Work Troubles

Special work is probably one of the most important and expensive parts of the equipment of the average street railway, sometimes costing more than all of the rolling stock, yet it is the most likely to be abused. It is abused, because the section foreman who installs and cares for it is seldom more than a common laborer; because the roadmaster is often a friend of someone higher up placed where he will do the least (?) damage; or possibly he is a track hand who has worked up to that position but is unable to read intelligently the blueprint that accompanies an order of special work; or because the management is composed, as it often is, of men who have had very little practical knowledge of track work.

A few roads, especially where the managers are engineers, may overdo track design and maintenance, yet in many instances, less attention is given to an order for special work than to one for lead pencils. It is to the credit of the special work manufacturers that they send highly-skilled specialists to take the measurements for their goods and, when the material is fabricated, fit it together carefully on the floor of their shops. Still, this is a matter of self-protection with them, as comparatively few railways, if we except the big metropolitan lines, have engineers and roadmen who are qualified to lay out such work.

There comes to mind the sixteen external joints in a double track "grand union," where, because the roadmaster was a relative to the manager instead of being a track man, he failed to realize the importance of installing properly fitted compromise joints. Instead, he used standard splice bars packed out with pieces of tin cut from discarded cans, a substitution the writer discovered a scant two years later when of all the numerous joints in this set of special work only these sixteen developed "jolts" and the paving was torn up for repairs. As we did not have the proper splice plates in stock these joints were shimmed up temporarily and the paving was restored until special joints could be obtained at a cost of $8.50 per pair. By the time these new plates had been installed the cost of repairs had mounted to $15.86 per joint, and even then the ends of the special work had to be left with cupped places in them because we had no means of regrinding these joints. In addition to this the transportation department had traffic tied up twice on this busy intersection by the skewing of big interurban cars across the tracks while the claim department settled for $500 damage claims—all because of the failure to apply sixteen pairs of compromise joints which should have been ordered with the special work at a cost of $2.60 each. Thus this failure was equivalent to fully 1000 per cent interest on deferred maintenance.

Another illustration: The switch piece at one end of a passing track had become so badly worn that motormen had been running through it for several months in continual dread of being on the ground before it would be renewed. The manager, who was also the purchasing agent, readily consented to the purchase of the most approved and expensive type of switch, but balked on the price of a spring box because, as he put it, they had always used "rubbers" in their spring switches and so might just as well save the price of the spring box. But the motormen becoming venturesome on finding the new switch "easy" and safe, kept trying it out until one day the rubber jumped out of the slot and the rear truck followed the other track, with the consequence of tearing the bolster loose from under the car and wrenching a big hole in the floor. After that spring boxes were ordered on all switches that required them, but the saving of $12 maintenance had been wiped out several times over in car repairs.

There has been much discussion concerning derailments at facing switches due to the wheel climbing the point of the mate. In nearly every case handled by the writer, investigation has revealed that either the mate or the switch alone had been renewed, the new part being purchased from some other manufacturer. In spite of the utmost care in following the general dimensions of the original turnout, the difference in the place of manufacture is sufficient to account for numerous troubles of this kind. This variation was not of such great importance with the older types of special work and lighter cars, but in the modern types with throats ground so closely to theoretical lines, it is just as essential that the renewal parts be furnished by the original manufacturer from the original templets and drawings as it is in making replacements in machinery. In fact, it is a serious question whether it is profitable in the long run to make partial renewals in special work. There is no question that better results may be obtained if a company makes an entirely new replacement while using the good parts out of the old work to replace worn parts in old work relegated to less important lines, than to use old and new parts together.

This may be illustrated by an experience with a new mate which had replaced an old one without any other change in the switch set. No amount of checking revealed the cause for the repeated derailments at this point, and it was thought that certain cars which proved to be the only offenders had something wrong with their trucks. One day, after the engineer had broomed out this mate and powdered it with dust in an effort to trace the wheel travel through it, a big double-truck car passed over it leaving behind a piece of wheel flange fully 3 in. long and too hot to hold in the hand from having just broken on the hardened point of the mate. Although it was impossible to check broken wheels against this particular piece of special work a period of observation satisfied the writer that wheel chipping at this place would in a short time amount to more than the cost of an entirely new set of special work.

Examination of the special work on another road revealed 108 frogs, switches and mates to which from one to five years of useful service might be assured by investing $1,100 in an electric welding and grinding outfit,

and the necessary labor to remove the pitted places, estimated at from $2 to $10 each. But the management kept postponing this investment until a more convenient season, with an ever-increasing chipping of wheels from the rough riding of special work. Inside of twenty months it had spent $3,000 in replacements while nearly one-half of the remainder of the special work mentioned had been ruined beyond profitable repair. While it would be impossible to make any estimate of the salvage value of making the suggested repairs, it is quite evident that such repairs would have quickly paid for the equipment to do the work and still leave the equipment available for future work of a similar nature.

CONCLUSION

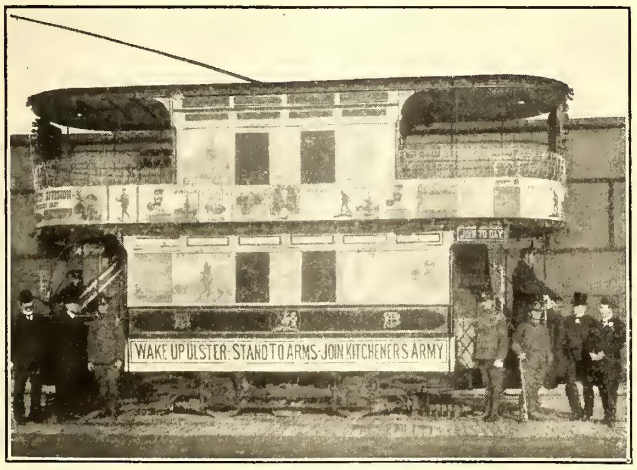
It would be unfair for the writer to identify any of the incidents mentioned since the persons responsible were doing their best to keep their properties efficient at the lowest cost, but the incidents recited may be considered sufficiently accurate and reliable, having been taken from actual cost records, to demonstrate that deferred maintenance or unskilled track work is an expensive method of conserving the roadway and that it is just as important to apply skill and science to the maintenance of track and special work as it is to any other line of endeavor.

Recruiting Car at Belfast

BY A. A. BLACKBURN, M.I.E.E., M.I.M.E., CHIEF ENGINEER BELFAST (IRELAND) CITY TRAMWAYS

The tramways committee of the Belfast Corporation having been approached by the officer commanding the Ulster division of Kitchener's army to assist them in their recruiting campaign, placed a tramcar at their disposal. The car works department then prepared one of its standard cars for the occasion.

The top, side and end boards were very tastefully covered with a large variety of recruiting posters. In the center windows of both the top and bottom compartments were displayed large colored transparencies of the King and Queen, with a poster in the center bearing the words, "Britons, Your Country Needs You." On all other windows were displayed colored posters urgently calling for recruits.



BELFAST CAR WITH A STIRRING APPEAL FOR VOLUNTEERS

Along the lower panels at the sides of the car were the following inscriptions: "Wake Up, Ulster—Stand to Arms—Join Kitchener's Army" and "Ulstermen, Join Our Heroes at the Front. They Expect You. They Need You." At night the car is brilliantly illuminated with 400 16-cp lamps in colors.

The car traverses all the routes and runs from 9 a.m. until 10 p.m. On the car are three recruiting officers, who have found that this car has brought in quite a number of willing recruits from the outlying districts of Belfast.

Progress on the Newark Terminal

Construction of Subway Nearly Complete—Steel Frame Erection to Upper Train Floor Going Forward Rapidly

The accompanying illustration shows the appearance of the site of the $5,000,000 terminal which the Public Service Railway is constructing in Newark, N. J. Just below the center is seen one of the grillages of I-beams which are on the tops of the caissons, while the steel columns, upon which the elevated train floor will be supported, are shown in process of erection. The mouth of the subway is near the left center of the picture. The construction is going on in four divisions—subway, terminal building, subway loop, and elevated approach. All of these were fully described in the article in the ELECTRIC RAILWAY JOURNAL of Nov. 28, 1914, page 1190. The subway is now practically completed with the exception of back filling and restoration of street paving, although no track is laid. The foundation for the building is in place, 125 caissons, from 6 ft. to 16 ft. in diameter, having been sunk to bed rock, an average of 53 ft. below the street level. Columns weighing about 400 lb. per foot are being erected on these. As the caisson centers could not be carried out to the building lines, cantilever girders, weighing up to 1000 lb. per foot, are being installed to serve as upper grillages to carry the columns out to the building lines.

NEWARK TERMINAL—BIRD'S-EYE VIEW LOOKING NORTHWEST, SHOWING STEEL COLUMNS

The frame will be up to grade in about thirty days and the balance of the steel is now being fabricated by the Hay Foundry & Iron Works of Newark, the subcontractor working under the Hedden Construction Company, the general contractor. The subway loop is excavated and a heavy retaining wall is now being built which will form the rear wall of the subway loop and also retain the earth fill which forms a part of the elevated approach. The elevated approach fill has been completed from Mulberry Street to the retaining wall now being built. West of the retaining wall and to the main building the approach will be carried on steel work and on a bridge over Pine Street. Practically all of the track changes required in connection with the rerouting, which forms a part of the general terminal scheme, have been made. It is expected that the terminal will be finished early in 1917.

Iowa Annual Convention

Abstracts of Four of the Papers, Presented at Keokuk April 22 and 23, Are Published—The Subjects Treated Are Safety, Time Schedules, Return Circuits, and the Jitney

The annual convention of the Iowa Street & Interurban Railway Association was being held in Keokuk, Iowa, as this issue went to press. It followed a meeting of the Iowa Section of the National Electric Light Association held on April 20 and 21. All meetings were at the Hotel Iowa. An account of the proceedings of the Iowa Street & Interurban Railway Association will be published next week. Abstracts of four of the papers presented at the meeting follow.

RESULTS OF SAFETY WORK

BY F. K. GEORGE, DIRECTOR OF SAFETY UNITED LIGHT & RAILWAYS COMPANY, GRAND RAPIDS, MICH.

While it may be said that the organization of the safety-first movement among railway employees is as yet largely experimental, the results already attained lend color to the claims of the most enthusiastic supporters of the cause. The railroads of New York State, taken as a whole, reduced the casualties to employees and passengers in the last year of operation of the safety-first work by 70 per cent. In 1914 the Detroit United Railway, by its organization among employees, reduced the number of cars in collision 43 per cent; of passengers hurt in boarding and alighting accidents, 17 per cent; of passengers falling from cars, 37 per cent; of derailments of cars, 11 per cent; of pedestrians hurt by cars, 8 per cent and of vehicles struck, including animals and excluding automobiles, 1½ per cent. There was an increase of 27 per cent in the number of automobiles struck by cars, although in the same period the number of automobiles in Detroit increased more than 50 per cent. Figures as to the actual saving in money are difficult to obtain, but managers can calculate for themselves what a reduction of 43 per cent in the number of cars in collision will do for shop costs.

If these results can be obtained by merely bringing about a more constant thought of safety on the part of employees, much more can be done if the general public can be brought to do its share of the thinking. The problem for the electric railway manager to solve is how the general public can be awakened to a sense of its responsibilities for safety first. The Chicago surface railways appear to have solved one phase of this problem in an effective manner. In 1914 H. L. Brownell, director of safety, delivered scores of lectures in the public schools, showing the children by means of moving picture films and stereopticon views how accidents occur and telling them how to be safe. The result was that fatal car accidents to children were reduced more than 70 per cent in 1914. In July, 1913, seventeen children were killed by being run over by cars, but in the same month of 1914, after the campaign of education in the public schools, not a single child met death from this cause.

The key to a successful safety-first campaign is to arouse the thought of safety first in the minds of everyone. It is a problem of thorough organization, of continued agitation, of constant reiteration of the thought and of intelligent selection of the human elements with which to accomplish the work. No headway can be made in this work if it is conducted in a cold, unsympathetic manner. To arouse the enthusiasm of the employee the organizer himself must be filled with his subject and be able to inject his enthusiasm into those whom he calls in as his aides.

The United Light & Railways Company impresses upon its employees that safety-first work is as much a part of their duties as those for which they are regularly employed. The men who serve on the safety committees are paid the same rate of wages as for their regular occupations. Sometimes, for convenience, the committee meetings are held in the evenings; in every case the committee members go on the payroll at the regular rate for the time so spent. On the departmental safety committees of five members each, no foreman of a department, superintendent or other official can serve, for the company desires the workers themselves to be the active ones. There is, of course, a governing committee containing company officers and committee chairmen.

The increasing traffic of the streets and the country highways presents a problem which the electric railway manager finds difficult of solution. This problem has been vastly complicated in the last few months by the appearance of the jitney bus, but the statistical department should keep a close cumulative record of the jitney bus accidents. The fact should be emphasized that the danger is bound to increase, no matter how stringent may be the regulations imposed upon such traffic.

RAILWAY RETURN CIRCUITS

BY F. V. SKELLY, ASSISTANT SUPERINTENDENT TRI-CITY RAILWAY & LIGHT COMPANY

In order to secure economy in power, an average potential gradient in the track of 1 volt per 1000 ft. is desired. The gradient may be determined by taking the over-all voltage when the average current is flowing in the track. If the system is large, arrangements can be made with the local telephone company for connections at selected points through the railway network. At the telephone exchange, smoked-chart recording voltmeters can be put in these circuits, and the average voltage drop secured for any hour in the day. If this is found to be too high, the rail bonds must first be improved, and if that is not sufficient, negative feeder copper installed.

Poor contact in the rail bond is the principal cause of high resistance, which can only be determined by the use of a good bond tester. One of these instruments of the Roller-Smith type has been used with much success on the tracks of the Tri-City Railway Company. Three feet of bonded rail are compared to an equal length of unbroken rail, and the reading gives direct the equivalent length in feet of unbroken rail. With this machine a series of tests was made on newly installed bonds for 80-lb. rail with the following results: Twin terminal bonds which had been installed one year gave an average reading of 5.6 ft. Oxy-acetylene welded bonds installed about three months gave an average of 3.2 ft., and electric-arc-welded rail joints were of lower resistance than the equivalent length of rail. The accuracy of these readings depends on the amount of current flowing in

the rail and near the end of a line it is often necessary to wait for a car to use current before the reading can be made.

I might mention here that the oxy-acetylene welded bond promises to give good results. It is impossible to tear this bond from the rail head, as repeated blows from a heavy sledge fail to dislodge it. The contact resistance is low, and the cost for labor less than for any bond which requires the rail to be drilled. The Twin City Rapid Transit Company made use of this bond as early as 1910 and now claims a cost of only 40 cents per bond installed. Our experience is that the cost is slightly higher. Pin expanded bonds, compressed terminal bonds, soldered bonds and thermit welded bonds have each been tried with varied success.

Our engineers have recently put on trial fifty arc-welded rail joints. After three months of average service the bond resistance was taken, and in every case the resistance of the joint was found to be less than the resistance of an equivalent length of rail. The cost of this joint complete is about $4, which is well within the cost of bolted plates with copper bonds included.

It is very necessary that all special work should be shunted by copper cables capable of carrying the current in the track at that point. This is common practice, but if bonds are poorly maintained the drop across special work often causes serious trouble. The remedy is so simple that only carelessness can account for its existence. A millivoltmeter connected across special work will indicate the condition at a glance. In making such tests we found one steam road crossing around which the voltage drop was from 5 to 13. This crossing was relaid and all trouble removed by carefully shunting all current through a 500,000 circ. mil. cable laid beneath the track. We consider a cross bond every 300 ft. to be sufficient to counteract the evil effects of an occasional bad joint.

If the voltage drop in any particular section of track cannot be further improved by bonding, it will then be necessary to install return feeder cables to drain those sections of track in which the voltage drop from track to power house is high. Our experience would lead us to believe that the insulated negative return feeder will give the best result when an improvement is planned in the return circuit. When copper cables or wires are buried in the ground inspection is impossible and corrosion is rapid. Sections of No. 00 copper wire lying under the track and acting as uninsulated return feeders have been found to have been entirely destroyed by corrosion.

It would be impossible to go further into this subject and not refer at this time to electrolysis, an important source of loss due to the return circuit. It is a well-known fact that stray current leaking from the rails follows the path of least resistance. If the track resistance is high this stray current finds an easier path through the earth and underground pipes. The power loss is less as the conductivity of the return circuit is increased, but wherever the current leaves the underground structures, corrosion of metal by electrolysis takes place. Pipe-owning companies naturally object to this and present their claims when repairs are necessary. The situation in Davenport with regard to electrolysis is an example of partial pipe drainage. At the substation the water and gas pipes are grounded to the cable running to the negative busbars. Under this condition there is practically no difference of potential between track and pipes in the vicinity of the station, but at several points in the city positive districts have been located.

In reviewing the situation, it might be reiterated that too little attention is paid to the track return circuit. The track maintenance department is kept busy repairing special work and paving and has no time to look after rail joints that ride smooth, although they may steam with the heat of lost power. Make a swift examination of your track after any light snow and look for the points on the rail where the snow flakes melt. You will not require a bond tester there to tell you that the bonds are broken. In any event, a thorough examination or test of all bonds and cable connections should be made twice each year, and a record kept in such form that a repair gang can follow it up and correct the faults.

TIME SCHEDULES

BY L. L. SLOSS, SUPERINTENDENT OF TRANSPORTATION DES MOINES (IA.) CITY RAILWAY

The method which I have followed in making schedules for the past ten years is to lay out the form of schedule required for each individual line, based upon statistics compiled as follows: Take, for example, as many eighteen-hour day runs as the individual line has at the time of compiling statistics. Then get from the conductors' trip cards the total number of passengers hauled from the first car in the morning to midnight, setting forth zones every ten or fifteen minutes, the latter zone being usually sufficient in a city situated similar to Des Moines. In a large city, however, St. Louis for example, I have found it necessary to use the ten-minute zone to get a more accurate check on business done during the eighteen hours. This is especially true during the peak loads.

As to the needs of car service at different periods of the eighteen hours, certain time statistics used are as follows: Seventy-five seats for 130 passengers during peak loads, and 100 seats for seventy-five passengers during the middle of the day and at night, or when tripper service is off the road. The one-hour zone may be used, where practical, to strike this average. I will venture to say, however, that sometimes personal observation on certain lines brings better results as to satisfactory service rather than the use of the above figures.

THE JITNEY BUS

BY C. I. PALM, OMAHA & COUNCIL BLUFFS STREET RAILWAY

Last autumn some owners of second-hand automobiles in Los Angeles, being out of employment, thought they could pick up a few "jitneys," or nickels, by carrying players to the various moving picture establishments. The owners of these small cars had read about the big and apparently highly-profitable business being done by a "$500,000 motor coach company," which operated in Los Angeles and to the neighboring villages, but which went into the hands of receivers last December. To the newspapers belongs the credit for the rapid spread of this craze. It has been stated that a Kansas City, Mo., newspaper publisher, who opposed the granting of a franchise to the Metropolitan Street Railway, became so peeved when the franchise was granted by a popular vote that he sought revenge against the street railway company by starting to publish stories of the "success" of the jitneys in cities along the Pacific Coast. Extravagant claims were made of their earnings, but nothing, of course, was ever mentioned about their expenses. A number of small-car owners fell for it, and converted their cars into jitney buses by hanging a 5-cent sign on them.

Newspapers in other cities, imagining they had grievances against the street railway, likewise started spreading the craze.

At this writing we have in Omaha fifty-four jitney buses. Four of these are seven-passenger cars; six are trucks, seating from nine to fourteen passengers; and the remainder are five-passenger cars, mostly Fords. Jitneys started operating in Omaha early in February. On Feb. 19 there were fifteen on the streets. Due to unfavorable weather conditions, they did not increase in number very rapidly; but with the advent of propitious weather, we expect there will be a flock of them of such proportion as to darken the sun. No ordinance looking toward their regulation has as yet been passed by the municipal authorities, although improvement clubs and other civic bodies and letters to the daily press have urged that such an ordinance be passed.

The jitneys in Omaha already have had a number of accidents (one fatal), and as they grow in number and the competition for nickels becomes keener the percentage of accidents will be larger. The operators are organized and call themselves the Omaha Jitney Bus Men's Association. According to the president of the association, it has a membership of seventy-five, and there are but two independent operators in the city.

In Council Bluffs there are eighteen jitneys, all five-passenger cars. They are classed with the expressmen in that they are required to file a bond in the sum of $200.

In general the bond requirement alone or a regulatory ordinance for jitney buses will make jitney men discontinue operation in many instances. In some cities the surety companies have declined to assume the risk. For the insurance of this kind that has been written a high premium has been paid, and it is very likely that the rates will be advanced as the percentage of accidents increases. A report is current that jitney operators in Salt Lake City have discontinued operation because they are now required to furnish bond, and the bonding companies are demanding that they put up collateral to the full amount of the bond. This they have been unable to do. Notwithstanding the absolute fairness of the bond requirement, jitney operators have protested against it, giving as their reason that the earnings from the business will not permit the expense.

Opposition to the jitneys and petitions for their regulation have not come from the street railway companies, but from the business men, improvement clubs and other civic bodies, who have realized the menace and the irresponsibility of the whole proposition. However, the craze has reached its height and is now waning. The small car owner, if he has not already done so, will soon find out that he cannot carry a passenger for 5 cents and make a profit.

Investigation has shown that very few of the men who operated jitneys a few months ago are still in the business. The personnel of the operators is constantly changing, and the few who are staying with the game are doing so because it is the only employment they can find. They are satisfied with the income remaining from the nickels collected less the cost of gasoline and minor repairs. When their machines are worn out, or if they should ever meet with a bad accident, they realize the jig is up. The proposition is therefore largely a product of unemployment, and cannot continue to exist for any length of time. That it cannot do so under proper regulation is further evidenced by a statement made by the jitney owners in Los Angeles that the passengers on the running board are the profits of the business.

I believe there is a field for the auto-bus, but not as a 5-cent proposition. Its mission is rapid transit de luxe. A proportion of the population in the larger cities would, without doubt, be glad to pay a higher rate of fare than that charged by the street railways for a guaranteed seat in a comfortable and up-to-date vehicle operating at a rapid but safe rate of speed. The auto-bus should take a place between the street car and the taxicab.

Correction of the evil effects of the jitney bus will have to be by the public, and not by street railways. The industry, however, can do much toward this end by a fair and square presentation of facts concerning the effect the jitney will have on a community if permitted to continue operating unregulated. An excellent way to present the facts about the jitney is by the distribution of circulars on your cars. The people who ride on the street cars are the jury in this case, and I know of no better way to present your argument to that jury.

Safety Publicity in Pittsburgh

The Pittsburgh Railways Company has recently been conducting a publicity campaign in connection with the safety-first movement and to this end it has established a "safety always" exhibit in the window of one of the large department stores in Pittsburgh. The exhibit has created a great deal of attention and this has been augmented by the publicity methods used by the railway company in connection with it. The accompanying circular is one of several that have been posted in the cars for the purpose of calling atten-

PITTSBURGH RAILWAYS' SAFETY POSTER

tion to the exhibit, and owing to the fact that this poster deals with the popular objection to fully-inclosed cars, namely, that they prevent passengers from boarding the cars when in motion, it presents a new phase of the system for safety publicity. The photograph showing a passenger who fails to board a car before the doors are shut has apparently appealed to a great many people. This has been shown by the extended comments that have been heard since the utility of the fully-inclosed platform has been thus advertised.

ANNUAL CONVENTION SAN FRANCISCO OCTOBER 4 TO 8, 1915

American Association News

ANNUAL CONVENTION SAN FRANCISCO OCTOBER 4 TO 8, 1915

Chicago Elevated Company Section Formed with Bright Prospects—B. I. Budd Offers Trips to Convention for Effective Section Work—Important Committee Meetings Held

CHICAGO ELEVATED SECTION FORMED

At a meeting held on April 17, 136 members of the Elevated Club of Chicago out of a total of 158 present signed applications for membership in the new company section No. 6 of the railway association. This will be known as the Chicago Elevated Railway Company Section.

President H. A. Johnson, master mechanic Chicago Elevated Railways, stated the purpose of the meeting, remarking that the success of the club since its formation in October, 1914, warranted the immediate formation of a company section.

A communication from E. B. Burritt, secretary of the national organization, was then read. This set forth the purpose of the company section movement and the benefits to be derived by the individual members. It stated that since its organization the Milwaukee Section had grown 340 per cent, the Public Service Section 277 per cent, the Denver Tramway Section 466 per cent, while the Washington Section showed good progress and good results were expected from the Manila Section.

H. A. JOHNSON,
President
Company Section No. 6

D. L. SMITH,
Secretary and Treasurer
Company Section No. 6

Martin Schreiber, engineer of maintenance of way Public Service Railway and chairman of the committee on company sections, emphasized the points made in Secretary Burritt's letter and explained in some detail the exact workings of the company section. He traced the history of the railway association and its reorganization in 1905, and contrasted conditions now and in the early days. "The company section," said he, "fills two important functions, to assemble suggestions and create new ideas, and to disseminate and localize these." The association does not want individual members for the purpose of increasing the income, as each costs for printing and the like the sum of $4.57. It wants them so that the association may be truly representative of the industry. Mr. Schreiber closed his address with an illustrated description of the new Public Service Railway terminal now under construction at Newark, N. J. (See page 793 of this issue.)

President B. I. Budd next addressed the club and set forth the importance of broadening the scope of its work by becoming a section of the national body. He stated that the company section movement had his hearty support, and that he knew of no better way to obtain individual development. All employees should acquaint themselves with the problems of the industry, many of which are complicated. It is essential that individuals as well as companies should aid in their solution. The increased cost of materials, coupled with the longer haul at the same revenue, necessitates greater efficiency in operation. The public expects it and greater efficiency must be uppermost in every employee's mind to make the industry a success. Also, if men are to succeed they must know what is transpiring in all departments. Mr. Budd said that he hoped the section work would prevent men from running in a rut. The membership should extend to all branches of the service. The national association is doing a wonderful work for the companies and individuals, extending into legislative, economic and political fields. In closing, Mr. Budd expressed his high regard for his employees, stating that he had been with the company for twenty years and therefore realized the changed conditions, and the importance of developing the individual. To encourage the employees to their best efforts he offered to pay the expenses of three of them to the national convention each year, department heads being barred from competing for these prizes.

E. J. Blair, electrical engineer, then urged the importance of forming the company section immediately. He spoke of the work of a club formed ten years ago by the employees of the Metropolitan West Side Elevated Railway, which was short-lived because its interests were too local.

A committee next presented a new constitution for approval and it was adopted, and the following officers were elected: H. A. Johnson, president; T. B. Millne, vice-president; D. L. Smith, secretary and treasurer, and H. B. Savage and E. J. Blair, directors.

A lunch followed the meeting, the formal proceedings of which were interspersed with musical selections rendered by the glee club.

BIOGRAPHICAL NOTES REGARDING PRESIDENT JOHNSON AND SECRETARY SMITH OF THE NEW SECTION

President H. A. Johnson has been in elevated railway work in Chicago since 1908, when he entered the employ of the Metropolitan West Side Railway. Before this he had been connected with the Chicago, Burlington & Quincy Railroad, specializing in locomotive work, a line for which he was prepared at Purdue University. With the West Side Railway he served in the inspection and electrical departments, the armature shop, the power house and the drafting room, later becoming superintendent of motive power and equipment or master mechanic. He was engineer in charge during the construction of the Douglas Park extension. When the elevated railways were reorganized in 1911 he became master mechanic of all.

D. L. Smith is the power supervisor of the elevated railways. He was born in Freeport, Ill., in 1890, and after completing his studies in the public schools took a course in electrical engineering at the University of Illinois. He was graduated in 1911, and immediately accepted a position as wireman with the Metropolitan West Side Railway. After serving for some time in that position he became a draftsman in the electrical department and was later made acting foreman in charge of electrical work. In 1913 he was appointed

power supervisor of the elevated railroad system. Upon the formation of the Chicago Elevated Club last October he was elected secretary and treasurer.

WASHINGTON SECTION

In the motormen's literary competition advertised in the poster reproduced in the issue of the Electric Railway Journal for April 10, forty papers were submitted. The awards will be made at the next meeting of the section to be held on April 30.

DENVER TRAMWAY COMPANY SECTION

At the regular monthly meeting of company section No. 3, held on April 15, the subject discussed was "What Can We Do for Denver?" As the topic was one of general interest, non-members, including the families of the members, were invited, with the result that the attendance was 300 or more. The address of the evening was delivered by Frederick W. Jefferay of Denver. He was followed by John A. Beeler, vice-president and general manager Denver Tramway; Wm. H. Rhodes, line foreman Denver Tramway, and Sheridan S. Kendall, secretary of the State Railroad Commission. As would be inferred from the list of speakers and the attendance, the meeting was a pleasant and profitable one.

MANILA SECTION

The regular monthly meeting of joint company section No. 5 was held on March 2 in Manila, P. I. E. A. Barretto outlined a plan for encouraging saving among employees through the agency of the section, but a motion was passed reciting the opinion that such an effort should be made through individual or other means rather than through the company section. The paper of the evening was by F. J. Tew, on "Maintenance of Motors." After discussion by L. S. Cairns, W. R. McGeachin, W. A. Smith and J. C. Rockwell, C. N. Duffy read extracts from articles in technical journals on the subject of municipal ownership.

COMMITTEE ON EQUIPMENT

The sub-committee on steel axles of the committee on equipment met in New York on April 15 to discuss a proposed revision of the standard specification for quenched and tempered carbon-steel axles, shafts and similar forgings. Those in attendance were R. H. Dalgleish, Washington, D. C., and W. E. Johnson, Brooklyn, N. Y., of the sub-committee, and the following representatives of manufacturers: G. Aertson, Midvale Steel Company; L. W. Conroy, Carnegie Steel Company; J. R. Holcomb, Midvale Steel Company; E. F. Kenney, Cambria Steel Company; R. P. Rapp, Gulick-Henderson Company, and A. A. Stevenson, Standard Steel Works Company. The proposed revision was considered in detail, and recommendations to the main committee will be made as follows: That the form coincide as far as possible with that of the A. S. T. M. specifications and that the title be made more definite. That in forgings under 4 in. in diameter the ultimate strength and elastic limit be increased 5000 lb. each, to 90,000 and 55,000 lb. per square inch respectively. That the provision for application of load in testing in fixed increments be omitted as uncommercial practice. That the definition of the treating charges be made more definite. That a clause requiring a proof test of forgings be added with no definite recommendations as to details. That the number of retreatments be limited to three.

The sub-committee on pinions and gears met on the following day to discuss with the manufacturers specifications which had been prepared. There were present R. H. Dalgleish, Washington, D. C., and W. E. Johnson, Brooklyn, N. Y., of the sub-committee, and, representing the manufacturers, W. H. Phillip, R. D. Nuttall Company; E. S. Sawtelle, The Tool-Steel Gear & Pinion Company, and G. L. Schermerhorn and A. A. Ross, General Electric Company. Specifications for two classes of case-hardened steel pinions, and for quenched-and-tempered forged carbon steel pinions in three different grades were discussed in detail, following which corresponding specifications for gears were taken up. As time did not permit final settlement of all points raised during the meeting it was decided that these should be taken up by correspondence, with the expectation that the needs of the various interests involved could be harmonized before the next meeting of the committee as a whole, which will occur next month.

COMMITTEE ON FARES AND TRANSFERS

This committee of the Transportation & Traffic Association met in Detroit on April 15 and 16. Those present were: J. E. Duffy, Syracuse, N. Y., chairman; J. V. Sullivan, Chicago, Ill.; G. K. Jeffries, Indianapolis, Ind.; C. E. Learned, Boston, Mass., and B. C. Edgar, Nashville, Tenn. A final draft of the report covering the executive committee assignments on transfer-issuing and collecting devices, fare-collection methods on center-entrance and prepayment cars, and through versus zone collection on suburban and interurban lines, was prepared.

COMMITTEE ON PASSENGER TRAFFIC

The Transportation & Traffic Association committee on passenger traffic met in New York on April 12 and 13, those present being: P. P. Crafts, Mobile, Ala., chairman; E. E. Soules, Peoria, Ill.; J. K. Punderford, New Haven, Conn., and E. M. Walker, Dubuque, Iowa. The report on motor buses, trackless trolley and one-man car operation was formulated and after detailed revision will be ready for the executive committee.

Joint Committee on Line Construction

The sixth meeting of the national joint committee on overhead and underground line construction was held on March 31. Most of the time was devoted to discussion of the overhead power wire crossing specification, and the work of revision was well begun. The specification was divided into four sections and the following sub-committees were appointed to handle the work of revision on their respective sections: Sub-committee "A" (structural)—F. L. Rhodes, chairman, G. A. Harwood, R. J. McClelland, R. D. Coombs, J. H. Davis; sub-committee "B" (insulation)—W. J. Eck, chairman, Percy H. Thomas, F. B. H. Paine, R. E. Chetwood, E. B. Katté, A. S. Richey; sub-committee "C" (conductors)—Paul Spencer, chairman, Thomas Sproule, George Cellar, W. I. Capen, R. J. McClelland, H. T. Wreaks; sub-committee "D" (clearances)—C. L. Cadle, chairman, G. F. Sever, W. J. Canada, L. S. Wells, H. S. Warren, E. B. Katté.

Circular letters have been issued to operating companies, tower manufacturers, consulting engineers, and others, requesting data and opinions regarding the proposed specifications.

What the committee particularly desires at this time is the suggestion of specific clauses, or paragraphs, to be added to or changed in the existing specification, and it is hoped that anyone interested in this subject will communicate at once with the secretary, R. D. Coombs, 30 Church Street, New York, N. Y.

COMMUNICATIONS

Engineering Considerations in a Proposed Line

Pittsburgh, Butler, Harmony & New Castle Railway

Zelienople, Pa., April 20, 1915.

To the Editor:

I was much interested in the article in your issue of March 13 headed "Engineering Considerations in a Proposed Line." The first consideration when contemplating the construction of a railroad is its possible or probable revenue. Capital is much more easily interested in the building of a very expensive railroad that promises large dividends than in one easy to build whose earning power is doubtful. Then, if the proposed road is a connecting one, that is to say, if it is proposed to connect two trunk lines, the very first question is one of relationship between the trunk lines which it is proposed to connect. If a spirit of friendliness and good feeling exists between the managements and there is a manifest need for such a connecting link and the proposed road can enter the field not as a competitor but as a supplemental line, then the proposed road would certainly prove a revenue producer. On the other hand, if bitter feeling was engendered through fierce competition, it would not matter how much the proposed connecting road was needed; in all probability it would prove a failure because each management would endeavor to route all traffic originating on his road as to keep it from his competitor.

Again, the cities referred to might be sources of large revenues or they might prove very poor feeders. If these cities lay in parallel zones of north and south or east and west travel and 150 miles apart, there would be but little intercourse between them. But if they lay in the same zone, the passenger traffic would be certain to prove most profitable. Before determining the probable income from freight traffic a thorough canvass of each city should be made. Every manufacturing establishment should be visited and information secured of the kind of goods made, annual output, present markets and possible markets along the proposed road. A similar canvass should be made of every town along the proposed line. The proposed railroad might cross and connect with numerous other railroads and complete a delivery service for them at very profitable rates. The originating road is not always master of the situation. In fact, it quite frequently happens that the delivering road holds the key to the situation. All of these matters should be very carefully and thoroughly gone into before any work is done and money expended on the proposed road, except that which is necessary to make reconnaissance surveys. The proper sequence is, first, the reconnaissance survey; second, the traffic survey, then the determination as to whether the road is to be built or the project abandoned. Were this *modus operandi* always followed there would not be so many non-revenue-producing railroad stocks upon the market to-day.

Scan a list of railroad stocks, if you please, and compare the market values with the par values. These glaring discrepancies would not exist if all men engaged in the construction of railroads were practical railroad men, or, in other words, if the promoters of railroad enterprises were always practical railroad men there would not be so many non-productive properties in existence to-day. The men who do the technical work are usually college products whose services can be bought for so much "per," who possess neither practical knowledge nor railroad executive ability.

These are the men who will be able to advise as to the relative costs of the various motive powers and their efficiency, and whether a narrow-gage, broad-gage or standard-gage road should be built and why. With the above facts before them they would also be able to determine whether small units and frequent service or large units and less frequent service would prove the more profitable. The questions of roadbed and track materials are ones which the practical engineer would have no difficulty in solving.

J. B. McIntire, General Freight Agent.

Feeder-Tap Resistance in Rotary-Converter Practice

The Cleveland Railway Company

Cleveland, Ohio, April 20, 1915.

To the Editors:

I have noticed the editorial entitled "Protecting Electrical Apparatus" which appeared in the issue of the Electric Railway Journal for April 3. In regard to this subject please be advised that the idea of providing considerable resistance between the switchboard and the first feed-in tap from the feeder to the trolley is not new, as it has been practiced in St. Louis by the United Railways Company since 1902. Again the Public Service Corporation of New Jersey has taken advantage of this practice since 1905. Accordingly in all our work we have taken care to provide sufficient resistance between the nearest point on the trolley wire and the switchboard so as to prevent station knockouts from short-circuits occurring in the vicinity.

There is no fixed rule or method employed to determine the necessary amount of resistance required for this purpose, at any rate I know of none. We are compelled, therefore, to substitute a cut-and-try method by cutting in and out feed-in taps until the desired protection is secured. In Cleveland this question was given very careful consideration when the new sixty-cycle rotary converter substations were placed in operation, and it was necessary in some cases to remove the first feed-in tap from the feed wire to a distance of a mile away from the substation, it being very important, of course, to prevent violent short-circuit current flows in the circuit to which sixty-cycle rotaries are connected.

L. P. Crecelius,
Superintendent of Power.

Westinghouse Electric & Manufacturing Company

Boston, Mass., April 9, 1915.

To the Editors:

In connection with the discussion of converter flashing and feeder-tap resistance a recent experience of mine with rotary operation may be interesting. About a year ago a suburban electric railway in New England shut down its own power plant and purchased central station power. Its source of current had previously been a d.c. engine-type generator. Sixty-cycle 600-volt rotaries were installed in a substation from which to operate this road, on which cars of twenty-seven tons weight are used. Before shifting over to rotaries, some of the equipments on the cars were in bad shape, but did not give much trouble, as the average voltage at the motor terminals was low. When current from the rotaries was delivered to these cars, however, the voltage on heavy loads was maintained at 600, and numerous short-circuits were experienced.

This was especially frequent just outside of the substation where the feeders and trolleys tapped. The "shorts" were frequently followed by flashovers at the rotary commutators, sometimes from brush-holders to the bearings or frame.

As the superintendent of this road strenuously opposed the removal of any taps, resort to various expedients were necessary, as follows:

First, electrolytic lightning arresters were connected across the terminals of the rotaries. This relieved the stress somewhat, but did not appreciably reduce flashovers. Then, the machine breakers were set high in order to have a feeder breaker trip and not relieve the rotary of the whole load suddenly. This was effective except at such times when excessive overloads were experienced on two or more feeders, in which case the machine breakers would trip, often followed by flashovers. Then time limits, applied to machine breakers, were installed. This helped to reduce flashovers materially, but did not eliminate them. Finally, the taps outside the substation were removed to points about ½ mile distant, and the flashovers vanished.

It has been found especially difficult to convince engineers who have always operated electric railways from motor-generators that short-circuits on rotaries, supplied with power from a large central station, are more vicious and difficult to handle than those on motor-generators. With a d.c. generator driven by a motor, the short-circuit current is limited by the output of the machine, which has a drooping voltage characteristic. In the case of a rotary, however, all of the current back of the rotary in the power house has to be handled by the rotary and the d.c. voltage holds up if the a.c. voltage does. The resistance in the feeder line between rotary and taps may be looked upon as furnishing the equivalent of a drooping voltage characteristic for the rotary which, of course, tends towards the elimination of flashovers.

If the superintendents and engineers of railways operating rotary converters will exhaustively study the operating characteristics of rotaries, there is no question but that their desirability will be more thoroughly appreciated.

E. C. Baugher,
Manager Railway and Lighting Division.

Removing Pinions from Motor Axles

General Electric Company
Schenectady, N. Y., April 13, 1915.

To the Editors:

I have read with very much interest the description of the Chicago Elevated Railways, method of mounting pinions, appearing in the issue of the Electric Railway Journal for March 20, as well as the two articles on the same subject by R. H. Parsons, in the issues of March 27 and April 3.

The subject covered in these articles is extremely important and is worthy of the most careful consideration by every operator. The methods usually employed are at the root of many pinion failures, sprung shafts, etc.

I am heartily in accord with the points mentioned in these articles with the exception of the reference to the use of a gas ring in removing the pinion. The application of flame to pinion teeth is extremely dangerous and very liable to destroy the value of the heat treatment at the point where the flame touches, even if the flame is applied with the utmost care.

Pinion removal on some of the older types of box-frame motors is a serious problem owing to the limited space between the pinion and the framehead, but the operator can, at a very slight expense, change his frameheads to accommodate a suitable pinion puller.

If a pinion cannot be removed by a properly designed puller it is an indication that too much force was exerted in mounting, and a little care in the mounting methods will obviate the majority of the removing troubles.

The following method seems to give the most general satisfaction for removing pinions: Select a pinion puller which is designed to withstand high stresses without injury to itself and which grips the motor ends of as many teeth as possible, thereby preventing localization of injurious stresses on the ends of two or three teeth. With the jack screw of the puller set up to the limit, the majority of pinions can be removed. If not, with the pinion still under tension of the puller, block up the pinion from the floor to prevent springing the shaft, and provide a metal protection which will span and touch the tops of three or four teeth. Then lay the protector on the tops of the teeth and strike it a sharp blow. This method will take care of the most aggravated cases, but will not have the desired effect unless the underside of the pinion is rigidly supported.

A. A. Ross,
Railway and Traction Engineering Department.

Making the Safety Movement Permanent

The Cleveland, Southwestern & Columbus Railway
Cleveland, Ohio, April 14, 1915.

To the Editors:

In connection with your editorial entitled "The Brass Band in the Safety Movement," permit me to say that I do not think electric railway companies have yet learned to differentiate between the conditions surrounding the applicability of the safety-first movement on steam railroads and those on the street and interurban railways. The conditions differ widely also on each of these classes of electric roads, although to some extent they are analogous. I will confine this letter to a discussion of the interurban aspect, as I see it.

Most of the accidents on steam railroads are those occurring to employees in the discharge of their duties in the shops, in the switching yards, on the tracks and in the handling of freight trains. The number of passengers injured is comparatively small. On the other hand, the number of accidents to interurban railway employees is comparatively small, while by far the larger number occurs to passengers and trespassers. This is due to the fact that interurban railways cross more streets at grade than the steam railroads and, in addition, run upon the streets of villages and cities.

The function of safety committees on steam railroads is largely to provide ways and means of reducing accidents to employees. The expense of maintaining these committees is largely compensated for by changed physical conditions, the introduction of safety devices, the installation of danger signs, the adoption of new tools and machinery, etc. Very few safety measures are taken, however, to diminish the number of accidents to passengers.

Many interurban roads have established safety committees according to the plans followed by the steam railroads. In consequence, they have found themselves maintaining expensive organizations whose recommendations involve the expenditure of money for new equipment, safety appliances, new tools, machinery, etc. These, no doubt, are beneficial to the road, but in cost are entirely out of proportion to the object sought, namely, to avoid the greatest number of accidents for the least outlay. For instance, it is estimated that about 85 per cent of all accidents are caused by the negligence and carelessness of the employees. It is, therefore, entirely out of proportion if 95 per cent to 98 per cent of the recommendations of safety committees involve the expenditure of money for new equipment. Safety

devices are valuable only in so far as they better general conditions. They are not specific enough to eliminate the accidents caused by the employee. Moreover, on roads inspected by public utility commissions, the returns from accidents caused by defective equipment are almost negligible.

There also arises the question of whether the magic words "safety first" have not spent their force and lost their effectiveness. I prefer always to refer to the work as the "prevention of accidents," rather than the "safety first" movement. We often hear and see employees and the public refer to safety-first signs in a jocular way. We see the safety pins and perverted cards used in advertising stunts. We see the slogan used for banks, trust companies, laundries or for almost any other manufacturing and mercantile business, so that I believe it has become so common that it has lost its effectiveness in our business. I am still of the opinion that the only way accidents can be prevented is by using moral suasion and developing a proper spirit in the employee. Educate employees along the lines of their duty toward themselves, their fellow-men and their companies and reach the public through the schools. Then satisfactory results are sure to follow.

E. F. SCHNEIDER, General Manager.

BUREAU OF SAFETY

CHICAGO, ILL., April 16, 1915.

To the Editors:

Under the caption "The Brass Band in the Safety Movement" the ELECTRIC RAILWAY JOURNAL recently printed an editorial which was gladly received by those conservative safety workers who have viewed with alarm the tendency toward spectacular and harmful methods resorted to so frequently for the promotion of safety. It is to be regretted that a work so essential and so beneficial should have been diverted in this "brass band" way.

Accident prevention work is a common-sense work and, like the other activities of the company, is dependent for success upon common-sense methods constantly maintained and intelligently directed.

Whenever an employer desires to promote any of the important operations of his industry, he does so by the development of a carefully-studied and well-executed plan of organization, based upon common-sense methods and by enlisting the co-operation of his organization. The whole force of employees appreciates the saneness of such a plan and therefore gives it loyal support. Accident prevention should not be considered differently but should receive very similar and businesslike attention.

"Safety first" must not be a meaningless, flippant slogan. Safety must be a part of the business of the entire force of men and so recognized by every executive and in the office and in the shop. Not on safety days alone but every day, not by a safety committeeman alone but by every man.

If safety work is considered of secondary importance and is spasmodically or indifferently considered, it will be looked upon by the workmen as a fad and will receive but little earnest co-operation. If, however, the employer impresses upon his men that it is a common-sense part of the business, the employee will readily and earnestly give his support to the movement.

An occasional campaign characterized by entertainment, smokers and moving pictures cannot impress the employee with the seriousness of the safety business. It is rather apt to instill in his mind the thought that there is not much in a subject so presented to call for his serious consideration. The intelligent worker finds the business of living a most serious matter and his labor and ability to earn a living a most important fundamental possession. Any movement designed to improve or to conserve these, his chief assets in life, is absolutely sure to meet with his commendation and his hearty support.

Safety or accident prevention is important to the employer for humanitarian and economic reasons. It is similarly important to every citizen. Safety or accident prevention is particularly important to the worker because he is the directly interested beneficiary and holds largely within his own power the guarantee of his own safety. To the employer it is a matter of humanity to the employees, who are for the time his wards, and of returns on an investment of which he is custodian. To the employee it is a matter which concerns his life and his fortune and ofttimes the welfare and happiness of his dependents. The workman is not slow to realize this, and whenever so impressed and so interested he becomes a part of the safety movement, and that is most effective and most invaluable in the particular plant where he is employed and in the community where he resides.

The man who, because of the hurry of modern times or the desire to excel in his work, sometimes takes chances that might eliminate him from the world's activities, has only to be reminded of these things in order to become interested in this great work of conservation. This is the accident-prevention spirit, the greatest factor in accident-prevention work. It is this spirit of accident prevention which, if fostered and encouraged, will do more than anything else to bring about the desired results to that employer who is anxious to rid his plant of preventable accidents. One such man and his influence are a far greater factor toward real safety in the plant than misdirected and unbusinesslike safety methods ofttimes employed in an effort to obtain quick-cure results. No successful plan for safety and no sustained interest on the part of employees can be maintained without the co-operation born of a realization of this individual responsibility on the part of the man on the job.

Sustained interest in this movement can only be had by maintaining a perpetual organization and sub-organizations, so formed as to include all of the men of the plant and so systematized that periodic meetings will be held in which all of the members of the respective organizations and sub-organizations will have a chance actively to participate. This participation should include the discussion of accidents, the consideration of the causes which contributed to them and the opinions of the workmen as to how such accidents or near accidents might have been prevented. Such meetings of groups of men should be provided with all the information obtainable as to all of the accidents which occur in the plant and with an accurate analysis of the various causes which contribute to these accidents. The workmen should be encouraged to give suggestions for the elimination of physical hazards, for the cultivation of thoughtfulness and for the improvement of habits and practices that tend to cause accidents. Suggestions and recommendations originating from the workmen should receive the most careful attention from those to whom they are submitted, and an explanation should be made in all cases to the workmen of the reasons why any particular recommendations were rejected.

CHARLES B. SCOTT, Secretary and Treasurer.

Safety buttons have been awarded to six employees of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, as recognition of suggestions made by them for additional safeguards for the traveling public.

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.)

Dispatching City Cars

BY EDWARD DANA, ASSISTANT SUPERINTENDENT OF TRANSPORTATION, BOSTON ELEVATED RAILWAY

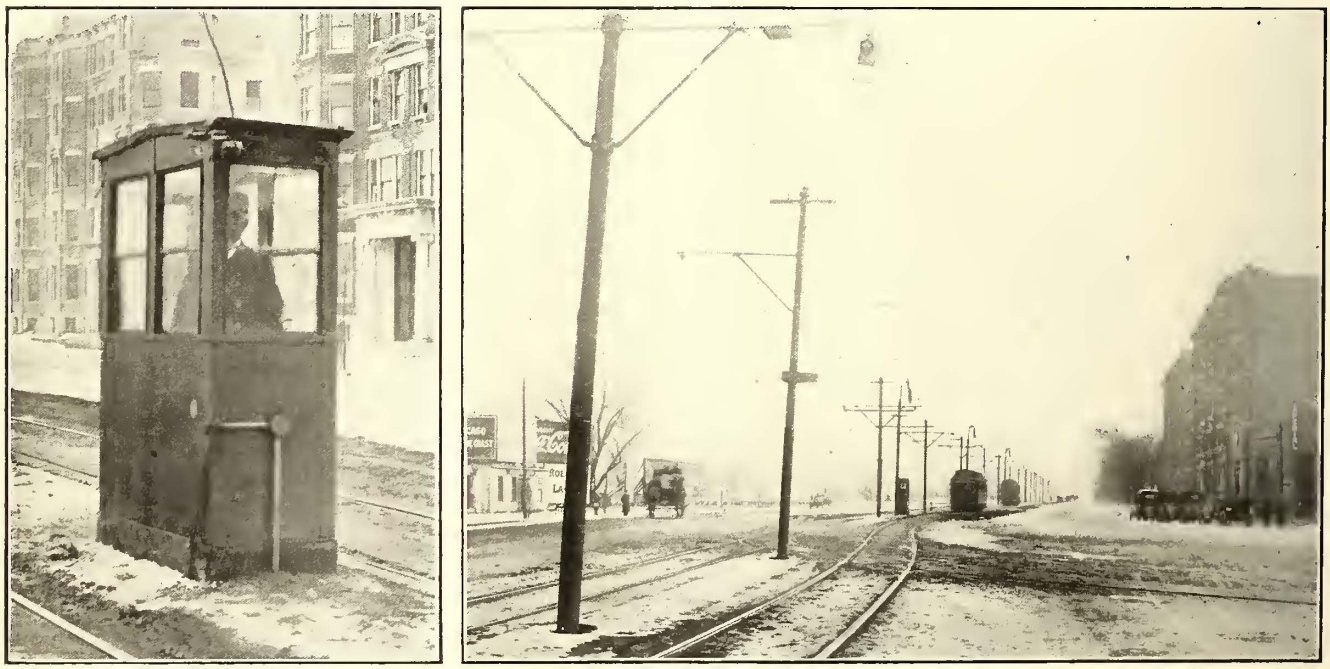
The Boston Elevated Railway has recently constructed between its tracks on the Commonwealth Avenue reservation a sheet-steel booth set upon a concrete base, as shown in the accompanying illustration. The inside dimensions are 5 ft. x 2 ft. 2 in., sufficient to accommodate one man without discomfort. It is lighted by electricity and provided with an electric heater. The front and both sides are provided with windows, allowing a wide range of vision for the individual inside. A telephone has been provided connected with the division headquarters in which the booth is located, and such light equipment as may be required for use in emergencies.

The man on duty is provided with stool and writing shelf, and he maintains a train sheet showing by routes the exact arrival time of cars throughout the day at this important junction point. He is provided with two switches which control red signals suspended from the trolley pole arm on the two converging tracks on Brighton and Commonwealth Avenues. He can thus hold cars which have arrived ahead of schedule or can properly space cars so that they will alternate on the main line. This is of great value at the in-town terminals, for a great deal of public criticism can be avoided when cars to different destinations are properly alternated, instead of running in groups to the same destination. Such a complete record of car movements approaches the long-established station or dispatcher's records of the steam railroads and obviously can be of service to the claim department, as well as of value to the transportation department in remedying defects in the service and refuting untruthful condemnation of its service.

While opportunity does not always exist to control all lines at strategic points, wherever it does exist it should be the aim of the up-to-date railway to adopt such efficiency methods. Cars are started on time from their respective terminals, or if they are not there is no excuse for such failure. If, then, at some strategic junction point or points they may again be checked and by means of some control signal can be started over again if they are ahead of time, a great deal of the demoralization of the service can be prevented.

On any heavy line each motorman is apt to have his own views as to the operation of his car to fit street and traffic conditions. The initial half of in-bound trips is usually light because the cars are operated in the more sparsely settled territory. If, then, a certain percentage of the motormen on the line make a practice of meeting the congested conditions on the in-town end of the line by running ahead of time over the initial section, they simply aggravate the trouble in that section by unbalancing the traffic load, skipping passengers they should have taken, delaying the following cars and creating the not uncommon condition of bunched cars. This adds to the unavoidable delays in the congested section a further factor, with the result that the elapsed time allowed on the schedules tends to meet these conditions, thereby utilizing a greater number of cars, and consequently crews, than is absolutely necessary to perform the given service.

It is true that inspectors are supposed to prevent just such conditions, but if we stop to consider their multifold duties and the little time which they can give actually to check individual car schedules, it is not sur-



DISPATCHING SURFACE CARS AT BOSTON—DISPATCHER'S BOOTH; SIGNAL CONTROL INSTALLATION OVER TRACK

prising that they should work largely by rule-of-thumb methods. On the other hand, with a positive check and full advantage taken of it, pretty nearly the maximum efficiency and economy are obtained. To determine the relative saving, suppose a company operated 1800 cars and that by proper service regulation a reduction of 1 per cent in cars operated could be secured; this would represent a capital investment of eighteen cars at $8,000 each, or $144,000, which could be dispensed with. The interest alone amounts to approximately $8,000, or sufficient to maintain such traffic men at all hours at six strategic points. There would also be a saving in mileage, wear and tear, wages, etc., of no mean proportion.

We should not expect that the multitudinous conditions of to-day can be successfully met with the same relative amount of supervision as existed a decade ago. Time ticked off at the same rate then as now, but action ticks off much faster now than then, and individual carelessness has increased, thereby resulting in the need for a greater amount of molding, watching and checking up if the greatest ultimate efficiency and economy are to be obtained.

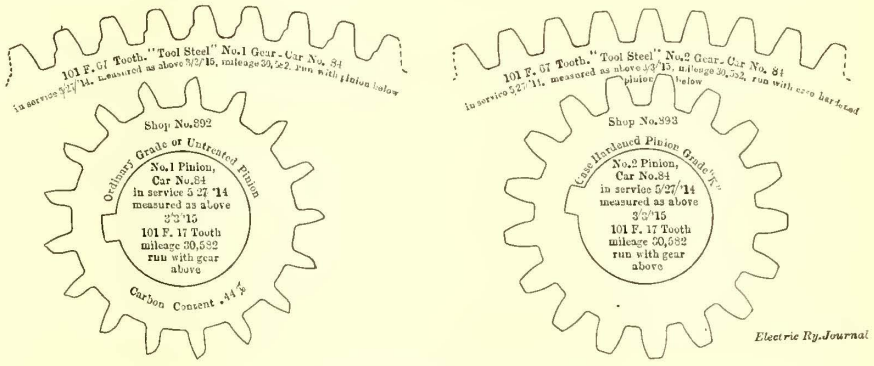
Working Ordinary and Hard Gears and Pinions Together

BY W. H. MC ALONEY, SUPERINTENDENT ROLLING STOCK DENVER TRAMWAY COMPANY

Within the past four or five years and during the early introduction of high-grade or hard gears and pinions, some operators thought it was good policy to work a hard pinion with a soft or ordinary-grade gear. The claim made for this practice was that the hard pinion would keep its tooth contour for a long time, thereby giving perfect meshing and so eliminating the back lashing or battering which the ordinary grade will not stand so well.

Through a joint error of the storeroom and a shopman, the No. 1 motor of car No. 84 was equipped with an ordinary-grade pinion on May 27, 1914, although this car was otherwise fitted complete with high-grade or hard material. The results of the error are shown herewith.

The right-hand portion of the drawing shows that on the No. 2 motor which used hardened material for both gear and pinion practically no wear resulted after 30,582 miles had been made in city service. Contrariwise, as indicated by the left-hand portion of the drawing, the No. 1 motor which used a hardened gear with a soft pinion showed for the same mileage about 25 per cent loss in pinion life and about 75 per cent loss in gear life.



AN EXPERIMENT IN GEARING

Left-hand view shows bad effect of meshing an untreated pinion with a treated gear. Right-hand view shows good effect of meshing a treated gear with a treated pinion.

Electrical Equipment of Belmont Tunnel Cars

In connection with the article on page 764 of the ELECTRIC RAILWAY JOURNAL for April 17 bearing this title, the statement should have been made that the General Electric Company also is furnishing electrical equipment for this route of the Interborough Rapid Transit Company. The total number of cars is twelve, six with Westinghouse apparatus and six with General Electric apparatus. The GE equipment per car consists of two GE-240-C tapped-field, fully-ventilated motors, and a new electro-pneumatic, low-voltage, lightweight control, designated as PC-2.

Joint Repairs

BY S. GAUSMANN, BROOKLYN, N. Y.

While much can be said about the different kinds of joints used by American city railways, the writer will endeavor to cover only the subject of repairs.

AVOID SHORT BONDS UNDER PLATES

In the older style of plated joints on 9-in. rail most of the joint failures can be traced to the use of short bonds under the plates. The bond holes come so close to the rail ends that they cause the latter to split. It is well to remember this experience even where a modern plated joint is used, for while the use of short bonds under plates might save a little in first cost as against a long bond around the plates, such savings will be more than offset by the early failure of the joints and the consequent cost for repairs.

COMPLETE JOINT REPAIRS BY GRINDING

Joint repairs receive too little attention and much money is wasted in making these repairs because the work is not completed by grinding. I have yet to see a joint that will not pound from the start if it has not been ground absolutely level.

Many styles of grinders, from the ordinary file to expensive machines are available. No road, no matter how much it desires to economize, can afford to be without some kind of grinder. On account of the amount of grinding to be done at the joints a wheel grinder, if handled by experienced men, is preferable. A good electrically-operated grinder can be constructed, chiefly from old material usually found in electric railway shops, at a cost not to exceed $300. This is but a small investment when the value of its work is considered.

If followed closely joints can be kept in good condition by the use of the file and holder first illustrated in the ELECTRIC RAILWAY JOURNAL for Oct. 25, 1913, and described in detail on page 194, Jan. 24, 1914. The common tendency, however, on many railways is to wait until the joints show serious defects, when much more expensive repairs are necessary.

THE DISH AS IMPORTANT AS THE WORN JOINT

While many methods have been devised to make repairs to joints, the "dish" in the rail opposite the joint is neglected. This "dish" should always be taken care of by arc welding, by grinding, or by both methods. If this work is not done at the same time that the repairs of the joint are made, the next failure of the joint will be accelerated.

Breaks in the casting of cast-welded joints are often due to poor or to cold metal. Of the various re-

pair methods available, the most satisfactory is to cut in a piece of rail. It may be added that when a break of this kind occurs the metal can be easily removed from the rail and repairs made by cutting in a "dutchman" equal to the size of the opening and by plating the joint, but while this method is inexpensive the job is of doubtful durability.

Drawing Back Cut Rails Instead of Using Short Inserts

Where old 9-in. track is to be extensively overhauled, without relaying, the old plates should be discarded and new plates substituted, because a close examination invariably will show that the old plates are badly pounded. Further, the rail should be thoroughly cleaned to remove all scale and corrosion before the new plates are installed.

If we cut out broken rails in track which is being overhauled and substitute short pieces therefor we are discarding much good rail and increasing the number of joints in the track. More satisfactory repairs can be made and the life of the rail lengthened considerably by cutting out the bad ends and "bucking back" the rail. In other words, the rails, whether cut or not, are drawn back until they abut. Where possible, the holes remaining should be left in the rail so that they can be used with the new plates. Thus each joint can be repaired by using but one pair of plates, and instead of using short inserts one piece of rail, say 20 ft. long, can be installed at the end.

The cost of doing the work as described is practically the same as simply to repair joints without cutting back, and the track is left in much better condition.

As an illustration we will take 120 ft. of single track, which, with 30-ft. lengths of rails, means eight joints. Let us assume that the rail is broken or battered down at four of these joints. The following will then be the comparative costs of the two methods with wages averaging 18 cents per hour.

In the first method we must cut in 8-ft. pieces of rail at the four joints, replate the joints with the old plates, supply new plates for the additional joints, and bond all joints with one compressed terminal bond around the plates at each joint.

In the second method we cut out bad ends at all joints, put in one piece at the end, replate all joints with new plates and bond as in the first method.

	First Method	Second Method
Cutting rail and removing plates	$2.08	$2.08
Drilling and plating	3.85	2.90
Repairs other joints	1.20	....
Bonding labor	2.40	2.00
Grinding joints and dishes	10.40	8.36
Rail	8.64	4.32
Bonding material	9.36	7.80
Joint plates, new	7.40	18.50
Bolts and miscellaneous	5.17	4.40
	$50.50	$50.36
Credit; old rail and plates	6.30	5.40
Net cost	$44.20	$44.96

Joint Repairs by Reforming Old Plates

Where joints are to be repaired in old track, without general overhauling of paving, etc., the invariable practice is to reform the old plates. The economy of this is doubtful and depends much upon the length of time that the joints have been permitted to pound and upon the style of plates involved. Where dishes are but slight, the reforming of the old plates is advisable, preferably with a plate bending machine rather than by hand. However, this practice is not economical when the dish has developed considerably because it is then necessary to grind away too much of the head of the rail to level the joint. To be sure, when this is done the track is put in better condition, but the improvement is not permanent.

The arc welder is doing much to simplify joint repairs, for with this method bad dishes and even pieces that have broken out of the rail head can be built up.

The following comparison of the cost per joint according to the various methods described is for average conditions. It is assumed that the plates are in good condition, and no allowance is made for the elimination of split rails, for the cost of opening and closing the pavement, for removing plates, for replating, for bolts and for bonding, as all of these items would be the same in each case.

The wages per hour of men employed are blacksmith, 35 cents, with helper at 20 cents; grinderman, 25 cents, with two helpers at 18 cents; welderman, 25 cents, with one helper at 20 cents and one helper at 18 cents, and two laborers on machine at 20 cents.

	Hand	Machine	Welding
Raising and fitting plates	$0.46	$0.11	...
Grinding	.52	.52	$0.32
Arc welding	...	...	.35
Interest on investment	...	.01	...
Total	$0.98	$0.64	$0.67

While some kinds of plated joints permit the use of the old plates in repairs, the ordinary fish plate cannot be satisfactorily reformed. It should be replaced with new plates, using machine bolts with drive fit. The cost of the new plates increases the cost of the joint, but repairs made in this manner will prove more economical and durable in the end.

Taking Care of Split Rails

Hardly any road has a standard for the lengths of rail to be cut in to care for split rail ends. Some use 4-ft. pieces while others use 8-ft. pieces, these being cut before they are taken to the work. This practice, however, results in scrapping much rail from which further service can be obtained.

The most desirable and economical way to use rail for this purpose is to make the first cut in track say 8 ft., substituting therefor a piece of the same length. Then, after cutting off the bad ends of the piece removed use it for the next insertion, continuing this salvage operation until the last piece of recut rail is 4 ft. long. In this way we can use up all old rail by cutting out the split or dished ends only. This method has other advantages besides the saving in cost of rail, principally in allowing one to use rail which is worn to the same degree as that in track, thereby reducing the cost of grinding and permitting the wear to continue evenly.

Conclusion

There is but little to summarize, but that little is that the secret of efficient joint repairs lies in the thoroughness with which the work is done. This work should always include arc welding and grinding. While the cost might be thought high at the time, the results will justify the greater initial expense in the end.

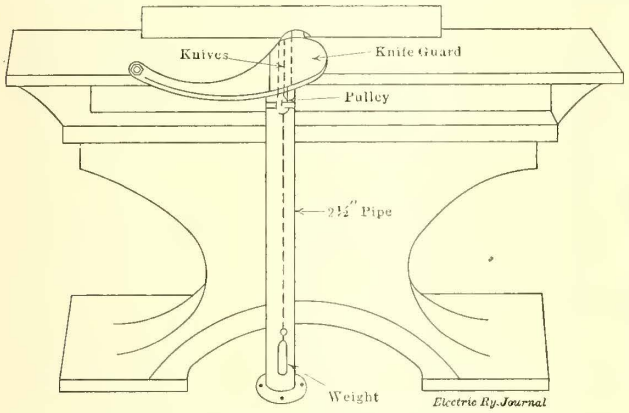
A recent issue of the *Commerce Reports*, published by the bureau of foreign and domestic commerce, gives a brief account of the opportunities for export trade in electric apparatus to Brazil. It speaks of the Para Electric Railway & Lighting Company, operated by J. G. White & Company of London, as having material on the ground for an extension of its lines as soon as the financial condition permits. The lighting system at Maceio, owned by J. Basto & Company, is said to be considering the installation of a small electric railway line.

Knife Guard for Jointer or Hand Planer

BY A. R. JOHNSON, ASSISTANT TO SUPERINTENDENT OF EQUIPMENT THIRD AVENUE RAILWAY SYSTEM, NEW YORK

One of the many features of the safety-first movement is to encourage employees, particularly those who are actually in the shops, to send in any suggestions which they believe would tend to eliminate accidents to operators of shop tools. An excellent way to promote this work would be to have some employee of mechanical ability occasionally pay a visit to different machine shops to study the various methods and ways of prevention. Real accident prevention can be accomplished only by those who understand machinery, lectures and moving pictures being of secondary consideration.

The accompanying sketch shows an efficient guard for a jointer or hand planer. Those familiar with this class of machines can readily appreciate the necessity of guarding them because the least slip on the part of the



INSTALLATION OF WEIGHTED KNIFE GUARD ON WOODWORKING TOOL

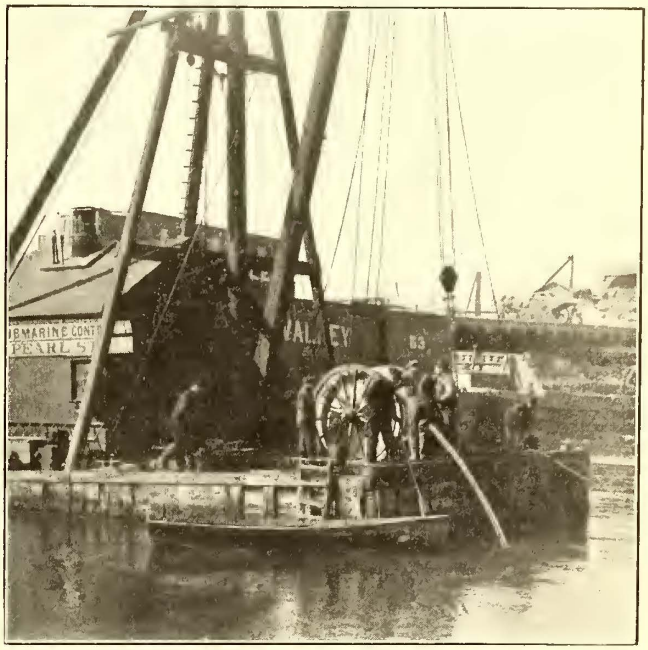
operator is liable to result in the loss of some fingers or part of the hand. This guard is arranged always to cover every part of the knives attached to the machine. It consists of a piece of wood bolted to the machine at one end and arranged to slide back and forth. It is kept flush against the material which passes over the knife by means of a piece of weighted wire or chain. The latter is attached to the under part of the guard on the outer edge and passes over a pulley installed at the upper part of a 2½-in. pipe.

A Submarine Cable Installation

Recently the Brooklyn Rapid Transit System installed three submarine cables across Wallabout Canal. Each cable was approximately 275 ft. long. The cable is three-conductor, 11,000 volt, 350,000 circ. mil., 5/32 in., 30 per cent Para rubber over each conductor plus 2/32 in. varnished cambric and a 5/32 in. varnished cambric belt over all, 5/32 in. plain lead sheath jute bedding, No. 4 B. W. G. galvanized steel wire armor and a final jute wrapping.

The factory test was 27,500 volts between the conductors and between the conductors and ground for five minutes before armoring, and a test of 21,000 volts between conductors and between conductors and ground for armoring. The illustration herewith shows the cable in course of installation by the New York Submarine Contracting Company.

After these cables were stretched across the canal and properly located, divers went down and made use of water pressure to place the cables in the bed of the canal to a depth of 17 ft. below mean high water. This was done to prevent the propellers of vessels from injuring the cables. In the manholes on each side of the canal the cables are spliced to three-conductor, high-tension 11,000-volt, sector, paper-insulated, lead-incased cables, and between the manholes and the bulkhead they are installed in 4-in. galvanized iron pipes, so that the cable may be readily removed in case of trouble.

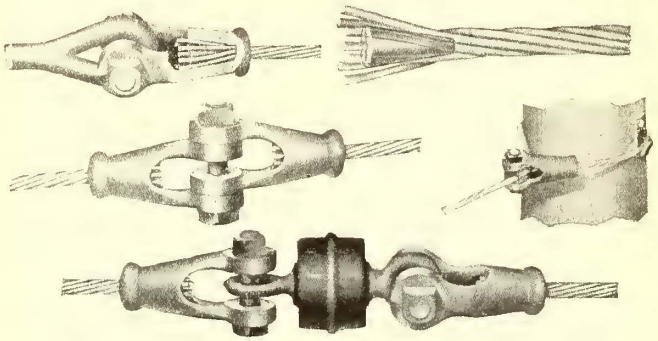


INSTALLING THREE 11,000-VOLT SUBMARINE CABLES ACROSS THE WALLABOUT CANAL

In the manholes a split band was placed over the armor of the cable and against the iron pipe, and the armor was bent back over the clamp to prevent the cable from being pulled from the manhole in case vessels should foul them.

Clevis Clamps for Stranded Conductors

An efficient wire clamp known as the "Marchand," for clamping guy wires, messenger wires and trolley span wire, etc., has been developed by the Steel City



CLAMPS FOR STRANDED WIRE

This illustration shows clevis clamp attached to anchor rod, plantom view of tapered plug inserted in end of guy wire, method of splicing by use of two clevis clamps, clevis clamp as a pole fastening, clevis clamp adapted to strain insulator.

Electric Company, Pittsburgh, Pa., and is shown in the accompanying illustrations.

The clamps devised for stranded wire and aluminum conductors are made in the clevis style. It will be seen that the clamping principle applied, as shown in the accompanying phantom view, is the simplest of all, namely, the wedge. The clamp proper consists of a conical-

shaped socket and conical wedge. The wedge is slotted to allow compression and has a hole through the center for the passage of the core or center wire.

The strand is first inserted in the socket, and the tapered plug is forced over the core or center wire so that the sheath wires are spread apart. The cable is then drawn back into the socket by the cable strain, the tapered plug compresses and grips the core wire or wires, and the sheath wires are gripped or wedged between the tapered plug and the wall of the socket. The sheath wires are evenly separated by the projections inside the socket to insure equal distribution of pressure on the tapered plug and wall of the socket.

These clamps securely grip each wire of the strand without introducing strains which would tend to weaken the strand at any point. The strand cannot squeeze out or be released upon excessive strains or the sudden release of strain. The deformation of the tapered plug under pressure caused by strain on the strand is amply provided for in this way—the wires that have the greatest strain are imbedded in the malleable metal until the other wires take up their proportion of the total strain to which the strand is subjected.

The large size clevis clamp for seven-wire strand weighs only 24 oz. and will hold ½-in. seven-wire strand guy wire to the approximate breaking point of 22,000 lb. These clamps are designed to carry 50 per cent more load than the tensile strength of the strand to be applied. Only one clamp is required for each connection. When subjected to the maximum strain, less than ⅛-in. of slack is realized from normal to breaking point of the guy wire.

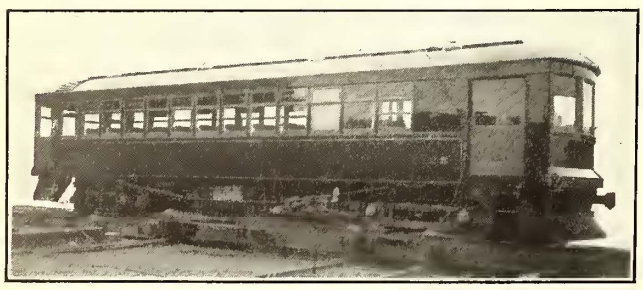
Combination Car for Kansas Interurban Line

The Kansas-Oklahoma Traction Company has recently ordered from the American Car Company, St. Louis, Mo., for its new interurban line, a semi-steel passenger and baggage car, which is shown in the accompanying illustration.

The general dimensions of the car are as follows:

Length over the Hedley anti-climbers	50 ft. 5 in.
Length over the vestibule	49 ft. 5 in.
Length of the passenger compartment	30 ft.
Length of the baggage compartment	15 ft. 2 in.
Width over the sills	8 ft. 5 in.
Height from the sill to the trolley base	9 ft. 2⅛ in.
Height from the top of the rail to the sill	3 ft. 5½ in.

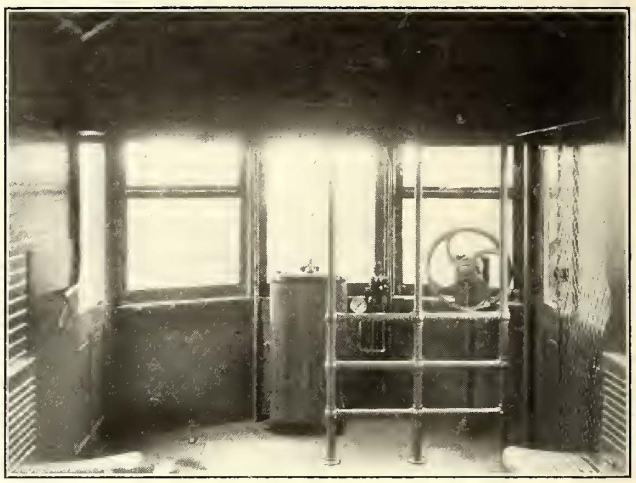
The underframe is composed of side-sill angles with longitudinal I-beams and channel cross-sills. The side of the car is sheathed with No. 14 steel. The car body is mounted on Brill-27-M.C.B.-2X trucks, each of which



COMBINATION PASSENGER AND BAGGAGE CAR FOR THE KANSAS-OKLAHOMA TRACTION COMPANY

is equipped with two Westinghouse No. 306 motors; Nuttall gears, Westinghouse pinions and Midvale 34-in. wheels. Westinghouse control and air brakes and American hand brakes are used. The couplers are of the Tomlinson radial type. Pilots are attached to the underframe at both ends of the car.

The seating arrangement of the car provides for fifty-four persons, forty-two in the passenger compartment and twelve in the baggage compartment. The rattan cross-seats in the passenger compartment are of the Brill Winner pressed-steel type. They are 37 in. wide and allow for a 22½-in. aisle. A 24-in. door connects the passenger and baggage compartments. The latter compartment, in addition to four transverse seats,



PROTECTIVE RAILING FOR MOTORMAN IN BAGGAGE SECTION OF COMBINATION CAR

contains two longitudinal folding slat seats. A Peter Smith hot-air heater, located in this compartment, distributes heat through the car by means of ducts. Heavy 1¼-in. pipe framing, as shown in an accompanying illustration, is erected just behind the motorman's position to protect him during the loading and unloading of baggage.

Ventilation is obtained through the arch roof by means of eight Brill exhaust ventilators, four on each side of the center line of the roof. Other special equipment includes the Curtain Supply Company's curtain fixtures, Pantasote curtain material, Sterling fare register, National Lock Washer Company's sash fixtures, O. M. Edwards trap doors and Earll trolley retrievers. The interior trim is in bronze.

Automatic Flagman Crossing Protection for the Rhode Island Company

The Rhode Island Company is making installations of automatic crossing protection on its Buttonwoods-Rocky Point line, consisting of twenty-four automatic flagmen furnished by the L. S. Brach Supply Company, New York.

The arrangement is such that on approach of the car toward the crossing a triple warning is given to those using the highway by the visible effect of a swinging red lantern, a moving blade and the ringing of a locomotive type bell. The effect of the swinging red light is furnished from eight 25-watt stationary lamps, to each of which current is supplied alternately backward and forward. As the lamps are behind red lenses, the effect obtained is similar to that of a swinging red light. Long hoods, which protect each lamp, make these lights plainly visible in the daytime at a greater distance than a crossing bell can be heard, especially to automobilists for whom this crossing protection is especially adapted.

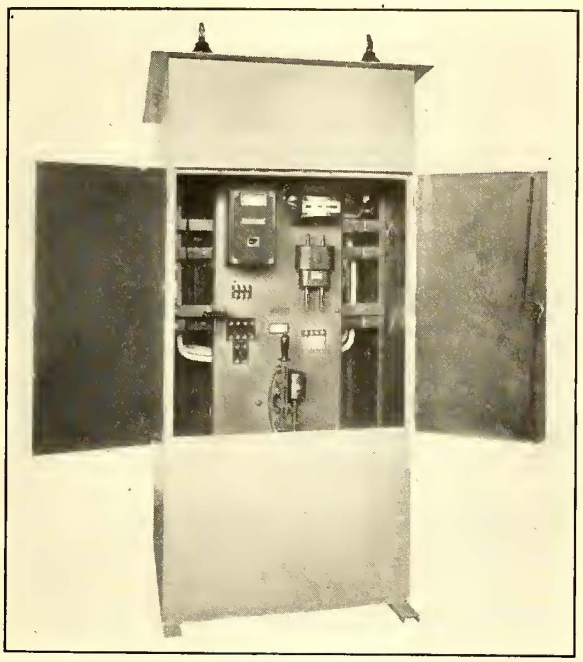
The moving blade consists of a large enamel disk, on which the word "stop" appears, in white letters on a red background. This is swung to and fro similar to a pendulum movement. Above the disk is a weather

protection for the swinging blade, on which the words "When in motion" appear, so that the combination reads, "When in motion—Stop."

This signal is governed by relays operated from track circuits to be used in combination with the Rhode Island Company's new automatic signal protection furnished by the Union Switch & Signal Company.

Rural Substation in Railway Signal Work

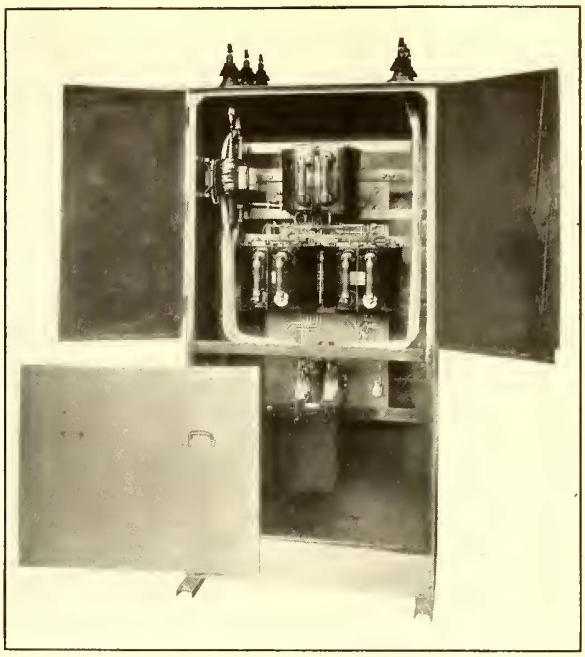
The field of application of the rural substation is constantly broadening as its merits become better recognized. The main features are, of course, mobility, ease of installation and low initial cost as compared with a permanent indoor substation of like capacity to accomplish the same result. The accompanying illustrations show views of the first outdoor-type steel switchhouses of this class built for railway signal purposes, and used in this connection by the Southern Railway at Inman, S. C., and Austell, Ga. The outdoor substations, of which the switchhouses are a part, effect a considerable



FRONT VIEW OF 4400-VOLT, THREE-PHASE SWITCHHOUSE FOR RAILWAY SIGNAL SERVICE

saving in outlay as compared with what would have been the cost of a substantial permanent substation to house the equipment. Each house is located at the foot of a pole tower supporting the transmission line, the outdoor power transformers, disconnecting switches, choke coils and lightning arresters.

The equipment of the switchhouses is a little more elaborate than usually required for power or lighting purposes. The ordinary house has merely an oil switch, or an oil switch and watt-hour meter, with the necessary current and potential transformers. In the house illustrated there are also an extra potential transformer, a voltmeter, a circuit-closing relay, two potential receptacles, and an incandescent lamp with bracket. The extra transformer, two potential receptacles and voltmeter in connection with the other two potential transformers required for the watt-hour meter, allow the voltage to be read on both sides of the oil switch before it is closed. The incandescent lamp gives illumination at night for reading the voltage or for lighting the inside of the house. The circuit-closing relay is used in the usual manner to trip the oil switch in case of overload or short-circuit.



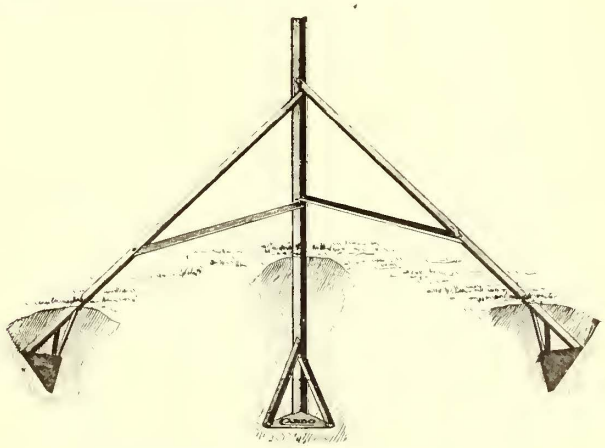
REAR VIEW OF 4400-VOLT, THREE-PHASE SWITCHHOUSE FOR RAILWAY SIGNAL SERVICE

Equipments of this kind are now being built by the General Electric Company. The houses are shipped wired complete, so that the only construction work necessary to put them in commission is to fill the oil vessels and connect the incoming and outgoing leads to the roof bushings.

Wide-Wing Spring Posts for Right-of-Way Fencing

The tendency toward more durable right-of-way fencing than is afforded by the ordinary wooden post or short-lived metal post is indicated by the earth-cushioned spring-post system of the Carbo Steel Post Company, Chicago, Ill. The outstanding merits asserted for this construction may be taken up in the following order:

Easy Transportation and Installation—The posts are made of rust-resisting steel of such high tensile strength that a very light and properly designed section will take care of strains that would upset other posts. It is necessary only to drive the post to one-half the depth used for wooden posts, since the carbo post (anchor-drive type) is furnished with wide wings that give an excellent anchorage. This post, furthermore, can be installed in cold weather.

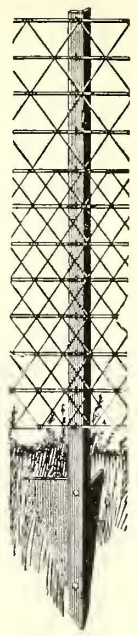


INSTALLATION OF A CORNER POST

Springiness—When in a fence the posts act like a spring—the earth itself becomes the shock absorber of the post. By cutting through the ground at the ground line, the posts transfer the usual breaking-off strains at that line to the fencing itself. Special strain corner posts, with suitable bracing, are provided for curves and sudden changes in grade.

Sanitary—Wooden fencing posts are now recognized as favorite haunts of the clinch bug and other farm pests. For this reason right-of-way fencing through farming country should be free from this source of trouble, even where the law does not forbid wooden posts.

Durability and Maintenance—It has been demonstrated that the short life of fence posts is due to stiffness of the line posts, every line post necessarily acting as a corner. Stiff posts break off because they cannot transfer the strains to the fencing. The wide-wing spring post avoids this source of loss in addition to being proof against fire, vermin and lightning. If properly maintained by means of occasional repainting above the ground line they should be good for thirty years or more. Thus, although the first cost of the post is higher, its permanence when compared with wood is so great that it produces a saving within a few years, aside from its merits in other directions.

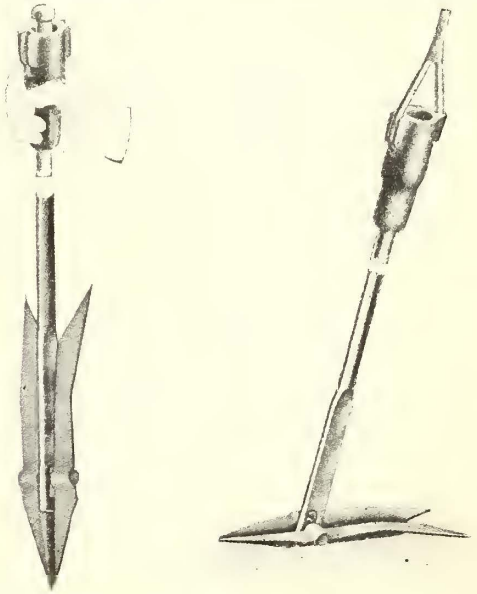


WINGED POST

Ground Anchor Set in One to Two Minutes

The accompanying illustration shows the "Coghlin," a new type of ground anchor which has been placed on the market by the Track Specialties Company, Inc., New York. This anchor has been used extensively in Canada for the past few years.

Briefly described, the device is used to maintain the correct position for fences, smokestacks and transmission poles of all kinds. The rod is ¾ in. in diameter,



DRIVING POSITION OF ANCHOR; LOCKED IN SERVICE

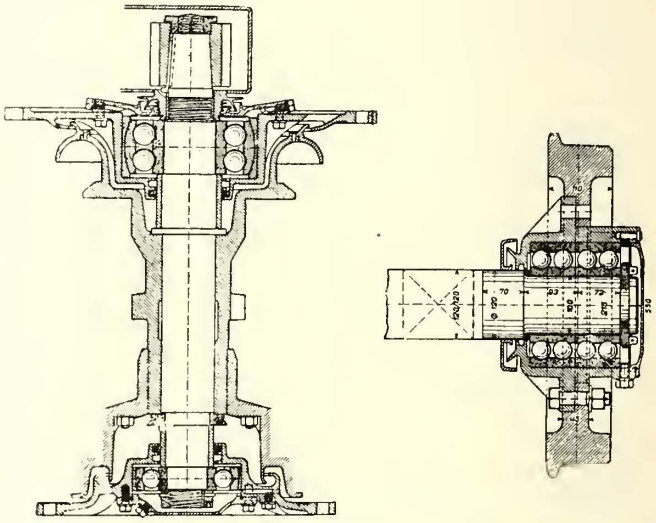
5 ft. 11 in. long, and is made of high-carbon, heat-treated and oil-tempered steel. The anchor is driven like a picket, and a hammer is the only tool required to force it into the ground. It locks automatically for driving and opens automatically for anchoring. Once driven, it is set, and the expense of installing is practically nil.

The special malleable-iron end for connecting the guy wire eliminates the expense of an eyelet. This piece also protects the hand while the anchor is being driven and acts as a swivel to take any twist from the guy.

This ground anchor requires no digging or boring of holes, and its first cost is practically its last. It is stated that it can be forced into the hardest ground in one or two minutes.

Ball Bearings on European Cars

Experiments with the use of ball bearings on railway rolling stock are reported to have been conducted for some time past on the Montreux-Oberland Railway, in Switzerland, where two double-truck cars provided with ball bearings were placed in service in 1910. In 1911 seven more cars were equipped in a similar manner, and the results were so satisfactory that the axles of all new motor cars are now being furnished with ball bearings. At the present time the line has



BALL BEARINGS IN EUROPE—CROSS-SECTION OF ARMATURE SHAFT AND OF RIGID AXLE WITH LOOSE WHEEL

thirty-nine cars so equipped. On two new motor cars the motor shafts also have been equipped with ball bearings.

An interesting novelty in the application of ball bearings on this road is represented in the accompanying illustration, which shows the arrangement used in the case of standard 30-ton passenger cars equipped with a single truck having three axles. In this case the axles were rigidly attached to the truck framing and the wheels rotated on ball bearings at the end of the axle. This resulted in easy handling on curves because the two wheels of the same axle revolved independently of each other. Dynamometer tests have shown that there is a resistance of 10.6 lb. per ton with standard bearings, as against 4.6 lb. per ton with ball bearings. The ball bearings are lubricated only once in six months, as compared with once in fifteen days in the case of a standard bearing, the life being estimated to be from ten to fifteen years.

The Oakland, Antioch & Eastern Railway has transferred its executive staff from the California Building, San Francisco, to the company's building at Fortieth and Shafter Streets, Oakland. General administrative offices will still be maintained in San Francisco and are located in the Hobart Building.

News of Electric Railways

BOSTON TRANSPORTATION

Massachusetts Commission Reports to the Legislature on Transportation in Metropolitan Boston

The Massachusetts Public Service Commission has submitted a special report to the Legislature upon transportation problems in Metropolitan Boston, in accordance with a resolve of last year's General Court. The report consists of forty-seven pages of discussion by the commission and an exhaustive supplementary report by William B. Bennett, assistant chief engineer of the Wisconsin Railroad Commission, who was employed by the board to make an independent study of the transportation questions now at the front at Boston. Mr. Bennett was assisted by E. J. Steinberg, engineer in charge of the Milwaukee office of the Wisconsin commission. The full reports are to be printed by the State at a later date. A detailed financial report has also been prepared by J. W. Lester, accountant of the Massachusetts commission, upon the Boston, Revere Beach & Lynn Railroad and the six street railways operating in the metropolitan district, and a report will soon be completed by Prof. W. L. Puffer upon safety on rapid transit lines.

The primary question before the board was the relation of steam and electric railways at Boston to the general transportation problem of the metropolitan area. The report holds that any comprehensive plan for the improvement of steam railroad facilities at Boston must await the financial improvement of the railroads themselves.

The questions with which Mr. Bennett's report deals may be divided into four classifications: (1) Changes in the present service of the Boston Elevated Railway. (2) Future extensions of rapid transit service, including the proposed use of certain steam railroad locations by the rapid transit lines. (3) Unification of street railway and rapid transit lines. (4) Revision of fares.

The commission plans to take up the proposed changes in Boston Elevated Railway service in the future, with public hearings. Briefly these changes concern the rerouting of cars on the surface lines; trailer service; the building of a transfer station for surface and elevated lines at Egleston Square, to relieve Dudley Street station congestion; modifications of Dudley Street station; and changes at Maverick Square, East Boston; Forest Hills and on the rapid transit lines.

With respect to these recommendations, the board concedes that the present routing of cars on both the Boston Elevated and Bay State systems is far from satisfactory at many points, but urges caution in working out a readjustment. The company has already taken steps toward the early use of trailers in the Boylston Street subway and the gradual extension of such service to other lines during rush hours. The board favors the construction of inclosed loop tracks at Egleston Square by which surface car service in the Roxbury-Jamaica Plain district can be better co-ordinated with the rapid transit line, relieving congestion at the Dudley Street station. The removal of certain concessions on the east loop at Dudley Street is also to be considered as a means of increasing the traffic capacity of this station. The board favors reconstructing the Maverick Square portal of the East Boston tunnel to permit the operation of multiple-unit trains.

The Bennett report divides the metropolitan area into six subdivisions tied together in pairs by three main routes intersecting in the heart of Boston; viz., the Cambridge subway with the Dorchester tunnel extension now under construction; the Sullivan Square-Forest Hills line, and the Boylston Street subway and East Boston tunnel. It suggests the joint use by the rapid transit lines of certain steam railroad locations, as one permitting the operation of through multiple-unit trains from Manhattan Square to Harvard Square. This, it is estimated, would call for an investment of $4,000,000 against $7,133,600 for the proposed extension of the Dorchester tunnel from Andrew Square to Cadman Square. The Bennett report also favors the immediate completion of the South Everett elevated line from Sullivan Square and its connection with the Sangus branch of the Boston & Maine Railroad, equipping the latter for electric train operation and handling freight on industry tracks by electric power at night. Another recommendation by Mr. Bennett is the connection of the West Roxbury branch of the New Haven system with the Boston Elevated rapid transit line at Forest Hills. The plans of the board's advisory engineer also include extension of the Boylston Street subway to the Boston Custom House, with connection to the East Boston tunnel, and a subsequent connection of the former to the Newton circuit line of the Boston & Albany Railroad when this is electrified. Still another extension suggested in the Bennett report is one of the East Boston tunnel to the Charles River viaduct and thence via the Southern Division of the Boston & Maine Railroad to Somerville. No attempt has yet been made to ascertain the attitude of the steam railroads toward this joint use of tracks, but the board believes that favorable arrangements might be made in view of the falling off of suburban traffic in the last twenty years on the steam lines.

The commission does not as yet feel convinced that the consolidation of the Boston Elevated Railway and the Bay State Street Railway is necessary to the solution of transportation problems in the metropolitan district. It has given the matter much consideration, but desires more concrete evidence of the benefits of the proposed merger before it sanctions the plan.

The Bennett report recommends that the charter of the Boston Elevated Railway be amended to enable the commission to establish a zone system of fares like that of Milwaukee. The board regards the Milwaukee zone system as an improvement upon the flat fare system. It points out that the gradual increase of the former tends to improve present conditions. The Milwaukee system, however, does not lend itself to conditions of dual corporate operation as found at Boston. The comparative areas of the territories in square miles served by the following transit companies are of interest: Boston Elevated, 80; Philadelphia Rapid Transit, 96; Detroit United Railways, 52; Cleveland Railways, 46; Buffalo International, 40; Indianapolis Traction & Terminal, 34; Milwaukee Railway & Light, 30; New York Railways, 18. In most of these cities fare inequalities exist.

In the opinion of the board, interference with the present contractual relations between the Boston Elevated Railway and the State should be advocated only after clear proof of its necessity. Certain equities have been created by the company's charter which attach to both company and public. Up to the present time the board feels that the contract has worked well as a whole. It has resulted in the extension of a combined rapid transit and street railway service at a flat rate of 5 cents over a metropolitan area larger than any similar area in the country, taking transfer facilities into account. The last eighteeen years have been marked by the practically continuous building of rapid transit lines. The board realizes the importance of prosperity to the Boston Elevated as a factor in the transportation development of the community. It recognizes that the company's stock is now selling below par and that its present financial condition is less favorable than has been the rule in the past. At the same time it does not favor any change in fares at present, believing that the recent disturbance in business conditions may be a large factor in the situation. No steps have been taken by the company toward securing a revision and the board believes that the State should not take the initiative here. The form of relief, also, deserves exhaustive study, and might lie in an abridgement of transfer facilities, a decrease in taxes, reduction in the burdens relative to the care of the streets, etc.

In conclusion the board states that it regrets its inability to solve the problem of fare inequalities in such communities as Hyde Park, Chelsea and Revere. Neither the Boston Elevated nor the Bay State Street Railway favors extending the 5-cent fare system of the former to cover these communities. The board points out that despite these inequalities metropolitan Boston stands in a class by itself with respect

to the degree of articulation of electric railway service existing. It offers its services as always, in the investigation of specific problems and will shortly take up in a comprehensive way the transportation changes outlined above in relation to the Boston Elevated Railway.

COMMISSION REGULATION

Mr. Maltbie, Mayor Mitchel and Mayor Harrison All Discuss Public Utility Problems

Milo R. Maltbie, who retired recently as a member of the Public Service Commission of the First District of New York, after having served on the commission since its creation in 1907, was interviewed by the Brooklyn *Eagle* recently as to the tendency in regulation and the work of the New York commission in particular. Mr. Maltbie's remarks in regard to the constructive work of the commission are largely a matter of history. His statements as to the future of regulation and the possible increase in the powers of commissions are, however, of much interest, drawn, as they are, from his long commission experience and his activities in civic affairs prior to his appointment to the commission. In the *Eagle* of April 18 Mr. Maltbie said in part:

"Eight years have passed. Many other states have enacted public utility laws, and commissions have been appointed. But there is now more criticism of state commissions—their personnel and their decisions—than at any time since 1906. I do not say that it is always just, but that it exists no one will deny. Political and personal considerations have too frequently determined appointments. Experienced men have been displaced. Insufficient appropriations have been made. Corporations have fought orders, thinking by litigation and delay, and sometimes by personal attacks and abuse, to render regulation ineffective. They have been their own worst enemies; for by doing so, they are creating an undercurrent of distrust of and opposition to the whole idea of regulation.

"Now, every thinking man knows that the day of unregulated private monopoly has passed. It will never return. The world moves, and the crawfish does not typify its method of locomotion. If regulation breaks down, a more radical remedy will inevitably be adopted, and the public will not again pause and try another rejuvenation of state regulation. Let no one mistake to whom the blame or credit, according to one's viewpoint, of this result will be due. It is almost equally divided between the narrow politicians who look only to the spoils and the shortsighted corporation officials who do not realize that it is better for them, or rather better for the property which they are supposed to represent, to have effective regulation administered by men who are known to be independent and unaffected by their blandishments or threats than to have a kind of pseudo regulation which is to their liking.

"The commission should be given power in unequivocal words to require companies to restore or make good any impairment of their capital and to provide ample depreciation funds with which to renew, repair and replace their property. Investors should be protected. The history of the Metropolitan Street Railway shows that the public may often suffer through the failure to provide for the upkeep of the property. Indeed, sooner or later, the public pays for corporate mismanagement, either through bad service, high rates or losses to investors.

"What is needed is the use of the enforcement clauses as they stand. If the courts will not support the enforcement of the orders of the commission, let the responsibility rest there, and the sooner we know it the better. But I do not believe that they will long continue to do so. Public opinion will reach them if they do, for it will be behind any official who attempts to make regulation effective. The courts have trimmed and paired the powers of the commission, but legislation can be secured to offset such decisions."

Mayor Mitchel of New York has accounted to the committee of 107 for his stewardship of fifteen months. In referring to the campaign of Dr. S. S. Goldwater, commissioner of health of this city, with respect to limiting the capacity of cars the Mayor said:

"Perhaps the most interesting of the undertakings of this department has been that to secure better conditions of transit for the people of the city. Everyone has known for years that our surface and subway cars have been crowded to a point dangerous to the public health. Every agency supplied by State and city has unavailingly attempted to better these conditions. The health department, by the simple expedient of notifying the transit companies that the operation of overcrowded cars is a menace to public health, and by the promulgation of an order of the board of health forbidding overcrowding in the cars, has compelled these companies to increase their service and decrease congestion. This order is issued under power conferred by the charter and its breach is punishable by heavy fine. In the successful use of this power has been found the only effective means of attacking the overcrowding problem in the surface and subway cars of this city. Dr. Goldwater told me only two days ago that the operator of the subway will be compelled, under his regulations, to maintain during the summer a full winter schedule, and thus afford thousands of additional seats to the traveling public."

In his annual message, made public on April 18, Mayor Carter H. Harrison, of Chicago, Ill., reviews the twelve years he has served as chief executive, this period covering the 1907 traction ordinances, the unification of the surface railways and the creation of the Chicago Elevated Railways collateral trust. In discussing public utility questions the Mayor says:

"The more I see of private ownership of the public utilities the more I am convinced that there is but one safe and sane plan for the public to adopt, namely, to set its mind with determination upon public ownership, and not to deviate by a hair's breadth from the most direct course by which it may be attained."

PUBLIC SERVICE NOMINATIONS RECALLED

Governor Brumbaugh of Pennsylvania Has Recalled the Nominations Made by His Predecessor

Martin G. Brumbaugh, Governor of Pennsylvania, has recalled the names of the seven Public Service Commissioners as executive appointments. The commission will continue to perform all the functions of office until successors are appointed. The Governor's letter follows:

"On Jan. 5, 1915, my predecessor in office nominated for the advice and consent of the Senate the following named persons to be members of the Public Service Commission, to serve for the terms set opposite their names, respectively, to compute from July 1, 1913: Samuel W. Pennypacker, ten years; La Rue Tone, nine years; Emory R. Johnson, eight years; Milton J. Brecht, seven years; Charles F. Wright, six years; Frank M. Wallace, five years; Walter H. Gaither, four years. I respectfully advise the Senate that I do hereby recall said nominations."

Political Pennsylvania appears to be at sea in regard to the act of the Governor. Senator Penrose at Atlantic City declined to make any comment until he had learned at first hand the Governor's reasons. Attorney-General Brown is said to hold the view that the letter of recall automatically withdraws the nominations from the Senate and leaves the Governor free to send in new nominations. On the other hand, Senate leaders are quoted to the effect that they still have the Tener nominations and that, parliamentarily speaking, the Governor cannot get hold of them unless the Senate decides that he should have them. In partial explanation of the Governor's act the Philadelphia *Ledger* says:

"As to recasting the public utilities law, it is asserted on authority that the Governor has been much impressed with the arguments of the League of Third Class Cities that the law ought to be amended so as to allow a much greater degree of home rule in the regulation of public utilities. As to the personnel of the commission, it is asserted on like authority that the Governor has been searchingly inquiring into the corporation inclinations or connections of certain commissioners. It is said that in the course of this investigation he disclosed conditions which caused him to feel that the commission should be recast and that new nominations should be made. It is understood that the Governor has in mind the plan of reducing the number of commissioners from seven to five, thus saving $20,000 a year, and he will

insist that the commissioners devote more time to their work. In inquiring into the affiliations of members of the commission, the Governor, it is said on authority, employed detectives."

NEW YORK COMMISSION INVESTIGATION

Summary of Legislative Committee Recommendations—Bill Embodying Features of Changes Suggested

The Thompson committee has made public a summary of its report to the Legislature of New York State. This second report made by the committee is concerned chiefly with the doings of the commission for the second district. It does not recommend the removal of any of the members in so many words. It explicitly exonerates them from neglect of duty and official misconduct, charges made against the commissioners for the first district. The report does say that the commissioners were found "more or less inefficient in their administration of the law and in their dealings with the corporations." In the summary of its report the committee says:

"The committee feels that the questions of rates, service and right to exercise franchises are the questions in which the public has the deepest interest. These questions should have the most careful consideration, and in that connection the question of the regulation of the issuance of securities should also be carefully studied. Under a recent enactment of the Legislature of the State of Pennsylvania an entirely new method was provided in relation to the issuance of securities by public utilities corporations. It seems desirable to adopt either in whole or in part the provisions of the Pennsylvania law.

"Its operation should be investigated by the committee for the purpose of determining that question. The question of no par value of capital stock is also a question which may be very profitably studied. The law as it stands today in this State permits the issue of capital stock without having a capital par value appearing thereon as to all corporations except moneyed corporations and public service corporations. It seems desirable to extend this provision to public service corporations.

"The question also of the unrestricted issue of capital stock based upon patents, copyrights, good-will, etc., may be the subject of careful investigation and reflection. The propriety of increasing the liability of stockholders of all corporations for the debts of such corporations is also a question which should have attention.

"In conclusion it seems to the committee that the subject submitted to it is of such great and far-reaching importance that it would be futile for the committee to attempt at this session of the Legislature to accomplish results which might fairly be expected. Because of that fact the committee has determined to recommend that it be continued in existence until the meeting of the next Legislature."

The minority said:

"We cannot express too strongly our condemnation of three changes recommended by the majority in the public service commission law, which boldly destroy regulations of public utilities and render the commission powerless. They are: (1) The destruction of the commission's power to supervise the issuance of stocks and bonds, with the resultant flood of watered securities and a return to the period of stock inflation, exhaustion of railroad property, high rates, and poor service to the public. (2) In increased liability upon stockholders of utility corporations similar to that in national and State banks; (3) Taking away from the commissions their accounting, supervising and accident powers.

"As a further imposition upon the investor in these watered securities it is proposed to make him liable to the creditors of the company up to the par value of the stock. This will destroy the marketability of utility securities, and by discouraging investment must lead inevitably to government ownership, since the State will be required to supply the funds for construction and operation."

On the evening of the day that the committee made public the summary of its report Mr. Thompson introduced in the Senate a bill for the abolition of the present public service commissions and the substitution of a public service commission of seven members. The bill provides that the Governor, with the consent of the Senate, shall appoint seven commissioners to constitute the public service commission, and shall designate one of his appointees as chairman. Three of the appointees must be residents of what now constitutes the first district. They are to constitute the Public Service Commission for the First District. Three appointees must be residents of up-State communities. They will constitute the commission for the second district. The two commissions and the chairman will constitute the Public Service Commission of the State. Under the bill there would be two associate commissioners for New York City, with no designated terms of office, to carry on and complete the duties in connection with the construction of new subways which devolve on the present commission. The term of each of the other commissioners is fixed at seven years to insure rotation and continuity. The salaries are left at the present figure, $15,000. The Thompson bill provides for counsel at $10,000 a year and a secretary at $6,000. The bill provides that only two members of each commission shall be of the same political party.

On April 20 Governor Whitman announced that he would not accept the suggestion of the Thompson committee. The Governor said that he did not intend to act hastily, and that undoubtedly he would postpone action for several weeks. The ouster bill introduced by Senator Thompson of Niagara, chairman of the investigating committee, according to a Senate leader, is unlikely to pass.

PUBLICITY CAMPAIGN IN URBANA

The City Council of Urbana, Ohio, has passed an ordinance granting a new twenty-five year interurban franchise to the Ohio Electric Railway in place of its present franchise, which has more than nine years to run. The action of the Council is due to the change in public sentiment in Urbana which was brought about by a publicity campaign undertaken by the company last February, prior to a referendum election on the franchise question. At first the public was almost unanimously opposed to granting the franchise, and it was regarded as a foregone conclusion that the ordinance would be defeated overwhelmingly at the election. Nevertheless, the company sent a special representative, F. B. Wright, Jr., to Urbana three weeks prior to the election to undertake a campaign of educational publicity, the purpose being to acquaint the public with the company's problems and to strengthen its position in the event that another application for a franchise should be made at some future time.

The opposition to the franchise was thoroughly organized, but so effective were the company's educational efforts that out of a total vote of about 1500 the franchise received within five of a majority. The election being a special one, more than 500 voters, mostly workingmen, did not go to the polls. It was generally conceded that these citizens were not opposed to the franchise but were unwilling to sacrifice their working time in order to vote on the question.

The change in sentiment was so unlooked for that the company immediately renewed its application for the franchise, which the Council passed by a vote of five to two after three readings and two public hearings. The franchise was then approved by the Mayor.

One of the advertisements used in the campaign follows:

"THE SWING OF THE PENDULUM—A TALK FROM THE SHOULDER

"It has been suggested that in applying for an extension of our franchise which has over nine years to run, we are trying to 'put something across' on the city; that we are afraid that a law may be enacted at some future time which may require us to pay Urbana more than we now pay for the right to operate our cars here.

"Such a view is based on the assumption that the pendulum can swing only in one direction—that the burdens which have been imposed on corporations of this class will continue to be increased, will never be reduced.

"For ten years past nation, state and city have added to these burdens annually; old forms of taxation have been increased, new taxes added, additional restrictions imposed, further expenditures required, extra assessments levied.

"Indirectly, but none the less certainly, others besides the corporations themselves have had to bear these burdens.

You, who complain of the high cost of living, the worker who has been laid off because some corporation had to cut expenses, the merchant who cannot make collections, are all helping to carry the load.

"The pendulum has swung very, very far in one direction, but it will swing back because it must swing back if the nation is to grow and the people are to prosper.

"It is possible that the backward swing has already started.

"You may have noticed that the great steam railroads, the first to crumple under the burden, were recently granted an increase in freight rates. They got this increase because their employees, the shippers and the public realized that their own interests demanded it.

"You will not predict that by the time our present franchise expires, franchise and similar burdens will be lighter than they are to-day, but it seems very unlikely, to say the least, that they will be any heavier.

"In the meantime we are paying 5.2 per cent of our total receipts in taxes and nearly 7 per cent in taxes and various local assessments.

"The Ohio Electric Railway.

"We repeat that our sole reason for seeking a franchise extension now is that our bonds extend beyond our present franchise."

CINCINNATI TRANSIT MEASURE

The Ohio Senate has approved the Bauer bill, which provides for the creation of a rapid transit commission for Cincinnati and opens the way to the solution of the problem of affording rapid transit to certain portions of the city and bringing the interurban lines to the business section. This is the bill that was prepared by City Solicitor Walter M. Schoenle, of Cincinnati, and afterward approved by the city officials, the present Rapid Transit Commission and the civic organizations.

Senator Moore offered an amendment providing for the city engineer acting for the commission. This was accepted. Another amendment adopted by the Senate prevents the issue of more than $150,000 of bonds without the approval of the people. Under a third amendment in case any bond issue or lease submitted to the voters fails of ratification at the polls the members of the commission are to be discharged and new ones appointed. It is claimed that this bill will not come into conflict with the Behne bill, since the bond issues will have to be approved by the voters. It does not provide for municipal ownership in the usual acceptance of that term, because the road will be leased to an operating company.

Very interesting suggestions made to the Rapid Transit Commission of Cincinnati by A. S. White, New York, were contained in a letter received on April 12. They contemplate the construction of the rapid transit road or loop in units, because it would be impossible to undertake the construction work over the entire route in the beginning. Mr. White further states his belief that the plan he has mapped out will relieve the city of heavy taxation that might follow if great care is not taken in locating the line and planning its construction. Mr. White says that the corporation he proposes to organize to lease these units will also own and operate several interurban lines that now reach the city limits. They will be rehabilitated physically and financially and the lines will be extended north and northeast. The figures named by Mr. White include cost of construction only. The operating company will furnish power, cars and other equipment.

INJUNCTION SOUGHT BY LABOR

A motion was filed on April 14 in the Federal Court at Indianapolis, Ind., by attorneys representing the local branch of the Amalgamated Association, asking Judge Anderson to restrain the Indianapolis Traction & Terminal Company from securing signatures to its form of working contract with employees. The local union men claim that this working contract is in violation of the arbitration award of the Public Service Commission in that it permits men in emergencies or on special occasions to work without the eight-hour rest if they so desire and does not compel them to be off one Sunday each month. In his decision rendered in November, 1914, when a temporary injunction was issued restraining all labor leaders and union officials from attempting to bring about a strike on the local street railway lines at Indianapolis, Judge Anderson ruled that the service contract which was then being signed by many of the employees of the company, was in full force and effect on its signers, and that when all the men had signed the contract it would then take the place of the arbitration award of the Public Service Commission of Indiana and be in effect as to all the employees of the Indianapolis Traction & Terminal Company. About 90 per cent of the trainmen have now signed the individual working contract. It was announced on April 19 that W. B. Wilson, secretary of labor, is, at the request of the Central Labor Union of Indianapolis, sending a committee of conciliation to try to adjust what the labor leaders consider grievances, although officials of the company state that this is the first intimation they have received that there are any differences of opinion which need to be adjusted.

MASSACHUSETTS LEGISLATURE

Two bills providing for the public ownership of street railways within the State of Massachusetts have been killed and the bill fixing the hours of car dispatchers on street railways to eight per day has been laid on the table in the Senate. The House has killed the bill limiting the number of passengers allowable on a street car, and the bill prohibiting defective fenders has also been lost. Leave to withdraw has been given the bill providing that tunnels shall be equipped with emergency outlets, and the bill granting half fares to pupils of normal schools has been referred to the next session in the report of the committee on street railways. A resolution has been passed directing the Public Service Commission to investigate the part taken by electric railways in connection with the oiling and repairing of streets, the order being the outcome of a measure introduced to cut down some of the burdens now carried by operating companies in this connection. The bill authorizing street railways to charge admission fees to parks has been enacted into law. Other bills on which leave to withdraw has been secured are one taxing the surplus of street railways and one requiring an investigation of freight and express business on street railways.

SPRINGFIELD SERVICE NORMAL

Service on the Springfield (Mass.) Street Railway has been continued along normal lines the last two weeks, following the recent strike. The State board of conciliation and arbitration has held several sessions to investigate the causes of the strike, but no formal conclusion has as yet been rendered, and no offer in the direction of arbitration has been made by the board up to this writing. Private conferences have been held at Springfield by the board with the company's officials and with representatives of the employees' union. At these sessions extended discussions of the problem of checking the work of conductors have been held. The company's position has been steadily maintained as set forth in the statement of President J. T. Harmer published in this journal at the inception of the strike. Although the company maintains that the installation of transfer registers is not the general practice on roads the size of the Springfield system, it adheres to its previously expressed willingness to equip its cars with the registers at the request of its employees. The company is also ready to carry out its agreement with the union, which provides for the arbitration of all disputed matters. The company has steadily maintained that its system of checking the work of conductors is accurate and that the evidence secured in this way warranted the discharge of the three conductors whose cases were seized upon by the union as the basis of a grievance. H. M. Flanders, general manager of the company, said at one of the conferences that only after prolonged investigation by different checkers on the cars is a conductor found guilty of misappropriating fares. As many as fifty reports have been considered before a man has been thus adjudged. Recent investigations showed that at least forty-eight out of 250 conductors were turning in irregular accounts, but only four or five were discharged It is probable that the board may offer its services as arbitrator of the cases of the discharged conductors.

Utility Commissioner Impeached.—Commissioner A. P. Watson has been removed from the Oklahoma Corporation Commission by impeachment proceedings. No appointment has been made to fill the vacancy.

Long Island Enabling Bill Passed.—The Patten bill to empower the city of New York to lease a right-of-way over the Long Island Railroad tracks from Corona to Great Neck in connection with the operation of the new rapid transit lines passed the Assembly on April 20 and now goes to Mayor Mitchel.

Ott Bill Passes.—On April 13 the Ott bill, requiring that motormen and conductors on street and interurban railways be allowed eleven hours rest in each twenty-four hours and that they shall not work more than ten out of each consecutive thirteen hours, was passed in the Ohio Senate. It had previously passed the House.

Ohio Commission Resignations.—O. H. Hughes and Charles C. Marshall tendered their resignations as members of the Ohio Public Utilities Commission on April 19. Their action was taken out of deference to the desire of Governor Willis to have at the heads of the various departments men who are in sympathy with his ideas of administration.

Bills of Particulars in New Haven Cases.—Judge Hunt of the Federal District Court at New York has granted the request of William Rockefeller and eleven other past and present directors of the New York, New Haven & Hartford Railroad for bills of particulars concerning the alleged violations of the Sherman anti-trust law, for which they have been indicted.

Pierce Bill Defeated.—The Pierce indeterminate franchise bill, referred to in the ELECTRIC RAILWAY JOURNAL of April 10, page 729, has been defeated in the New Jersey House. Before coming up for final passage the measure was amended to prevent the consideration of franchise values by the Board of Public Utility Commissioners as factors in fixing the rates of public utilities.

Progress in Toledo.—At its first meeting on the evening of April 16 the new franchise committee of the City Council of Toledo, Ohio, decided to prepare a tentative agreement for the consideration of the officials of the Toledo Railways & Light Company. It is to contain a clause through which the city may, under certain conditions, acquire the company's property at any time upon giving one year advance notice.

Philadelphia's Loan Amendment.—Senator Vare, as chairman of the committee on municipal affairs, has favorably reported the constitutional amendment which would increase the borrowing capacity of the city of Philadelphia from 7 to 10 per cent for the purpose of developing port and transit facilities exclusively. The proposed amendment was adopted by the last Legislature. The measure will be finally adopted by this Legislature and next fall will go before the people.

New Jersey Marginal Road Bill Approved.—On April 19 the Governor of New Jersey signed the bill initiated by the Jersey City Chamber of Commerce to permit the building of an electric railway to link together the six trunk railroads that now terminate separately on the west bank of the Hudson River opposite New York City. The plan comprehends the building of the line by Jersey City with funds raised from the sale of twenty-year city bonds. The cost of construction is estimated at $1,500,000. A map of the route and sidings was published in the ELECTRIC RAILWAY JOURNAL of April 3, page 663.

Readjustment of Union Agreement in Cleveland.—J. J. Stanley, president of the Cleveland (Ohio) Railway, has notified the local branch of the Amalgamated Association that the company desires to open the working agreement with that organization for negotiations on a new wage scale. First-year motormen and conductors have been receiving 27 cents an hour, with an increase of 1 cent a year until they receive 30 cents an hour. The company proposes that first-year men receive 25 cents and second-year men 27 cents, with an increase of 1 cent a year after the second year until the men receive 30 cents. The new proposition would also eliminate the requirement that the men be members of the union, and substitute a recommendation to that end. It would also prohibit employees in uniform from entering saloons or drinking within three hours of the time they report for duty.

Financial and Corporate

WAR AND BERLIN RAILWAY

Prices of Commodities and Wages Increase—Earnings and Traffic Decrease—5000, or 50 per Cent, of Men at Front—600 New Female Conductors

Although the effect of the European war did not make itself felt on the Berlin surface railways until the autumn of 1914, the annual report of the Grosse Berliner Strassenbahn for this calendar year shows that the losses in traffic because of the war and also because of additional rapid transit and omnibus competition forced a cut in dividends from 8 per cent in 1913 to 6 per cent in 1914 on a capitalization of $25,020,600. In the early days of mobilization there was a feverish increase in travel, but even for August the loss compared with 1913 was 13 per cent, and by December it had increased to 15 per cent. On the other hand, the mobilization of 50 per cent of the operating staff made it necessary to cut the service 25 per cent until the 5000 employees called to the colors could be replaced. For this reason the service on certain parallel lines was reduced or eliminated, while on the active lines trailers were increased, headways were lengthened and the operating speed was raised.

During the first seven months of the year 12,735 people were employed, but during the last five war months there were only 9546. At first the number of applicants for employment to fill the places of the enlisted men was so large that the company thought it would have no difficulty in getting new men. This expectation was not fulfilled, however, because most of the unemployed were quickly snapped up by the manufacturers of war material. Although about 600 female members of employees' families were trained for service as conductors, the difficulties of educating them were great because most of the instructors had been mobilized. Yet by the end of 1914 the number of cars in operation was only 15 per cent less than in December, 1913, a fairly good balance thus being kept between the decreased traffic and the decreased service.

The directors have high praise for the employees remaining in Berlin, who have been obliged to work many extra hours. On account of the increase in the price of foodstuffs and other necessaries, the company has raised wages pending the settlement of the war. In the case of employees at the front who left dependents behind them, the company is paying each wife $6.25 a month, with an additional $1.25 for every child less than fifteen years of age. A donation of 3¾ cents daily is made for what is termed "milk money." Women conductors with children also receive the $1.25 and 3¾ cents allowances. The positions of all men called to the front are being kept open for them. By Dec. 31, however, 151 had been killed in the field.

During 1914 the company carried 426,420,000 passengers as compared to 456,300,000 passengers in 1913. Of the former number, 61,846,870 used commutation tickets. The earnings from passenger transportation were $10,224,480 for 1914 and $11,104,541 for 1913. The number of car kilometers decreased from 106,444,657 in 1913 to 96,893,861 in 1914, while the earnings per car-mile were 16.68 cents and 16.88 cents respectively. The operating ratio was 61.37 per cent in 1914 and 58.64 per cent in 1913. On account of war conditions the amount of money spent for welfare work was greatly increased, amounting to $363,623 in 1914 as compared to $260,990 in 1913, the difference being chiefly caused by war donations for the last five months. The maintenance of rolling stock cost $875,843 in 1914 as compared to $896,991 in 1913. The maintenance of 372 miles of single track right-of-way, including overhead construction, was reduced from $430,944 to $390,442 during the year. At the end of the year the company was paying pensions to 768 former employees and 230 widows.

The total number of cars on Dec. 31, 1914, was 2958, made up of 1813 motor cars (973 single-truck cars) and 1145 trailers. During 1914 the company added fifty single-truck cars with closed vestibules and separate entrance and exit. These cars are arranged to carry twenty-six seated and twenty-three standing passengers.

ANNUAL REPORTS

United Light & Railways Company

The statement of earnings and expenses of the United Light & Railways Company, Grand Rapids, Mich., and its subsidiary companies for the year ended Dec. 31, 1914, follows:

SUBSIDIARY COMPANIES

Gross earnings (including $713,585 for inter-company business)	$6,166,959
Operating expenses and taxes (including $713,585 for inter-company charges)	3,797,534
Net earnings, subsidiary companies	$2,369,425
Interest on subsidiary companies' bonds and notes:	
To United Light & Railways Company	$339,553
To the public	974,583
Total	$1,314,136
Net profit on stocks—subsidiary companies	$1,055,289
Net profit due others than United Light & Railways Company	15,506

UNITED LIGHT AND RAILWAYS COMPANY

Earnings available on stocks owned by United Light & Railways Company	$1,039,783
Dividends and interest receivable	344,294
Salaries and miscellaneous earnings	123,155
Gross earnings—United Light & Railways Company	$1,507,232
Expenses	$103,836
Taxes, general and federal	10,779
Total	$114,615
Net earnings—United Light & Railways Company	$1,392,617
Interest on first and refunding 5 per cent bonds	333,034
Interest on notes	109,887
Bond discount	12,912
Balance available for dividends	$936,784
Dividends—first preferred stock—6 per cent	462,801
	$473,983
Dividends—second preferred stock—3 per cent	63,272
Balance available for common stock and depreciation	$410,711
Credit of depreciation reserve	165,993
Balance—credit to surplus	$244,718

The business of the company in the gas and electric departments showed a satisfactory increase, but because of depressed industrial conditions the railway department showed a slight decrease. The gas sales in cubic feet for the twelve months ending Dec. 31, 1914, were 1,290,701,400, an increase of 89,374,200, or 7.5 per cent. Electric sales in kilowatt-hours were 90,116,518, an increase of 3,742,559, or 4.5 per cent; while the revenue passengers of all classes carried were 35,621,922, a decrease of 935,010, or 2.6 per cent.

In addition to the sum of $169,391 set aside for depreciation from current earnings, the subsidiary companies expended for maintenance an additional $392,750, which was charged directly to operating expenses, making the total for maintenance and depreciation $562,141. The book surplus of the Mason City & Clear Lake Railroad and the Peoples Gas & Electric Company existing at the time of their purchase by the company, in amount $86,399, was also set aside as an addition to the reserve for depreciation. The operating expenses of the subsidiary companies included $249,953 accrued for payment of general and federal taxes, an increase of $41,406 for the fiscal year, and also material increases in wage scales paid to street and interurban railway employees.

During the year the company acquired in exchange for its securities, or by purchase, further amounts of the stocks and bonds of its subsidiary companies. Through sinking fund operations, additional bonds of the Tri-City Railway & Light Company, the Citizens Railway & Light Company, the Iowa City Gas & Electric Company, the Chattanooga Gas Company and the Peoples Gas & Electric Company, aggregating $191,000, were purchased and cancelled. During the year there were also retired $12,767 of certificates of indebtedness and car trust notes of the Cedar Rapids & Marion City Railway and the Grand Rapids, Grand Haven & Muskegon Railway. There were also retired $420,000 of notes issued in part payment of properties, leaving outstanding $500,000 of similar notes to become due on Jan. 1, 1916.

During 1914 $984,924 was expended for additions to properties and extensions of service. Of this total $191,325 was expended on gas properties, $417,699 on electric properties, $373,148 on railway properties and $2,751 on heating properties. Several miles of additional street railway extensions were made in Cedar Rapids and Muscatine, and to the Tri-City system.

In February, 1915, the company sold $750,000 of three-year and $750,000 of five-year gold notes. The resulting proceeds enabled it very materially to reduce its notes payable, so that the amount outstanding March 15, 1915, was $479,386, as compared to $1,354,372 outstanding as of Dec. 31, 1914. The total number of stockholders on Dec. 15, 1914, was 2400 (an increase during the year of 332), of which the large proportion were preferred stockholders.

General Electric Company

The condensed profit and loss statement of the General Electric Company, New York, N. Y., for the twelve months ended Dec. 31, 1914, follows:

Sales billed	$90,467,691
Cost of sales, including all operating, maintenance and depreciation charges	81,496,728
Profits from sales	$8,970,963
Interest and discount	$1,306,876
Income from securities owned	1,313,989
Sundry revenues	263,555
Income from other sources	$2,884,420
Less: Interest on debenture bonds	567,556
Total	$2,316,864
Net income	$11,287,827
Dividends paid	8,142,767
Net surplus for the year	$3,145,060
Surplus at Jan. 1, 1914	16,939,819
Surplus at Dec. 31, 1914	$20,084,879

The total of sales billed for 1914, amounting to $90,467,691, compares with $106,477,438 for 1913, while the cost of sales, including all operating, maintenance and depreciation charges, increased in 1914 from $81,496,728 to $96,207,833. The profit from sales decreased from $10,269,605 to $8,970,963, while the net surplus for the year decreased from $4,908,674 to $3,145,060.

In general the business of the company experienced marked contraction during 1914. Had not a large volume of unfilled orders been carried over from the year 1913, the effect of the general depression would have been still greater. While there was a decrease of about 25 per cent in the value of orders received, the total number of transactions was practically equal to that of the previous year. The unfavorable relation between the number of orders and their value, however, operated to increase materially the cost of securing and handling business. The number of employees engaged at the end of 1914 was about 15,000 less than in the previous year.

During the year the company followed its usual practice in writing off against income account its total expenditures in 1914 for patents, applications, licenses under patents and other outlays relating thereto, amounting to $408,532. Stocks, bonds and other securities are carried at a valuation of $29,667,213, of which $21,056,354 represents the securities of subsidiary companies and $8,610,859 the securities of public utility and other companies. The current accounts and notes receivable are carried at $19,091,026.

The manufacturing floor space was increased by 940,000 sq. ft. during the year, but most of this construction was under way when the year began. The expenditures for additions and improvements to manufacturing plants aggregated $6,006,955 and the amount written off was $4,370,793.

Railway Storage Battery Car Company

The report of Samuel C. Steinhardt, president Railway Storage Battery Car Company, for the corporate year 1914 has just been rendered. It refers to the change in organization of the company and the appointment of Leo Klopman as general manager and Frank Koziell as engineer. The new management has made a number of changes in the policy of the company, owing to the fact that it has been found impracticable to induce the larger railroad systems to use non-standard cars, or cars in which there has been a radical departure from type and accepted car-building standards. Most of the cars sold previously have reported

during the year unsatisfactory running conditions, due in nearly every instance to faulty design or improper construction. The best of these cars have been remodeled and sold to the Lorain, Ashland & Southern Railroad. The Railway Storage Battery Car Company now plans to have its cars built by some of the several standard car builders rather than to build them in its own factory.

Among the assets of the company is the entire capital stock and outstanding bond issue of the Wilmington, New Castle & Delaware City Railway and an interest in the securities of the Wilmington Southern Traction Company. These properties were purchased by a former management to afford opportunities for the demonstration of railway storage-battery operation. While this purpose was successful, Mr. Steinhardt thinks there would be a shrinkage in this item if there were liquidation in the immediate future. The report says that Mr. Edison has not only excused the default of the company in purchasing the required minimum of batteries in 1914 but has established the same low minimum for 1915 and has extended to the company its exclusive contract for fourteen months by giving it a date as of March 1, 1915, instead of January 1, 1914. The report also cites the run of one of its cars by the Pennsylvania Railroad from Newark to Philadelphia and says that the engineers of the Pennsylvania Railroad have recommended the purchase of a number of these cars for use on branch lines. Negotiations are now under way to determine the type and character of the car best suited to this service. The company looks forward to a favorable business period and considers that the year now opening will demonstrate not only the operating but the commercial success of the Edison storage-battery car.

ELECTRIC RAILWAY EARNINGS IN 1914

According to a study made by *The Commercial & Financial Chronicle* from financial reports for 270 electric railways, the gross earnings of these carriers increased from $483,923,118 in 1913 to $487,412,007 in 1914, an amount of $3,488,889, or 0.72 per cent, although during the same period the gross earnings of the steam railroads of the United States fell off $208,178,035, or 6.55 per cent. The aggregate net earnings for the electric carriers was $185,476,614 in 1914 as compared to $186,566,064 in 1913, a decrease of $1,089,450, or 0.58 per cent. The steam railroads, however, showed a loss for 1914 of $75,925,113, or 8.39 per cent. Of the 270 railways reporting, 120 suffered decreases in their gross earnings, but in most cases the loss was light and was overbalanced by the gains of the other carriers.

Fourteen railways reported only their gross earnings and forty-eight presented statements for the fiscal year ended June 30, 1914. If adjustments are included to cover these lines, the total gross earnings for 1914 for 332 companies were $553,095,464, an increase of $4,798,944, or 0.87 per cent, while the net earnings totaled $211,020,088, a decrease of $1,126,315, or 0.53 per cent. These figures do not indicate the total earning power of electric railways in the country, for many minor companies and several large ones are not included.

The following figures indicate the percentage increase in gross earnings of the stated year over that preceding: 1905, 8.68 per cent; 1906, 11.49 per cent; 1907, 9.33 per cent; 1908, 0.94 per cent; 1909, 7.49 per cent; 1910, 7.51 per cent; 1911, 6.33 per cent; 1912, 6.36 per cent; 1913, 5.94 per cent, and 1914, 0.87 per cent. A similar record of net earnings shows the following increases: 1905, 10.71 per cent; 1906, 11.01 per cent; 1907, 4.09 per cent; 1908, 0.79 per cent; 1909, 14.03 per cent; 1910, 6.54 per cent; 1911, 5.96 per cent; 1912, 8 per cent; 1913, 5.7 per cent, and 1914, 0.53 per cent (decrease).

CALIFORNIA UTILITY ISSUES

The California Railroad Commission has issued a report covering the financial activities of the public utilities of the State during 1914. The report shows that the public utilities of all classes were authorized to issue securities to the total sum of $226,725,501. For the entire period of the commission's jurisdiction over securities, from March 23, 1912, to Dec. 31, 1914, the utilities were authorized to issue securities amounting to approximately $400,000,000.

The securities authorized for 1914 exceed those authorized for 1913 and eight months of 1912. While no accurate figures are available for the period prior to 1912 it is probable that the security issues of 1914 were the greatest in the history of the State. Not all of the securities authorized were issued, but it may be estimated that approximately 75 per cent either have been already issued or are to be issued. During 1914 the commission denied or dismissed applications to issue securities approximating $17,000,000.

The record of new development shows that work was carried forward during 1914 on 700 miles of projected new railway enterprises, but no segregation is made as to electrical railway and steam mileages. During 1914, however, the electric railways were authorized to issue $8,298,435 of securities for additions and betterments, while of the total of $226,725,501 of securities authorized $17,372,185, or 7.66 per cent, were authorized for all the corporate purposes of these carriers.

Baton Rouge (La.) Electric Company.—The Baton Rouge Electric Company has issued $150,000 of three-year 6 per cent gold coupon notes dated April 1, 1915, and due on April 1, 1918. The proceeds from the sale of these notes, together with the proceeds from the sale of $100,000 of first mortgage bonds, will be applied to the purchase of land and the construction of a steam power station with a capacity of 2000 hp.

Chicago (Ill.) Elevated Railways Collateral Trust.—A syndicate of leading Chicago and New York banks has sold $8,000,000 of Commonwealth Edison Company 5 per cent thirty-five-year first mortgage gold bonds. The proceeds are to be used to retire the $7,000,000 of one-year 5 per cent notes issued in 1914 in settlement of its $6,000,000 guaranty obligation in connection with the formation of the Chicago Elevated Railways collateral trust and in payment of a sufficient number of debentures of the Chicago Elevated Railways to make the total investment $7,000,000. In return for this amount the Commonwealth Edison Company received approximately 200,996 common shares and $1,270,000 of debentures of the Chicago Elevated Railways.

Chicago (Ill.) Elevated Railways.—It is announced that $12,500,000 of first mortgage 5 per cent gold bonds of the Northwestern Elevated Railroad have all been sold and the syndicate offering these bonds has been dissolved. Previous references to the sale of these securities were made in the ELECTRIC RAILWAY JOURNAL of Jan. 23 and April 3.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.—The Ohio Public Utilities Commission has authorized the Cleveland, Southwestern & Columbus Railway to extend the time of payment of $200,000 of first mortgage 6 per cent gold bonds of the Cleveland & Elyria Electric Railroad from the due date of May 1, 1915, to Aug. 1, 1920. The right is reserved to the company, however, to pay at its option any or all of the bonds on any interest date at prices ranging from 101 up to Nov. 1, 1916, down to par after Nov. 1, 1919. Hayden, Miller & Company, Cleveland, have made arrangements to handle the extension. Holders of the old bonds will receive cash for them from the bankers at maturity. If they desire to exchange for the extended bonds, this privilege will be allowed if the new bonds have not been sold.

Interborough Rapid Transit Company, New York, N. Y.—The directors of the Interborough Rapid Transit Company have declared a second extra dividend of 5 per cent on the $35,000,000 of stock. The other extra dividend was paid on Jan. 2. With the regular dividend of 10 per cent the stock is now really put on a 20 per cent basis.

Long Island Railroad, New York, N. Y.—The operation of the Long Island Railroad for the calendar year showed a deficit of $494,131, as compared to a deficit of $977,985 for 1913. The passenger traffic showed a steady growth, particularly in the territory operated electrically. The new business created by the Pennsylvania station and tunnels was very satisfactory. The number of passengers handled in and out of the station amounted to 11,031,845, an increase of 1,402,819 over the previous year. During 1914 the company added to its equipment forty motor passenger coaches, fifteen motor passenger and baggage coaches, three motor passenger, baggage and mail cars and two storage-battery cars. Contracts have been made for twenty

new steel cars for electric service, to be delivered in 1915. The company now has 88.6 miles of road electrified (covering more than 200 miles of track) out of a total of 398.48 miles of road. The annual report states that negotiations in connection with the trolley line on Atlantic Avenue, Brooklyn, are still under way. A tentative agreement has been made with the Brooklyn Rapid Transit Company to buy this line, but it has been delayed by failure to secure a proper franchise from the city.

Nashville (Tenn.) Traction Company.—In answer to the various rumors that the Nashville Traction Company, which about eighteen months ago received a franchise to operate in Nashville, was being acquired or about to be acquired by the Nashville Railway & Light Company, officers of the former company have issued a formal denial. This is to the effect that the company proposes to live strictly up to its obligations and that it will build, equip and operate its lines in strict accordance with the prescribed terms of the ordinance. The company has now completed 5 miles of track.

Oakwood Street Railway, Dayton, Ohio.—The holdings of the family of the late Capt. A. L. Stout in the Oakwood Street Railway have been purchased by C. B. Clegg, president, who now holds the greater part of the capital stock of $500,000. Captain Stout was the builder of the road. It is said that the line may be extended through Oakwood as a result of this purchase.

Ocean Shore Railroad, San Francisco, Cal.—Stockholders of the Ocean Shore Railroad met with the directors in San Francisco on April 8 and ratified the action of the directorate in levying a new assessment of $3 per share. It was stated that the funds to be raised by the assessment would be used principally for the purchase of rolling stock and for the meeting of indebtedness incurred by the acquisition of real estate.

Pacific Gas & Electric Company, San Francisco, Cal.—An executive committee for the Pacific Gas & Electric Company has been appointed, consisting of Frank G. Drum, Frank B. Anderson, John A. Britton, C. O. G. Miller and A. F. Hockenbeamer. J. A. McCandless has been elected a director to succeed J. E. Gladstone, resigned. It was announced at the annual meeting of the company that a definite statement regarding dividends on the common stock would be made not later than May 1. John Nickerson, Jr., New York and St. Louis, is offering the 6 per cent first preferred stock of the Pacific Gas & Electric Company, of which $12,500,000 was authorized last year by the California Railroad Commission and of which $9,356,400 has been sold to stockholders and customers of the company at 82½. Of this stock $55,290,700 has been issued and fully paid for and $4,065,700 has been subscribed and partly paid for. The California Railroad Commission on April 16 authorized the company to issue $367,000 of its general and refunding mortgage gold bonds to the Bankers Trust Company, New York, as trustee. These bonds are a portion of the $4,586,661 of bonds authorized on June 30, 1914.

Pittsburgh, McKeesport & Westmoreland Railway, McKeesport, Pa.—An order was made on April 15 by Judge Ambrose B. Reid fixing May 18 as the date of the public sale of the road, franchises and equipment of the Pittsburgh, McKeesport & Westmoreland Railway. It was ordered that the property be sold for not less than $95,000. The petition asking the court to fix the date of the sale was presented by James R. Secrist, receiver. Prior reference to this was made in the ELECTRIC RAILWAY JOURNAL of Aug. 22, 1914.

Portland Railway, Light & Power Company, Portland, Ore.—E. W. Clark & Company, Philadelphia, are offering at 98, to yield 6.1 per cent, $5,000,000 of two-year 5 per cent coupon gold notes of the Portland Railway, Light & Power Company. These notes are dated May 1, 1915, and due on May 1, 1917, but are redeemable at par and interest on sixty days' notice. The proceeds will be used to retire $5,000,000 of 5 per cent one-year notes due on May 1. The new notes are secured by the deposit of the entire issue of $5,000,000 of first mortgage sinking fund thirty-year gold bonds, due in 1937, and the entire capital stock, excepting directors' shares, of the Mt. Hood Railway & Power Company.

Seattle (Wash.) Municipal Street Railway.—The municipally owned street railway in Seattle, Divisions "A" and "C," showed a deficit of $2,042 for March, including interest on $300,000 of Division "A" bonds but excluding depreciation and sinking fund. The total cost of operation for Division "A" and Division "C" for the month was $4,838, and the revenues, $2,796. Of the revenues, $1,409 is credited to Division "A" and $1,386 to Division "C." With the advent of better weather and the coming of summer, Division "C" is expected to find itself on a paying basis, for this line serves campers near Lake Burien. Already conditions on this section of the municipal lines have improved, the net loss in March being only $81 as compared to $156 for February.

Washington (D. C.) Utilities Company.—The Fidelity Trust Company, Baltimore, which is trustee for the issue, is offering at 99 and interest, to yield more than 6 per cent, one-year 5 per cent collateral trust gold notes of the Washington Utilities Company. These notes are dated May 1, 1915, and are redeemable at par and interest on any interest date at thirty days' notice. The total authorized issue is $1,500,000, the proceeds of which are to be used to pay off an equal amount of one-year notes maturing on May 1. The notes are secured by the deposit of 27,500 shares of common stock of the Washington Railway & Electric Company, which have a market value of more than $2,420,000. The Washington Utilities Company was formed in 1911 as a holding company for the securities of street railways, interurban companies and other properties in and about Washington, D. C. The authorized capitalization is $50,000,000 of common stock, of which there are 54,680 shares outstanding.

DIVIDENDS DECLARED

American Railways, Philadelphia, Pa., quarterly, 1¾ per cent, preferred.

Columbus Railway, Power & Light Company, Columbus, Ohio, quarterly, 1¼ per cent, preferred B; quarterly, 1¼ per cent, common.

Grand Rapids (Mich.) Railway, quarterly, 1¼ per cent, preferred.

Lehigh Valley Transit Company, Allentown, Pa., 1 per cent.

Manchester Traction, Light & Power Company, Manchester, N. H., quarterly, 2 per cent.

BATON ROUGE (LA.) COMPANY

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Feb,		'15	$13,906	*$8,769	$5,137	$2,083	$3,054
1 "	"	'14	13,748	*9,514	4,234	2,148	2,086
12 "	"	'15	179,596	*113,502	66,094	25,033	41,061
12 "	"	'14	166,635	*106,576	60,059	25,220	34,839

BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.

1m., Feb.,		'15	$6,226	*$7,216	†$990	$1,127	†$2,117
1 "	"	'14	5,786	*7,176	†1,391	1,065	†2,455
12 "	"	'15	122,326	*102,007	20,320	13,283	7,037
12 "	"	'14	122,800	*99,220	23,580	12,997	10,583

CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.

1m., Feb.,		'15	$23,439	*$15,059	$8,380	$6,558	$1,821
1 "	"	'14	25,285	*15,698	9,587	6,401	3,185
12 "	"	'15	347,303	*209,699	137,604	78,019	59,583
12 "	"	'14	378,058	*209,448	168,610	73,857	94,753

COLUMBUS (GA.) ELECTRIC RAILWAY

1m., Feb.,		'15	$55,777	*$26,969	$28,808	$28,792	$16
1 "	"	'14	53,510	*22,286	31,224	24,838	6,385
12 "	"	'15	688,655	*305,683	382,971	332,101	50,870
12 "	"	'14	621,919	*289,504	332,415	283,019	‡71,048

DALLAS (TEX.) ELECTRIC COMPANY

1m., Feb.,		'15	$149,397	*$82,309	$67,088	$33,426	$33,662
1 "	"	'14	183,066	*113,819	69,248	26,651	42,594
12 "	"	'15	2,153,492	*1,232,770	920,722	384,372	536,349
12 "	"	'14	2,243,579	*1,322,352	921,227	307,131	614,096

EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.

1m., Feb.,		'15	$48,408	*$30,316	$18,092	$8,908	$9,184
1 "	"	'14	50,039	*33,415	16,623	8,242	8,381
12 "	"	'15	669,978	*392,529	277,448	102,830	174,618
12 "	"	'14	491,026	*310,253	180,774	79,837	‡135,794

EL PASO (TEX.) ELECTRIC COMPANY

1m., Feb.,		'15	$79,241	*$42,265	$36,976	$4,198	$32,778
1 "	"	'14	89,664	*47,729	41,936	4,344	37,592
12 "	"	'15	1,031,058	*564,455	466,603	51,112	415,491
12 "	"	'14	913,037	*497,722	415,315	50,432	374,117

GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.

1m., Feb.,		'15	$148,941	*$94,347	$54,594	$36,209	$18,385
1 "	"	'14	175,051	*106,501	68,550	38,963	29,587
12 "	"	'15	2,362,731	*1,280,568	1,082,162	438,095	644,067
12 "	"	'14	2,417,005	*1,374,742	1,042,263	429,340	612,922

*Includes taxes. †Deficit. ‡Includes other income.

Traffic and Transportation

THE JITNEY BUS

San Francisco, Atlanta, Fargo, Gadsden, Spokane and Little Rock Pass Regulatory Measures—State Bills—The Jitney Convention

The Board of Supervisors of San Francisco, Cal., passed without opposition on April 19 the ordinance regulating motor bus transportation on the streets of San Francisco. The measure provides for an annual license fee of from $10 to $40, according to the carrying capacity of the car for which license is granted. There is also a provision requiring that a bond in the sum of $10,000 be filed before a license is issued to provide for compensating passengers who may be injured or killed while riding in the jitneys. Other requirements of the ordinance are that there shall be no overloading by permitting passengers to ride on fenders or running boards; that in taking on or discharging passengers cars shall be brought to a stop within 2 ft. of the sidewalks and curb, and that the greatest care shall be exercised in approaching crossings or going down grades. Licenses are to be issued by the Board of Police Commissioners. The regulation of jitney traffic is left with the police department.

A jitney bus ordinance has been passed by the Council of Atlanta, Ga., and is now before the Mayor for signature. The ordinance becomes effective immediately on passage except that the city cannot force the jitneys already licensed to take out new licenses until July 10. The license imposed is from $75 to $100 on small cars, $100 to $150 on seven-passenger cars, and $150 to $200 on motor buses. The applicant for a license must set forth the route he intends to use, and a bond in the sum of $5,000 must be filed to protect those who may have claims on account of accident. It is made unlawful for jitney drivers to charge more than a 5-cent fare. Council reserves the right to cancel licenses, and licenses are issued subject to the right of the Council to amend the ordinance. The number of passengers to be carried in any vehicle is limited to the number of people who can get into the body of the car.

The City Commissioners of Fargo, N. Dak., have passed an ordinance regulating the jitney. The measure includes a provision that all vehicles operated for hire, except taxicab or auto liveries, which do not stand upon the public streets, shall secure licenses to operate from the city. If a license is granted the applicant must pay into the city treasury $50 per annum for each vehicle carrying not to exceed five passengers and $75 for each vehicle carrying more than five passengers. The applicant must also file with the city auditor an indemnity bond in the sum of $10,000 for not to exceed two automobiles and an additional $10,000 bond for additional automobiles or vehicles exceeding two, and a bond at the same ratio for any additional vehicles so licensed. The fare charged by any licensed vehicle for the conveyance of passengers for hire is not to exceed the sum of 50 cents for conveying each passenger to any point within the city limits or within 1½ miles of the outer boundary of the city. Any person who violates any of the provisions of the ordinance is to be punished by a fine of not less than $10, nor more than $100, for each offense, or to be imprisoned not to exceed thirty days.

The City Council of Gadsden, Ala., has passed an ordinance regulating the jitneys. The measure makes it unlawful for anybody to operate a jitney between fixed points on a fixed schedule at a fixed charge without first securing a franchise from the city. A license of $25 is imposed for each car, and a bond of $2,000 for each car operated must be furnished.

The bill passed by the Legislature of Tennessee to regulate the jitney has been signed by the Governor. It defined as a common carrier all conveyances intended to afford a means of street transportation similar to that furnished by street railways and makes it unlawful for any common carrier so defined to use or occupy any street without first obtaining a permit or license, such permit or license to embody such routes, terms and conditions as the city or town may elect to impose. A bond in the sum of not less than $5,000 for each car operated is to be filed with the public authorities to secure any damage that may be adjudged against the carrier. All incorporated cities and towns authorized and empowered to grant permits or licenses to such common carriers to operate over the streets are to fix the routes, terms and conditions upon which the carriers may operate.

The Thompson bill introduced in the Legislature of New York to govern the operation of the jitney bus, referred to previously in the ELECTRIC RAILWAY JOURNAL, has been passed by both houses and is now before the Governor.

Representative Morris of Van Wert County has introduced a series of bills in the Ohio Legislature to require the owners of jitneys to secure franchises from City Councils, pay excite taxes to the State and be subject to regulations by the Public Utilities Commission.

Peculiar and adverse conditions exist in Washington in relation to the jitney. All of the drivers and owners of cars for hire in Spokane, Wash., have been forced by the city authorities to suspend operation until they have complied with the State law, which requires a $2,500 bond and a State license, and until they have secured permit in accordance with a new city ordinance passed in that city. Although representatives of the Pacific Casualty Company, San Francisco, say that they have applications from jitney drivers in Tacoma for bonds required by the State law Attorney Ashton Dovell, representing a jitney association in Tacoma, has advised the members not to take out the $2,500 bonds until the Supreme Court rules on the bill's emergency clause, and county and city authorities at Tacoma have made no effort to date to enforce the law requiring State and city licenses and a bond. The city of Seattle also has done nothing to enforce the State law requiring jitney bus operators to carry a bond of $2,500. It is reported unofficially that not more than 350 jitneys are being operated in Seattle at this time, and that less than half of this number are properly bonded and licensed.

The Street Auto Service Company, Salt Lake City, Utah, has abandoned its service. On April 10 only two jitney buses were in operation in Salt Lake out of a fleet of thirty or forty in operation at the height of the fad. The refusal of security and bonding companies to write the bonds required of the jitneys under the new city ordinance without a deposit of collateral security caused the Street Auto Service Company to withdraw its service. The terms of the regulatory ordinance passed in Salt Lake were published in the ELECTRIC RAILWAY JOURNAL of April 10, page 733.

The jitney has ceased to exist in Buffalo. As previously noted in the ELECTRIC RAILWAY JOURNAL an ordinance has been passed and signed covering the operation of motor vehicles, and the Buffalo Jitney Bus Company has practically abandoned its plans for establishing service in the city. No cars have been operated by the company for three weeks.

The referendum petition filed by the jitney interests at Los Angeles, Cal., against the new jitney regulatory ordinance was found to lack the necessary number of signatures of qualified electors, and the city attorney has ruled that the ordinance is now in effect.

The earnings of the Pacific Electric Railway in Long Beach, Cal., fell off to the extent of $52,000 for the first eight months prior to Feb. 15, 1915, and 75 per cent of the loss, or $39,000, is attributed to the inroads of the jitney, according to the testimony of D. W. Pontius, traffic manager of the railway, before a hearing held in Los Angeles on April 9, by the State Railroad Commission of California. The hearing was called in response to protests against the removal of the railway's tracks on East Ocean Avenue.

The official report of the first regular meeting of the executive committee of the Safety First Federation of America, held in New York recently, says that several of the public officials in attendance at the meeting related their experiences with the jitney and that, while the members of the committee were keenly interested in the reports from various cities, the opinion was expressed that jitneys had not been in operation long enough for regulation to be prescribed governing their operation. A reference to this meeting was made in the ELECTRIC RAILWAY JOURNAL of April 17, and several of those who attended the meeting were quoted in their personal capacities.

Judge Crump in the Law of Equity Court at Richmond,

Va., has denied the application of the Virginia Railway & Power Company for an injunction restraining jitneys from operating except under a franchise granted by the city. The company has appealed the case to the Supreme Court. The matter of regulation is now before the ordinance committee of the Council. The company has put a few small five-passenger autos in service in the city to determine the desirability of the service for districts where an electric railway franchise cannot be obtained.

The City Council of Spokane, Wash., has passed a jitney ordinance. Control of jitney routes, schedules and hours of service are lodged with the Council, which will issue all permits to operators and reserves the right to cancel them at any time. Jitneys are required to run at least eight hours a day and light their cars at night.

In advance of the opening of the Federal League season at Kansas City, Mo., on April 10, the jitneys were widely heralded as the convenient means of reaching the park. Altogether it was a big jitney day. Many new trucks were in service, and the sunshine brought out a host of touring cars to carry passengers for hire. People flocked into the jitneys, most of which bore signs "To the ball game." The jitneys had almost universally been charging 5 cents for rides even farther than to the ball park, and 10 cents has been the regular rate for longer trips. The jitneys bore no signs indicating the price to the park, though in a few instances the drivers announced that the rate was 25 cents on this occasion. But in very many instances when the people offered their nickels, at the park, they were informed that the price was a quarter. The higher price was paid, with mutterings, in most cases. Few jitneys were on hand, however, to care for the crowds after the game.

Delegations to the national jitney convention in Kansas City on May 4, 5 and 6 are promised from thirty cities so far. Including the representatives of the manufacturers of motor cars and appliances, the attendance probably will exceed 200, and may reach 400. Among the speakers invited are Frank P. Walsh, chairman of the industrial commission; Samuel Gompers, president of the American Federation of Labor; Walter C. White, president of the White Motor Car Company; Henry Ford, of the Ford Company, and E. K. Benson, vice-president of the Studebaker Company. The first response was from Hugh Chalmers, who announced that Lee Olwell, first vice-president of the Chalmers Company, would be present. The program will include speeches and discussions of these subjects: financing the national association; legislation; insurance; equipment; regulation of cars and driving; badges and emblems. Several old line liability companies are said to be dickering with the jitney associations on writing liability insurance, but the rates so far offered are considered excessive.

The jitney is becoming a menace in Philadelphia. The number of cars in service has increased materially lately and the need for regulation has become apparent. A census of the cars has been taken by the police, but the details have not been made public. It is expected that the matter will be taken up at the next meeting of Councils. Among those who have gone on record in favor of regulation is Daniel T. Pierce, of the Barber Asphalt Company, formerly executive assistant of the Philadelphia Rapid Transit Company. Mr. Pierce, who has lately returned from a trip to the South and the West, during which he studied the jitney at first hand, has written to Mayor Blankenburg. Typical regulatory measures which Mr. Pierce mentions are those passed in San Francisco, Salt Lake City, Little Rock, San Antonio, Portland, Louisville, and Seattle.

The City Council of Little Rock, Ark., has passed an ordinance governing the jitney. The bond required is for $2,000. License fees payable to the city by operators of jitneys or other public automobiles, as fixed by the ordinance, are as follows: for cars with seating capacity of five to seven persons, including chauffeur, $3 per month; cars carrying from eight to twelve passengers, $6 per month; cars carrying more than twelve passengers, $8 per month. A feature of the new ordinance requires that all public chauffeurs shall be licensed, after passing an examination as to training and fitness, conducted by the city automobile inspector, an official to be appointed by the Mayor.

In an opinion rendered to the Public Service Commission of Maryland, William Cabell Bruce, general counsel to that body, says the jitneys are common carriers. Mr. Bruce said: "In my opinion it (the jitney bus) is subject to the jurisdiction and authority of the commission in every respect that the steam car or the electric car is, except so far as essential differences of structure and operation necessarily limit the application to it of provisions of the public service commission law relating to the latter."

ACCIDENT SAVINGS DIVIDED

San Diego Electric Railway Distributes $15,468 in Accident Savings Among 304 Men

On Feb. 20 William Clayton, vice-president and managing director of the San Diego (Cal.) Electric Railway, addressed the following letter to the company's trainmen:

"Inclosed herewith is a check representing your share of the savings effected by our safety-first plans in San Diego. After a very careful investigation of the cost of accidents, extending over a period of three years, the company agreed with its motormen and conductors that it would set aside the average cost of car accidents (exclusive of law department expenses, claim department expenses, etc.), during the previous three years in proportion to the gross receipts of the company.

"We started on April 1, 1914, with an absolutely clean sheet; that is to say, none of the accidents that had taken place prior to that date was charged against the fund. Of course, considerable sums of money were paid out between April 1 and Dec. 31, 1914, for accidents which had occurred previous to April 1, 1914. These payments have been met by the company.

"The whole object of this safety-first fund has been to encourage the motormen and conductors to use the greatest possible vigilance in avoiding accidents to the traveling public, whether passengers on the street cars, in automobiles, or pedestrians. We believe that a special reward for vigilance on the part of the motormen and conductors in avoiding accidents is beneficial to the public and the company. The result of the first nine months confirms our judgment that the plan is good, and we are satisfied.

"The total amount of money saved out of the accident fund for nine months was $15,468.69. This check is your share of it. This division has been made on the basis of the number of hours each motorman or conductor has worked in the period of nine months, which is the fairest way, in our opinion, any division could be made. We hope the results of this plan are perfectly satisfactory to our employees and that it will encourage them to still greater effort and greater vigilance in avoiding accidents. It would be a great pleasure to us if we could say at the end of the year that we had had no accidents whatever and be able to turn over to our men 3 per cent of the gross receipts, amounting to $30,000, $40,000, or any other proportionate sum, as reward for the excellence of their judgment or vigilance. The more you can make out of this fund, the better we will be satisfied."

THE SCRANTON EXPERIENCE MEETINGS

In the Electric Railway Journal of April 10, page 735, brief mention was made of the experience meetings of the Scranton (Pa.) Railway. Every two weeks on Monday morning the superintendent of transportation of the company has a meeting in his office of all dispatchers and inspectors, at which time all matters pertaining to safety-first recommendations and suggestions concerning the operation of the road in a general way are offered and considered. These meetings and discussions usually last from one to one and one-half hours. Every Wednesday morning in the office of W. E. Boileau, the general manager, a meeting is held of the heads of all departments, at which are discussed all matters pertaining to the operation of the road. In fact, it might be called a cabinet meeting, at which the general manager advises with the heads of the departments, and the heads of the departments with each other, looking to the improvement of service, efficiency and economy of operation. These meetings usually last an hour.

Once a month a meeting is held of all employees who can attend, but principally the men from the transportation department, one session being held in the morning one month and in the afternoon the next month. At these meetings short talks are made by the employees, the superintendent, general manager, and some one from the claim or legal department, along the lines of safer and better operation. The management now plans to have others from outside the organization make short talks, and city officials and men interested in the safety-first movement on other roads will be invited to speak. The main object of the meetings is to bring the men in closer touch with the management and secure their hearty co-operation. A stenographer takes down the proceedings, the transcript is duplicated and a copy is sent to each employee. In this way those who are unable to attend are made acquainted with the proceedings.

ANOTHER INCREASE IN FARES

The New Bedford & Onset Street Railway, New Bedford, Mass., has annonnced a proposed increase in its fares effective on June 1. The statement of the company follows:

"The New Bedford & Onset Street Railway has given notice to the Public Service Commission of Massachusetts, as required by the law of 1913, that it proposes to change its rates of fares by substituting 6 cents for 5 cents for each existing fare limit, and selling reduced rate tickets of twenty for $1, in substitution of the present rate of twenty-four for $1, the change to go into effect on June 1. The Public Service Commission will doubtless order a hearing on the matter at an early date.

"The New Bedford & Onset Street Railway has been in operation fourteen years and has demonstrated the amount of business which the communities it serves can furnish. Owing to steadily advancing costs of wages and materials, and the requirements for depreciation and for safety devices and other requirements of the public authorities, without an equivalent increase in its business, the company is not at present in receipt of an income sufficient to enable it to continue its present service and properly maintain its railway, without an increase in the rates of fare paid by the public which it serves."

Increasing Philadelphia-Allentown Service.—The Lehigh Valley Transit Company is operating two new limited trains between Philadelphia and Allentown, one leaving Allentown at 6 a. m., for Sixty-ninth Street, Philadelphia, and one leaving Sixty-ninth Street at 6:57 a. m. for Allentown.

Increase in Fares Suspended.—The Public Service Commission of Massachusetts has issued an order suspending the proposed increase in rates on the Berkshire Street Railway until July 20. This action will prevent the higher rates becoming effective on April 30. The date for the hearing has not yet been set.

Near-Side Stops in Yonkers.—The Common Council of Yonkers, N. Y., has amended the traffic ordinance so as to require the cars of the Yonkers Railroad to stop on the near side of street intersections, empowering the commissioner of public safety to designate certain crossings as exceptions to the rule. Less than a year ago a far-side stop ordinance was passed, but unsatisfactory results made a change necessary.

Sprinkler for Columbus.—The railroads and viaducts committee of the City Council of Columbus, Ohio, has decided to make a favorable report on the ordinance authorizing a contract with the Columbus Railway, Power & Light Company to operate a flusher over 25 miles of city streets. The company will purchase a car designed especially for street-cleaning purposes and will operate it 240 nights in the year at the rate of $10 a night.

Higher Fare Sought.—The New Jersey & Pennsylvania Traction Company has applied to the Board of Public Utility Commissioners of New Jersey for permission to establish a 20-cent rate, instead of the present 15-cent rate, between Trenton and Princeton. Lawrenceville and intermediate points would be affected by the increase. The rate between Princeton and Trenton formerly was 10 cents, but in 1912 the commission permitted an increase to 15 cents.

Chicago, & Milwaukee Electric Railway Increases Fares.—On April 15 the passenger rates on the Chicago & Milwaukee Electric Railroad, Highwood, Ill., an interstate line, were increased in Illinois and Wisconsin. The present fare from Milwaukee to Chicago has been $1.15 one way. The new fare is $1.40, or approximately 2 cents a mile for the 72-mile run. The increased rate will prevail between all points and no reduction for round trips will be made. In order to obtain permission to advance its rates the company appealed to the commissions of Wisconsin and Illinois and to the Interstate Commerce Commission.

Accident on New York Elevated.—In an accident on the Second Avenue elevated line of the Interborough Rapid Transit Company, New York, N. Y., on April 15 at Chatham Square junction a northbound train on the Second Avenue line separated on the switch, part of the train continuing on Second Avenue and the two rear cars jumping off to the west. The first car to leave the track, which was the fifth car of the train, was derailed and a short-circuit resulted. The structure caught fire and the side of the car was scorched before the blaze was extinguished. Two passengers were injured.

Inquiry Into Service Orders.—On motion of Commissioner William Hayward, the Public Service Commission for the First District of New York has decided to appoint a special committee to look into all service orders previously adopted by the commission and to report whether any such orders are obsolete or unworkable. In proposing the resolution, Commissioner Hayward stated that in his opinion it would be better for the commission to have ten good orders which could be enforced than a hundred about which there is any doubt. Chairman Edward E. McCall has appointed Commissioners William Hayward and George V. S. Williams as the committee.

Reduction in Service in Winnipeg.—General conditions, due to the war, present financial conditions in Winnipeg, and jitney competition are responsible for the request of the Winnipeg (Man.) Street Railway to reduce its service in Winnipeg by twenty cars, according to the statement of the railway's counsel to the Public Utilities Commissioner. Nearly 600,000 fewer passengers were carried on the cars last month than in March, 1914. For the first twelve days of April, this year, there were 400,000 fewer passengers than in the corresponding period of last year, and the receipts for the twelve days were $15,000 less than for the first twelve days of 1914.

Seattle Service Questions.—The Public Service Commission of Washington will not issue an order directing the Puget Sound Traction, Light & Power Company to better the Wallingford Avenue service. The city of Seattle, last month, asked for discontinuance of shuttle service on the Alki Point, Fauntleroy, Ballard Beach and Wallingford cars. On March 24 the commission directed the company to abandon the shuttle service on the first three named lines. The Wallingford case, however, was taken under advisement. Holding that it has no jurisdiction, the commission recently dismissed without prejudice the application of the city for a continuance of the contract between the Seattle Port Commission and the Puget Sound Traction, Light & Power Company, under which the latter carried ferry passengers on the West Seattle stub line for a 2½-cent fare. This contract expired on March 16.

Advances in Fares.—The New York State Railways has filed with the Public Service Commission of the Second District of New York, effective on May 14, advances in local one-way and round-trip ticket fares and chartered car rates between stations on the Oneida lines, advances in local one-way and round trip in both directions between stations on Utica lines and stations on Oneida lines, advances in joint one-way fares from Canastota, Chittenango, Clark Mills, Hecla, Kirkville, Manlius, Center, Oneida, Syracuse, Utica, Vernon and Wampsville to various New York State destinations on the New York Central and the West Shore Railroads and advances in joint one-way fares from Canastota, Chittenango, Hecla, Kirkville, Manlius, Center, Syracuse, Utica and Vernon to destinations on the New York, Ontario & Western Railroad, Cleveland to Durhamville inclusive, and Kenwood to Norwich inclusive.

Moving a Baseball Crowd.—Three very recent improvements in the method of handling fares—or, rather, two improvements on one basic new plan—had a good tryout recently in Kansas City, at the opening of the Federal League baseball season. A crowd of about 12,000 persons attended the game; and the Metropolitan Street Railway moved the fans away after the game in sixteen minutes, except for the stragglers. The prepayment system was the key to the facility of handling the passengers. All the cars used were prepayment cars, and most of them were also equipped with fare boxes. Perhaps the most useful feature of the collection, however, was the work of the front door collectors through which passengers were embarked at both ends of the cars at the same time. Downtown the company had its front door collectors stationed at many corners to assist in loading the cars bound for the ball park.

Seattle Suburban Fare Case.—Ralph S. Pierce, assistant corporation counsel of Seattle, Wash., will petition the United States District Court for a judgment on the city's pleadings in the case brought by the receivers of the Seattle, Renton & Southern Railway in an effort to set aside the order of the State Public Service Commission, which prohibits the establishment of a zone system, whereby a higher rate than 5 cents might be charged to outlying districts in the Rainier Valley. The city intervened in this case and pleaded the company's franchise, which requires a service for a charge of not to exceed 5 cents in the city limits. The receivers contended this was not a sufficient defense, for the reason that the Public Service Commission had set aside franchise contracts in other cases. Judge Jeremiah Neterer holds that the city's defense should not be set aside, and that under the Webster decision a franchise agreement is binding until set aside by the Public Service Commission. If Mr. Pierce is successful the Seattle, Renton & Southern Railway will be prevented for at least two years from making any change in rates.

The Louisville-Indianapolis Service.—Attorneys representing the Board of Trade of Louisville, Ky., in the case before the Interstate Commerce Commission by which it seeks to obtain more favorable rates on freight shipments from Louisville north, are in possession of the answers filed by the electric railways. These point out that it is customary in dividing joint rates that apply over "an expensive river crossing" to deduct a bridge toll before prorating, and that the Louisville & Southern Indian Traction Company is entitled to a deduction of 2 cents for each 100 lb. on less than a carload and 1 cent on carload traffic, before the rates are subdivided, as compensation for transporting goods across the bridge between Kentucky and Indiana. The same answers also set forth that the Louisville & Southern Indiana Traction Company is entitled to receive a minimum of 20 per cent of the freight rates as an originating or delivering line, in addition to its bridge tolls and that the connecting lines should receive percentages of the rates in proportion to their mileages. Service between Louisville and Indianapolis is operated over four connecting transportation lines.

New Company Publication.—The Union Traction Company, Indianapolis, Ind., has begun the publication of *Safety*. The first issue is dated April. It contains ten pages, cover and an insert portrait of Arthur W. Brady, president of the company. The announcement made to the employees in regard to the new paper follows: "It gives us pleasure to announce that beginning with April we will publish a magazine devoted to the work of our safety-first organization, and pertaining to the general operation of the property of this company, including the welfare of its employees. It is our intention at the present time to make the magazine a monthly edition and to forward a copy to every employee of the company. In addition to safety-first and welfare matters which are general in character, we expect to publish other subjects of interest taken up at the meetings of our general and local safety boards, as well as the proceedings of our-semi-annual banquets. We trust that the magazine will prove to be so attractive that everyone will take pleasure in reading its contents and keeping posted regarding these matters in which we are all so much concerned. We shall be obliged to any employee for any information or suggestion that may assist us in making the magazine a success."

Personal Mention

Mr. Linus H. Stickle, who for the last two years has been associated with the claim department of the International Railway, of Buffalo, N. Y., and for the last six months assistant claim agent, has been appointed supervisor of claims, a new position.

Mr. W. L. Hemingway, vice-president of the Mercantile Trust Company, Little Rock, Ark., has been elected vice-president of the Little Rock Railway & Electric Company, Little Rock, Ark., to succeed Mr. D. H. Cantrell, who has been elected president of the company, as noted elsewhere in this column. Mr. Hemingway has also been elected treasurer of the company.

Mr. Charles A. Coons, formerly with the International Railway, Buffalo, N. Y., has been appointed general superintendent of transportation of the United Traction Company, Albany, N. Y., effective on May 1. Mr. Coons will succeed Mr. John F. Uffert, who since early in 1914 has held the positions of general superintendent of transportation and master mechanic. The appointment of Mr. Coons to the position of general superintendent will relieve Mr. Uffert of his duties in this connection, and he will in future devote all his time to the office of master mechanic.

Mr. Charles H. Guckel has resigned as general manager of the Springfield (Mo.) Traction Company, controlled by the Springfield Railway & Light Company, which in turn is controlled by the Federal Light & Traction Company, New York, N. Y. Mr. Guckel has been connected with public utility companies for the last eighteen years. Before becoming connected with the company at Springfield he was engaged in public utility work at Boise City, Idaho. He was also at one time connected with the Swan Falls Power Company and the Swan Falls Interurban Railroad.

Mr. Joseph A. Kucera has resigned as business manager of the Electric Railway Journal. Mr. Kucera has had general charge of the business department of this paper or of the *Electrical World* since 1908, and his versatility and business ability are shown by the fact that for some time he was business manager of both papers. Previous to 1908 Mr. Kucera was business manager of the *Electric Railway Review*, Chicago, which was purchased by the McGraw Publishing Company in that year. He originally studied law and is a member of the Chicago bar. Mr. Kucera has not yet announced his plans for the future, but has the best wishes of his former associates in anything which he may undertake.

Mr. A. T. Van Diense, formerly manager of the properties of the Federal Light & Traction Company at Albuquerque, N. M., has been appointed general manager of the Springfield Gas & Electric Company and the Springfield (Mo.) Traction Company to succeed Mr. Charles H. Guckel. Mr. Van Diense was graduated from Purdue University. He was connected with the Westinghouse Electric Company at El Paso, Tex. Previous to that he was manager for a short time of the lighting and ice plant at Deming, N. M., and an irrigation project of the New York Light & Power Company in New Mexico. He next became manager of the property at Albuquerque of the Federal Light & Traction Company, which controls the Springfield system.

Mr. Deaderick H. Cantrell, of the firm of Rose, Hemingway, Cantrell, Loughborough & Miles, has been elected president of the Little Rock Railway & Electric Company, Little Rock, Ark., succeeding the late Judge W. M. Kavanaugh. Mr. Cantrell was formerly vice-president and a director in the company. In assuming the presidency of the company Mr. Cantrell will not undertake to make any marked changes in its policies or organization. As attorney for the company he has at all times been in close touch with its affairs, and by reason of that fact the duties of the office of president will not materially increase his labors or interfere with his general practice of the law as a member of the firm of Rose, Hemingway, Cantrell, Lougborough & Miles. He will continue personally to look after the company's legal business. Mr. C. J. Griffith will remain as general manager in charge of the operation of the road, while Mr. Cantrell will exert his energies in directing the plans and policies of the company.

Construction News

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

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

RECENT INCORPORATIONS

***Goldsboro (N. C.) Electric Railroad.**—Chartered in North Carolina, presumably to succeed the Goldsboro Street Railway and to acquire electric railways, and also to build lines in or adjacent to Goldsboro within a radius of 50 miles of Goldsboro. Capital stock, $25,000. Incorporators: G. S. Dewey, Leslie Well and Joseph E. Robinson.

***Dover, Millersburg & Western Railway, Canal Dover, Ohio.**—Incorporated in Ohio to build an interurban electric railway between Canal Dover and Millersburg via Sugar Creek. Capital stock, $10,000. Incorporators: T. F. Phillips, Benjamin George, G. T. Pryor, C. F. Uhl and H. H. Hostetler.

***Huron & Northwestern Railway, Huron, S. D.**—Application for a charter has been made by this company in South Dakota to build a 105-mile interurban railway from Huron to Roslyn. Capital stock, $25,000. Incorporators: F. W. Henderson, Summit; Walter Pelsam, Sioux Falls; C. B. Adams, Chicago; Charles E. Wolf, and Frank Budack, Washpeton, N. D. The same people have incorporated a construction company known as the Huron Development & Construction Company, with a capital stock of $50,000.

FRANCHISES

Henderson, Ky.—The Evansville Railways has asked the Council for a twenty-year franchise in Henderson.

Henderson, Ky.—The Henderson Traction Company has asked the Council for a twenty-year extension of time on its franchise on its line between Henderson and Evansville.

Arlington, Mass.—The Bay State Street Railway has asked the Council for a franchise to replace its present track in Mystic Street with double tracks from Chestnut Street to Massachusetts Avenue connecting with the elevated cars.

Arlington, Mass.—The Boston Elevated Railway has asked the Council for a franchise to double track its line in Boston on Mystic Street to Chestnut Street and in Chestnut Street from Madford Street to Mystic Street, making a loop.

Durham, N. C.—The Durham Traction Company has asked the Council for a franchise for the extension of its lines down Holloway Street to the baseball park in Durham.

Oakwood, Ohio.—The Spaite-Wright Realty Company has asked the Council for a franchise in Oakwood, a suburb of Dayton, for an electric railway to connect with the loop of the Oakwood Street Railway on Brown Street and to extend south along the Lebanon Road to Peach Orchard Road, a distance of 1½ miles.

***Linnton, Ore.**—The County Commissioners of Multnomah County were recently petitioned by residents of Linnton and points adjacent, near Portland, for a twenty-five-year franchise for construction of an electric interurban railway, to operate between Linnton and Portland, to take the place of the United Railway Line, which ceased operation on April 1. The new line, which must be completed and in operation one year after the adoption of the proposed franchise, will be constructed at a cost approximating $100,000. Construction must begin within six months. A five-cent fare will be charged. The petitioners are headed by O. M. Clark, Richard Shepard and J. B. Holbrook, of Linnton.

Easton, Pa.—The Northampton Traction Company has asked the Council for permission to lay a new switch and reconstruct its track with new and heavier rails on North Fourth Street between Church Street and Northampton Street in Easton.

***Petersburg, Va.**—A meeting of the Board of Supervisors of Prince George county was held recently to consider applications from two companies for the privilege of constructing an electric railway through the county from Petersburg to City Point, a distance of 10 miles. The rival companies are the Petersburg & James River Company and the Petersburg & Appomattox Company.

TRACK AND ROADWAY

Parker & Colorado River Electric Railway, Parker, Ariz.—The final survey for this railway has been completed and grading will be begun at once. W. H. Tharpe, Parker, is interested. [Oct. 17, '14.]

Pacific Electric Railway, Los Angeles, Cal.—Work will be begun by this company at once on the improvements that will be made to its right-of-way on South Fair Oaks Avenue between the Salt Lake track and the south city limits in Pasadena.

Connecticut Company, New Haven, Conn.—Work will be begun at once by this company on the extension of its lines along Boston Avenue in Bridgeport, as far east as Central Avenue.

Capital Traction Company, Washington, D. C.—The date for a formal hearing by the Public Utilities Commission on the proposal of this company to build a new north and south line by way of Seventeenth Street and I Street northwest in the city of Washington has been advanced from April 22 to May 27.

Waycross Street & Suburban Railway, Waycross, Ga.—Among the extensions planned by this company for the near future will be a line from its present terminus at its carhouse about ½ mile to Hebardville, along the right-of-way of the Atlanta, Birmingham & Atlantis Railroad. Another extension along Glenmore Avenue about ¾ of a mile to some suitable point at or near a park; also the taking up and removing the line from Gilmore Street to Lee Avenue, and thence extending its line under the tracks of the Jacksonville branch of the Atlantic Coast Line Railroad through Gilchrist Park to a suitable terminus in said park in Waycross.

Lewiston-Clarkston Transit Company, Lewiston, Idaho.—Plans are being made by this company to inaugurate service between Lewiston and Clarkston on May 3. The actual construction of the railway was practically completed by April 15. H. C. Hartung, Lewiston, general manager. [April 3, '15.]

Fox & Illinois Union Railway, Aurora, Ill.—This company has completed the construction of its 20-mile line from Yorkville to Morris. H. H. Evans, president. [Nov. 28, '14.]

***Rockford (Ill.) Southern Railway.**—This company, which will build a line from Rockford to Rochelle, is to begin survey and engineering work at once. The line will be built by A. C. Lingelbach & Company, Chicago. The cost of the new railway will be approximately $800,000, which will be secured through a bond issue. The Chicago company will build the line and accept bonds in payment for the construction work. The new company will be organized with a capital stock of $50,000 and will be an independent organization. The proposed line will pass through the towns of New Milford, Holcomb and Kings to Rochelle from Rockford. L. Leon de Tissandier, Rockford, engineer.

***Muscatine, Ia.**—Plans are being made to build an electric railway to connect Muscatine, Iowa City and West Liberty. Among those interested are A. D. Bowen, Muscatine, and William Musser, Iowa City.

Arkansas Valley Interurban Railway, Wichita, Kan.—Plans are being contemplated by this company for a line west from Hutchinson to Kinsley.

Worcester (Mass.) Consolidated Street Railway.—The extension of the Greenwood Street line from its present terminus at Greenwood Street and Upland Street to the city limits in Worcester is being considered by this company. Preparations for repair work are being made by this company for relaying its track in Main Street, from Lincoln Square to Chandler Street in Worcester.

Detroit (Mich.) United Railway.—Grading has been begun by this company on the extension south from Almont.

Muskegon-Saginaw Electric Company, Muskegon, Mich.—Within the next few days a surveying party, in charge of Clifford S. Gamble, former city engineer, will begin the work of surveying the proposed interurban route between Muskegon and Saginaw. Fifteen townships voted right-of-way franchises to the company. In addition to the physical survey of the road a survey from a passenger and freight viewpoint will also be made. [June 13, '14.]

Duluth-Superior Traction Company, Duluth, Minn.—Plans for a new route for the extension of the Piedmont Avenue line to Hermantown and Hutchinson roads are being made by this company.

Minneapolis & Northern Railway, Minneapolis, Minn.—This company, which operates an electric railway from Mill City to Anoka, has resumed service again, after a suspension of all operation for two months.

Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn.—This company is engaged in laying steel on its new line from Auto Club Junction to Minneapolis Junction, where a connection with the Electric Short Line Railroad, also of Minneapolis, is made. Arrangements have been made with the latter company to operate over its lines into Minneapolis, and it is planned to have this extension complete and ready for service into Minneapolis by May 30, 1915.

St. Paul (Minn.) City Railway.—This company expects to begin work soon laying new track for the St. Clair Street line in St. Paul.

***Canton, Mo.**—Preliminary arrangements are being made to build an electric railway from Keokuk, Ia., crossing the Des Moines River at St. Francisville, Mo., thence to Kahoka, Williamstown, La Belle, to Jefferson City and from Williamstown to Canton. A spur will be built on an old railway dump that extends from Canton to Memphis, Mo. S. J. Dement, Williamstown, and associates are interested.

Kansas City, Lawrence & Topeka Railway, Kansas City, Mo.—Grading has been begun on the line from Bonner Springs to Lawrence, Kan. Work will soon begin on the line from Manhattan to Topeka.

Metropolitan Street Railway, Kansas City, Mo.—This company is reconstructing tracks on Walnut Street under the same plan as adopted on Main Street last fall, temporary tracks being laid between permanent roadbed and the curbing for railway traffic, and other traffic being excluded from the street pending completion of the work. Main Street is now being paved. Plans are being made by this company to begin work at once double tracking through Swope Park to the Zoo, north on Sixty-seventh Street from the Swope Parkway line, in Kansas City.

City Light & Traction Company, Sedalia, Mo.—This company has arranged for the purchase of a quantity of 60-lb. steel rails which will be brought to Sedalia and utilized on the Thirteenth Street line of that company in replacing a large number of light rails now in use on that line.

Binghamton (N. Y.) Railway.—An extension of this railway through Port Dickinson from the present terminus to the north line of Port Dickinson is contemplated by this company.

New York Municipal Railway Corporation, New York, N. Y.—The contract to build the first section of the elevated railroad on Jamaica Avenue through Richmond Hill, from Crescent Avenue to Myrtle Avenue, a portion of the Dual Rapid Transit System, has been awarded by this company to Post & McCord for $750,000. The structure is to be completed inside of a year.

Penn Yan & Lake Shore Railway, Penn Yan, N. Y.—During the next four weeks this company expects to award contracts to build about ½ mile of new track with 7-ft. girder rails in paving in Penn Yan.

Hiawassee Valley Railway, Andrews, N. C.—Work is being rushed by this company on its 35-mile line between Andrews, Hayesville and Hiawassee, Ga. It is planned to have the section of the line from Andrews to Hayesville in operation by July 1. H. S. Kinehew is in charge of the work. [Aug. 1, '14.]

***Vinita (Okla.) Railroad.**—Preliminary arrangements are being made by this company to build an electric railway from Vinita to Centralia and Miami. John R. Rose, Vinita, is interested.

Ohio Electric Railway, Cincinnati, Ohio.—This company and the railroads and viaducts committee of the Columbus City Council have tentatively agreed upon a plan for the construction of a viaduct over the Norfolk & Western Railroad tracks in Columbus. The improvement will cost about $105,000, of which the city is to pay $30,000 and the Norfolk & Western Railroad the remainder.

Ohio Valley Traction Company, Portsmouth, Ohio.—Grading has been begun at Wheelersburg by this company.

***Toledo, Ohio.**—G. T. Wiswell, Chicago, and associates are considering plans to build an electric railway to connect Toledo and Columbus. The proposed route would touch Fostoria, Upper Sandusky and Richwood, and in part would parallel the Hocking Valley Railroad. It is stated that the line will be financed if the right-of-way can be secured.

Wentworth Street Incline Railway, Hamilton, Ont.—Discussing the question of tunnel extensions of the Wentworth Street mountain incline railway, City Engineer A. F. Macallum said he figured the cost of the work, exclusive of structural steel work, at $52,000. [Feb. 20, '15.]

Toronto (Ont.) Railway.—This company and the Municipal Board has ordered the reconstruction of the roadbed on College Street east of Bathurst Street in Toronto. Before the work is begun the city will supply specifications to the board's engineer.

Toronto & York Radial Railway, Toronto, Ont.—This company has withdrawn from the Ontario Legislature its application to double track the lower end of its railway on Yonge Street, Toronto.

Portland, Eugene & Eastern Railway, Portland, Ore.—Plans are being made by this company to repair its tracks on Eighth Avenue west at the same time the city widens the avenue between Charnelton Street and Monroe Street in Eugene.

Irwin-Herminie Traction Company, Irwin, Pa.—Surveys have been completed by this company on the extension from Irwin to Manor.

Middletown & Elizabethtown Street Railway, Middletown, Pa.—This company reports that it has secured right-of-way, but on account of the present financial conditions no definite plans have yet been made when construction will be begun on the proposed electric railway to connect Middletown and Elizabethtown. F. H. Alleman, vice-president. [Jan. 20, '12.]

Pittsburgh (Pa.) Railways.—The lines of this company are to be extended from the Sewickley-Coraopolis Bridge through Sewickley Borough.

Reading Transit & Light Company, Reading, Pa.—Work has been begun by this company on the renewal of its double track on Penn Avenue in Reading.

Johnson & Somerset Street Railway, Somerset, Pa.—Work has been begun by this company on its line between Rockwood and Johnson. A traffic agreement has been entered into under the terms of which this company will have the use of the Johnstown Passenger Street Railway Company's tracks into the city of Johnstown from a point near the Kelso mines. Plans are being made to begin construction on the railway at once.

West Chester (Pa.) Street Railway.—New ties are being laid by this company along its line between Market Street and Chestnut Street in West Chester.

Austin (Tex.) Street Railway.—Plans are being considered by this company to double track its line to Lake Austin and to extend several of its lines in Austin.

Ogden, Logan & Idaho Railway, Ogden, Utah.—Construction work is to be begun at once on the 36-mile line between Brigham City and Wellsville, which, when completed, will give Utah a continuous electric railway between Payson, in the southern part of Utah, and Preston, just over the northern border in Idaho. [April 10, '15.]

Salt Lake & Utah Railroad, Salt Lake City, Utah.—Surveys are being made by this company between Provo and Springville, 6 miles. Grading for the extension from Provo to Springville will be begun at once.

Princeton (W. Va.) Power Company.—Walton & Company, Falls Mills, Va., contractors for this railway from Princeton to Bluefield, 12 miles, have the line constructed as far as the city limits of Bluefield, and plans are being made to begin track laying at once. S. J. Evans, Princeton, president.

Wheeling (W. Va.) Traction Company.—Plans are being made by this company for an extension through Rayland to Dillonvale, Mount Pleasant and Adena.

Janesville & Madison Traction Company, Madison, Wis.—This company reports that it has secured permission to build its line from Madison to a point on the other side of Lake Monona, known as the town hall of Blooming Grove. The company has laid all the ties around the lake and has already put in ½ mile of track. It proposes to extend its line from time to time during the summer, having secured practically all of the right-of-way. The company is in the market for rails and has purchased a large quantity of ties from the Brown Land & Lumber Company at Rhinelander, Wis., and of Howland & Waltz, Minneapolis, Minn., and Butternut, Wis. Arrangements for equipment will be made about Aug. 1. G. Pickhardt, 409 Washington Building, Madison, president. [April 17, '15.]

SHOPS AND BUILDINGS

Humboldt Transit Company, Eureka, Cal.—Announcement has been made by this company that a site for new carhouses and repair shops has been purchased at the corner of J and Harris Streets in Eureka and plans are being made to erect a building thereon.

Glendale & Montrose Railway, Glendale, Cal.—This company reports that it has postponed the erection of its new carhouses pending the decision of a hearing before the California Railroad Commission on April 28 of an application for permission to increase the capital stock of the company. Upon a favorable decision of the commission stock will be sold at the first opportunity for the purpose of erecting the carhouses.

Fort Dodge, Des Moines & Southern Railway, Boone, Ia.—Among the improvements planned by this company will be the enlargement of its passenger station in Boone.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.—Plans are being made by this company to enlarge its freight yards at Utica and Mulberry Streets in Waterloo.

Missouri & Kansas Interurban Railway, Kansas City, Mo.—Plans have been completed by this company for a new depot at Olathe to cost about $15,000. A new depot at Forty-first Street and the State line will also be built at a cost of $10,000.

Toledo, Bowling Green & Southern Traction Company, Toledo, Ohio.—This company has completed its new freight house on St. Clair Street in Toledo at a cost of $12,000.

Southern Traction Company, Dallas, Tex.—This company advises that it plans to erect one-story brick passenger stations in Abbott, Forreston and Milford, Tex. In Corsicana property has been purchased and remodeled for station purposes. The company is at present building a one-story brick structure to be used for passenger and express purposes at Italy, Tex. The building will be 26 ft. x 100 ft.

Texas Traction Company, Dallas, Tex.—This company has completed its new express station in Dallas. No definite plans have been made as yet when construction will be begun on the new passenger station at McKinney.

POWER HOUSES AND SUBSTATIONS

United Railroads of San Francisco, San Francisco, Cal.—This company reports that it has under construction a small substation which it plans to have in operation in the course of sixty days. The initial installation will consist of one 1500-kw, sixty-cycle rotary converter. All of the electrical apparatus has been received in San Francisco. The foundations for the building and the machinery are completed, and nothing remains to be done but to erect the walls and roof.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.—This company will expend approximately $300,000 during the next three months for equipment for its power plant in Waterloo. A 4000-kw Allis-Chalmers turbine is being installed, which will more than double the capacity of the power plant. Three 500-hp Stirling boilers are also being installed, more than doubling the boiler capacity. The old boilers will be removed as rapidly as the new boilers are installed. The new boilers are equipped with automatic stokers and induced draft apparatus. In addition to the turbine and new boilers other new machinery is to be purchased.

Winnipeg, Selkirk & Lake Winnipeg Railway, Winnipeg, Man.—This company has completed its substation at Stone Mountain.

Manufactures and Supplies

ROLLING STOCK

Union Electric Company, Dubuque, Ia., expects to be in the market soon for two semi-steel single-truck cars.

East Liverpool Traction & Light Company, East Liverpool, Ohio, is reported as expecting to purchase two monitor-roof double-truck cars similar to those in operation in Pittsburgh.

New York Municipal Railway, Brooklyn, N. Y., has received recommendations from the Public Service Commission, First District of New York, to order its third lot of 100 subway cars. The contract, it is understood, will be awarded to the American Car & Foundry Company, which received the order for the first 200 cars. Deliveries will be made during the latter part of 1915 and the first part of 1916.

TRADE NOTES

Du Pont Fabrikoid Company, New York, N. Y., has removed its New York sales office from 90 West Street to Room No. 1614, Equitable Building, 120 Broadway.

Philadelphia Holding Company, Philadelphia, Pa., has received an order for radial type trucks for forty-three of the new cars recently ordered by the Binghamton Railway.

Dearborn Chemical Company, Chicago, Ill., has opened an office in Buenos Aires, Argentine, in charge of Edward C. Brown. The office will be located in the Edificio del Banco Anglo Sud-Americano.

Carbo Steel Post Company, Chicago, Ill., manufacturer of transmission poles, has started construction on a new plant in Cambridge, Ohio. The main office of the company is in the Rand-McNally Building, Chicago.

National Tube Company, Pittsburgh, Pa., advises that its exhibit at the Panama-Pacific Exposition is a part of the U. S. Steel Corporation's exhibit which is located in the Mines and Metallurgy building and occupies 44,000 sq. ft., the largest single exhibit at the exposition.

Edwin G. Hatch, whose resignation from the Clark Electric & Manufacturing Company was announced in the ELECTRIC RAILWAY JOURNAL of April 3, will open a new office on May 1 in the Equitable Building, New York, for consulting work in connection with the purchase, etc., of material for transmission lines and power houses. He will also specialize in protection systems for overhead line crossings.

Rooke Automatic Register Company, Providence, R. I., calls attention to the fact that its system of fare collection is used on the "Over Fair Railway" and in the auto trains at the Panama-Pacific Exposition, described on page 754 of the April 17 issue of this paper. These concessions are among the most popular on the grounds, and the use of the Rooke register in collecting fares on them makes one of the most practical exhibits shown at the exposition.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., announces that its Chicago office at 39 South La Salle Street has assumed charge of the sale of Nuttall gears, pinions and trolleys, manufactured by the R. D. Nuttall Company, Pittsburgh, Pa., for the electric railway, mining and industrial fields in the Chicago territory, which includes the southwestern part and upper peninsula of Michigan, northern halves of Indiana and Illinois and all of Wisconsin, Iowa, Minnesota, North Dakota, South Dakota and Nebraska.

Bureau of Safety, Chicago, Ill., formerly a department of the Middle West Utilities Company, which some time after its organization took over the safety work of the Commonwealth Edison Company and the public Service Company of Northern Illinois, both of Chicago and of the Insull group, has recently been incorporated as a separate institution. It will be known as the "Bureau of Safety" and will act in the capacity of counselors in safety work. Charles B. Scott, formerly in charge of this bureau for the Middle West Utilities Company, has been made secretary, treasurer and general manager of the new organization. George Otis Spencer is president and Bernard Flexner is vice-president.

L. S. Brach Supply Company, New York, N. Y., is mov-

ing its factory to larger quarters at 129 Sussex Avenue, Newark, N. J. An extensive laboratory for the testing of the company's apparatus has been included in the new factory, besides ground space for the erecting of signals for testing before shipments. Among some of the products that will be manufactured in the Newark plant are: Brach automatic flagman, arresters, hydro-grounds, recorders, switch devices and concrete products. The Solderall Company, a subsidiary of the L. S. Brach Supply Company, will also have its products manufactured in this plant. The company will continue to maintain branch offices at 143 Liberty Street, New York, and Peoples Gas Building, Chicago.

ADVERTISING LITERATURE

Bridgeport Brass Company, Bridgeport, Conn., has issued a sheet on its "phono-electric" wire.

Statistics Bureau, New York, N. Y., has issued a catalog on its materials for the graphic presentation of facts, including maps and pins, co-ordinate paper, curve cards, slide rules, pocket counting machines for transit studies and other articles.

Western Electric Company, New York, N. Y., has issued an advertising sheet describing and illustrating the process used in manufacturing its iron and copper wire. Other sheets recently issued by the company describes its phantom telephone circuit apparatus, its lineman's "Buffalo" grip and its lead covered cable.

General Electric Company, Schenectady, N. Y., has issued Bulletins Nos. 48904 and 48905, which are devoted to the subject of electric arc welding and arc welding apparatus for foundries and large repair shops. Bulletin No. 48905 illustrates and describes both stationary and portable apparatus for electric arc welding. Bulletin No. 48904 takes up the general subject of electric arc welding and describes the three processes by means of which welding may be done. It also refers to the welding equipments, materials, notes the advantages to be derived from this process, and mentions special applications of electric welding.

Simmen Automatic Railway Signal Company, Buffalo, N. Y., has recently issued a booklet entitled "An Analysis of Railroad Accidents" which presents statistics covering the causes of notable collisions and derailments that occurred between July 31, 1901, and March 31, 1914, the compilation being made from Interstate Commerce Commission quarterly accident bulletins. The various causes of accidents are subdivided into two general classes, one covering the wrecks that would have been prevented by a complete signal system, or about 73 per cent of the total. The other class includes only accidents which are not preventable by any signal system. Accidents of the first class are separated into fourteen subdivisions according to the causes, and each one of these subdivisions is briefly discussed, the possibility for eliminating it by the Simmen System of automatic signals being explained in addition. A particularly interesting feature of the booklet is a table arranged in four-year periods which is included in the last two pages. The presentation of the statistics in this manner provides an opportunity for a rather searching study of railroad accidents in general. One very obvious point is that the increase in protected mileage during the period covered by the table has been accompanied by a practically corresponding increase in accidents due to disregard of fixed signals in stop position. Other influences which are less obvious, but of which the effect would probably be reflected in the table, are safety legislation, legal limitation of hours of service, the safety-first movement, and the increases in speed and trainloads which are features of modern railroading.

NEW PUBLICATIONS

Public Utility Economics. A series of ten lectures delivered before the West Side Young Men's Christian Association, New York. 213 pages, illustrated, published by the Forum.

Under this heading have been collected the lectures delivered before the Finance Forum of the West Side Y. M. C. A. in New York during the winter of 1913-1914. Abstracts of these lectures were published in the Electric Railway Journal at that time. The forum was fortunate in securing addresses from men of such important affairs as were represented in this group, and the collection and preservation of these lectures in bound form is an excellent plan. The chairman of the advisory committee of the Finance Forum is O. B. Willcox, of W. P. Bonbright & Company, New York.

The Adjuster's Manual. By C. H. Harbaugh. The Spectator Company, New York. 408 pages. Leather, $2.50.

This book, which is the second edition of a work first published in 1905, is written with the idea of assisting insurance companies, railways, adjusters and agents in the adjustment of claims resulting from accidents or sickness. The new edition, which is thoroughly revised, contains more than 100 pages of additional information. Among the new features may be mentioned twelve illustrations of the skeleton, muscles and organs of the body, a glossary of medical terms used in accidents and health insurance, 1700 words and explanations, new tables of information and new articles on special diseases. On account of the elimination of technical terms in the discussion of the medical subjects, the book is readily comprehensible.

Money and Banking. By John Thom Holdsworth. D. Appleton & Company, New York. 1914. 435 pages. Cloth, $2, net.

The recent institution of the federal reserve system and the discussions precedent thereto undoubtedly brought home to the mind of the average man how little he knew about the real operations of the national banking system, although this is a subject whose fundamentals should be thoroughly understood by all. For this reason the present book by Mr. Holdsworth, covering the history, principles and practices of money, credit and banking in this country, should be welcomed by all business men. It contains the text and an explanation of the new federal reserve system, and it gives the reader a most lucid and up-to-date account of present practices in money and banking. While intended primarily as a text book, the work is well adapted to the general reader.

Elementary Electricity and Magnetism. By W. S. Franklin and Barry MacNutt. The MacMillan Company, New York, N. Y. 1914. 174 pages. Cloth, $1.25 net.

Advanced Electricity and Magnetism. By the same authors. The MacMillan Company, New York, N. Y. 1915. Cloth, $2 net.

The elementary book while intended, like the other, as a text-book for colleges and technical schools, is written in the simple style which characterizes the writing of these authors. There are numerous illustrations drawn from science and practice.

The advanced text covers the physical theory of the subject and requires a fair knowledge of elementary physics and of mathematics. As the title indicates the treatment goes beyond the realm of experimentation and into theory, but numerous interesting and well selected problems serve to preserve the tangibility of these subjects.

Constant Voltage Transmission. By H. B. Dwight. John Wiley & Son, Inc., New York, N. Y. 1915. 115 pages. Cloth, $1.25 net.

The purpose of this book is to advocate the use of synchronous motors in eliminating variations in voltage in electric power systems. To this end the author shows how the line power factor can be controlled by means of synchronous motors, thus giving control of the voltage, and he summarizes the practical and theoretical aspects of the systems employing overexcited synchronous motors for the purpose. He summarizes the advantages of constant voltage transmission thus: Steady voltage, steadier frequency in small water-power plants, lower total cost where the voltage is less than about 1000 per mile, overloads are better handled, large conductors reduce cost of towers and land, wide spacings and large conductors extend corona limit, increase in economical distance of transmission, better protection due to high reactance, tendency to use sixty cycles, and the method can be gradually adopted. The attendant disadvantages are: Tendency of synchronous machines to drop out of step, possible large accidental variations in voltage, increase in short-circuit current unless reactance is increased, decrease in reserve due to fewer lines, higher total cost for short, high-voltage lines, and lower efficiency.