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## The Pennsylvania Terminal Station

The magnificent terminal station of the Pennsylvania Railroad on Manhattan Island will be completed and ready for use within a few weeks. It is a fitting monument to the constructive genius of the late A. J. Cassatt, who as president of the railroad conceived and planned the system of tunnels, yards and bridges which are to unite New Jersey with Manhattan and Long Island and provide for an all-rail route to New England from the South and West. The plan in its entirety is a great piece of railroad civil engineering, but it is one that would have been impossible to execute a decade ago. The whole success of the stupendous undertaking, involving an expenditure of nearly \$160,000,000, depends on the safe and reliable operation of trains by electricity through the river tunnels and into the underground station. The art of heavy electric traction was in its infancy when the scheme was first proposed, and it required true courage to stake so much on future developments in an entirely new field. However much credit may be given the engineers and their "sand hogs" who bored the tunnels, the achievements of the engineers who perfected and built the electrical apparatus to move trains are equally worthy of the highest praise.

## Another Example of the Everybody Busy Principle

Four years ago this paper presented articles on the "everybody busy" principle. It was then intended to encourage more careful attention to the details of shop practice and thus obtain higher efficiency from the employees. Since the presentation of the earlier articles we have commented on many shop labor schemes that have served to increase the labor efficiency of mechanical plants. Some of the accepted methods have warranted elaborate articles. Among them were the accounts of how good results had been obtained by the piece work system. Other plans, though less elaborate, have given comparable results for certain phases of the work for which railway repair shops are organized and operated. A good example is the method for lessening the cost of manufacturing armature coils by the use of the otherwise idle time of substation attendants, put into practice by the Chicago, South Bend & Northern Indiana Railway Company some months ago. Coil winding forms and material are distributed to the substations and when the men are not attending to their principal tasks they occupy their time by winding armature coils. This scheme has a three-fold value: An economy in the manufacture of coils over that hitherto in force, and ranging from \$7 to \$10 per set, is realized; the attendants now do not idle away their time by reading novels, and the class of substation attendants which the railway company wishes to have in its employ feel more satisfied with their positions, because of their increased duties and opportunity for service.

### Fast Schedules and Minor Delays

Fast schedules are an important factor in promoting long-distance passenger traffic and an appreciable reduction in the running time between terminals is usually followed by a gratifying increase in through travel. In competition with the service given by parallel steam roads the interurbans are handicapped in the matter of running time by unavoidable speed restrictions within cities and fast time can be made only on the long stretches in open country. The limit of safety and capacity of the equipment has already been reached by many roads wherever opportunities are afforded for high-speed running and but little further improvement can be expected in that direction. The elimination of every unnecessary stop or slow-down, however, would save many valuable minutes in the aggregate, even on the fastest runs. Many of the physical causes of minor delays would cost little or nothing to remove; others are the result of engineering mistakes made in the construction of the road and would require a considerable expenditure to remedy them. There are, also, the delays caused by sluggishness or indifference on the part of trainmen and employees. An exchange of pleasantries in taking orders from the dispatcher consumes time; the fact that the agent at a station waits for the car to arrive before loading up a truck with outgoing baggage and express causes another short delay. A sluggish conductor can lose five seconds at every stop by fumbling for the bell cord. It is always an instructive object lesson to a railway man to watch the change of engines on one of the 18-hour flyers between New York and Chicago. Every man is alert and not a second is lost in useless words or motions. The same degree of intelligent activity if exercised by all employees concerned would save many minutes on a 100-mile interurban run.

There is an old adage which might be paraphrased for the occasion into "Save the seconds and the minutes will take care of themselves." Any manager who is desirous of improving his schedules cannot do better than to examine into the reason for making every slow down and stop and add up the seconds wasted in unnecessary delays. How to save 10 or 15 minutes on a long run will be quickly apparent.

### Eliminating the Special Car

The customary method of handling pleasure traffic when the excursionists are all members of one organization is to furnish special cars for a specified amount, say \$12 per double-truck car for any period up to three hours, and \$3 per hour thereafter. The fact that chartered cars will be furnished is often considered to be a strong inducement to get the business. Nevertheless, it is reasonable to consider whether it is not possible to secure as much if not more of this traffic by carrying it on the regularly scheduled cars under certain conditions. The practice on one road where this view is taken is for the company to sell to the treasurer of the excursion party a definite number of specially-marked tickets good on any car on a certain day, at a slight reduction from the single fares. Where there are concessions at the park it is, of course, possible to sell a ticket covering transportation and admission into one or more concessions at a slight reduction so as to avoid any actual lowering of the rate of fare, if this plan should be considered more desirable. The principal point made is that the sale of individual tickets renders it easy for individual excursionists to leave for and return from the picnic grounds at their own convenience.

In many cases it is not possible for many of the older folks to go out in the afternoon. Probably most of the members could be taken out in groups during the hours of light regular traffic. Of course, there is a certain advertising value accruing from the employment of special cars, but the drawback of their omission can be more than overcome by placing the society's bunting on all or most of the cars on the division effected. This manner of handling the pleasure travel of organizations avoids all interference with the schedules and saves the expense of extra crews and cars.

One use of special cars which may easily become an abuse is when they are chartered by merchants to bring shoppers to town free of charge, by giving them shopping rebate coupons. This practice brings into being a certain amount of new travel, but the use of exclusive cars should not be encouraged. The objection toward them is two-fold—if pushed too far. The railway loses the full-price fare of those who would travel anyway, and again if many people are carried in this way without individual expense, they become dissatisfied with the regular rates.

### The Gas Engine in Railway and Lighting Service

The paper on "Gas Engines in City Railway & Lighting Service," presented by E. D. Latta, Jr., before the Charlotte, N. C., meeting of the American Institute of Electrical Engineers held March 30 to April 1, inclusive, is one of the few comprehensive accounts which have appeared on American gas engine practice. The plant operated by Mr. Latta is not a large one as the principal units comprise only two 540-kw, 60-cycle, 2300-volt, three-phase generating sets. The apparatus was novel, however, and was used under extremely unfavorable conditions as regards ultimate fuel economy. At the same time the low load factor was advantageous so far as reliability of operation was concerned. It is questionable whether the Charlotte Electric Railway, Light & Power Company would have installed a gas engine plant at all if it had not been intended chiefly to be a stand-by plant for a contemplated water-power development. The unexpected competition of other hydroelectric interests restricted the field for the sale of current and therefore led the Charlotte company to rely exclusively on the gas station. The load handled by this station comprises the rapidly fluctuating demands of railway and elevator service besides lighting and small motors. The engines are of the horizontal, twin-tandem, double-acting, four-stroke cycle type and are so well governed that even when a heavy load is suddenly thrust upon or taken from the engine, there is only a momentary swing of 2 per cent below or above the mean speed for the given load. The engines can run in synchronism with the cranks in almost every possible relation. Even a 42 per cent over-load has been carried momentarily without causing a troublesome drop in speed. Mr. Latta adds that the temperatures of the alternator above room temperatures do not indicate an excessive synchronizing current, and there has never been any tendency from either the 300-kw or 500-kw rotaries to fall out of step. The larger rotary does hunt slightly, but only when one generator is running. However, this converter is practically as large as the alternator and the fly-wheel effect of its rotor is not enough to take up the greater speed variations of a single engine.

The actual service operation of novel machinery naturally brings to light some defects which were not foreseen by the

designers or discovered during the experimental runs. The early difficulties with piston packing for combustion engines of this type have been eliminated in this case by using segmental iron rings, which together with their castings are removed monthly for renewal and cleaning. Neither the lubrication nor the cooling system has given any difficulty. As to gas troubles, it was found that pre-ignitions would take place owing to the heating up of the engines when 25 per cent over-load was carried for several hours. Back-fires and muffler explosions also occurred, but practically all interruptions of this kind were momentary. It is very creditable, indeed, both to the manufacturer and to the user of this apparatus that the sum of all the delays caused by the gas engine equipment in a 24-hour a day plant should have been only 2 hours and 45 minutes during the first year's operation. Furthermore, there is reason to believe that the record for the second year will be much better. It may be of interest to add that the noise of the gas engine exhaust, which some expected to prove a nuisance, cannot be heard within 50 ft. of the engine building. In fact, the noise of the machinery itself actually is greater than that of the exhaust.

The regulating qualities and reliability of the gas engine station having been demonstrated, it is interesting to examine the operating and maintenance costs. The total annual output of the two 810 brake-hp engines was 12 403 engine hours which was equivalent to about 3,356,000 kw-hours from the two 540-kv alternators. These figures give the poor average load factor of 45 per cent based on the output divided by the product of the engine hours and the capacity of one engine. The amount of fuel per kw-hour, including the coke required for starting the producers, was 1.97 lb. Assuming an efficiency of 85 per cent for the alternators at 45 per cent load, only 1.275 lb. of coal was used per brake hp-hour. The kw-hour production cost, including the auxiliaries, was 0.9759 cent, of which 0.349 cent went for coal, 0.170 cent for power house labor, 0.131 cent for producer labor, 0.085 cent for all lubrication and waste and .076 cent for all repairs and maintenance. These figures are low when compared with steam plants of similar output, but a fair parallel is impossible because the items of interest, depreciation and taxes, which are certainly larger for the gas engine station, have been omitted. It is proper to point out, however, that Mr. Latta did not give these latter figures because the installation was arranged for three units instead of two and all the buildings, producers, gas holders, and piping were put in for the ultimate capacity. Thus the relatively small additional cost of one generator set and foundation will increase the capacity by 50 per cent while raising the fixed charges only 18 per cent. The author concludes that the gas engine has a wide field of usefulness, but doubts whether it is best adapted to a plant operated under conditions like those obtaining in Charlotte unless storage batteries are used to permit the engines to be operated at constant load. The three principal conditions under which the gas engine is at the greatest advantage are: Where natural or blast furnace gases are available; where low grade coal can be purchased very cheaply; and where a source of power at low prices but of uncertain continuity is available. In the last case, provided the character of the service will warrant the cost of reserve power, the gas engine is ideal for a railway and lighting company, because it may be started and put under load in less than two minutes.

### Tickets vs. Cash Fares

An engineering contemporary has recently expressed the opinion that a ticket system is essential with prepayment cars to avoid the delays on the rear platform and expressed the opinion that if American street railway companies had adopted 3-cent fares and the ticket system 15 years ago instead of extending their transfer privileges they would to-day be in a far better financial position and the public would have been better served and better satisfied. We are far from defending either the logic or the results of the transfer system as now in force in most cities in this country. Whatever might have been the effect upon the earnings of electric railway companies of a reasonably restricted use of transfers, the companies have not been responsible for the excessive issue of transfers which has been a marked feature of electric railway operation during the past 10 years, nor have they introduced the system voluntarily. In practically every case it has been forced upon them either by State or municipal enactment, usually against their strong protest and after all legal means to prevent its establishment have been exhausted. The substitute proposed, however, of a 3-cent fare by cash or ticket, would, we believe, be worse than the disease, if that were possible, nor do we consider that it is at all necessary to secure successful results with prepayment cars.

One of the fears generally expressed before this type of car came into general use in this country was that it would be slow in loading, but this has not been found to be the case. When prepayment cars were first operated in Buffalo, one of the earliest if not the earliest city in the United States to adopt this style of car, the management as a precautionary measure installed change stations at several points in the downtown section of Buffalo so that persons who did not have small change could secure it at these stations before boarding cars. The company soon found, however, that the public recognized the advantages of having the change ready and this experience has been duplicated in other cities. When a service of this kind is inaugurated a little popular education is advisable and this plan has nearly always been followed. But the public is quick to learn and appreciate the improvement in service which the cars afford and they are in use in so many cities now that a few preliminary instructions only are necessary. For instance, in a case which occurred last week in which prepayment cars were operated for the first time in a city of about 200,000 inhabitants, 80 per cent of the fares on one car observed were in nickels and a 25-cent piece was the largest coin presented to be changed. We do not mean to say that at very crowded crossings there may not be some slight loss of time in the prepayment type as compared with the old type of car, but this delay is more than made up by shorter stops elsewhere on the route.

Undoubtedly the prepayment car has introduced new problems particularly in the best method of collecting fare, for example, whether it is better to use a fare box which returns change to the conductor or not, or whether the fare should be collected by the conductor without a box. It would be surprising if all questions of this kind should have been completely solved in the short space of time in which this type of car has been in general use. But experience is constantly being acquired in regard to these matters and we should know more about the relative advantages of the different methods before long.

## RECENT PRACTICE IN MOTOR MAINTENANCE IN BOSTON

The headquarters of the department of rolling stock and shops of the Boston Elevated Railway Company have for many years been located at 439 Albany Street, in the South End district of the city. Upon a tract of land once occupied by the Hinckley Locomotive Works, the Boston Elevated organization has long maintained a centralized installation for the maintenance of equipment. On this site also stands the company's "Central Power Station," and the offices of the generating and distributing departments, as well as those of the electrical engineering staff, are located upon the premises. An

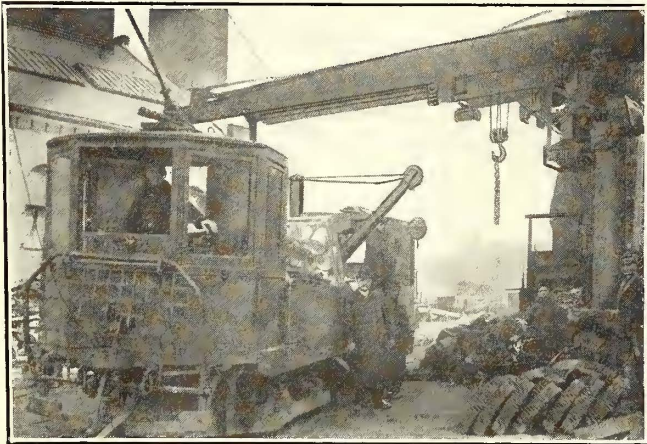


Fig. 1—Boston Elevated Shops—Supply Car and Hoist

extensive stores depot has also been maintained by the company at this place. In addition to the Albany Street shops, the company maintains an extensive repair plant for car-body work at Bartlett Street and a special shop for the maintenance of

elevated cars at Sullivan Square. In general, however, the maintenance of surface car motive power has been centralized at Albany Street.

The Albany Street shops represented the growth of an existing installation to meet the requirements of a rapidly expanding system. Interest in their work centers in the utilization of special appliances of a labor-saving character rather than the design of the shops as a whole.

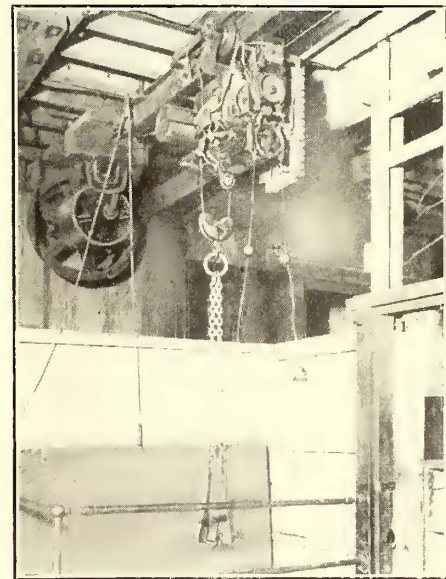


Fig. 2—Boston Elevated Shops—Electric Hoist Between First Floor and Shop

On March 12 the shops were destroyed by fire. Preparations had just been completed for the publication of an article describing the labor-saving tools operated in these shops in connection with armature repairs, and through the kindness of the company, it is still possible to review some of the methods and appliances employed previous to the destruction of the plant. These methods and appliances are of established value, and in the formation of new facilities for armature maintenance there is no question that many of the means of working which proved acceptable in the old shop will be continued in the future plant.

The maintenance of armatures and field coils, with the handling of all special winding and insulation work in connection with motor and generator service, repairs on electric track switches, escalator, fan and shop motors was conducted in the "Armature Department," which occupied the second floor of the machine shop building at Albany Street. The department shared with various store rooms an L-shaped area about 325 ft. long and 75 ft. wide, there being separate sections for different classes of work, including a taping and insulating room for lighter work, small coil winding, etc. Fig. 1 shows the method by which armatures and other equipment and supplies were handled at the entrance of the shops. The same view shows one of three stock cars used in handling material and equipment between the shops and different car houses and power plants on the system. Each of these cars is equipped with four motors and weighs about 20 tons. A 1-ton Sprague revolving hoist with a 7-ft. boom is installed in each car. A cab and separate trolley at each end, with a central gondola type space, facilitated rapid handling. All heavy material received at the shop entrance was handled in and out of the shops so far as necessary by a 2-ton Sprague telfer hoist running upon a monorail 15-in. I-beam half way into the machine shop, with a spur leading to an elevator way by which all heavy apparatus and material was hoisted into the armature department. Maximum facility in handling wheels, axles, etc., was afforded by the combination of the telfer and the stock car crane at the shop entrance.

Fig. 2 illustrates the provision which was made for handling material between the ground floor and the armature shop, a 1-ton electric hoist of the telfer type being in service. This was equipped with chains and grips by means of which an armature could be rapidly raised from the street floor to the repair department and thence carried to the proper machine or winding division by the telfer runway. In order to increase the safety of the hatchway leading to the lower floor the company had installed a railing composed of three wrought-iron pipe lengths at the opening, the top rail being hinged and provided with a pin lock so that it could be quickly raised in handling material, while remaining free from any danger of accident at other times. The telfer traverse was effected by hand power. The starting and stopping switch handles of the

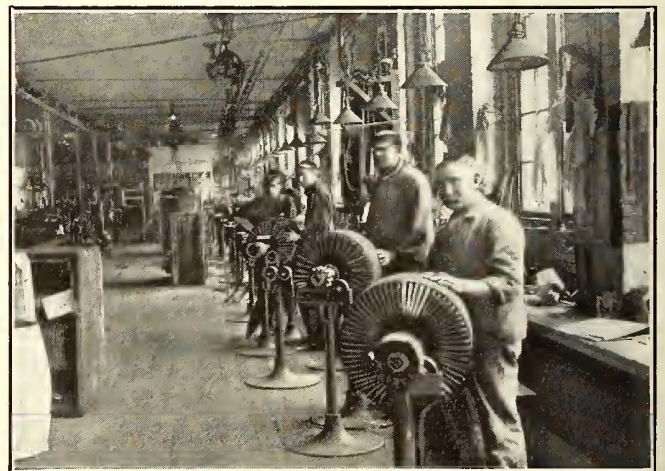


Fig. 3—Boston Elevated Shops—Armature-Winding Shop

telfer were tied together by a wooden rod to save the time often lost by the operator in reaching after swinging grips. Strain insulators were installed in the wires leading to the motor controller.

A view of the armature winding stands in the shop, taken just before the fire, is shown in Fig. 3. The shop was liberally provided with traveling hoists, and this section was served by a line running directly above the stands. The winding was carried on at the south side of the shop, close to unobstructed windows, giving a maximum of daylight for the service. The usual bench tools were provided, and each stand was furnished

with a separate 16-cp incandescent lamp for local illumination, the general lighting of the department being effected by 11 Cooper-Hewitt mercury vapor lamps. An armature stand of this type consists of a pedestal and column supporting a box fitted with  $\frac{7}{8}$ -in. half openings with roller bearings 5 in. in diameter and  $1\frac{3}{8}$  in. in thickness. The rollers are placed 5 in. apart on centers and carry the armature shaft with ease, regardless of the type of motor undergoing repairs. The stands are adjustable as to height and ordinarily carry the armature center line of shaft at from 3 ft. to 4 ft. above the floor. The rollers are not fastened into place, but are held simply by gravity.

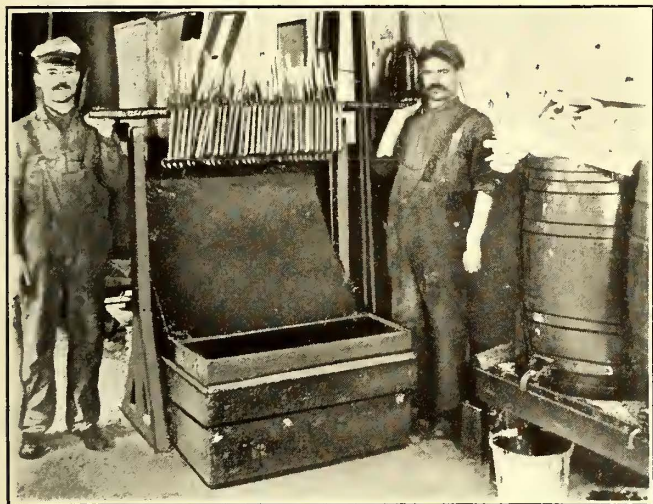


Fig. 4—Boston Elevated Shops—Method of Dipping Coils in Large Numbers

The following motors are in service on the Boston Elevated system:

WP-50.

GE-58, 70, 73, 74, 86, 202, 800, 68.

Westinghouse, 12, 12A, 68, 121, 312, 301.

Of these the GE-202 and Westinghouse 312 and 301 motors are of the interpole type. Before the fire there were about 57 persons on the payroll of the armature department. The number of employees required in this work has been considerably reduced in the past two or three years by the improvement in operating condition effected on the road itself and by the betterment of work in the department. In a recent month the department repaired 316 armatures, 357 field coils, made 2714 new armature coils and also performed a large number of miscellaneous repairs on control and other apparatus. Practically all the work is handled on a piece-work basis. The results of this policy have been to give the company a larger output for a given expenditure of time and money, as well as to afford the employees an opportunity to earn higher wages.

Fig. 5 illustrates the equipment which was in use in the shop for blowing out armatures received from the various car houses. As soon as an armature reached the department by the hoist indicated above, it was transferred to a place in front of a 24-in. exhaust fan driven by a 3-hp 550-volt motor, and held in position by a traveling hoist for blowing out by a nozzle piped to the regular compressed air service of the shops. The fan was mounted in the wall and arranged to deliver the dust and dirt to a sheet-iron stack rising on the outside of the building to a point about at the roof level. This arrangement enabled the work of cleaning out to be performed with a minimum accumulation of dust, whereas before the fan was installed the amount of dust and dirt thrown around the premises was a decided inconvenience.

So far as practicable in this shop, all similar work was performed in multiple operations, a typical instance being shown in Fig. 4, which illustrates the method of coil dipping used. Thirty coils were dipped simultaneously in the compound tank by two men, and the standards at the side of the tank permitted the multiple drainage of the coils back into the supply. The

compound tank was fitted with an inclined cover to save loss of the asphaltic material used.

The Boston Elevated Railway Company was one of the first railways in the country to recognize the value of undercutting commutators for increasing their life and service reliability. About 3000 commutators have now been slotted by this company, the maximum depth used being  $1/16$  in. Every type of motor used on the system has been slotted, and it is estimated that the life of commutators has been increased from 300 per cent in the case of the newer motors to 800 per cent in the older machines. The company used a lathe with a special tool, Fig. 6, and found this advantageous on account of its ability to move the tail stock over a little and follow the commutator groove in case the bars get a trifle out of line. Experience showed the wisdom of not slotting too deeply on account of the serious character of burns when they occur in deep grooves. It is estimated that 11 tons of copper were saved last year through the reduction of copper wear brought about by reduced sparking. All commutators are undercut by a saw-toothed sheet steel disc 32 mils thick, the disc diameter being 1 in. The discs are blanked and milled by the company in lots of 50 or 75, and are then case hardened. They are used on a square arbor and cost about 1.5 cents each, ready for service. After use on four commutators the disc can be resharpened for 0.5 cent and used to undercut four commutators more.

It is the company's practice to coarse-file all commutators after the undercutting is done, leaving a slight burr or fin on the inside of the slot, which is then removed by hand with the use of a steel knife. This cleans out particles of mica. The slotting is performed with an air jet blowing upon the tool. The commutator is gone over with a fine file and sandpaper, and the air jet is used continually while the sandpapering is in process. The slotting tool is driven by a spindle belted to the counter-shafting above the lathe, tension being provided by two idlers carried on a spring rod held above the head of the operator as illustrated in Fig. 7, which also shows the air and electric hoisting facilities which were provided at these lathes. Two lathes were set apart for this work alone. The company has

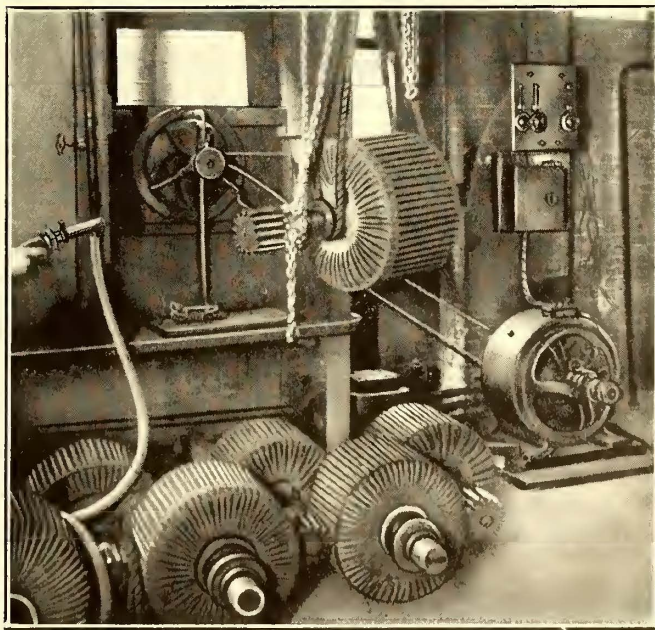


Fig. 5—Boston Elevated Shops—Equipment for Blowing Out Armatures

found that the most scrupulous care needs to be taken in doing undercutting work, and that hasty slotting is apt to lead to more trouble than the process saves. For this reason no special effort has been made to perform undercutting in quicker time than is the case elsewhere. It has been found desirable to allow an hour for cleaning out the undercut channel between the bars. If the work is hurried too much it is likely to leave thin edges of the mica next to the undercutting, with the result that

the brushes ride unevenly on the commutator and cause severe sparking. Besides the wear of copper through sparking which is saved the longer life saves labor in cutting off sleeves, disconnecting leads, withdrawing the commutator, machining new commutators, rebuilding with new mica, replacing the commutator, reconnecting, fitting new sleeves, turning down to dimen-

brush spring with which the pressure applied to the brush is always radial to the commutator.

Fig. 12 illustrates a gas heater which was used in the department in connection with the heating of commutators to drive out shellac before pressing, to give an even commutator. Air and gas were supplied through valved pipes leading to the burners

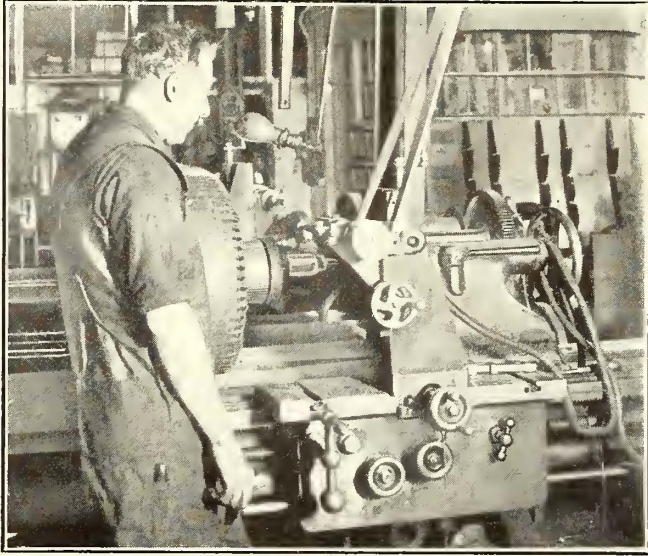


Fig. 6—Boston Elevated Shops—Lathe Used for Undercutting Commutators

sions, transporting the armature back to the car house and assembling it in the motor.

The company has found that with the grooved commutator it is advisable to use a high-grade brush and a low brush tension, reducing the wear of the commutator to a minimum. A treated brush is unsatisfactory with an undercut commutator, for the reason that the dust given off by the wear of the brush

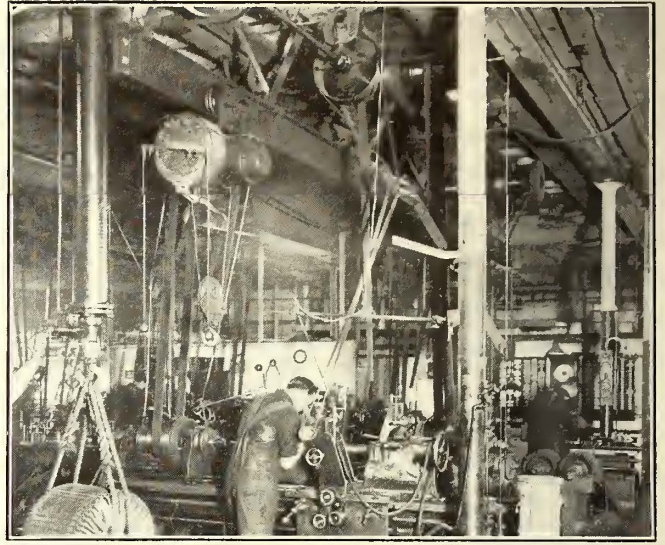


Fig. 7—Boston Elevated Shops—Hoisting Facilities at Commutating Undercutting Lathes

in the bottom of a sheet-iron chamber, and, to facilitate more rapid work, the commutator was covered with a cylindrical shell after being set upon the heater. On the same bench was located another gas and air heater used in connection with soldering coils, melting glue, etc. Thirty-six coils were dipped at once here. For setting commutators in a lathe for machining the department made use of a tapered split ring into which the

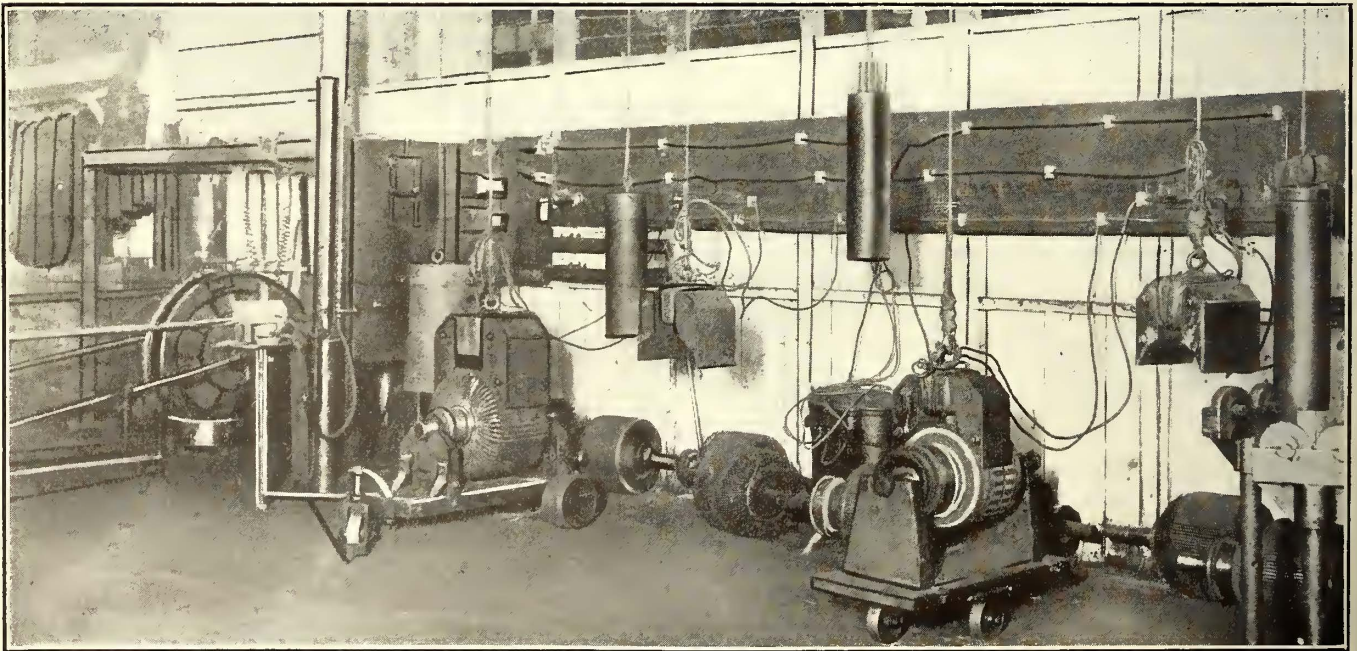


Fig. 8—Boston Elevated Shops—Testing Plant for Armature Department

adheres and accumulates in the slot and causes short-circuiting of bars; the treated brush also tends to become gummy and cause friction and sticking in the brush holder. Several of the high-grade brushes have reached the point where the wear on the commutator is so slight as to indicate a life of several years. Of equal importance with the undercut is the securing of closer fits in brush holders, maximum bearing surface, and a

commutator was first placed, the ring then being fitted into a solid outside tapered ring which was set into the lathe chuck.

Completed armatures were tested as illustrated in Fig. 8. The plant consisted of an old a.c. generator belt-driven by a 23-hp, 550-volt motor. This alternator furnished through a stationary transformer current for testing the condition of the coils in the armatures repaired, the current being applied to a

wound core built of laminated plates in the shape of pole pieces, arranged to set over the completed armature with a small air gap. When alternating current was applied to this coil, the coil and core acted as the primary of a transformer, inducing electromotive forces in the armature coils beneath. Any short circuit existing in the winding was immediately manifested by flashing and heating upon a momentary application of the al-

for the straightening of shafts. It consisted of two hollow cylindrical castings 14 in. in diameter when assembled, with a central hollow core 5 in. in diameter in which the shaft was placed. The length of the device was 7½ in., and the thickness of the cast-iron shell was ½ in. Each half of the assembled

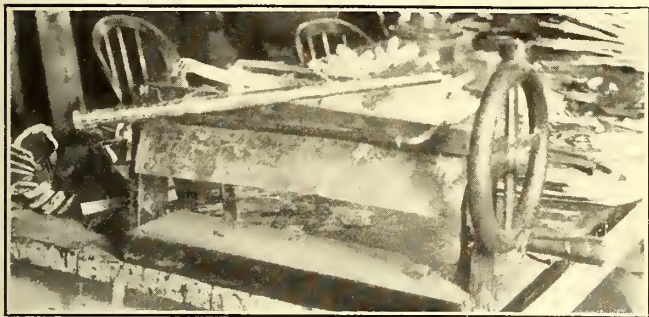


Fig. 9—Boston Elevated Shops—Insulating Machine for Forming Tubes



Fig. 10—Boston Elevated Shops—Winding Machine for Track Switch and Other Coils

ternating e.m.f. to the core above the armature coil. The alternating e.m.f. was usually 700 volts to 750 volts for this short-circuit test, which was used during the completion of armatures and also in the process of banding and painting. The primary cores were easily movable up or down, being counterbalanced by suitable weights and hung from pulleys.

In addition to the short-circuit testing equipment the department utilized the following standard bench tests, making several momentary applications in each case:

Between commutator bars.....	200 volts
Between bars and shell.....	2,000 volts
Between new armature coil and core.....	1,600 volts
Between old armature coil and core.....	1,000 volts

Field winding insulation now will stand 5000 volts under the company's methods of construction. In winding motor field coils the company uses a fluid hardening compound put on in a thickened condition, depending upon the space available. This is interposed between successive layers. In addition to its insulating properties this compound acts as a heat conveyor and

collar is supplied with a mixture of gas and air through pipes leading to appropriate controlling valves on a post near by. Curved brass leads were used beyond the Y where the two supplies were joined, to avoid frequent breakage of hose lines carried around sharp corners, etc. The core holes were plugged with pipe plugs. On the inside of each half cylinder were rows of 1/32-in. holes used as flame apertures, there being a total of 96 in the complete collar. The device was set on a metal plate across the bed of a lathe for convenience, the gas and air being served through ½-in. pipes on each side. A latch was provided to hold the halves together in service. In operation the shaft was placed inside the collar and the jets lighted, the shaft being left by itself until red hot. Special points were used in the lathe to hold the shaft in position, and to save injury to the regular pointers. Shafts were formerly bent in cold condition by one man and a helper, the work requiring from two to three hours, according to the nature of the distortion. By this means it was done by one man in one-half to three-quarters of an hour, and the shaft was left in better condition than when bent cold. Formerly trouble was experienced from the crystallization and subsequent breakage of cold-bent shafts. The heating was not detrimental to the wearing value of the metal and the resulting strength improved the service materially.

The insulating room of the armature department was about

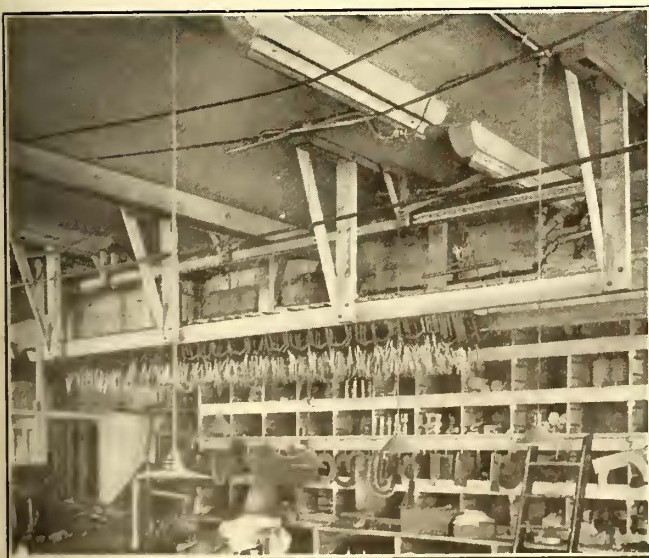


Fig. 11—Boston Elevated Shops—Armature Coil Storage Rack in Insulating Room

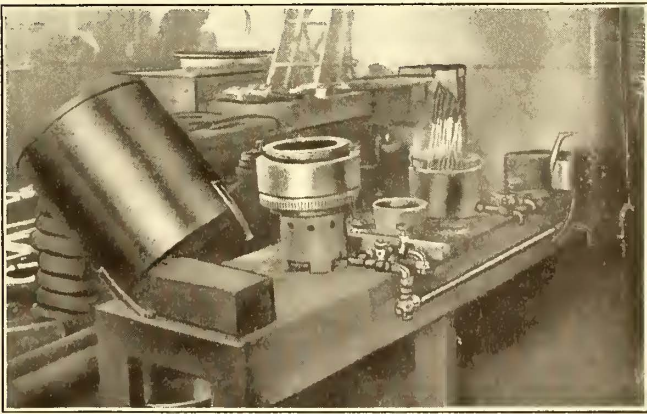


Fig. 12—Boston Elevated Shops—Gas Heaters for Heating Commutators

prevents the mechanical chafing of coils under service conditions. Whenever the company uses an asbestos field coil it is still invariably necessary to have the winding impregnated. Cotton asbestos coils are generally used. Common practices are followed in winding field coils and in banding armatures. Fig. 13 illustrates a device which was used in the department

50 ft. long and 30 ft. wide. The work covered cutting of insulation for all purposes, taping armature coils, coil storage, winding solenoid and magnets, and in general the lighter repairs of the electrical equipment. A recently completed feature of this room was the armature coil storage rack shown in Fig. 11. This rack had a capacity of about 2000 coils, weighing

approximately 2 tons, and was built of timber framing carried from the ceiling by  $2\frac{3}{4}$ -in. x 6-in. pieces. The coils were carried on 1-in. wrought-iron pipes laid across the framing, and in the center a runway was provided upon which a block and tackle with a pipe carrier were suspended to facilitate handling the coils in groups. The framing was about 4 ft. wide, and was hung about 8 ft. above the floor line. A special advantage of its use was the storage of coils in an out-of-the-way location but in a manner preventing the distortion of coils by their own weight or by contact with other articles. Apart from the saving in bench space effected and the absence of distortion, the coils were provided with much better drying facilities on this frame, which was made by the company at moderate cost for this service.

Fig. 10 illustrates a coil-winding machine which was used in the insulation room. Its chief features of interest were the adjustment of speed by a conical friction contact and a foot brake, by means of which the winding of any given layer of turns could be instantly stopped in case the operator wished to shut off the work. A large number of solenoids for electric track switches were wound in this division of the armature department.

The company uses the Cheatham track switch and has improved its construction by removing the ordinary fiber head and replacing it with a  $\frac{1}{4}$ -in. threaded brass head with a  $\frac{1}{4}$ -in. fiber collar upon which the winding is carried. This is sealed inside and outside with solder and much trouble from moisture is thereby prevented. The coil is rewound in hardening paste and this paste is also put on the outside of the coil. The brass collar is made a little higher than the winding, with a fillet of paste at the corner. The reliability of the switch has been notably increased by this change.

A device which was used in the formation of insulating tubes shown in Fig. 9. The tube stock was made of fuller-board 10 mils thick, the length of the completed tube for grid service being about 10 in. and the diameter  $\frac{3}{4}$  in. In operation the fullerboard was rolled in the machine, a wooden clamp being held on the top of the rolling material. Mica cloth 10

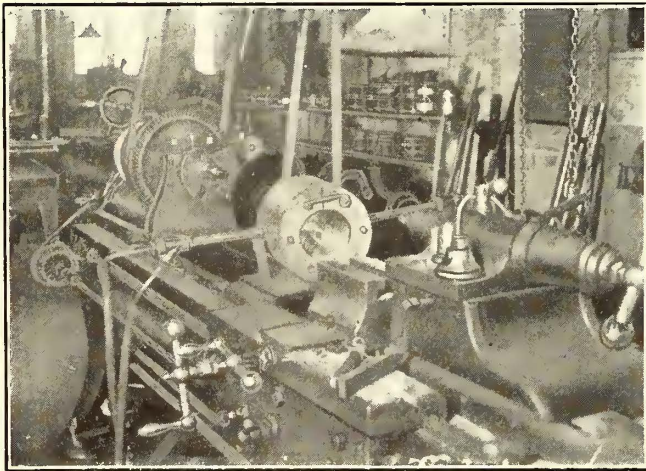


Fig. 13—Boston Elevated Shops—Shaft Straightener in Armature Department

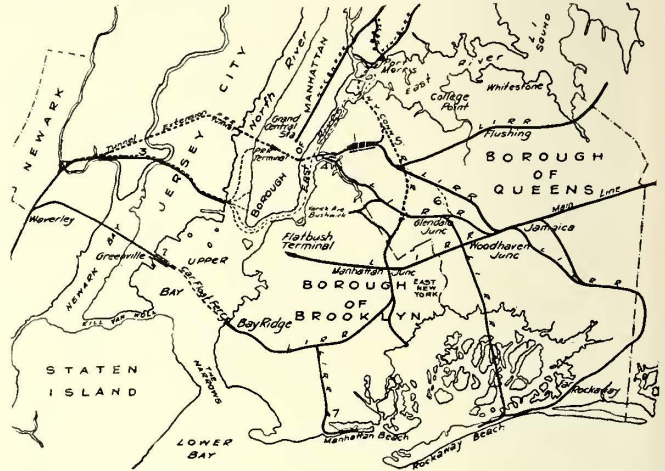
mils in thickness was put on for the last two turns and shellacked. The company made its own tubes in lots of 500 each. In this machine 300 tubes a day could be made, allowing half a minute per tube.

Another machine was also used in this division of the shops for forming insulation for use in various sized slots. This device consisted of a bar pressed down by a foot lever upon the insulating material according to the form beneath the bar. A spring restored the bar to the normal open position when not in use. The machine was designed to handle commutator slot insulation of any size up to a maximum length of  $12\frac{1}{2}$  in.

## TERMINAL STATION OF THE PENNSYLVANIA RAILROAD IN NEW YORK CITY

The enormous Manhattan terminal station of the Pennsylvania Railroad is rapidly nearing completion, and by mid-summer electric trains will be running through the tunnels under the North and East rivers. The new station will be used by all through and suburban trains of the Long Island Railroad which now run to Long Island City, and by through and suburban passenger trains of the Pennsylvania Railroad. An initial daily service of 600 Long Island Railroad trains in and out and 400 Pennsylvania trains has been planned.

The New York tunnel extension begins at Harrison, a short distance east of Newark, N. J. At this point through passenger trains from the South and West will change from steam



Pennsylvania Terminal—Map of Tunnels and Long Island Lines

locomotives to electric locomotives. Transfer platforms for passengers, a car yard and a locomotive yard for the steam and electric locomotives have been built here. From Harrison a double-track line on a high embankment extends across the Hackensack Meadows to the Bergen Hill portal of the tunnels which lead under the North River, into the terminal station.

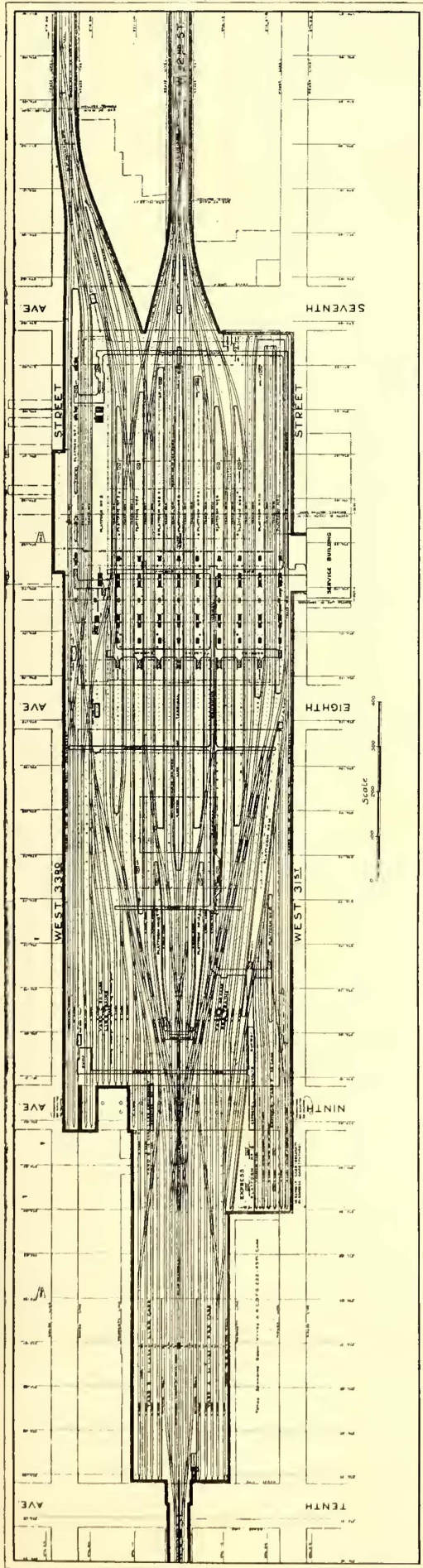
When the two tracks emerge from the tubes under the North River at the entrance to the terminal station yards at Tenth Avenue they begin to spread out. From Ninth Avenue, and extending into the station, the number of tracks increases from 2 to 21. Leading out of the station yard to the east are four main line tracks, passing under Thirty-second and Thirty-third streets, and thence under the East River to the Sunnyside yard on Long Island. The crosstown tunnels end at the river shaft, situated in the block between Thirty-third and Thirty-fourth streets east of First Avenue. From this point four tubes extend under the East River to Long Island City and Sunnyside yard—the terminus of the tunnel extension.

Sunnyside yard has many unique features. Provision is made for running all trains around a loop, pulling them into the coach-cleaning yard at one end and departing from the other end, thus turning the entire train and avoiding the necessity for switching baggage cars and sleeping cars to opposite ends of the train and turning of combination cars separately. The arrangement of tracks on different levels permits cross-over movements without grade crossings and eliminates interference with high-speed traffic. The yard is 5500 ft. long and 1550 ft. wide, embracing some 153 acres of land. It contains 73 miles of tracks which have a storage capacity of 1550 cars. There is additional space for extending the trackage of the yard to provide for more car standing room whenever it is required. From Sunnyside yard tracks lead to the New York Connecting Railroad, which will form a junction with the New York, New Haven & Hartford Railroad at Port Morris after crossing the East River by the steel-arch bridge to be built over Ward's and Randall's Islands.

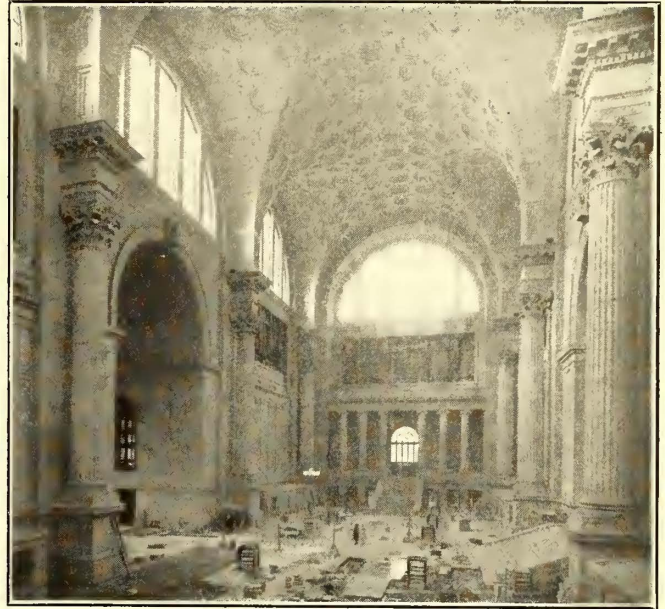


TERMINAL STATION

The main entrance to the terminal station in New York City is from Seventh Avenue, between Thirty-first and Thirty-third streets. The station tracks are 40 ft below the street surface, and the station is divided into three levels. The Seventh Avenue entrance is for foot passengers only. It leads to the main waiting room through an arcade 225 ft. long by 45 ft.



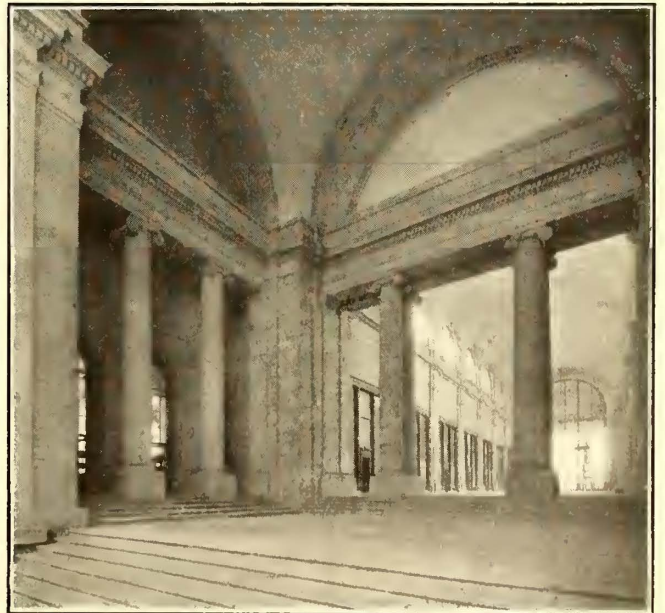
Pennsylvania Terminal—Plan of Station at Track Level



Pennsylvania Terminal—Interior of General Waiting Room

wide, flanked on both sides by shops and booths. At the farther end of the arcade are the restaurant, lunch rooms and café, and beyond is the general waiting room and concourse.

On the first level below the street is the general waiting room, 277 ft. by 103 ft. Along the walls are located the ticket offices and baggage-checking windows, all so arranged that a passenger may proceed from one to the other. Adjoining the



Pennsylvania Terminal—Corner of Loggia

general waiting room on the west are two smaller waiting rooms, 58 ft. by 100 ft., for men and women. The main baggage room, 450 ft. long, is on the same level with the general waiting room. It covers the full area occupied by the arcade and restaurants on the floor above. Baggage is delivered and taken away through a special subway. From the baggage room trunks are delivered to the tracks below by motor trucks.

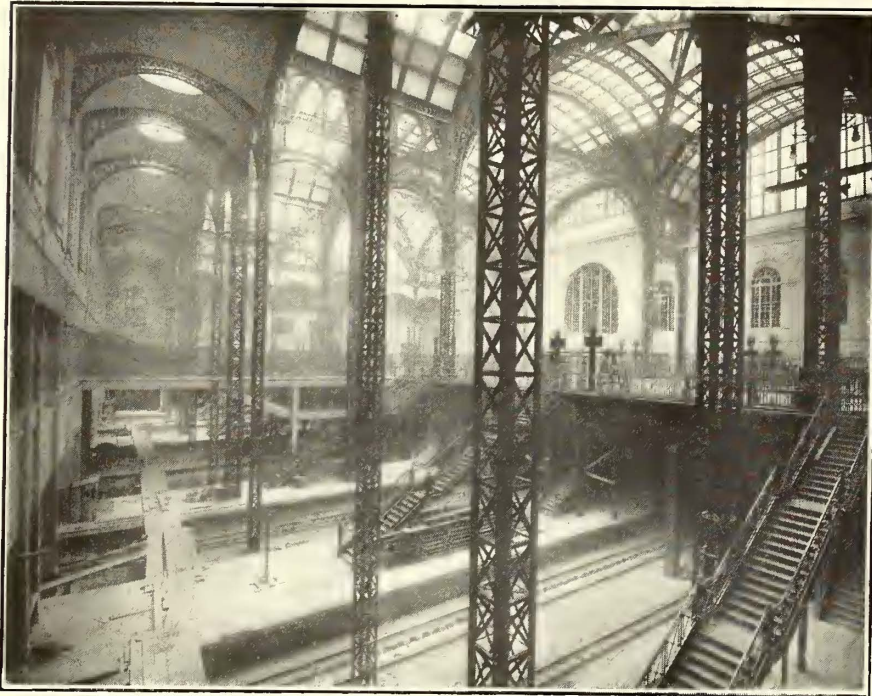
Parallel to and connecting with the main waiting room by a wide thoroughfare is the concourse, a covered assembling place over 200 ft. wide, extending the entire width of the station and under the adjoining streets. Stairs descend from the concourse to each of the train platforms on the track level. The concourse and adjacent areas are open to the tracks, forming a

Island by way of the East River tunnels. Ample entrances and exits are provided so that this traffic can be handled independently.

The stone work of the station, enclosing about 8 acres of ground, was completed on July 31, 1909. Built after the Roman Doric style of architecture, the building covers the entire area bounded by Seventh and Eighth avenues and Thirty-first and Thirty-third streets. The length of the building is 788 ft. 9 in. and the width 430 ft. 6 in. along the Seventh Avenue facade. The plan of the station was designed to give the greatest number of lines of circulation. The structure is really a monumental bridge over the tracks, with entrances to the streets on the main axes and on all four sides. In this respect the building is unique among the railway stations of the world, affording the maximum entrance and exit facilities.

The Seventh Avenue facade is composed principally of a Roman Doric colonnade. Above the central entrance is an entablature surmounted by a clock with a dial 7 ft. in diameter. This facade of the building was conceived especially to express a monumental gateway. Entrances are formed through each of the two corners of the station on Seventh Avenue for carriage drives; each is about 63 ft. wide.

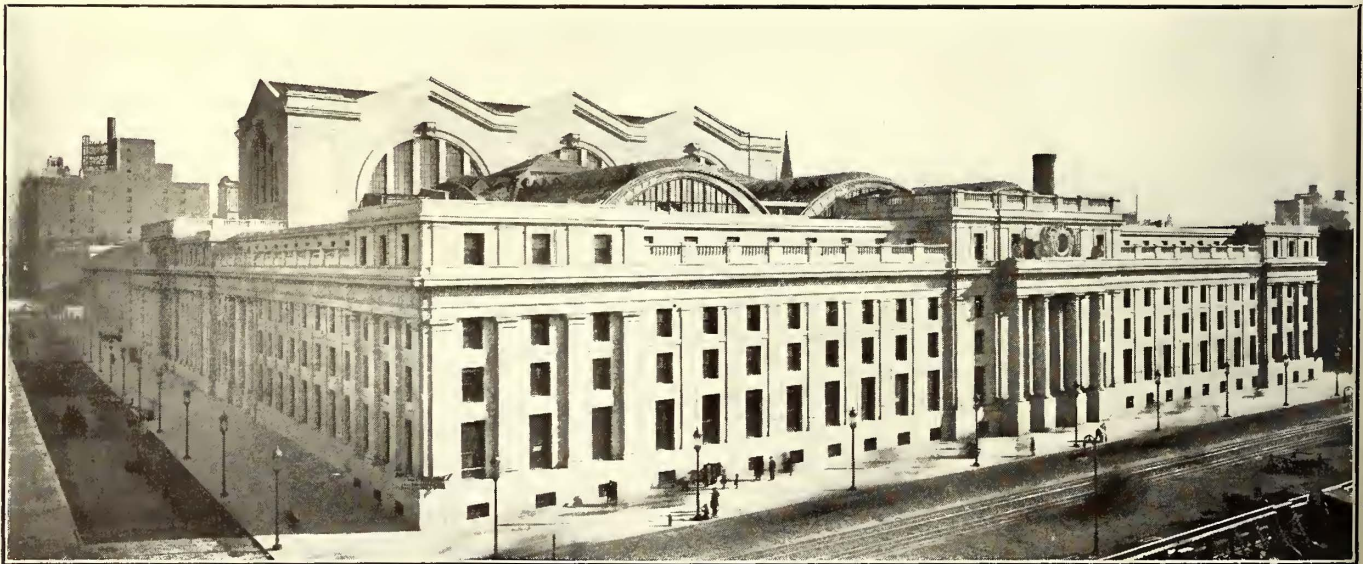
Midway along the sides of the building are the entrances on Thirty-first and Thirty-third streets, which are flanked by series of columns of the same dimensions as those on the Seventh and Eighth Avenue facade. Above these colonnades are also sculptured groups supporting large ornamental clocks. The Eighth Avenue frontage is finished with pilasters, except at the spacious entrance to the main floor of the concourse from this side of the building. The accompanying engravings, from recent photographs of the station,



Pennsylvania Terminal—General View of Concourse and Train Platforms

courtyard 340 ft. long by 210 ft. wide, roofed by a lofty train shed of iron and glass. In addition to the entrances to the concourse from the waiting room there are also direct approaches from the streets.

In addition to the main concourse, and located between it and the tracks, is a sub-concourse, 60 ft. wide, which will be used



Pennsylvania Terminal—Eighth Avenue Façade

for exit purposes only. This exit concourse is 18 ft. above the tracks, but is connected with each of the track platforms by two stairways and one elevator. From it ample staircases and inclines lead directly to the street.

The north side of the station, extending along Thirty-third Street, has been assigned to the Long Island Railroad. Into this part of the station trains will run from all points on Long

give a good idea of the magnitude of the building and its dignified architectural treatment.

The Western Railway of France is preparing plans for the electrification of its lines between Saint-Germain and Argenteuil at a cost of \$12,000,000. It is planned to begin work this year and complete the change by 1914.

### IMPROVEMENTS IN THE DEPARTMENT OF ROLLING STOCK AND SHOPS OF THE METROPOLITAN STREET RAILWAY

A description was published last week of the organization of the department of rolling stock and shops of the Metropolitan Street Railway and of the work done in rehabilitating the cars and shops. As stated in that issue, before these improvements were begun, a careful study was instituted of the possibilities of economical maintenance, with the purpose of

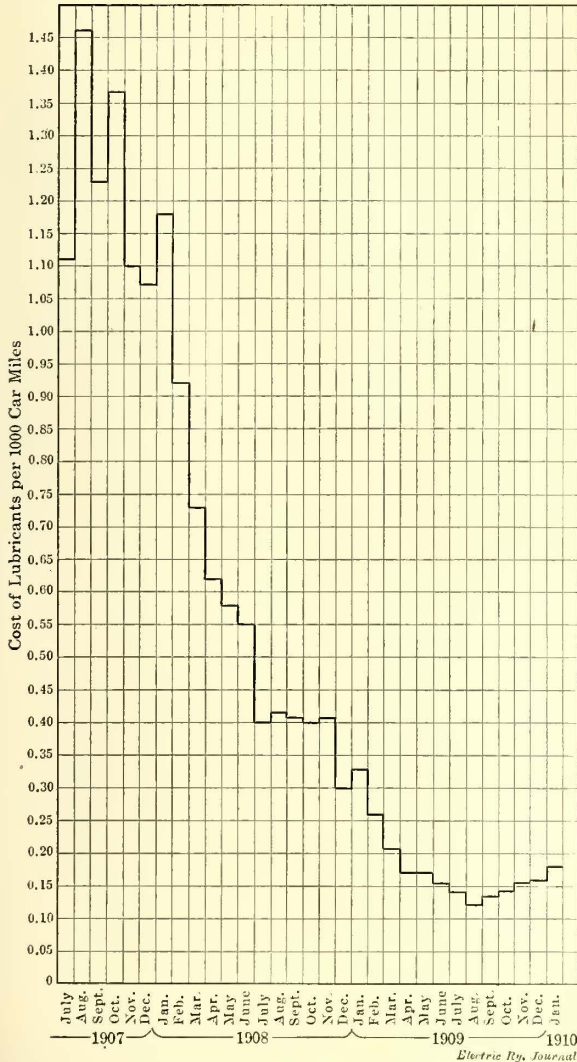
panying diagram the cost has been reduced from \$1.46 per 1000 car-miles to that of 18.19 cents in January, 1910. The figures for August, 1909, show the minimum cost of 12.38 cents per 1000 car-miles.

Every precaution is taken to prevent the waste of oil, and in this connection a number of improved oil-storage facilities have been installed. The general arrangement followed is that a tank is buried in the ground or stored in a fireproof vault, and is connected by a system of piping to an oil pump placed in a fireproof oil-room. It is possible with these pumps to draw a small or large quantity of oil as may be required. Explicit instructions are also issued from time to time according to changes in the season or local conditions as to the amount and kind of oil to use for different purposes. The accompanying bulletin is a typical one.

*To All Car House Foremen:*

It is imperative that all bearings shall be inspected and lubricated according to the following instructions.

Type	Date of Inspection	
<b>ARMATURE BEARINGS</b>		
GE 57	Inspect even numbered cars on even dates. Inspect odd numbered cars on odd dates.	Keep oil cups filled to within $\frac{3}{4}$ in. of top of cup.
GE 1000	Same as GE 57.	Keep oil cups filled to within $\frac{1}{2}$ in. of top of cup.
GE 210	Inspect on regular 700-mile inspection.	Oil in well not to gage less than $2\frac{1}{2}$ in. or more than $3\frac{1}{2}$ in.
GE 80	Inspect on regular 700-mile inspection.	Keep waste saturated with oil.
WH 310	Inspect on regular 700-mile inspection.	Oil in well not to gage less than $2\frac{1}{2}$ in. or more than $3\frac{1}{2}$ in.
<b>AXLE BEARINGS</b>		
GE 57	Inspect on regular 700-mile inspection.	Keep waste in oil cup saturated.
GE 1000	Inspect on regular 700-mile inspection.	Keep waste in oil cup saturated.
GE 210	Inspect on regular 700-mile inspection.	Lubricate on 5000-mile basis.
GE 80	On every 700-mile inspection waste must be pressed up to the axle, and more saturated waste added if necessary.	On each 5000-mile inspection take saturated waste out of axle cap. Tease the waste, then repack the cup and lubricate if necessary.
WH 310	Inspect on regular 700-mile inspection.	Lubricate on 5000-mile basis, remove waste every 3 months and after teasing same repack the cup.



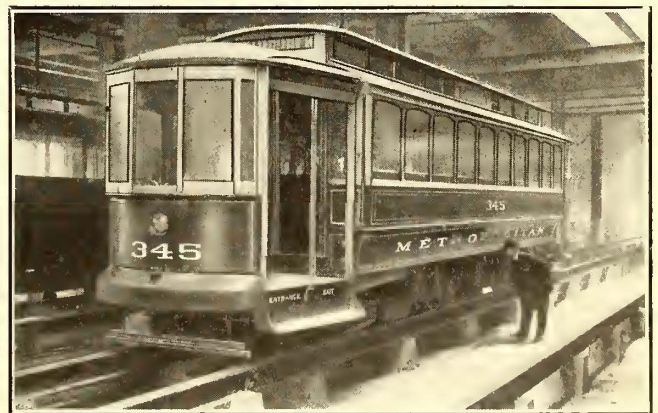
Metropolitan Rolling Stock and Shops—Cost of Car Lubrication by Months

establishing standards in this department which could be followed consistently in the future rehabilitation of the system. The program included, besides the broad principles outlined last week, a great many detailed improvements which it is the purpose of this article to describe.

LUBRICATION

At the time of the appointment of the receivers practically all of the truck and motor bearings on the cars of the Metropolitan Street Railway Company were lubricated with grease. The cost of lubrication was high and the results poor. On Oct. 1, 1907, the work of changing over to oil lubrication was begun. The oil now is used with wool waste as a truck journal-box packing, and in the older types of motors it is placed in oil cups, which regulate the feed of the oil to the bearing. In the modern type of motors, the oil is used with wool waste and so arranged that it comes directly in contact with the bearing surface.

Careful record has been kept of the cost of motor and truck lubrication per 1000 car-miles that has been attained by this system and the results are striking. As shown on the accom-



Metropolitan Rolling Stock and Shops—Depressed Aisle in Car House

GEARS—JOURNALS

Gears—Inspect on regular 700-mile inspection.	Lubricate on 5000-mile basis.
Journals—Inspect and lubricate on 5000-mile basis.	
<b>FLOW BARS, BRAKE RIGGING AND SIDE BEARINGS</b>	
Plow bars—Clean and lubricate on 700-mile inspection.	Clean and lubricate nightly during wet weather.
Brakes—Clean and lubricate on 700-mile inspection.	
Side bearings—Clean and lubricate every 30 days (jack up car).	

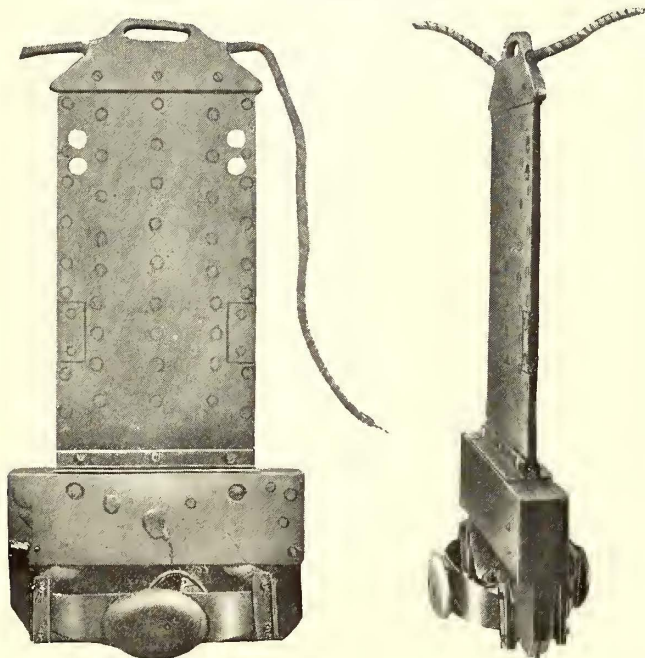
Another method used to attain economy was to create a friendly rivalry among the groups of men who did the actual lubrication, to see who could make the best records. This contest was kept up by furnishing the men, month by month, with statements showing the amounts used and so arranged as to give a comparison between different car houses, also between the Northern and Southern districts. This assisted greatly in reducing the cost.

## WHEEL GUARDS

A long chapter could be written upon the study which has been given this subject, but no attempt will be made here to print more than a brief outline. Platform fenders were abandoned in the summer of 1907 as unsuited to the conditions in New York, especially because of their liability to damage from vehicles. Experiments were then conducted with wheel guards, both automatic and non-automatic. The former were found most efficient and accordingly all cars have been equipped with devices of this character. The types most used are the Hudson & Bowring and the Parmenter 1909 model, but there are a few Sterling-Meekers. The company is also testing the Hipwood wheel guard.

## BRAKE SHOES

Brake shoe design and wear constituted another question which was given very careful consideration. During the first part of 1909 a system of records was established by which the results of the wear of brake shoes of various types could be systematically compared. With this information it was possible to take up intelligently the plan of obtaining brake shoes



Metropolitan Rolling Stock and Shops—Side and End View of Old Plow

on a mileage basis and a contract was entered into with the National Brake Shoe Company, Chicago, upon a mileage basis. The resulting cost has been considerably below any figure that the company had been able to reach in actual practice previous to the time of signing of the contract.

The brake shoe data, like that of other parts of the car equipment, are kept in such a manner that it is possible to compare the results of one car house against another, or of one district against another, for each type of shoe. In this way a spirit of rivalry has been created by which better results have been secured.

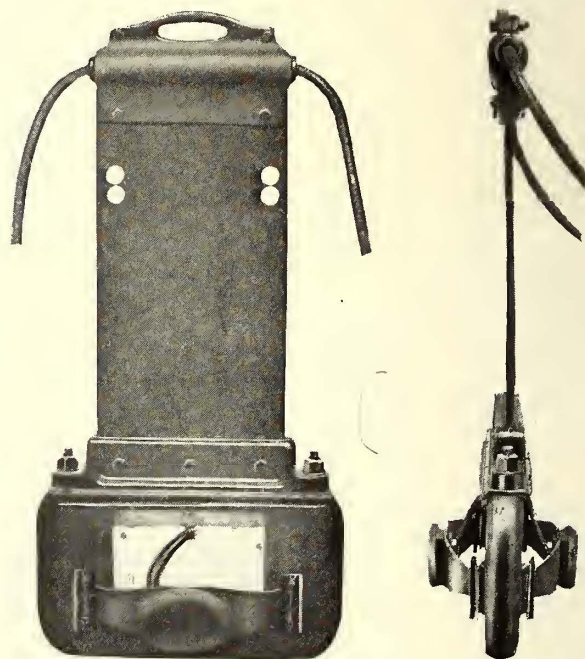
## CONTACT PLOWS

In perhaps no part of the work of the department of rolling stock and shops has greater improvement been made than in that of contact plows. This substitute in New York for the overhead trolley has always been a source of trouble and expense. These can never be eliminated, but at least a betterment has been effected. Some of the changes have been along the line of reduction in initial cost, others have been in the way of improvements of mechanical and electrical features of the plow. One of these latter has been the substitution of a flat copper lead in place of the more expensive stranded lead formerly used.

Considerable difficulty was experienced with the old type of plow, because the wooden parts would dry out and open up,

and this would permit moisture to work into the body of the plow. To eliminate this difficulty as far as possible, all the wooden parts are now thoroughly saturated with linseed oil before they are assembled, and after assembling they are completely coated with pitch. Another difficulty experienced was that a large number of surplus plows were accumulated during the summer for use during the bad weather in the winter. These plows, while standing in storage, would crack in the wooden portion. During the past winter a smaller surplus of plows has been maintained.

Another improvement was a new method of fastening the fuse wire. The old fuse wire was attached to the back of the contact plate by means of a cap screw and flat washer. This type of fuse gave considerable trouble by breaking or becoming disconnected beneath the washer. With the new fuse the wire is soldered into a copper terminal at each end, this terminal being in turn fastened to the back of the contact plate and to the end of the plow lead, respectively. The results obtained from this new type of fuse have been vastly superior to those obtained with the old lead.



Metropolitan Rolling Stock and Shops—Side and End View of New Plow

## RUBBER CONTACT PLOWS

In 1908 a new plow was developed and 10 were tried out. Five were made with a body composed of a molded fiber compound and the other five with a body composed of rubber compound. The shape of the body of these new plows was quite different from that of the old plows, on account of the different nature of the material, and they were designed with a view of having a substantial structure and as large a creep-age surface as possible in the limited space available.

Views of the old and new plows appear herewith. As will be seen the connections of the flexible lead from the shoe to the conductors in the bottom of the plow are substantially bolted together in a recess. This recess is filled with an insulating waterproof compound, and the whole body of the plow is thoroughly coated with at least four coats of good quality japan, thus making a thoroughly waterproof construction. The rubber apron shown weighs approximately 13 lb.; the head of the plow, which is of cast iron, weighs  $10\frac{1}{4}$  lb.; the shank plates, which are of steel, weigh 17 lb. each, and the copper lead, which runs through the shank of the plow, about  $\frac{1}{2}$  lb. This makes the total weight of the plow approximately 60 lb.

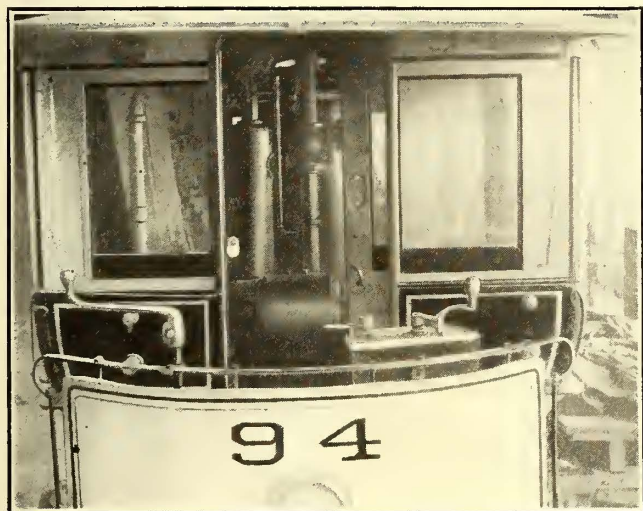
Experiments are now under way in the use of the rubber plow, and a lot of 500 have been ordered and are being put into service at the present time. The expense of a plow of this character is somewhat more than that of a wooden plow, but

the management anticipates that much better results will be attained.

NEW MACHINERY

Concurrently with the introduction of these various improvements the management, as described, has steadily pursued a policy of centralizing the shop work, so far as practicable, and of modernizing its shops. During this work considerable new machinery has been purchased and installed. Much of it has paid for itself in a short time because of the economies which it has made possible. A list of some of the larger machine tools added to the equipment follows:

At the car house at Fiftieth Street and Sixth Avenue a 15 ton pneumatic crane has been installed. This crane serves



Metropolitan Rolling Stock and Shops—End View of Vacuum Cleaner Car

the two west northerly tracks on the Fifty-first Street side of the building.

The following machines have been added to the carpenter shop mill since the receivership:

- 1 10-in. four-sided moulder.
- 1 variety moulder or shaping machine.
- 1 jig saw.
- 1 swing cut-off saw.
- 1 chain mortising machine.
- 1 36-in. triple drum sand-papery machine.

At the present time an exhaust system is being installed for the removal of shavings and sawdust from the various machines.

In the machine shops the following equipment has been added:

- 1 No. 1½ Acme bolt cutter.
- 1 turret bolt cutter, Niles-Bement-Pond.
- 1 shaper, 24-in. stroke, Niles-Bement-Pond.
- 2 14-in. emery grinders, Norton Company.
- 2 No. 4 shop saws, Quincy-Manchester-Sargent.
- 1 cold saw for pipe cutting, Columbia Machine Works.
- 1 shaper, 14-in. stroke, Niles-Bement-Pond.
- 1 22-in. x 26-in. drill press, Hooper Manufacturing Company.
- 1 20-in. x 22-in. drill press, Hooper Manufacturing Company.
- 1 22-in. x 30-in. drill press, Aurora Tool Company.
- 6 cranes and trolleys, Quincy-Manchester-Sargent.
- 6 16-in. air hoists, Quincy-Manchester-Sargent.
- 6 10-in. air hoists, Quincy-Manchester-Sargent.
- 1 crane, 10,000 lb., Quincy-Manchester-Sargent.
- 12 10-in. air jacks, Quincy-Manchester-Sargent.
- 1 24-in. x 96-in. lathe, Niles Machine Company.
- 1 26-in. x 36-in. drill press, Aurora Tool Company.
- 1 24-in. x 32-in. drill press, Curner Tool Company.
- 1 24-in. x 28-in. drill press, Aurora Tool Company.
- 1 shaper, 16-in. stroke, Stockbridge Machine Company.
- 1 large wheel lathe for the turning of rolled steel wheels, installed at Fiftieth Street.

In the blacksmith shop 12 forges were installed and arranged with hoods connected to the stack in the boiler-room. An oil furnace with blower, a new 200-lb. Bradley strap hammer, a large No. 2 Hillis & Jones combination shear and punch and a case-hardening furnace and file sharpener have also been installed.

A compressed-air system with Stillwell-Bierce-Smith-Vaile Company compressor and piping carried throughout the build-

ing has been added to the Fiftieth Street shops. This compressor supplies air for the air hoists and air-operated tools.

A 30-ton Fairbanks track scale has been installed at the Ninth Avenue and Fifty-fourth Street car house, partly so that the company can keep careful check on the weight of the various parts of the equipment and rolling stock and partly for the weighing of heavy material and scrap.

At the 146th Street and Lenox Avenue armature-room a complete impregnating plant was installed about June 1, 1909. A commutator slotter has also been put in service.

SAND-BLAST MACHINE

Another machine at the Fifty-third Street shops not often owned by an electric railway company is a sand-blast machine. This was installed because the amount of sand-blast glass used in the car is large and it was found cheaper to purchase the clear glass and "grind" it. Consequently, a sand-blast outfit was built in a small room on the fourth floor of the Sixth Avenue and Fiftieth Street building which takes care of all the work of this character. It is also possible with this machine to manufacture all of the chipped glass which is required in the ventilators of a large number of the company's cars.

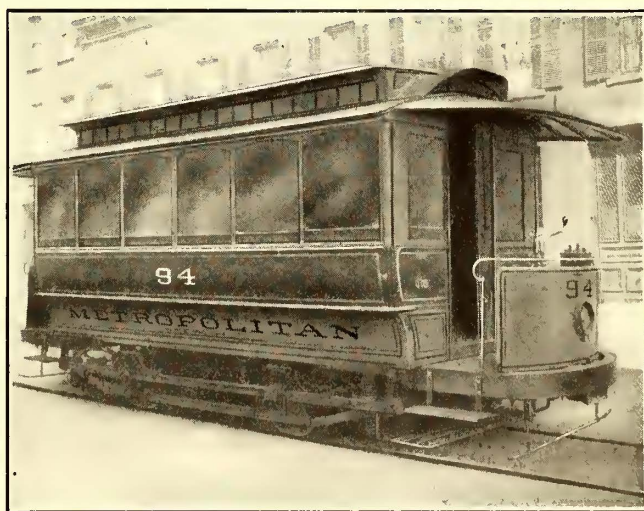
VACUUM-CLEANING CAR

A novel car is one devoted to vacuum cleaning, principally used in connection with the carpets employed on the seats of a large number of the cars on the system. This car contains a vacuum-cleaning machine, complete with motor. The headquarters of this car are at the main repair shop, but it is sent to the various car houses at regular intervals.

TEST CAR

Another special car is No. 1205, which carries a Herrick testing set. This set was purchased in February, 1909, and is employed for testing the old and new car equipments and, being mounted in a car with other testing apparatus, can easily be taken from depot to depot. The usual electrical tests of circuits, controllers, motors, armatures, fields and resistances, etc., can be made with it.

Since this car has been in service it has thoroughly tested 2300 cars. As the testing force is becoming more expert in



Metropolitan Rolling Stock and Shops—Side View of Vacuum Cleaner Car

the use of this set the prospects are that during the next 12 months a larger number of cars will be inspected than has been the case during the past 12 months.

Last winter the test car was found very serviceable in testing the electrical equipments of snow sweepers. This is done immediately after each snow storm in which the sweepers have been used.

BRAKING TESTS

In connection with braking tests and for the requirements of the transportation department a car has been equipped with a speedometer. The instrument is located in the center of the car on one of the posts, so that it can be conveniently ob-

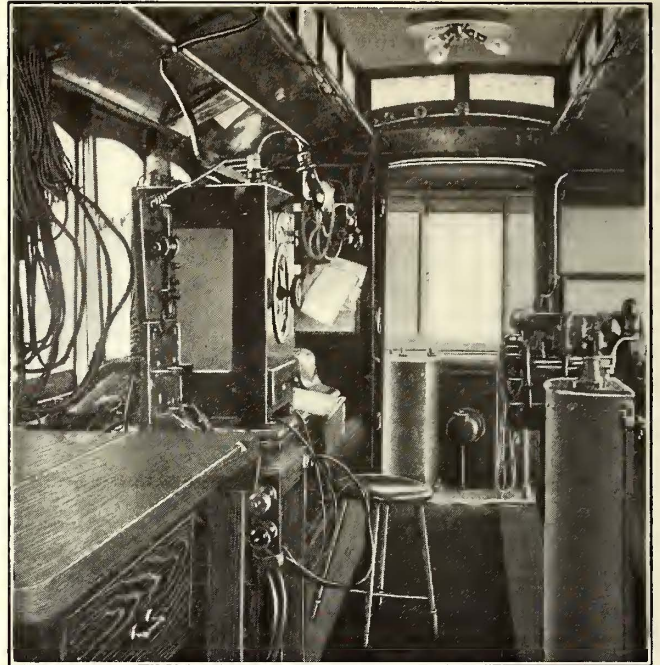
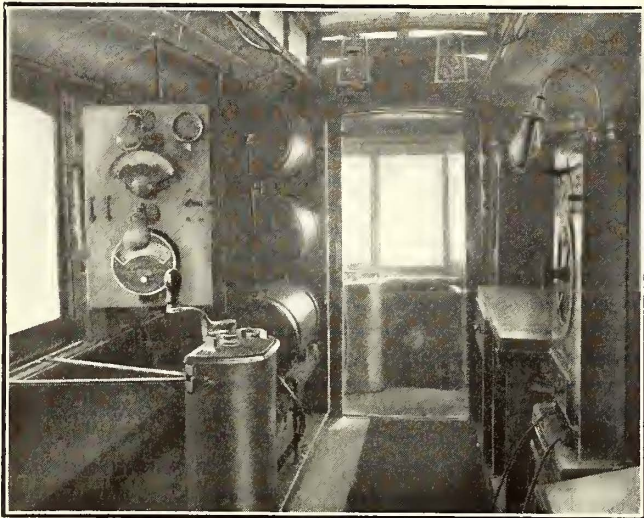
served, and shows the speed in miles per hour. The transportation department uses this car to show motormen the speeds at which they run and by measuring the distance, the lengths in which stops can be made when running at various speeds.

#### EDUCATIONAL WORK

Monthly meetings of the car-house foremen have been inaugurated, at which not only the routine subjects of maintenance are discussed, but topics of general interest are brought up for consideration. To enable the various foremen to see something beyond their own immediate work visits have been arranged of the foremen of one car house to the other car houses and shops of the system. It was found that some of these

clean. Oily waste, rubbish and other inflammable waste material must be kept in covered steel cans provided for the purpose. Overalls must be kept in lockers when not in use. Spilled oil must not be allowed to remain on the floors or in the pits.

"Cars shall be moved only by authorized persons; and before any car is moved, careful examination will be made

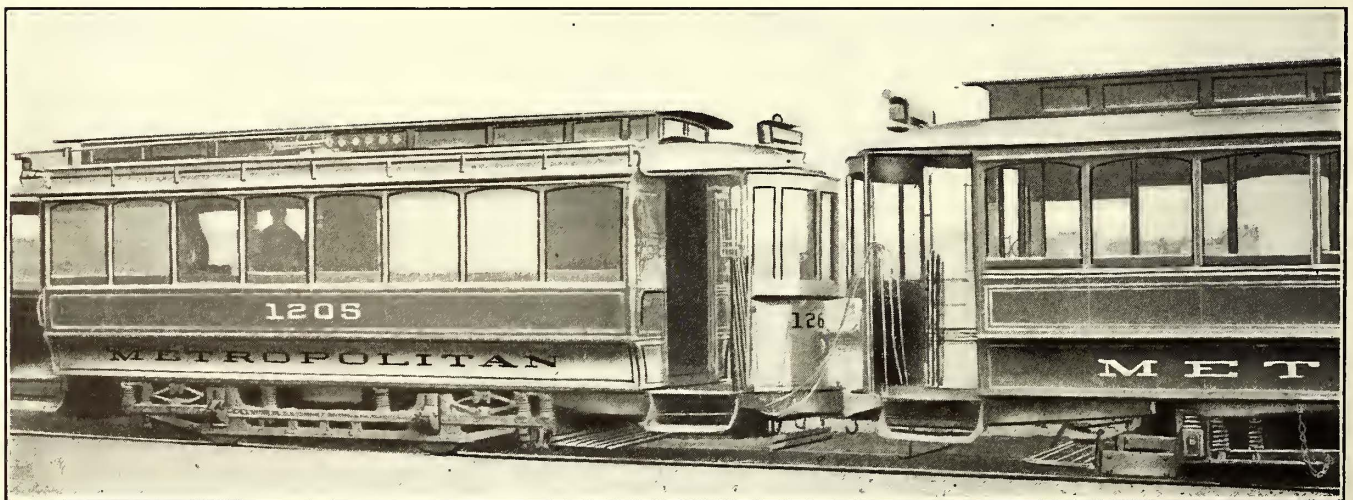


Metropolitan Rolling Stock and Shops—Interior Views of Test Car

men were ignorant of the work that was being done at other portions of the system, and excellent results were obtained from these visits. It is also proposed to have the various fore-

men to see that no one is working around, beneath or above such car.

"Cars shall be run only from the platform nearest the point to which the car is to be moved; or, if this is impracticable,



Metropolitan Rolling Stock and Shops—Test Car Coupled to Regular Passenger Car

men of both the car houses and shops visit the systems of the railways in the territory immediately adjacent to New York.

Meetings have also been held of the shop men at which addresses upon technical subjects have been presented. Regulations for their guidance have also been issued in book form and a copy given to each employee. These rules are 34 in number. A few of them are reproduced below to give an idea of their character and scope.

#### RULES

"The foreman of each shop or car house will be held responsible for the condition of the same, and the machinery and tools in his charge.

"It is imperative that the shops, car houses and pits be kept

the car, or cars, shall not be moved until a man has been stationed as a guard on the forward platform; and before starting a signal shall be given both by the conductor's bell and platform gong.

"After a car has been moved the controller and reverse handles must be removed, the hood switches and circuit-breakers thrown off.

"Workmen are cautioned not to commence work around, inside, beneath or above any car before ascertaining that the circuit-breakers have been thrown 'off,' that the plow is clear of the channel rail, and the car is 'dead'; that warning signs provided for the purpose have been hung conspicuously on each dash.



in the months of the fiscal years 1904-08, inclusive, are shown in Table III.

TABLE III.  
Boston & Northern Street Railway.  
Average Monthly Cash Balance.

Fiscal year ended Sept. 30.	1904.	1905.	1906.	1907.	1908.
October	\$486,710	\$456,862	\$409,247	\$418,894	\$271,052
November	310,674	285,700	128,798	239,261	214,580
December	230,870	207,305	112,291	187,657	254,436
January	77,993	139,593	292,279	177,742	234,454
February	82,602	204,405	311,802	247,781	216,770
March	215,209	209,944	361,829	238,648	246,531
April	193,798	217,678	392,185	279,627	157,542
May	233,939	163,739	188,755	240,236	214,063
June	136,600	270,424	254,876	268,207	306,602
July	540,382	203,174	261,990	377,126	287,659
August	359,406	304,659	451,483	295,901	318,267
September	442,082	337,063	465,461	350,479	192,434
Totals	\$3,310,265	\$3,000,547	\$3,631,086	\$3,321,559	\$2,914,387
Average monthly balance	275,855	250,045	302,590	276,796	242,865

Prepaid Interest, Insurance, etc.

Fiscal year ended Sept. 30.	1904.	1905.	1906.	1907.	1908.
October	\$100,439	\$98,731	\$112,059	\$89,953	\$112,301
November	65,645	69,495	104,084	75,500	101,217
December	34,463	35,107	88,757	108,003	92,355
January	69,706	61,866	85,931	104,785	99,594
February	60,726	46,188	81,560	112,227	91,118
March	40,978	27,005	76,388	107,545	83,585
April	65,513	59,303	72,498	103,985	76,246
May	43,440	36,743	69,877	98,304	69,947
June	22,630	16,596	66,366	93,343	63,762
July	46,002	44,686	64,002	89,507	61,836
August	27,529	25,630	63,454	85,173	58,318
September	45,531	38,997	98,993	83,706	98,039
Totals	\$622,608	\$561,407	\$984,869	\$1,152,121	\$1,008,318
Average monthly balance	51,884	46,783	82,072	96,010	84,026

Materials and Supplies.

Fiscal year ended Sept. 30.	1904.	1905.	1906.	1907.	1908.
October	\$608,045	\$373,599	\$306,848	\$413,666	\$526,764
November	601,403	380,063	326,718	402,563	481,143
December	596,342	400,929	322,623	433,450	492,594
January	569,528	404,549	328,874	445,952	481,688
February	544,904	399,445	363,304	457,092	466,451
March	538,352	393,213	397,623	490,655	467,638
April	514,401	371,774	431,528	522,265	449,897
May	506,959	385,832	515,880	579,028	430,577
June	511,012	395,233	495,644	555,959	429,607
July	482,220	427,890	462,231	544,694	407,742
August	437,405	368,407	427,270	519,374	394,861
September	393,934	309,486	424,509	513,340	383,121
Totals	\$6,304,505	\$4,610,020	\$4,803,052	\$5,878,038	\$5,412,080
Average monthly balance	\$525,375	\$384,168	\$400,254	\$489,836	\$451,006

The commission authorized the Boston & Worcester Street Railway to issue 3470 additional shares at \$100 a share for the following purposes: To pay floating debt, 1580 shares; to pay land damage, 370 shares; for permanent additions, 1400 shares; for working capital, 1020 shares. The company filed with the board a statement, shown in Table IV, of its average working capital requirements for the two years ending Oct. 31, 1909.

TABLE IV.  
Boston & Worcester Working Capital.

Cash on hand	\$62,137.07
Bills receivable	28,376.66
Prepaid interest and insurance	20,632.76
Materials and supplies	80,109.50
Total	\$191,255.99
Mileage	80
Capital stock	76.5
Funded debt	75.3
	\$1,725,000
	\$1,717,000

The income, mileage and securities of the Boston & Worcester for the three years ending Sept. 30, 1908, are shown in Table V.

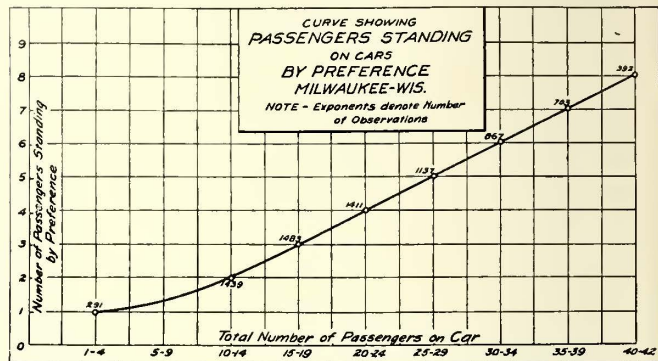
TABLE V.  
Boston & Worcester.

Totals	\$4,041,000	\$3,441,000	\$3,442,000
Gross income	\$546,886	\$523,642	\$507,261

A simple scheme which has been found useful by the Indianapolis, Crawfordsville & Western Traction Company is to paint the car number on the baggage compartment partition directly over the telephone instrument which is mounted thereon. The members of the crew write their orders on a shelf which is below the transmitter and so find it convenient to have the car number directly in sight.

REPORT ON MILWAUKEE TRAFFIC

The preliminary report of the Wisconsin Railroad Commission, just issued, contains among other matters a report of an investigation into the traffic conditions on the Milwaukee street railway system, conducted between October, 1908, and January, 1909, under direction of Prof. W. D. Pence, the commission's engineer, and R. W. Harris, field electrical inspector, assisted by other members of the staff and by suggestions of George Weston, consulting engineer of Chicago. The time required in field and office in making and compiling these observations was 560 working days, equivalent to a force of five men working constantly for a period of 4½ months. The report was directed principally to an investigation of the service given



by the company, the service required by the public and the necessary reroutings of various lines to avoid congestion in the downtown districts. After preliminary observations of the traffic as a whole it was decided to confine the observations to the periods of maximum travel, which were from 6 a. m. to 9 a. m., 11 a. m. to 2 p. m. and 5 p. m. to 8 p. m.

PASSENGER STANDING FROM PREFERENCE

The report states that "from a total of 9000 cars observed it was noticed that quite a number of the people riding preferred to stand even when seats were available, and this tendency seemed to follow a fixed law. In fact, observations showed that in 1499 cars an average of two people stood by preference when only 10 to 14 people were on the car. In 1483 cars observed, three people stood when there were only 15 to 19 passengers. In 1411 cars observed, four people stood out of 20 to 24 riding. Five were observed to stand in 1137 cases where there were from 25 to 29 people on the car. Six stood in 867 cases when the car contained 30 to 34 people. An average of seven remained standing in 703 cars observed which contained from 30 to 39 people, and finally in 392 cases, in which there were from 40 to 42 passengers on the car, eight of these stood by preference. Therefore, for a car having a seating capacity of 42 people (the size of the street car in general use in Milwaukee) a 'comfortable load' was taken as 50 passengers, on the assumption that if eight people preferred to stand, even if seats were provided for them, it was therefore unnecessary to provide seats for these eight people. A car which afforded seats for 42 people could then be called upon to carry a load of 50 people 'comfortably' under these conditions. A number of reasons might be suggested as explaining this preference of a number of passengers to stand rather than to sit down in available seats. The passengers may wish to stand on the rear platform and smoke, they may prefer to stand on the front platform for observation, or they may have been sitting down all day and prefer to stand for that reason, or, having only a short distance to ride, they may not care to go to even the slight trouble of searching for one of a number of available seats. In fact, there is a wide variety of reasons why a number of the passengers should prefer to stand rather than avail themselves of seats, and this tendency, as shown above, seems to obey a general law which is graphically illustrated in the accompanying diagram."

REROUTING

The engineers then compiled a series of "car demand curves" showing the average loading of cars on different points of the

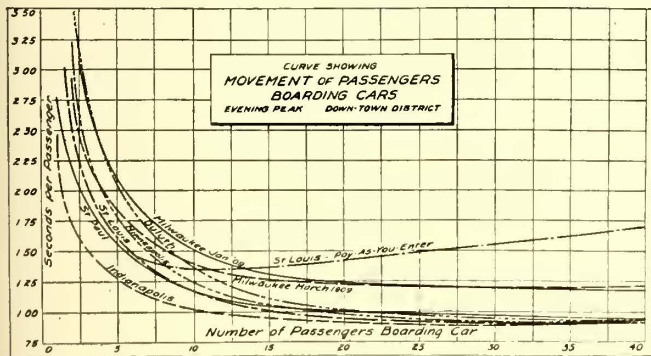


different routes during the periods of maximum traffic. An attempt was then made to determine the amount of traffic between different districts in the city by means of these curves and also by going over a complete set of transfers for an entire day to establish the origin and destination of the majority of the passengers on each line. The study proved that there was considerable through traffic between the western and north-western and the southwestern part of the city. This traffic was being taken through the city, but the company had requested permission to construct tracks over the Sixteenth Street viaduct connecting these sections of the city. If this should be done considerable congestion in the center of the city and time to the passengers traveling between these points would be saved and the report contains a recommendation that a grant of this kind be made.

**TIME IN BOARDING AND ALIGHTING**

Another point covered in the investigation was the time required by passengers in alighting from and boarding cars. It was noted that passengers in Milwaukee were slow in alighting from and boarding cars as compared with the average passenger in other cities. From observations made in St. Louis, St. Paul, Minneapolis, Duluth and Indianapolis, as well as Milwaukee, it was determined that during the evening peak in the downtown districts of these cities it required an average of 1½ seconds per passenger in Milwaukee to board a car when 10 passengers were getting on. This contrasted with 1.37 seconds in Duluth and St. Louis (pay-as-you-enter), 1.25 seconds in Minneapolis, 1.20 seconds in St. Louis and St. Paul, and 1.02 seconds in Indianapolis. When five people boarded a car, the average in Milwaukee was also longer than that of any other city. At Indianapolis five people would board a car in an average of 1.25 seconds per passenger, while at Milwaukee 2.12 seconds were required. Even when 15 passengers were boarding a car there was considerable difference in the time required by the average passenger between Milwaukee and the other cities investigated. The commission found that the best time made at Milwaukee was approximately 1.20 seconds per passenger, no matter how large the crowd, while the other cities attained an average of approximately 0.8 seconds per passenger when from 15 to 20 people or more boarded the car. In a general way, this same feature was noted in the movement of passengers in leaving cars. The report contains a diagram, reproduced herewith, which illustrates graphically the relative promptness of passengers in boarding cars in the various cities mentioned.

The engineers of the commission believe that the time in



Milwaukee could be cut down by various ways, among which they mention the plan of marking definite stopping places in the city, by making service stops at both sides of important transfer points, by soliciting the co-operation of the public and endeavoring to train passengers to move on and off cars in a more systematic manner, etc.

**CONCLUSIONS**

The commission adds that since the report was submitted the city has granted the company the use of the Sixteenth Street viaduct as recommended in the report, and that the company has received additional franchises on certain streets to facilitate better car routing and for the construction of a line in the

northern part of Milwaukee, north of the present North Avenue line, and that other changes have been agreed upon between the city and the company. Some of these were put in operation before the final report was submitted. The commission believes that its investigation, with the physical valuation of the property as made by the commission in 1907, will form a basis for reaching a conclusion as to the final disposition of the present controversy between the city and the street railway company.

**DISCUSSION OF PUBLIC SERVICE COMMISSION LAW**

A brief account was published in the issue of March 26 of the hearing held at Albany, March 16, 1910, before the Assembly committee on railroads, on the act to amend the Public Service Commission law of New York State. Among the points brought out was the history of the clause in Section 38 of the New York Railroad law which provides that "the legislature \* \* may from time to time alter or reduce the rate of freight, fare or other profits upon such road; but the same shall not, without the consent of the corporation, be so reduced as to produce with such profits less than 10 per centum per annum on the capital actually expended; nor unless on an examination of the amounts received and expended, to be made by the Board of Railroad Commissioners they shall ascertain that the net income derived by the corporation from all sources, for the year then last past, shall have exceeded an annual income of 10 per centum upon the capital of the corporation actually expended."

This phase of the subject was discussed by Prof. Charles A. Collin, attorney for the Brooklyn Rapid Transit Company. An abstract of Professor Collin's remarks follows:

"For 62 years these provisions have stood on the statute law of this State. This section first appeared in the first general railroad law enacted in this State, in the early stages of the constructive period of railroad building, and of railroad legislation. The act of 1848, Chap. 140, Section 30, provided substantially, as Section 38 does now, that the rates, fares and tolls charged by railroad companies would not be reduced by the Legislature unless such reduced rates, with other profits, would in the future allow 10 per cent profit upon the capital actually paid in, nor unless on an examination made by the State Engineer and Surveyor and the State Comptroller of the amounts actually expended and received during the preceding year such examination would show that during said preceding year the company had made a profit of 10 per cent upon the capital actually paid in.

"Four times since, these provisions have been repeated in the legislation of this State. The first repetition was in the great railroad act of 1850, Chap. 140, which is substantially the backbone of the railroad law of to-day. The only material change of language was that instead of a profit of 10 per cent upon the capital actually paid in, the companies should have a profit of 10 per cent upon the capital actually expended. The third declaration was in the act of 1883, one year after the State Board of Railroad Commissioners had been established, by substituting the Board of Railroad Commissioners for the State Engineer and Surveyor. Then the second of the two provisions was added—namely, that the rates charged should not be reduced unless on an examination of the amounts received and expended during the preceding year it was shown that the company had earned upon all income from all sources and upon a comparison of expenditures from all sources during that preceding year 10 per cent upon the capital actually expended. The fourth repetition by the Legislature of this limitation upon its own powers was made in 1901, when the act of 1883 was repeated without a change of a word so far as these two provisions were concerned, but with the addition of some extra matter as to sales of tickets by unauthorized agents. So during the last 60 years, on an average of every 15 years, the Legislature has solemnly repeated this declaration. And what was the reason? It was

because our forefathers in 1848, in their wisdom looked forward to the inevitable result of the building of these great public highways and of the development of the great industries which would be dependent upon them. They could not guarantee to private investors in the construction of these roads a profit, or even that they would not lose their original investment, as many of them did. But it could assure them on the word of the State, as a gentleman's agreement if no more, that if they did invest their money in these great public enterprises they should be allowed such profit as they could make up to 10 per cent.

"I do not pretend to say that the Legislature of 1848 could bind all subsequent Legislatures, as though they were enacting a constitution. I am not undertaking to say whether or not this was in the nature of a contract or the grant of a vested right. Probably none of us know what is the constitutional import of these four times repeated declarations by the Legislature of this State, and none of us will know until the Court of Appeals or, as it may be, the United States Supreme Court finally decides whether it is contractual in its nature, or not.

"Has the time for the encouragement of the investment of capital in business enterprises gone by? Are we altogether right, in reversing the constructive and encouraging legislation of the 50 years from 1848 onward, and adopting instead the obstructive and destructive legislation of the last 10 or 15 years? I am not advocating the proposition that there should be no protection, restraint or conservative supervision over both the construction of new railroads and the operation of railroads already constructed. The State never has adopted that policy. In the very first act of 1848 were elaborate provisions for reports to be made to the State Engineer and Surveyor; they were made more elaborate with the establishment of the State Board of Railroad Commissioners. But hasn't the time come for a reconsideration of the wisdom of the reversal to the policy of encouraging the investment of capital in enterprises so important? The foundations of prosperity in this State are the transportation systems whose development has not yet reached its climax, indeed it is still in its initial stage, yet what encouragement is offered for their extension? For sixty-two years there has been a gentleman's assurance from the State of the most solemn nature, that if the railway companies were able to make 10 per cent upon the capital actually expended, their rates would not be reduced. But now the State, by the act under consideration, is planning to say, not only that this agreement is expressly repealed, but that the Public Service Commission, as though they were a company of angels from heaven, are to have none of the restrictions which the Legislature four times in the last sixty-two years has said it will put upon itself in fixing rates.

"It is true, that neither the Legislature nor the Public Service Commission can take away the constitutional provision that property cannot be confiscated, but is this a valuable protection? Would business men be encouraged to invest their money in an enterprise upon the sole assurance that a body of five men can take all the profits away so long as they don't confiscate the property, or that they could reduce the rate until it becomes confiscatory, leaving the burden upon the owner to show to a jury that the reduction will put the profits below a reasonable amount—5 per cent or 6 per cent, or 7 per cent—and with experts on the other side swearing that with this reduction the owner can make 7 or 8 or 10 per cent.

"Is it not time to reverse this movement of legislation and to heed the evident reaction of public sentiment in favor of more railroad building, of business enterprise, of the promotion of industrial enterprises along lines of justice and honesty, and with no more obstructive and destructive legislation than is necessary to secure justice and honesty without undue interference with the promotion of the enterprise? In so doing my suggestion is either that Section 38 of the law be left as it is, and clearly established in force, without any ambiguity, or that it be redrafted and adapted to the situa-

tion of business to-day and made fairly and honestly a limitation upon the Public Service Commission where it will be effective.

"Public service business is not like private business. It requires publicity; it requires regulations of rates, because in some instances the privileges granted are necessarily monopolistic in their nature, and the same principles cannot be applied as to private corporations. But all the more is the necessity at this stage of affairs of encouraging investments in this line, and this can be done by making an assurance that to the Public Service Commission has been delegated the right to regulate fares only so long as it allows a rate of profit which will be fixed and which has stood for 62 years at 10 per cent, on the theory that no set of men is wise and good enough to be trusted with absolute power, and that whenever we have attempted to rely upon a benevolent despot, the benevolent despot has been either unwise with good intentions, or wise with bad intentions, with equally unfortunate results in either case. If we need constitutions to control our wise and good and great executive, if we need constitutional limitations put upon our judges whom we select with such care, if we need limitations put upon our Legislature, whose members are as wise on the whole as those in any of the other two departments of government, why are they not good enough for the Public Service Commission?

"The cycles of fat years and lean years are just about what they were in the times of Joseph and Pharaoh, and when during the future years the seventh is reached and great profits are being made and an accelerative rise in them is indicated, popular excitement rises. Then with a snap of a finger, as it were, the Public Service Commission can put down rates and the inevitable result follows, whether rates are put down or whether there are high tariffs or low tariffs, and the cycle comes around again, the panic and hard times, and it is then just about as easy to put the rates back as it is to take back the grant of suffrage after it has been granted.

### BEARING METALS IN RICHMOND

The Virginia Railway & Power Company, Richmond, Va., formerly used for its armature and axle bearings a tin base metal which proved unsatisfactory as the bearings broke frequently before the metal was worn away to any considerable extent. The old metal ran from 12,000 miles to 26,000 miles in the armature bearings and 11,000 miles to 19,000 miles in the axle bearings. It has now been replaced by a bronze bearing composed of 77 per cent copper, 15 per cent lead and 8 per cent tin. Some of these new bearings have already given over 50,000 miles and are still in service. This composition costs 4 cents to 5 cents per lb. more than copper, but whatever scrap is left has the same value as copper. The net cost of the alloy varies between 5 cents and 6 cents per lb. for the material used. It may be of interest to add that all armature bearings are bored with a self-centering machine and afterward rolled under pressure which gives a remarkably smooth finish, and thereby tends to increase the life of the bearing since, at the start, there are no inequalities in the surface.

On Jan. 28, 1910, Travis H. Whitney, secretary of the Public Service Commission of the First District of New York, sent a letter to Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, asking him if the company would voluntarily agree to place destination signs on the side of each car on the elevated lines, the same as are now displayed in the subway cars. Mr. Hedley immediately took the matter up with President Shonts, and the executive committee passed a resolution ordering an appropriation of \$28,000, which is the estimated approximate cost of the improvement. The action taken by the company was communicated to Mr. Whitney by Mr. Hedley on April 1, 1910. The signs have now been ordered and will be installed as fast as possible.

**EUROPEAN PROGRESS IN HEAVY ELECTRIC TRACTION**

The March number of the *Bulletin of the International Railway Congress* contains a lengthy review of European progress in heavy electric traction by Dr. Gleichmann, state councillor of the Bavarian Board of Public Works. Most of the material presented by the author has appeared in various earlier issues of the *ELECTRIC RAILWAY JOURNAL*, but the following résumé will include the novel facts in Dr. Gleichmann's report. After referring to the Oranienburg single-phase test line and earlier experiments of the Prussian-Hessian State Railways, the author mentions the work done in Bavaria. The Bavarian

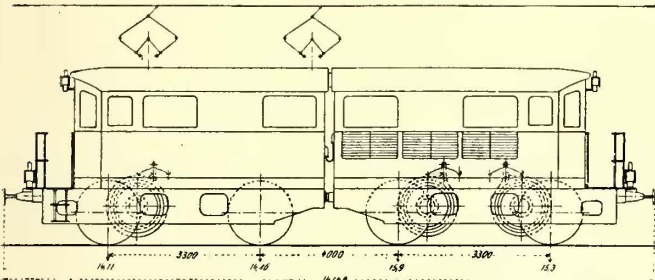


Fig. 1—Oranienburg Experimental Freight Locomotive

State Railways have no experimental lines, but have operated commercially since 1908 a 7.8-mile, 1000-volt d.c. railway from Berchtesgaden to Schellenberg on the Austrian frontier. The traffic is chiefly passenger service and is handled by nine cars, each carrying two 60-hp motors, presumably connected in series. The Bavarian Government has several electrification projects in view, all contemplating the use of water-power. The Prussian-Hessian, Baden and Bavarian State railways have decided to use single-phase current at 15 cycles for all important electrifications.

A table is presented to cover the construction and operation of the Berlin-Grosslichterfelde d.c. railway and the Hamburg-Altona 6300-volt, 25-cycle line as compared with the projected 10,000-volt, 15-cycle Wiesental and Salzburg-Berchtesgaden lines. An abstract of the more important data follows:

Line.	Berlin-Grosslichterfelde.	Hamburg-Altona.	Wiesental.	Salzburg-Berchtesgaden.		
Length in miles.....	5.74	6.57	30.60	25.09		
Maximum speed in miles per hour.....	31.00	31.00	43.50	49.70		
Cost in cents per kw-hour at own power station.....	1.26	....	....	0.70		
Cost in cents per kw-hour when purchased.....	1.68	....	.36	....		
Watt-hours per ton-mile:						
1. At power station.....	*59.00	†86.30	‡46.40	†96.50		
2. At current collector.....	*54.80	†62.10		†89.90		
Cost per ton-mile in cents.....	.2008	.2854	.1570	.3130		
1. Power at station.....	.1004	{	.1088	....	.0678	
2. Feeders and transformers.....			.0098	....	.0138	
3. Overhead equipment.....			.0106	.0252	....	.0612
4. Maintenance of cars.....			.0644	.1076	....	.1298
5. Trainmen's wages.....	.0156	.0168	....	.0388		
6. Supplies.....	.0098	.0172	....	.0016		

NOTE—One ton is equal to 2240 lb.

\* Not including lighting. † Including lighting and heating. ‡ Not including lighting and heating.

Several illustrated descriptions are then presented of single and multiple catenary suspensions, including a method for the simultaneous automatic regulation of both the catenary conductor wires, as described in the *ELECTRIC RAILWAY JOURNAL* of March 5, 1910. It is recommended that for all supporting wires, silicon bronze should be used in preference to steel because it does not rust, and besides it increases the conductive cross-section. The height of the conducting wire over the rails should not be less than 19 ft. 8 in., even in the open country. As to pole spacing with the multiple catenary, it is pointed out that while 327 ft. would represent the most economical spacing, 246 ft. would be preferable in order to keep the wind displacement of the wires within reasonable limits. It is assumed that

the poles would be double channels or square poles made up of four angles. For German trunk lines a wire of 100 sq. mm (197,350 circ. mil) cross-section has been accepted as standard for the trolley. The conductivity of this wire is 57 at 15 deg. C. (59 deg. Fahr.), and the ultimate tensile strength 38 kg per square millimeter (54,050 lb. per square inch). Such a

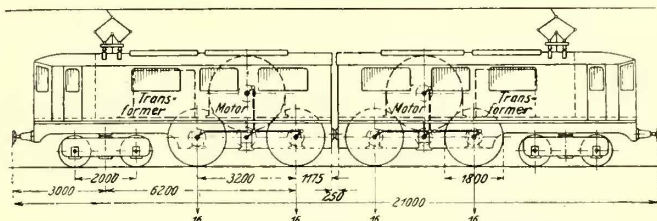


Fig. 3—Proposed High-Speed Locomotive

large cross-section is considered advantageous from the two-fold standpoint of running wear and durability.

Particular attention is given to various present and proposed designs of electric locomotives. The Oranienburg test locomotive, which was described in the *ELECTRIC RAILWAY JOURNAL* of Dec. 25, 1909, is offered as a typical example of the later

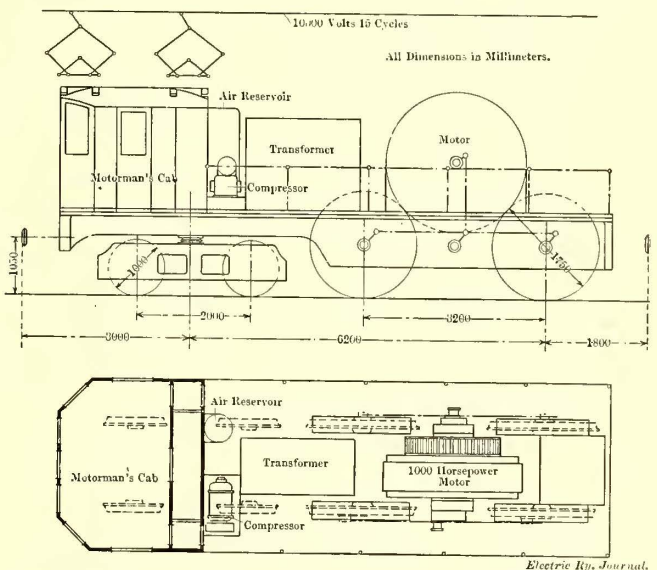


Fig. 4—Proposed Freight and Passenger Locomotive for Prussian-Hessian State Railways

geared types. In discussing coupling-rod transmission for electric locomotives, Dr. Gleichmann points out their principal advantages as follows: The motor can be entirely removed from the space between the wheels and hence as size limitations are practically abolished the number of motor units can be reduced; increased tractive effort secured by coupling up axles

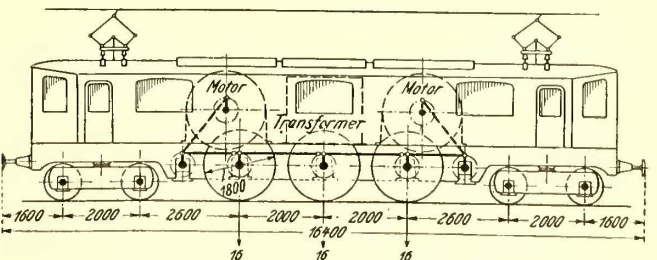


Fig. 6—Proposed Heavy Freight Locomotive

for driving from one motor; accessibility of motors; natural cooling of motors.

The first coupled-rod electric locomotive in Europe was designed by K. de Kando for the Italian State Railways, but in this type it was still necessary for the motors to be placed comparatively low relative to the locomotive frame. In several German designs a jack-shaft is placed between the trail-

ing axle and driving axle at each end of the locomotive. This jack shaft is at the same height as the driving axles and is placed in the frame. As shown in Figs. 2 to 8 inclusive, the jack shaft is connected with the axles proper by horizontal coupling rods and with the motors by vertical or oblique coupling rods. The advantage of this construction is that by the shortening or lengthening of the coupling rods between the

but for higher speeds and greater loads. It will carry two 1200-hp motors and have a speed of 74.6 m.p.h.

Fig. 7 illustrates a design worked out jointly by the Siemens-Schuckert Works, Berlin, and the Maffei Locomotive Works, Munich. In this case, each of the two 1200-hp motors is placed directly over the pony trucks. The transformers are next to the motors and the engineer's cab is in the middle. To permit the motors to be of ample width and have good bearings, the frame plates above the ponies are cut away and the frame is extended by a trough consisting of a steel casting. This locomotive is to develop a maximum speed of 74.6 m.p.h. Fig. 8 is similar to Fig. 7, but is intended for smaller loads and a speed of 46 m.p.h. Owing to the low maximum speed of 46 m.p.h. the ponies are replaced by single axles having a lateral play of 1 9/16 in. on each side. The two 390-hp motors are placed nearer the center than is the case in Fig. 7 and the transformers are in the center of the motorman's cab. This locomotive will develop a continuous tractive effort of 6610 lb. at 46 m.p.h. and a tractive effort of 8820 lb. for one hour at a speed of 37.9 m.p.h. The initial tractive effort is figured at 17,640 lb. Ten locomotives of this type are being built for the Wiesental Railway.

The motors for this locomotive are series wound and the armature has a short-circuited winding and auxiliary excitation. The external diameter of the motors is 7 ft., 1 13/16 in.

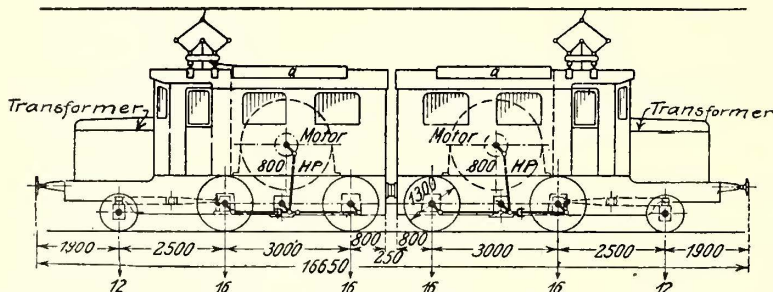


Fig. 2—Freight and Passenger Locomotive for the Bernese Alps

motor and the jack shaft, the motor can be located in any desired position. The disadvantage of the jack shaft is that another rotating member is required, thus producing additional friction.

Fig. 2 shows a freight and passenger locomotive intended for the Lötschberg tunnel, Switzerland. The locomotive is being built by the Krauss Locomotive Works, Munich, Germany, and the Allgemeine Electricitäts Gesellschaft. The locomotive is divided into two close-coupled sections having a common controller. Each section has two driving axles and one carrying axle. The latter is connected with the adjoining driving axles to form a truck; the coupling rod is articulated to allow for the lateral displacement of the driving axle. This locomotive will carry two 800-hp Winter-Eichberg single-phase motors with which to develop an initial tractive effort of 29,760 lb. The maximum speed is to be 46.6 m.p.h. Fig. 3 has been developed by the Allgemeine Company for two 1200-hp motors, and a maximum speed of 74.6 m.p.h. Each section of the locomotive is fitted with a truck. One advantage of this coupled design, in addition to easy running around curves, is that each half of the locomotive can be used separately. Fig. 4 shows the type of locomotive proposed for the Madgeburg-Leipzig-Halle section of the Prussian-Hessian State Railways. One 1000-hp motor is to drive the jack shaft by means of a vertical coupling rod. The motor and transformer are to stand exposed as illustrated. In case of heavy loads, these locomotives can be used as double units.

Fig. 5 shows an Allgemeine symmetrical locomotive now being built to haul freight and passenger trains for the French Southern Railway. This locomotive has three driving and two trailing axles. The load on each driving axle will be about 18

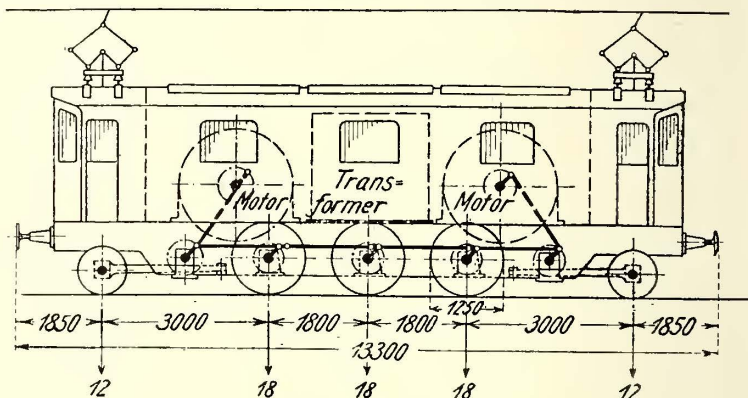


Fig. 5—Freight and Passenger Locomotive for the French Southern Railway

tons. The trailer axles have radial play while the driving axles are rigid except the middle one which has a little lateral play to facilitate running around curves. This locomotive will have two 800-hp motors to give a maximum speed of 46.6 m.p.h. In this design only one transformer is used for the two motors. The design Fig. 6 has been developed along the lines of Fig. 5,

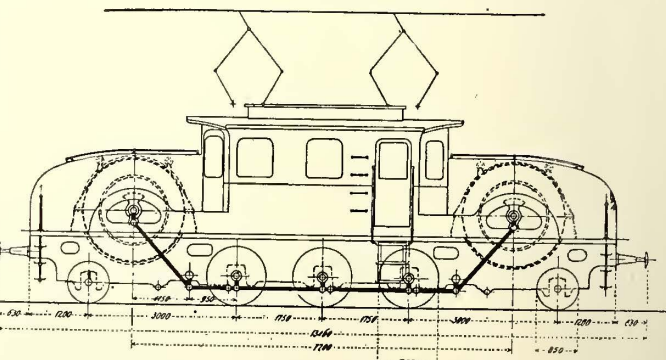


Fig. 8—One of 10 Locomotives for the Wiesental Railway

10,000:300. The two current collectors consist of pantographs which can be raised or lowered by compressed air. Each pantograph carries a light bow with a sliding contact of aluminum.

The various dimensions shown on the preceding drawings are in millimeters (1000 mm = 39.37 in.) and the axle weights are in metric tons (1 metric ton = 2204 lb.).

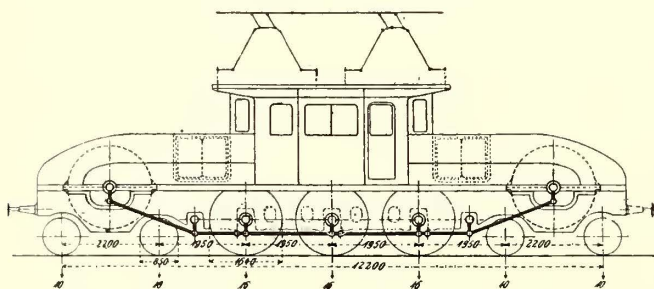


Fig. 7—Proposed High-Speed Passenger Locomotive

tons. The trailer axles have radial play while the driving axles are rigid except the middle one which has a little lateral play to facilitate running around curves. This locomotive will have two 800-hp motors to give a maximum speed of 46.6 m.p.h. In this design only one transformer is used for the two motors. The design Fig. 6 has been developed along the lines of Fig. 5,

## PROPOSED PUBLIC UTILITIES COMMISSION IN OHIO

The substitute bill introduced in the Legislature of Ohio by Representative Frank W. Woods and known popularly as the "Woods Public Utility Bill," was passed by the House of Representatives on March 30, 1910, by a vote of 91 to 16. It combines the most drastic features of the provisions of the New York and Wisconsin laws, and on account of its inquisitorial features is decidedly objectionable to interests operating public utilities in Ohio. A digest of the principal provisions of the bill follows:

The Public Utilities Commission of Ohio shall succeed the Railroad Commission of Ohio. All members of the commission shall give their undivided attention to the work of the commission, and neither members of the commission nor their wives shall be pecuniarily interested in any public utility subject to the provisions of the public utilities law. All sessions of the commission shall be open to the public. Each commissioner shall receive an annual salary of \$5,000. On the second Monday in February in each odd numbered year the commissioners shall elect a chairman to serve for two years. The majority of the commissioners shall constitute a quorum to transact business and the permanent office of the commission shall be at Columbus. Sessions may be held at any other place in this State when the members of the commission deem it advisable. The commission shall employ a secretary and such other assistants as it may deem necessary, but the salaries and expenses of the commission shall not exceed \$100,000 in any one year.

The law defines what constitutes an express company, a telegraph company, an equipment company, a sleeping car company, a natural gas company, a water works company, a heating or cooling company, a water transportation company, a messenger or signal company, a street railroad, a railroad, a suburban or interurban railway, a common carrier and a union depot company, and the terms of the act are made to apply to all of them. Section 501-2 of the act vests the commission "with the power and jurisdiction to supervise and regulate every public utility in this State and of all things necessary and convenient in the exercise of such power and jurisdiction." On complaint of any organization or municipality or by 25 companies, firms or individuals the commission shall be empowered to investigate and hear charges relating to rates or to service, and shall consider complaints from public utility companies and order municipalities or others to carry out such work as the commission deems just.

If any rates, tolls, charges, service, schedules or joint rates are found to be in violation of any law, resolution, ordinance or contract under which a public utility operates the commission shall have the power to substitute such rate or rates as are provided for under the circumstances. Decisions of the commission shall be subject to review by the courts, but every public utility shall furnish reasonable, adequate services and facilities. The charge made for any service shall be reasonable and just, and any unjust and unreasonable charge is prohibited.

Public utilities having conduits, subways, tracks, poles, wires or other equipment on, over or under any street or highway shall for a reasonable compensation permit the use of the same by any other public utility where public convenience is deemed to require such joint use. The commission is empowered to "prescribe reasonable conditions and compensation for such joint use."

Schedules showing all rates, tolls, fares and charges and all rules and regulations that affect rates, or tolls charged shall be filed with the commission. Complete schedules of joint rates shall also be filed with the commission, and no change shall be made in any scheduled charge or rate except upon 30 days' notice to the commission, which shall approve the change before it is put into effect. All changes in rates and tolls shall be posted for 10 days in a conspicuous place in every depot, station and office. The commission may prescribe such changes in the forms in which the schedules are

issued by public utilities as may be found expedient, and such schedules shall as far as practicable conform to the forms prescribed by the Interstate Commerce Commission.

Any public utility or other party dissatisfied with any order of the commission may within six months commence an action in the Court of Common Pleas against the commission as defendant to vacate and set aside any such order on the ground that the order is not lawful or reasonable. If upon trial, evidence shall be introduced by the plaintiff which is found to be different from that offered at the hearing before the commission, the commission can stay the proceedings for 15 days and modify its ruling and report its action to the court within 10 days from the receipt of the evidence, in which case the action shall be dismissed. Either party to an action in the lower courts shall have the right to appeal to the higher courts.

All freight tariffs relating to interstate traffic shall be filed with the commission within 30 days after passage of the act, and all such tariffs shall be filed with the commission when issued.

Section 516 defines the right of the companies to give free transportation over their lines. Section 555-I says "every public utility shall furnish to the commission all information required by it to carry into effect the provisions of this act and shall make specific answers to all questions submitted by the commission." Every public utility company, except suburban and interurban railroads and express companies, shall file with the commission on or before April 1 each year a report for the year ended December 31 preceding upon a form prescribed by the commission. All railroad accidents attended with loss of life shall be reported to the commission, which shall investigate such accidents as the public interest would seem to require. Every public utility shall on the first Monday in February in each year file with the commission a verified list of all railway tickets, franks, telephone books, telegraph books or tickets, passes and mileage books issued free during the preceding year, together with the names and addresses of the recipients and the reasons for issuing the same.

Each railroad, suburban and interurban railroad and express company shall on or before September 15, 1910, and on the same day thereafter each year, file a report for the year ended June 30 preceding similar in character and detail to the annual report required to be made by railway companies to the Interstate Commerce Commission. The commission shall ascertain and determine what are the proper and adequate rates of depreciation of the several classes of property of each public utility. The depreciation fund is to be used for new construction, extensions and additions as approved by the commission. Every employee of a public utility defined in the law who shall refuse to fill out the blanks of the commission or wilfully give a false answer to the questions propounded shall be guilty of a misdemeanor and shall be fined not more than \$1,000. The principal provisions of the bill regarding the issuance of securities follow:

"Section 602-24. No public utility shall issue any stocks, certificates of stock, bonds or other evidences of indebtedness for money, property, or services in payment of the same, either directly or indirectly, until there shall have been recorded upon the books of such public utility the certificate of the commission herein provided for, unless payable within one year from the date thereof.

"Section 602-25. No public utility shall declare any stock, bond or scrip dividend or divide the proceeds of the sale of any stock, bond or scrip, among its stockholders.

"Section 602-26. No public utility, domestic or foreign, shall hereafter purchase or acquire, take or hold, any part of the capital stock, bonds, notes or other evidences of indebtedness, of any public utility, unless authorized so to do by the commission, which is empowered by this act to give such consent as in the following section provided.

"Section 602-27. No corporation of any kind, domestic or foreign, shall purchase or acquire, take or hold, under any circumstances, more than twenty-five per centum of the total capital stock issued by any public utility, except where such

stock is transferred or held for the purpose only of collateral security, and in such case only with the consent of the commission. Nothing in this act contained shall be construed to prevent the holding of stock heretofore lawfully acquired. Every contract, assignment, transfer or agreement for transfer of stock by or through any person or corporation to any person or corporation in violation of any provision of this act shall be void and of no effect.

"Section 602-28. In case of the consolidation, under any law of Ohio, of any two or more public utilities, the aggregate amount of the capital stock, and the aggregate amount of the debt of the consolidated companies, shall not, by reason of such consolidation, be increased.

"Section 602-29. Any public utility as herein defined, or any agent, director or officer thereof who shall directly or indirectly issue or cause to be issued any stock, certificates of stock, bonds or other evidences of indebtedness contrary to the provisions of this act, or who shall apply the proceeds from the sale thereof to any purpose other than that specified in the certificate of the commission, as herein provided, shall be guilty of a felony and upon conviction thereof shall be imprisoned in the state penitentiary for not less than one year or more than ten years. All stocks, bonds or other evidences of indebtedness issued contrary to provisions of this act shall be void."

On December 15 of each year the commission shall deliver to the Governor a full report of its operations and make such recommendations to the General Assembly as it may deem proper.

## AMENDMENTS TO THE NEW YORK PUBLIC SERVICE COMMISSION LAW

The committee of the Assembly of New York State in charge of the bill revising the Public Service Commission act has concluded its hearings and on April 1 presented its report to the Assembly and it was advanced to the third reading April 5. The principal final revisions so far as they relate to electric railways compared with the present bill follow:

The commission has the right to increase the fares if they are "insufficient to yield reasonable compensation for the service rendered . . . with due regard among other things to a reasonable average return upon the capital actually expended and the necessity of making a reservation out of income for surplus and contingencies . . . notwithstanding that a higher rate, fare or charge has been heretofore authorized by statute."

The commission can establish or discontinue transfer points between different companies and can establish fares and charges for this service, and prescribe rules and regulations affecting the use of transfers when the existing practice is "unjust and unreasonable either as to persons transported by the said surface railroads or to any such street railroad corporation." It can also require the establishment of switch connections and the operation of through cars.

Exemption is made to the provision that no company can acquire more than 10 per cent of the capital of any other railway company of those corporations which now lawfully hold a majority of the stock of another corporation. Such a corporation may acquire the rest of the capital stock.

The commission is authorized to permit companies to issue securities for money actually expended during the past five years for construction, extensions and improvements, or for expenditures prior thereto if application is made before Jan. 1, 1912. In the original amendment this period was limited to three years. The companies are required to show vouchers for the expenditure of this money and securities cannot be issued for money spent for maintenance of service or replacements. All security issues must also be for money, property or labor procured or paid for by the issue of such securities and such as is or has been reasonably required. In the original act the words "has been" did not appear.

## THE PHILADELPHIA STRIKE

On April 5, 1910, the Philadelphia (Pa.) Rapid Transit Company posted in its car houses the announcement which is reproduced herewith and which contains new rules to govern employees to supplant the agreement which the company made with its men in June, 1909, and which was rendered inoperative by the strike declared on Feb. 19. As stated in the announcement all conductors and motormen in the service of the company on Jan. 1, 1910, who remain continuously in the service, will receive an increase to 23 cents an hour from July 1, 1910, and a further increase of  $\frac{1}{2}$  cent an hour on July 1 of each year until 25 cents an hour has been reached. All men who went on strike on Feb. 19 and who have been reinstated will be considered to have been continuously in the service of the company and the increase will apply to them. All men who entered the employ of the company after Jan. 1,

# Announcement.

The following are the general rules governing the employees of this Company on and after this date.

PHILADELPHIA RAPID TRANSIT COMPANY,  
CHAS. O. KRUGER, President.

April 5, 1910.

1. Whenever hereafter an employe is suspended or discharged, and upon investigation it is found that he has been unjustly suspended or discharged, he will be reinstated to his former position and paid for all time lost.

2. Employes are free to join or not to join any organization, and there will be no intimidation or discrimination against any employe so doing by any officer of the Company or their subordinates, nor in favor of one organization over another. There shall be no discrimination or intimidation among employes by reason of the fact of their membership or non-membership in any organization. The first duty of every employe is to the Company, and any form of discrimination, intimidation or boycott among employes tending to create hard feeling among them or dissatisfaction with the management will be the subject of discipline.

3. Any employe with a grievance shall first take it up with his Superintendent, either personally or through any Committee of our employes which he may designate to represent him. If the matter cannot be so adjusted, the General Manager, or an officer designate by him, will hear appeals on certain days to be fixed. Committeemen presenting appeals to the General Manager hereunder will be excused from service (without pay) on the days of such hearings without loss of standing.

4. Wages of all conductors and motormen in the service of the Company January 1, 1910, and who remain continuously in the service (time out on the strike of February 19, 1910, not to be counted against them) will receive an increase to 23 cents an hour on July 1, 1910, and a further increase of  $\frac{1}{2}$  cent an hour each July 1 thereafter, until a wage of 25 cents per hour is reached. Those taken into the employ of the Company after January 1, 1910, will receive 22 cents an hour for the first year of continuous service, 23 cents an hour for the second year and thereafter be entitled to yearly advances of  $\frac{1}{2}$  cent per hour until a wage of 25 cents an hour is reached. Wages of employes on the Elevated section shall be as announced January 1, 1910, except that increases shall be  $\frac{1}{2}$  cent yearly instead of 1 cent each two years, and new men will serve out one year only before being entitled to an increase.

5. The work-day for all motormen, conductors and train service men shall not be less than (9) nor more than (10) hours in any day; the full day's work to be completed within as nearly twelve (12) hours as possible to complete it, and the percentage of runs on the entire surface system shall be as follows: 85 per cent to be completed within twelve (12) consecutive hours, and 15 per cent to be completed within thirteen and one-half (13 $\frac{1}{2}$ ) consecutive hours; provided, however, that on no one schedule shall runs making over thirteen and one-half (13 $\frac{1}{2}$ ) hours exceed 10 per cent of the total number of runs on such schedule; with the further proviso that not more than two (2) runs on any one schedule may be tripper runs, the pay of which shall be per hour for actual platform labor. If, however, a majority of the motormen and conductors on any division shall petition the Company, in writing, to provide schedules which will give them longer working hours than above provided, and, therefore, greater earnings, the Company may then put into effect such schedules.

6. All extra and tripper work shall be performed by extra men when extras are available, and motormen, conductors and trainmen that have completed their regular day's work shall have the right to refuse extra or tripper work, providing that extras are available. The conditions and pay of trippers as now prevailing shall continue, and where regular men are called upon to do tripper work they shall receive the same rate of pay for the tripper work that the extra men would have received. All reporting time over ten (10) minutes shall be paid for at the regular rate as herein provided.

7. The Company will continue to give its employes a choice of places at which to purchase uniforms, as has been the case since June 1, 1909.

### Philadelphia Rapid Transit Company's Announcement

1910, will receive 22 cents an hour for the first year of continuous service, 23 cents for the second year and an increase of  $\frac{1}{2}$  cent an hour each year thereafter until 25 cents an hour is reached. The wages of the employes on the elevated division of the company will be continued as announced on Jan. 1, 1910, except that the increases will be  $\frac{1}{2}$  cent yearly instead of 1 cent every two years. New men on the elevated division will be required to serve only one year, however, before being entitled to an increase.

Defections from the ranks of the former employees have been small and constant, but on April 5, following the announcement of new conditions of service by the company, it was reported that about 400 men had indicated their desire to return to work.

The strikers as a body rejected on April 3 the proposal of the company presented to them through Mayor Reyburn and decided to continue the strike indefinitely.

## COMMUNICATIONS

### EXPENSES OF PUBLIC SERVICE COMMISSIONS

STATE OF NEW YORK PUBLIC SERVICE COMMISSION FOR THE FIRST DISTRICT

NEW YORK, April 1, 1910.

To the Editors:

After reading with interest the editorial on the New Jersey public service law in the *ELECTRIC RAILWAY JOURNAL* of April 2, I feel impelled to call your attention to what, undoubtedly, is an involuntary misrepresentation of the cost of the Public Service Commission for the First District of New York; or rather, an unjust comparison of its expenses with the expenses of a commission like that established in New Jersey, for the actual expenses of the New York commission are not misrepresented.

The editorial in question says:

"The constant observance of affairs in New York by the many residents of New Jersey whose business is on Manhattan Island makes it apparent that this feature of the law arises from a studied determination to prevent any such excessive burden for salaries and expenses as has been imposed by the Public Service Commission of the First District of New York upon the public that it was designed to serve."

The writer of the above compares the First District, New York, commission with the New Jersey commission as if their powers and duties were similar. Such a comparison is most unjust for the reason that the commission in New Jersey is charged simply with the general supervision and regulation of public utilities, while the First District commission in New York is, in addition, charged with carrying on the work of rapid transit development formerly performed by the old Rapid Transit Commission. While it is a fact that the expenses of the First District commission for 1908 were more than \$1,000,000, as your editorial states, it is also a fact that fully 66 per cent of the total was due solely and entirely to the rapid transit work of the commission.

It is, therefore, not fair to cite all of the expenses of the First District, New York, commission in comparison with the amount of annual expenditure allowed the New Jersey commission. Whether the \$50,000 limit in the New Jersey statute will be sufficient to cover the work of the new commission remains to be seen, but in any event the emphasis placed by some writers upon the cost of the First District commission in New York is misleading as an index to the cost of a regulatory board.

In justice to the commission I hope that you will call attention to the dual character of the work of this commission and the large cost of its rapid transit activities.

JAMES BLAINE WALKER,  
Second Assistant Secretary.

### COST OF MAINTENANCE IN MASSACHUSETTS

SOUTH FRAMINGHAM, MASS., April 2, 1910.

To the Editors:

I was interested to observe the list of Massachusetts street railways published on page 630 of your edition of April 2, giving the cost of maintenance per car-mile, etc. The table is interesting and instructive, but needs to be read with a knowledge of the methods used in making up the reports of the Massachusetts Railroad Commission.

The car mileage given is the mileage run by cars on the tracks belonging to the companies indicated, whereas the cost of maintenance is the cost of maintaining the cars owned by the several companies. In a case where the cars owned by a given company run on its own tracks exclusively and no foreign cars run on these tracks, the figures for the cost and maintenance per car and per car-mile are correct, but in perhaps the majority of cases the figures are not strictly correct, on account of the

running of the cars of one company over the tracks of another company.

In the case of the Boston & Worcester Street Railway Company the car mileage which should be charged to cost of maintenance is about 400,000 miles greater than given in the table, which would reduce the average cost per car-mile from 2.98 cents to 2.45 cents. In the case of the Providence & Fall River Street Railway, which has next to the greatest cost per car-mile as given in the table, I happen to know that the ratio of miles run by its cars on foreign tracks to the miles run on its own tracks is much greater than in the case of the Boston & Worcester Street Railway, and a proper correction would probably bring their cost of maintenance per car-mile down to much more nearly the average cost.

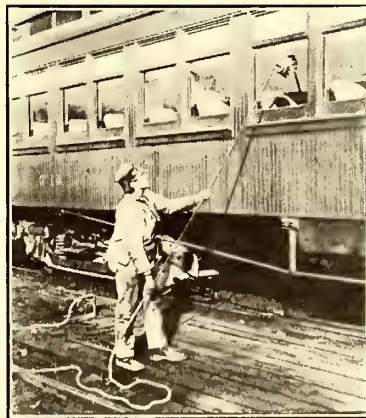
Unfortunately the reports of the Massachusetts Railroad Commission, while more complete than are available from most of the States, are nevertheless very misleading in many particulars unless all the circumstances in regard to the particular railways being investigated are known. The cost of power per car-mile, for instance, is very difficult to arrive at with any degree of accuracy because the cost of power given in the table is made up by subtracting from the operating cost of producing the power, the price received for all power sold and adding to it the price paid for all power bought. The result of this method is in at least one case that the power cost actually figures out less than nothing to one of the railways in the eastern part of the State, because the road in question has a very small car mileage and a large power house furnishing power to several other railways which pay it more for power than the entire cost of running the station. There is nothing in the report of the Railroad Commission that makes it possible to figure out the proper correction for conditions of the kind outlined.

There is certainly need of a great many more statistics of a very much more reliable character than we now find available with regard to the cost of operating electric railways.

MILAN V. AYRES,  
Electrical Engineer.

### CAR AND WINDOW WASHER

A self-feeding brush for cleaning passenger cars, as well as windows in shops, round houses, factories and industrial plants, is made by George R. Stanton, of Decatur, Ill. The device consists of an all-bristle, copper-tied brush, to which is attached a cold-drawn Shelby steel tube handle, which is lighter than the ordinary wooden handle. At the other end of the handle is a water valve, and a standard hose connection.



Car Window Washer

To use the device, the handle is connected to a hose from a hot or cold-water supply, and the water goes up through the handle and is then sprayed through the brush, very evenly, onto the object to be cleaned.

The valve is arranged to admit just enough water to wet the surface or else enough to thoroughly flush the wood, as may be desired. An ingenious form of "goose neck" prevents any water running back down the handle of the operator's sleeve. One man with this brush can clean the entire side of an electric car more quickly and quite as thoroughly, if not more so, than two men working in the ordinary way. The thorough flushing which the side of the car receives washes away the grit and dust in a manner not possible with the usual method except by scouring and friction, which is detrimental to the exterior finish. The flushing

is very effective also in cleaning the corners of the windows, and ventilators which are often passed over by the usual method.

Cleaners of this kind are in use by the Illinois Traction system and by other roads. They are made in 2-ft., 4-ft., 6-ft., and 8-ft. lengths.

**THROUGH RATES AND JOINT ROUTES**

The Committee on Interstate and Foreign Commerce of the House of Representatives has agreed upon and on April 1 reported to the House the bill to create an interstate commerce court upon which it has been engaged for the past two months. The wording has been changed greatly from that contained in the original bill submitted by Mr. Townsend on Jan. 10.

The interest of electric railway companies lies largely in the original proposal to exempt from the province of the Interstate Commerce Commission the authority to establish through routes and joint rates between steam and electric roads. As finally reported the bill reads, "The commission shall not, however, establish any through route, classification or rate between street electric passenger railways *not engaged in the general business of transporting freight in addition to their passenger business* and railroads of a different character." In the original bill the words printed above in italics did not appear, and the words "suburban and interurban" occurred between the words "street" and "electric."

In explanation of this change, the committee says:

"The original bill as introduced provided that the commission should not establish any through route, classification or rate between street, suburban or interurban electric passenger railroads and railroads of a different character. In the substitute bill, as recommended by your committee, this provision is stricken out and the section as recommended will authorize the commission to establish through routes, classifications and rates, including both steam and electric roads engaged in interstate commerce; but a question having arisen as to whether the commission under such provision might not have the authority to require a through freight route which would provide for carrying freight on street railways into and through the heart of cities, there is inserted the provision that the commission shall not, however, in establishing any through route, classification or rate, include a street electric passenger railway not engaged in the general business of transporting freight in addition to its passenger business."

**DISCUSSION OF FIRE INSURANCE AT BOSTON**

At the March meeting of the Boston section of the American Institute of Electrical Engineers a paper was presented by W. H. Blood, Jr., of Stone & Webster, Boston, on "Fire Insurance from the Engineer's Standpoint." The author pointed out the advantages of insurance on the mutual plan, and contended that existing rates on fireproof power stations were too high.

In the discussion which followed Ralph Swcetland of the New England Insurance Exchange stated that the profits of the insurance companies are made largely from their investments. These represent accumulation of profits of years ago, but many of the companies have been through serious conflagrations and have seen their capital impaired. Many deficiency charges are higher than the hazard would warrant, but they are made high to force owners of property to correct bad conditions. In the modern fireproof power station there is little use for sprinklers. In car houses, however, they were essential. Most public service corporations in New England, carry an amount of insurance very close to 90 per cent of the property value. The annual fire loss of \$215,000,000 in the United States and Canada, enormous as it is, does not represent the total cost of fires. The loss to the public is nearer \$450,000,000, if the cost of fire department maintenance and water supply is included.

M. V. Ayres, Boston & Worcester Street Railway Company, said that fireproof car houses or cars cannot be hoped for at

present. The ordinary electric car is very inflammable, composed as it is of dry, hard wood filled with varnish. If a fireproof building is filled with combustible material and a fire gets started there is an excellent chance of losing all the cars, which constitute the principal part of the investment which is in the building. It has been found that with fireproof roofs on steel trusses which cannot burn the trusses warp and fall in, causing more damage than if the roof had been of wood. There is a tendency to-day towards the use of fireproof cars. Some of the subway cars are really fireproof, although the first ones built were not. It is possible to build cars and car houses which will not burn and this might be done in the future. Mr. Ayres thought it was possible to build steel cars lighter than wooden cars. He had recently noted some steel cars in Pittsburg, which seat 57 passengers and weigh less than wooden cars which seat 44 persons. This was in part due to lighter motor equipment. Two cars for use in New York were also cited which were of steel construction, each being 1100 lb. lighter than wooden cars of the same dimensions.

E. W. Holst, superintendent of equipment, Boston & Northern and Old Colony Street Railway Companies, believed that it was not economical to build car houses of brick fireproof construction, because the difference in the insurance rate did not offset the difference in the cost of construction in a good many cases. The companies which he represented are using a composite construction of the mill type, with brick fire walls, and a limited amount of space in each section.

**AUTOMATIC SPRINKLERS IN BALTIMORE CAR HOUSES**

The United Railways & Electric Company of Baltimore, Md., has contracted with the General Fire Extinguisher Company of Providence, R. I., for the complete equipment of four of its new fireproof car houses with automatic aisle and ceiling sprinklers. The dry pipe system with Grinnell heads will be used. A total of 4312 heads will be installed as follows:

CAR HOUSE.	AISLE SPRINKLERS	CEILING SPRINKLERS
York Road .....	645	683
Gay Street and North Avenue.....	368	428
Electric Park .....	775	507
Lombard & Eighth Streets.....	453	453
Total .....	2241	2071

Aisle sprinklers are to be placed between all storage tracks and ceiling sprinklers in the offices, lecture, reading and pool rooms, bowling alleys and all parts of the car houses where the special work will not permit the use of aisle sprinklers.

Every precaution has been taken in these new car houses to reduce the fire hazard to a minimum and as a further safeguard the following general order to all motormen and conductors has been issued and is posted in the car houses:

"You are instructed, when turning into the barn a convertible, semi-convertible or closed car, to see that all windows, doors and ventilators are tightly closed."

This regulation was proposed by L. W. Evans, sprinkler engineer of the local Board of Fire Underwriters. It is believed that with this rule in force a fire originating in a car can be confined in that car and the breaking of the glass in the car would give the alarm effectively to the car house attendants.

**COST CORRECTION ON CHARLESTON PAINTING**

In the ELECTRIC RAILWAY JOURNAL of April 2, 1910, an article entitled "Painting Practice in Charleston," was published on page 570. In this article, several figures were given on the cost of carrying out different classes of painting. Corrections of two of these costs were not made in time to be printed in that issue. The figure for the single truck car with 20-ft. body and 28-ft. 7-in. length over all should have been \$55 instead of \$46 and for the single truck car with 18-ft. body and 24-ft. length over all should have been \$46 instead of \$40.



# News of Electric Railways

## Suggestion that Franchise Extension be Considered in Toledo

A. E. Lang, president of the Toledo Railways & Light Company, Toledo, Ohio, has addressed the following letter to the Council of Toledo, suggesting that the extension of the franchise of the company should be considered:

"It is common knowledge to all citizens of Toledo that a portion of the franchises of this company will, by the terms of their grants, soon expire. This applies to approximately 9 miles of streets out of about 68 occupied by our tracks. We believe the time has now arrived when the subject of an extension or renewal should be taken up by the city and the company, with a view of arriving at a fair settlement of all questions involved—fair and equitable alike to the city and to the company.

"It is the wish of the present management of the company to give to the citizens of Toledo a street railway service second to none. The company may not be able to please all the people in a city of 200,000 inhabitants, but it can hope at least to please a majority of them. It desires, if possible, to avoid the delays, expenses and enmities which were attendant upon the expiration of the street railway franchises in the cities of Chicago, Cleveland and Detroit. The company will not ask for more from the city than it feels it is justly entitled to, and, on the other hand, we are firm in our belief that the city will be actuated by a like spirit of fairness on its part toward the company.

"It is well known to everyone that the panic of 1907 rendered it difficult for any corporation to procure the necessary money for capital investment, and this fact, taken in connection with the long and determined franchise fights in Chicago, Cleveland and Detroit and the early expiration of franchises here, has rendered it wholly impossible for this company to secure needed funds to develop and extend its business to meet the requirements of this rapidly growing city. There is a demand on the part of the city for additional cars and, from various sections of the city, for double tracks and extensions of existing tracks, but it is utterly impossible for the company to procure the capital to meet these demands until the franchise question is settled.

"The negotiations for the renewal of franchises in Chicago, Cleveland and Detroit have taken the form of an investigation of the value of street railway property, the cost of operation, and their present as well as future requirements. To determine these matters, several months of careful investigation on the part of experts, municipal authorities and citizens have been found necessary.

"Franchise negotiations in Chicago were pending for years, with the final result that the street railway properties were appraised, 6 per cent interest being allowed on such appraisal and on all additional capital expenditures and the net earnings divided, 55 per cent going to the city and 45 per cent to the stockholders. The fare was fixed at 5 cents with universal transfers, and, under this arrangement, the city has already received \$4,250,000 as its share of the profit, and to-day enjoys one of the best street railway systems in the country.

"In Cleveland, where a contest exceeding eight years in duration, involving a renewal of franchises, has taken place, a settlement has finally been made with the railway on the basis of allowing 5 per cent interest upon outstanding bonds, and 6 per cent interest upon its stock, under an appraised value of its street railway properties. If the properties earn more than 6 per cent at the initial fare of 3 cents with 1 cent for transfers, then the fare shall be further reduced. But if they fail to meet the interest allowed, the rates of fare shall be increased in order to meet the return on the investment, as above stated.

"Negotiations in Detroit for a renewal of franchises have been carried on for many years along somewhat similar lines as obtained in the investigations at Chicago and Cleveland, but no conclusion has yet been reached. In all these cities, as above stated, a thorough and complete investiga-

tion of the books and street railway properties of the several companies has been found essential before franchises could be agreed upon. These investigations have been along similar lines, but varying somewhat to meet local conditions.

The statutes of Ohio provide that street railway franchises may be renewed upon such conditions as may be considered conducive to public interests. But we would respectfully suggest that before formal action in such matter be taken by the city or the company, it is desirable that the city make such investigation of the street railway problem in Toledo as it may deem wise, in order to reach a definite knowledge of the most desirable street railway system for the city with special reference to routes, equipment and frequency of cars, and also as to the cost of operating such a system. We will furnish the city with every facility for an examination of our properties and books, showing the cost of carrying passengers, the capital required for future developments, and all such other facts and information as may be desired.

"We respectfully urge that due consideration of this matter be given by the city, to the end that an early settlement may be reached, which will be of mutual advantage to the city and to this company."

## Cleveland Traction Situation

At a conference on April 1, 1910, between Judge R. W. Tayler, G. H. Dahl, street railway commissioner, and Newton D. Baker, city solicitor, it was agreed that the grant made to the Cleveland Railway should be amended to allow the company to charge to capital account the difference between the value placed upon the tracks during the Goff-Johnson negotiations, which was taken as a basis by Judge Tayler in his arbitration work, and the outlay for rebuilding. The remainder of the cost of construction, represented substantially by the Goff-Johnson valuations, will be charged to maintenance under the agreement mentioned. It is believed that this agreement will become legal by expiration of the time limit.

The earnings of the company for March will probably show a surplus. March was the first month that the entire system has been operated at a 3-cent fare, plus 1 cent for transfers. The official figures will probably be completed by April 15. Neither J. J. Stanley, general manager of the company, nor Mr. Dahl cared to comment on the results.

Mr. Dahl has ordered that newsboys shall not be allowed to board cars after April 15. He says that with the pay-as-you-enter cars, the conductors cannot assist boys getting on and off cars, and that the boys would inconvenience passengers by crowding through the aisles.

J. T. Ross has been selected by Mr. Dahl as engineer in his department, at a salary of \$6,000 a year. A brief biography of Mr. Ross will be found elsewhere in this issue.

On the evening of March 29 a number of retail merchants met at the Chamber of Commerce to discuss the possibility of having an interurban railway station built in Cleveland. A. E. Akins, vice-president of the Cleveland, Southwestern & Columbus Railway, intimated that the attitude of the city officials under previous administrations had discouraged the interurban railways from investing in Cleveland. E. W. Moore, president of the Lake Shore Electric Railway, said that the time had come for the railways, the city and the merchants to co-operate in the construction of the depot, and that he was ready to pledge two or three companies to further the project. He favored a central location for the station, possibly on the Public Square. The interurban railways now pay \$26,000 a year in rentals in the city. Henry J. Davies, secretary of the Cleveland Railway, stated that it would be impossible for his company to help finance the station on account of the extraordinary expenditures for reconstruction which it would have to make. H. H. Johnson, a lawyer, expressed regret that provision was not made in the Tayler settlement for the Cleveland Railway to participate in this work.

Victor W. Sincere, general manager of The Bailey Company, which operates a department store in Cleveland, proposed that the merchants take the lead in financing a company to build a station. An office structure could be erected in connection with the terminal and be so managed as to return a profit on the investment. N. L. Dauby, of The May Company, which also operates a department store, indorsed Mr. Sincere's proposal. C. W. Burrows, chairman of the retail merchants' board of the Chamber of Commerce, will appoint a committee to canvass the matter and consider locations for the station. The condition of the Superior viaduct, over which the Lake Shore Electric Railway and the Cleveland, Southwestern & Columbus Railway operate into the business section of the city, will be considered carefully. It may be necessary to stop cars on the west side of the Cuyahoga River until this viaduct is replaced or repaired. This work, however, would probably be carried out before a station could be completed.

On April 4, 1910, Mr. Baker rendered an opinion to Mayor Baehr that Cleveland could not enforce a transfer provision in the East Cleveland grant to the Cleveland Railway which would give everybody a right to ride to Collinwood and Euclid Beach for 3 cents, even if the City Council should force the company to route all Euclid Beach cars by way of East Cleveland. The East Cleveland ordinance referred to by Smith, Taft & Arter, attorneys for the Humphrey Company, owners of Euclid Beach, was made for the benefit of East Cleveland people and not for Collinwood or East Cleveland. Whatever rights East Cleveland may have with respect to transfers to Collinwood and Euclid Beach, those rights could hardly be worked out through the medium of intervention by the city, according to Mr. Baker.

#### Appraisals to Be Arbitrated in Detroit

At a meeting of the committee of 50 in Detroit on March 28, 1910, it was resolved, for the purpose of adjusting the difference between the estimate of the value of the property of the Detroit United Railway made by the subcommittee on appraisals and the value placed by the company on its property, to submit the matter to a board of arbitration to consist of three members, one to be chosen by the committee, one by the Detroit United Railway and the third by the other two. The committee has accepted without approval the report of the sub-committee on appraisals. The report will be referred to the arbitration board. Judge James O. Murfin, of the Wayne County Circuit Court, has been named as a representative of the committee on the board, and it is expected that the other two members will be named very soon.

According to F. W. Brooks, general manager of the Detroit United Railway, estimates have been made by the company of the cost of reproducing the property, of the total cost of materials purchased and of the value of the property as a going concern. Mr. Brooks said that the estimate of the cost of replacing the property was \$24,000,000, whereas the appraisal of the property made in the interest of the committee placed the value at about \$11,000,000. The officers of the company had only been in possession of the report of the committee a few days, and were not prepared to discuss the matter in detail because they had not had sufficient time to consider the figures. Mr. Brooks is reported to have said at the meeting on March 28:

"So far as the Detroit United Railway is concerned, we know very little about the appraisal of our property in the interest of the committee of 50. Twelve or 15 months ago we were told that the committee desired to inquire into the valuations and earnings of the company. President Hutchins stated that he stood ready to give all the information desired.

"In pursuance of that promise nothing was left undone to place at the disposal of the committee of 50 all books and records of the company. We at once set 100 men at work making a report to aid in the work. We were told that as fast as each section of the appraisal was completed the company would be called in before the committee. We so understood until we read in the paper that the appraisal was completed.

"We will be glad to take up the matter of valuation now at any time. If the appraisal which has been made is the sort of appraisal outlined in the newspapers, we positively disagree with its finding. We understand that the appraisal

was made of a going concern. We have 219 miles of track in the city, whereas the appraisal of the committee has reduced this trackage to 180 miles. It is evidently proposed to use the rest of this trackage without allowing us for it.

"I cannot discuss details of this appraisal because we do not know what has been done. We have not been consulted in the deliberations of the committee of 50, excepting in the matter of extensions and rearrangement of tracks. We have not seen anything of this appraisal in its progress. We stand ready to aid in a fair appraisal, but we believe we should know something of the methods that were pursued in arriving at the valuation of our property."

Petitions signed by more than 18,000 voters of Detroit have been presented to the Council, calling for a popular vote on the question of municipal ownership of the street railways in Detroit.

#### Hearing at Boston on Steam Railroad Electrification

The committee on metropolitan affairs of the Massachusetts Legislature gave a hearing on March 30, 1910, upon the bills for the electrification of the steam railroads in the vicinity of Boston. Representatives of public improvement associations who appeared on behalf of the bills urged electrification on the grounds of public health and comfort, convenience of travel and financial effect upon public and private property. A statement was quoted from the report of the United States Department of Commerce and Labor to the effect that the mortality from pneumonia was 50 per cent higher in cities than in rural districts on account of the unfavorable atmospheric conditions. Evidence was introduced to show that bridges within 10 miles of Boston are damaged to the extent of \$100,000 a year by locomotive fumes. Many hotels were at a serious disadvantage on account of the failure of the railroads to electrify their lines. Costly railroad yards in the heart of the city could be turned to commercial account through the construction of buildings and streets above them. Electrification would help to solve the housing problem at Boston.

Mayor Fitzgerald of Boston stated that the work at New York pointed the way for Boston. He cited the growing sentiment in favor of the abolition of the steam locomotive, and concluded with the statement that no interstation tunnel would be built with his consent unless electric operation is provided to all the suburban lines for a considerable distance out of the city.

William H. Coolidge, of the Boston & Maine Railroad, agreed that electrification was a good thing in itself, but urged that it would cost \$50,000,000 to electrify the suburban lines of the Boston & Maine Railroad and the New York, New Haven & Hartford Railroad at Boston. He contended that the charges upon this expenditure could not be met by the traffic, and cited the statement of C. S. Mellin, president of the New York, New Haven & Hartford Railroad, that it would cost eight to ten times as much to electrify the Boston lines as those at New York, on account of the radial character of the lines out of Boston. He urged that the railroads should be given more time to study the situation in accordance with the recommendation of the joint commissions which reported to the General Court upon the matter in January, 1910.

Melvin O. Adams, president of the Boston, Revere Beach & Lynn Railroad, the gage of which is 3 ft., asked that his system be excluded from the bills, as the cost of electrifying the road, \$1,250,000, would be prohibitive.

E. A. Whitman, for the Boston & Albany division of the New York Central & Hudson River Railroad, stated that the cost of the suburban traffic on the Newton circuit exceeded the revenue by \$200,000 per year. An expenditure of \$4,500,000 for electrification would be unwarranted. The Massachusetts public must decide between wharf and dock improvements and electrification. Nothing should be done until the art was further advanced.

#### Brooklyn Companies Submit Subway Proposal

The Brooklyn Rapid Transit Company and the Coney Island & Brooklyn Railroad, in a communication to the Public Service Commission and the Board of Estimate and Apportionment on April 6, 1910, applied for the use of the proposed Canal Street subway, offering to run surface cars from all parts of Brooklyn and some sections of

Queens over the Manhattan Bridge and through the proposed subway to West Street, Manhattan, for a uniform fare of 5 cents. In a statement which it made public on April 6 the Brooklyn Rapid Transit Company said in part:

"The Canal Street subway should not be confused with the Center Street subway, which has already been built, and which is designed for the exclusive use of high-speed elevated or subway trains. The application of the company says:

"This proposed agreement will accomplish all that has been suggested with reference to the extension of Brooklyn transportation routes over a reasonable distance in Manhattan, will furnish cheaper transportation considering the distance over which the passenger is privileged to ride than has been offered by any other railroad, and will obviate the necessity of a change of cars and an 8-cent fare such as will be the result of granting the application of the Manhattan 3-cent line now pending before your Board. We feel that it is due to the greater part of Brooklyn which all lines serve that these suggestions should be laid before you, and we respectfully request that the matter of our application be no longer delayed."

"The two roads also offer to operate a 3-cent service upon the Manhattan Bridge similar to the arrangements now in effect upon the Brooklyn and Williamsburg bridges. They say that their operation of surface cars through the Canal Street tube will not interfere with the operation of any elevated or subway trains that the Board of Estimate or Public Service Commission might also wish to conduct through it."

It is stated that the Interborough Rapid Transit Company will submit to the Public Service Commission an amended plan for the construction of new subways in New York as a result of the conferences which have been held recently between T. P. Shonts, president of the Interborough Rapid Transit Company, Mayor Gaynor and Chairman Willcox, of the Public Service Commission.

The rapid transit committee of the Board of Estimate & Apportionment of New York held a public hearing on April 4, 1910, in the City Hall, to listen to suggestions concerning subway developments in the city. Many property owners and representatives of civic organizations from each of the boroughs attended. The demand of each of these borough groups was that their respective boroughs should be favored in the planning of new subways. It was estimated that if all the suggestions made at the hearing were carried out the city would be committed to an expenditure of \$800,000,000 for new subways. The Mayor said that while he would agree to the use of the city's credit for the building of trunk lines the construction of out-of-the-way routes would have to be paid for by the property owners benefited by the improvement. Another hearing is to be held on April 11, 1910.

Chairman Willcox, of the Public Service Commission, has announced that the public hearings required by the law on the forms of contracts which have been prepared for the Broadway-Lexington Avenue route in Manhattan, the Broadway-Lafayette route in Brooklyn, the Fourth Avenue (Brooklyn) extensions and the Canal Street crosstown line will probably be begun in less than three weeks. Mr. Willcox said yesterday that the advertisements calling the hearings, which must appear for two weeks, would undoubtedly be published during the week commencing on April 11. Mr. Willcox said: "The entire cost of construction of these lines is estimated to be more than \$100,000,000. While there are more than 20 rapid transit routes already laid out by the Rapid Transit Commission and the Public Service Commission, which have received the approval of the Board of Estimate and Apportionment and for which consents have been obtained the commission has deemed it advisable to press work upon the lines. After this work is started other routes will be taken up and considered."

**Annual Meeting of the Society for the Promotion of Engineering Education.**—The annual meeting of the Society for the Promotion of Engineering Education will be held at Madison, Wis., on June 23, 24 and 25. Particulars of the meeting and of the general work of the society can be secured from the secretary, Prof. H. H. Norris, Ithaca, N. Y.

**Pennsylvania Tunnels Discussed.**—At a meeting of the American Society of Civil Engineers held in New York on

April 6, 1910, at 8:30 p.m., the following papers, which were illustrated with lantern slides, were discussed: "The New York Tunnel Extension of the Pennsylvania Railroad: The Terminal Station West," by B. F. Cresson, Jr., and "The New York Tunnel Extension of the Pennsylvania Railroad: The Bergen Hill Tunnels," by F. Lavis. These papers were printed in the proceedings of the society for February, 1910.

**List of Officers and Member Lines of the Central Electric Railway Association.**—A. L. Neereamer, secretary-treasurer of the Central Electric Railway Association, issued under date of March 31, 1910, in accordance with a resolution of the executive committee, adopted on Jan. 26, 1910, a list of the officers and member lines of the association for 1910. The list is arranged alphabetically, according to the name of the company. Mr. Neereamer requests that all changes in the list be communicated to him promptly so that it can be kept correct to date.

#### LEGISLATION AFFECTING ELECTRIC RAILWAYS

**Maryland.**—The Maryland Public Utilities bill has passed the House of Delegates at Annapolis by a vote of 95 to 3. Out of the four measures that were considered in the committee room, the Straus bill was the only one that was favorably reported upon. The amendments, of which there are nearly 40, were added with the drafter's consent and are stated not to modify essentially the workings of the original measure. Strong opposition to the bill is expected in the Senate. The bill is now in the hands of the Senate committee on finance. It is said that there is a division of opinion in this committee and that on several occasions the vote has been 4 to 4.

**Massachusetts.**—In addition to the hearings upon electrification, the Boston Elevated Railway holding bill, and the Boston & Eastern tunnel hearings have been resumed on the bills to permit the New York, New Haven & Hartford Railroad to develop electric railways in the Berkshire district at a cost of about \$2,000,000. There is very little opposition to the bill, but it has been held back by a report of the Railroad Commission about a year ago which advised against allowing steam railroads to control electric railways in Massachusetts. Advocates of the measure contend that private capital cannot be secured to develop the needed facilities, but that roads built by the New York, New Haven & Hartford Railroad could be made profitable by being constructed with a view to serving the steam railroad as feeders.

**New Jersey.**—A bill has been introduced in the Senate to amend the new public utility law in accordance with views expressed by Governor Fort. The Governor in signing the bill said that power should be given the commission to fix rates upon complaint of a municipal board or a given number of citizens. The amendments provide that orders of the commission for continuance of service shall be effective immediately; other orders to be effective at the end of 30 days. Appeals from orders may be made to the Supreme Court, but appeals shall not operate to suspend orders except where the Supreme Court so directs. A penalty of \$100 a day is imposed for failure to comply with the commission's orders. The representatives of many municipalities opposed the bill to provide for the elimination of grade crossings on railroads, on the basis of a payment of 65 per cent of the cost by the railroads affected and 35 per cent by the municipalities, at the hearing on March 29 before the judiciary committee of the Senate. Two strike arbitration bills have been introduced. One of the bills provides that the Governor shall appoint three commissioners or that the employers affected may name a member of the board, the employees a member and the Governor the third member. Either commission is to have the power to subpoena and swear witnesses, and its decision is to be binding. The expenses are to be paid by the State. The dispute over the question of the revaluation of railroad property seems likely to end in the passage of a bill putting the matter in the hands of the State Board of Assessors, with \$50,000 for the work, the reappointment to be completed within a year.

**Ohio.**—Representative Frank W. Woods has prepared a substitute for his original public utilities bill, and it was passed by the House on March 30 by a vote of 91 to 16. A digest of the principal provisions of the bill is published on page 669 of this issue.

# Financial and Corporate

## New York Stock and Money Market

April 5, 1910.

The stock market presents to-day the anomalous condition of developing strength on a situation which was taken to mean further depression. Since April 1, New York has shipped to London \$7,650,000, and it is believed that before the movement is over this market will lose at least \$25,000,000. In spite of this the money market remains easy. There continues to be brisk trading in Interborough-Metropolitan with prices practically unchanged.

Money to-day was quoted: Call, 2¾ to 3 per cent; 90 days, 4 per cent.

### Other Markets

The dissolution of the Philadelphia strike has relieved the pressure to sell and important local issues have advanced.

There was no market in Chicago to-day, owing to the election. During the past week there has been little trading in traction shares. Yesterday a few shares of Chicago Railways Series I sold at 100, several points decline from the last sale.

In the Boston market there continues to be trading in Massachusetts Electric and Boston Elevated. The former has advanced slightly while the latter has declined.

In addition to the usual liberal sales of the bonds of the United Railways Company, there have been traded in during the past week, in the Baltimore market, a few small blocks of the stock at about 13.

At the auction sale of securities in New York last week, \$10,000 5 per cent bonds of the Kansas City Western Railway were sold at 83¾.

Quotations of various traction securities as compared with last week follow:

	Mar. 29.	April 5.
American Railways Company.....	44½	44½
Aurora, Elgin & Chicago Railroad (common).....	*57¾	*57¾
Aurora, Elgin & Chicago Railroad (preferred).....	*94¼	*94¼
Boston Elevated Railway.....	128	126
Boston & Suburban Electric Companies.....	a16	a16
Boston & Suburban Electric Companies (preferred).....	a76	a76
Boston & Worcester Electric Companies (common).....	a10½	a10½
Boston & Worcester Electric Companies (preferred).....	a46	a46
Brooklyn Rapid Transit Company.....	77	77½
Brooklyn Rapid Transit Company, 1st pref. conv. 4s.....	84½	84½
Capital Traction Company, Washington.....	a133	a133
Chicago City Railway.....	a185	*185
Chicago & Oak Park Elevated Railroad (common).....	*3½	*3½
Chicago & Oak Park Elevated Railroad (preferred).....	*7½	*7½
Chicago Railways, pteptg., ctf. 1.....	a106	*106
Chicago Railways, pteptg., ctf. 2.....	a33	*33
Chicago Railways, pteptg., ctf. 3.....	a16	*16
Chicago Railways, pteptg., ctf. 4s.....	a9	*9
Cleveland Railways.....	*91½	*91½
Consolidated Traction of New Jersey.....	a76½	a76
Consolidated Traction of New Jersey, 5 per cent bonds.....	a104½	a104½
Detroit United Railway.....	*65	63
General Electric Company.....	150	150½
Georgia Railway & Electric Company (common).....	109½	110
Georgia Railway & Electric Company (preferred).....	a90	a87
Interborough-Metropolitan Company (common).....	22¾	27½
Interborough-Metropolitan Company (preferred).....	58¼	58¾
Interborough-Metropolitan Company (4½s).....	81¼	81
Kansas City Railway & Light Company (common).....	28	*28
Kansas City Railway & Light Company (preferred).....	a78	*78
Manhattan Railway.....	136½	136½
Massachusetts Electric Companies (common).....	a18	a18
Massachusetts Electric Companies (preferred).....	84	a85½
Metropolitan West Side, Chicago (common).....	a16½	*16½
Metropolitan West Side, Chicago (preferred).....	a52	*51¼
Metropolitan Street Railway.....	*15	*15
Milwaukee Electric Railway & Light (preferred).....	*110	*110
North American Company.....	76½	*76½
Northwestern Elevated Railroad (common).....	a16	*15
Northwestern Elevated Railroad (preferred).....	a68	*68
Philadelphia Company, Pittsburg (common).....	a51¼	a50½
Philadelphia Company, Pittsburg (preferred).....	a44½	a43
Philadelphia Rapid Transit Company.....	a21½	a22½
Philadelphia Traction Company.....	a87	a87¼
Public Service Corporation, 5 per cent col. notes.....	*100½	*100½
Public Service Corporation, cfs.....	a105½	a104½
Seattle Electric Company (common).....	a114	a114½
Seattle Electric Company (preferred).....	a102	103
South Side Elevated Railroad (Chicago).....	a53	*52½
Third Avenue Railroad, New York.....	6½	7¼
Toledo Railways & Light Company.....	11	10¼
Twin City Rapid Transit, Minneapolis (common).....	115¼	*115¼
Union Traction Company, Philadelphia.....	a40¼	a49½
United Rys. & Electric Company, Baltimore.....	a135½	13
United Rys. Inv. Co. (common).....	*37	*37
United Rys. Inv. Co. (preferred).....	*67	*67
Washington Ry. & Electric Company (common).....	a39½	a39
Washington Ry. & Electric Company (preferred).....	a91	a91¼
West End Street Railway, Boston (common).....	a92	a89½
West End Street Railway, Boston (preferred).....	a106	83
Westinghouse Elec. & Mfg. Company.....	64	66½
Westinghouse Elec. & Mfg. Company (1st pref.).....	*125	*125

aAsked.

\*Last Sale.

## Annual Report of the Washington Railway & Electric Company

Earnings of the Washington Railway & Electric Company and its subsidiary companies make the following comparison for the last three years:

	1909.	1908.	1907.
Gross earnings from operation....	\$4,080,063	\$3,720,573	\$3,385,748
Operating expenses.....	2,110,578	1,856,170	1,748,752
Net earnings from operation.....	1,969,485	1,864,403	1,636,996
Miscellaneous income.....	10,602	37,525	42,353
Gross income, less op'ting exp....	1,980,087	1,901,928	1,679,349
Fixed charges—			
Taxes.....	200,027	183,385	170,029
Interest.....	1,030,265	994,106	937,199
Total.....	\$1,230,292	\$1,177,491	\$1,107,228
Surplus.....	\$749,795	\$724,437	\$572,121
Operating expenses—percentage of gross earnings.....	51.73	49.89	51.66

The surplus revenues in 1909 were applied in part to the needs of the companies in which they originated, instead of being carried directly to the profit and loss account of the Washington Railway & Electric Company. The disposition of this amount is indicated as follows: Potomac Electric Power Company: Sinking fund requirements, \$54,000; amortization of discounts, \$5,628; loss on second-hand apparatus sold during year, \$29,646; reserve for depreciation, \$15,000; to profit and loss, \$27,111.

Other subsidiary companies: Depreciation of equipment, \$8,722; to profit and loss, \$42.

Washington Railway & Electric Company: Depreciation on equipment, \$51,278; dividends, 5 per cent on preferred stock and 1 per cent on common stock, \$490,000; to profit and loss, \$68,368.

The aggregate charge on account of depreciation on equipment of the railway properties is \$60,000. No details of operating expenses are published in the report.

Changes in the last three years, as compared with the preceding years, were as follows:

	1907, Increase over 1906.	Per cent.	1908, Increase over 1907.	Per cent.	1909, Increase over 1908.	Per cent.
Gross earnings from operation.....	\$252,508	8.06	\$334,825	9.88	\$359,490	9.66
Operating expenses....	135,656	8.41	107,418	6.14	254,408	13.71
Net earnings from operation.....	116,852	7.69	227,407	13.90	105,082	5.63
Miscellaneous income..	*2,242	*5.03	*4,828	*11.40	b*20,923	*71.75
Gross income less operating expenses.....	114,609	7.33	222,579	13.25	78,159	4.11
Fixed charges.....	66,110	6.35	70,203	6.35	52,801	4.48
Surplus earnings.....	\$48,499	9.26	\$152,316	26.62	c\$25,358	3.50

\*Decrease. a. Includes renewals of track charged in 1908 to surplus income. b. Excludes items now classified under gross earnings from operation. c. If track renewals had been included in operating expenses in 1908, the increase in surplus earnings that year over 1907 would have been \$53,492 and the increase in 1909 over 1908 \$124,181.

Clarence F. Norment, the president, states in the report: "If allowance is made for the difference in the classification of items, as indicated in the foot notes to the foregoing tabulated statement, it will be seen that the volume of increase in gross earnings was slightly greater than in the previous year. The large influx of visitors attracted by the inauguration and by popular interest in the special session of Congress, created unusually satisfactory traffic conditions during the first half of the year. Some of the exceptional business taken on during 1908 also favorably affected the earnings during the earlier portions of 1909.

"Operating expenses, after allowing for the difference in the classification, showed a ratio of increase of 7.95 per cent as compared with 8.85 per cent in all earnings. As, in the previous year, the expenditures for maintenance of track and roadway, buildings, electric lines and equipment, were very heavy and the physical condition of your properties is steadily improving in consequence.

"Pursuant to the terms of a contract with the Washington, Baltimore & Annapolis Electric Railway, the tracks of your Columbia division were reinforced with concrete beams at an expense of \$174,585. The cost of this work, plus 5 per cent interest, will be reimbursed to the company by the Washington, Baltimore & Annapolis Electric Railway in 30 semi-annual payments beginning July 1, 1910. It is the purpose of that company to equip its line with

lighter rolling stock, which we propose operating on the Columbia division as far as the treasury."

The total increase in passenger revenue in 1909 as compared with 1908 for all the railways in the system was 7.41 per cent. In the previous year the corresponding gain was 6.54 per cent and in 1907 it was 4.60 per cent.

#### Boston Elevated Railway Presents Holding Bill

The Boston Elevated Railway filed a bill with the committee on street railways of the Massachusetts Legislature on March 29 which provides for the acquisition by the company of connecting and intersecting street railways, electric railroads or elevated railways through the purchase of securities. By the exercise of the holding principle the company plans to extend operation to all the important lines in eastern Massachusetts by forming a single system of administration covering more than 1700 miles of track, with annual gross earnings of \$23,000,000, and a present service of 83,000,000 car miles per year. The bill provides that all security issues are to be supervised by the Railroad Commission; that no stock is to be sold without the approval of the commission; that the lines of the West End Street Railway or any other street railway hereafter organized and built within the territory occupied by the Boston Elevated Railway are not to fall within the bill's authorization; that power and traffic contracts are to be subject to the approval of the Railroad Commission, and that the company shall pay a franchise tax only upon its own shares. Frederic E. Snow, of counsel for the company, reiterated the general advantages of the bill. Massachusetts was committed to the policy of consolidation, but the Boston Elevated Railway could not enter a formal merger because its charter guaranteed a 5-cent fare on its lines, and the rental of the East Boston tunnel was based upon the earnings of all street railways owned, leased or operated by the company. In some cases the fares would be decreased, while in others they would remain stationary, for the company was carrying passengers as far as it profitably could for 5 cents.

**Belton & Temple Traction Company, Belton, Tex.**—The Federal Court at Waco, Tex., has ordered the sale of the property of the Belton & Temple Traction Company under foreclosure on May 3, 1910. The sale will be made by W. G. Haag, Temple, as special master, and he will report the sale to the court for confirmation on June 11, 1910.

**Camden & Trenton Railway, Camden, N. J.**—The sale of the property of the Camden & Trenton Railway under foreclosure to Henry W. Thompson, Jr., representing the bondholders' committee, as announced in the *ELECTRIC RAILWAY JOURNAL* of March 26, 1910, has been confirmed by the United States Court at Trenton.

**Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.**—The \$705,000 of first mortgage consolidated bonds of the Cleveland, Southwestern & Columbus Railway, which were pooled by the owners on Feb. 1, 1907, with a committee consisting of J. R. Nutt, George N. Chandler and F. E. Myers, are being delivered in exchange for the pooling certificates at the office of the Citizens' Savings & Trust Company, Cleveland, the agreement under which the bonds were pledged having expired.

**Commonwealth Power, Railway & Light Company, Grand Rapids, Mich.**—E. W. Clark & Company, Philadelphia, Pa., announced on March 31, 1910, that the plan for having the Commonwealth Power, Railway & Light Company take over the Commonwealth Power Company, Grand Rapids-Muskegon Power Company, Saginaw-Bay City Railway & Light Company, Grand Rapids Railway, Michigan Light Company, Flint Electric Company, Flint Gas Company, Cadillac Water & Light Company, Charlotte Electric Company, Shiwassee Light & Power Company and the Au Sable River Property and Rights had been declared operative, and that the new securities would probably be delivered by April 15, 1910. According to the plan for the organization of the Commonwealth Power, Railway & Light Company announced in the *ELECTRIC RAILWAY JOURNAL* of Jan. 8, 1910, the company is capitalized at \$18,000,000, of which \$6,000,000 is preferred stock and \$12,000,000 common stock.

**Dartmouth & Westport Street Railway, New Bedford, Mass.**—The Dartmouth & Westport Street Railway has pe-

titioned the Railroad Commission for permission to issue at \$150 a share stock amounting to \$237,500, par value, to pay for a new freight terminal house, a car storage house, improvements at Lincoln Park, new rolling stock and feeder improvements.

**Fort Dodge, Des Moines & Southern Railroad, Fort Dodge, Ia.**—It is stated that negotiations are being conducted for the sale of the Crooked Creek Railroad to the Fort Dodge, Des Moines & Southern Railroad. The Crooked Creek Railroad extends from Lehigh to Webster City, a distance of 18 miles, and is operated by steam.

**Fort Smith Light & Traction Company, Fort Smith, Ark.**—An initial dividend of 1¼ per cent has been declared on the \$650,000 of 5 per cent preferred stock of the Fort Smith Light & Traction Company, payable on April 15, 1910, to holders of record on April 1, 1910, out of the earnings of the company for the quarter ended March 31, 1910. Dividends on the stock are cumulative from Jan. 1, 1907.

**Gray's Harbor Railway & Light Company, Aberdeen, Wash.**—The property of the Gray's Harbor Railway & Light Company has been acquired by Sanderson & Porter, New York, N. Y.

**Interstate Railways, Philadelphia, Pa.**—The Interstate Railways has leased to the Reading Transit Company the Schuylkill Valley Traction Company; the United Traction Company, of Reading; the Oley Valley Railway; the Never-sink Mountain Railway; the Metropolitan Electric Company; the Lebanon Valley Street Railway, and the Edison Electric Illuminating Company, Lebanon. The transaction leaves the Interstate Railways with only the Trenton Street Railway, the Wilmington & Chester Traction Company and the Delaware County & Philadelphia Railway.

**Joplin & Pittsburg Railway, Pittsburg, Kan.**—E. H. Rolins & Sons, New York, N. Y.; N. W. Harris & Company, New York, N. Y., and Boston, Mass., and the Harris Trust & Savings Bank, Chicago, Ill., offer for subscription at 97 and interest the unsold portion of \$1,750,000 of first mortgage 5 per cent gold bonds of the Joplin & Pittsburg Railway, dated March 1, 1910, and due March 1, 1930, but redeemable at 103 and interest on any interest date.

**Meridian Light & Railway Company, Meridian, Miss.**—Henry L. Doherty & Company, New York, N. Y., have purchased practically all of the outstanding capital stock of the Meridian Light & Railway Company, consisting of \$702,400 of common stock and \$163,000 of 6 per cent preferred stock and will spend \$200,000 in extending and improving the property.

**Metropolitan Street Railway, New York, N. Y.**—The *Wall Street Journal* says that since the New York City Railway passed into the hands of receivers in September, 1907, there has been a total default of \$17,725,699 in interest and cumulative dividends on the bonds and stocks of companies in the Interborough-Metropolitan System. The amount in default on the stocks and bonds of the Metropolitan Street Railway and the Third Avenue Railroad is placed at \$12,236,899 and the amount in default on the stock of the Interborough-Metropolitan Company at \$5,488,800. These amounts do not include rentals on various subsidiary companies which have been discontinued owing to the lack of funds. A summary of the expenditures for reconstruction shows that this work has cost \$8,385,000.

**Philadelphia & Western Railway, Philadelphia, Pa.**—It is stated that E. B. Smith & Company, Philadelphia, Pa., have purchased the Philadelphia & Western Railway.

**Topeka (Kan.) Railway.**—William B. McKinley and his associates in the Illinois Traction Company have secured control of the Topeka Railway through the purchase of the stock of E. W. Wilson, president of the company, and the Wilson estate.

**Washington (Ind.) Street Railway.**—The Burns Construction Company, Chicago, Ill., has purchased the Washington (Ind.) Street Railway, and will operate the road in connection with a line which it is building from Indianapolis to Evansville by way of Washington.

**Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.**—The unsold portion of an issue of \$1,300,000 of first mortgage 5 per cent gold bonds of the Waterloo, Cedar Falls & Northern Railway is offered for subscription at 97 and interest by McCoy & Company, Chicago, Ill.

## Traffic and Transportation

### Order for Increased Service on the Elevated Lines in New York

The Public Service Commission of the First District of New York adopted on April 5, 1910, the following final order directing the Interborough Rapid Transit Company to increase the service on all the elevated lines in Manhattan and the Bronx:

"Ordered: I. That the Interborough Rapid Transit Company provide service daily on all elevated express and local tracks by operating trains in both directions past every station so as to furnish during each half-hour period, beginning at the even hour or half-hour, either:

"(a) A number of seats at least equal to the number of passengers; or,

"(b) The maximum number of trains and cars that can be operated with the elevated cars now and hereafter owned and equipped.

"II. That the interval of time between all trains operated shall be daily, except on Sundays and holidays, as follows:

"1. On the Ninth Avenue line, southbound, past Fiftieth Street:

"(a) Not more than a 4-minute interval between trains from 6 a. m. to 7 p. m.

"(b) Not more than a 6-minute interval between trains from 7 p. m. to 11 p. m.

"(c) Not more than a 10-minute interval between trains from 11 p. m. to 6 a. m.

"2. On the Sixth Avenue line (excluding Fifty-eighth Street trains), southbound, past Fiftieth Street:

"(a) Not more than a 4-minute interval between trains from 7 a. m. to 6:30 p. m.

"(b) Not more than a 5-minute interval between trains from 6:30 p. m. to 11 p. m.

"(c) Not more than a 10-minute interval between trains from 11 p. m. to 7 a. m.

"3. On the Third Avenue line, southbound, past Thirty-fourth Street:

"(a) Not more than a 2-minute and 24-seconds interval between trains from 6:30 a. m. to 7 p. m.

"(b) Not more than a 3-minute interval between trains from 7 p. m. to 11 p. m.

"(c) Not more than a 6-minute and 40-seconds interval between trains from 11 p. m. to 6:30 a. m.

"4. On the Second Avenue line, southbound, past Thirty-fourth Street:

"(a) Not more than a 4-minute interval between trains from 6 a. m. to 7 p. m.

"(b) Not more than a 6-minute interval between trains from 7 p. m. to 11 p. m.

"(c) Not more than a 6-minute interval between trains from 11 p. m. to 12:15 a. m. and from 5 a. m. to 6 a. m.

"And it is further ordered, that this order shall take effect on April 11, 1910, and remain in force until modified or revoked; and it is further ordered, that within five days after service upon it of a copy of this order said Interborough Rapid Transit Company shall notify the Public Service Commission for the First District whether the terms of this order are accepted and will be obeyed."

### Pay-As-You-Enter Service in Cincinnati

The service begun by the Cincinnati (Ohio) Traction Company on its Vine and Clifton and Vine and Norwood lines on March 1, 1910, with pay-as-you-enter cars, built under license from the Pay-As-You-Enter Car Corporation, has proved very successful and the cars have received the endorsement of the newspapers. One paper even conducted a contest among its readers by offering a prize of \$5 for the best short name for the cars. The successful name, "Pay-Enter," was suggested by 49 different people.

The company naturally made the most of the favorable comments in the press, but the success of the cars is due largely to the campaign of education for the benefit of the public and its employees which the company conducted previous to installing the cars. The rules for the guidance of conductors and motormen were so arranged as to cover briefly the position of the conductor, the position of the

motorman, the collection of fares, furnishing change, baggage, blockades, employees' tickets, etc. These rules were introduced with a statement of three important results which it was sought to accomplish with the cars as follows:

"1. The prevention of accidents through the starting of cars while passengers are in the act of boarding or alighting.

"2. Facilitating the collection of fares and enabling the conductor to give more complete attention to the operation of his car.

"3. Increasing the comfort of passengers by doing away with the necessity of having conductors push and crowd passengers in cars while collecting fares."

The principal notice to the public was a circular printed on newspaper 4 in. wide by 6½ in. high, at the top of which was a diagram of a pay-as-you-enter car showing the seating and platform arrangements. The company also introduced this circular with a statement of the three principal reasons for adopting the cars, worded substantially the same as in the circular to the employees. The circular then continued:

"It is believed that the above results will be fully realized if the company can have the cooperation of the patrons of these lines in the observance of a few simple rules, as follows:

"1. Passengers are requested to have exact amount of fare ready.

"2. Passengers will enter only by rear platform at point marked 'entrance' on car and follow the direction of the arrow on the above drawing.

"3. Passengers will deposit exact amount of cash fare or ticket in fare box and pass into car through the entrance door.

"4. Transfers will be handed unfolded to conductors and not deposited in fare box.

"5. Passengers needing change will receive the full amount from the conductor, out of which passengers will deposit fare in fare box.

"6. Transfers will be asked for at time of depositing fare in fare box.

"7. Passengers desiring change or transfers are requested kindly to allow those with exact fare and not needing transfers to pass in first, thus facilitating the movement into the car.

"8. Conductors are not required to change bills of larger denomination than \$2.

"9. Standing on rear platform will not be allowed, but smokers will be allowed to stand on front platform.

"10. No baggage or bundles will be allowed on the platform. If too bulky to be taken inside, baggage will not be allowed to be taken on car.

"11. Passengers desiring to leave car will use front door as far as possible. If car is full, those near rear may leave by rear exit door."

**Pay-as-You-Enter Cars in Rochester.**—The New York State Railways, Rochester Lines, placed 25 pay-as-you-enter cars, built under license from the Pay-as-You-Enter Car Corporation, in operation on its East and West Main Street line on April 1, 1910.

**Collision on Ohio Electric Railway.**—As a result of a head-on collision between an eastbound passenger car and a westbound express car on the Ohio Electric Railway west of Convoy, Ohio, on March 27, 1910, two men were killed and three injured. Two coaches were destroyed by fire.

**Freight Rights Approved in Massachusetts.**—The Railroad Commission of Massachusetts has approved the petition of the Interstate Consolidated Street Railway to carry freight and baggage in Seekonk, and of the Milford, Attleboro, & Woonsocket Street Railway for the same privilege in Franklin.

**New Limited Service Between Fort Worth and Dallas.**—The Northern Texas Traction Company has issued a folder, in which a new limited service is announced between Fort Worth and Dallas. This additional service makes 63 passenger trains daily between these cities. The company has also issued a series of postal cards in colors which show views along its line.

**Increase in Wages on West Penn Railways.**—An increase of one cent an hour in the wages of its conductors and motormen was announced, beginning April 1, 1910, by the West Penn Railways. This applies to one, two, three and four-year motormen and conductors. Hereafter the scale of wages will be 24, 25, 26 and 27 cents per hour, instead of 23, 24, 25 and 26 cents per hour.

**Change in Freight Rates on New York Line.**—On May 1, 1910, the Lima & Honeoye Electric Light & Railroad Company, Lima, N. Y., will reduce the rate per 100 lb. from 11 cents to 8 cents between Lima and East Buffalo on sheep and calves. At the same time the company will increase the rate on hogs from 9 cents to 10 cents per 100 lb., and will also increase the rate on cattle from 7½ cents to 10 cents.

**From Louisville to South Bend.**—A car containing 35 delegates to the meeting of the Central Electric Railway Association at South Bend, Ind., on March 24, was operated between Louisville and South Bend under the direction of Martin J. Insull, general manager of the Louisville & Northern Railway & Lighting Company and operating manager of the Indianapolis, Columbus & Southern Railway. The distance is 300 miles, and the running time was less than 11 hr. The route was over the tracks of the Louisville & Northern Railway & Lighting Company to Columbus and over the Indianapolis, Columbus & Southern Railway to Indianapolis. From Indianapolis to Peru the car was operated over the line of the Indianapolis Traction Company; from Peru to Goshen over the Winona Interurban Railway, and from Goshen to South Bend over the Chicago, South Bend & Northern Indiana Railway. Mr. Insull hopes to establish a regular service between Louisville and South Bend.

**Decision by Michigan Supreme Court in Detroit Fare Case.**—The Supreme Court of Michigan has decided against the Detroit (Mich.) United Railway in the suit to determine whether the company has the right to charge a 10-cent fare on its Jefferson Avenue line to Fairview. The city ordinance of 1889 required that passengers should be conveyed to any point within the city limits of Detroit. The Detroit United Railway contended that it occupied the position of an assignee of the Grosse Pointe Railway, and that it is not, as to the railway in the former village of Fairview, an assignee of the Detroit City Railway. The Supreme Court holds that: "The case presented does not involve in this view an interference with any vested right of the company, as the assignee of the Fairview Railway, but resolves itself simply into a question of the construction of the ordinance, and we construe the ordinance to include any street railway constructed or purchased by the Detroit United Railway which shall be within the city of Detroit as the limits of said city may from time to time be fixed by the Legislature."

**Anti-Spitting Crusade in Syracuse.**—The Beebe Electric Railway System, Syracuse, N. Y., is conducting an anti-spitting campaign upon its lines. For some time the company has carried signs in its cars, stations, waiting-rooms and shelter buildings, declaring that spitting upon the floor was forbidden and punishable by a fine of \$50 "by order of the State Board of Health." A recent investigation showed that the State Health Law afforded the company no protection. As a result it was found necessary to ask each city that had no anti-spitting ordinance and some 50 villages and townships to adopt a uniform ordinance prohibiting spitting, and providing a fine of \$5. Little difficulty in securing the cooperation of the various boards of health has been encountered, and within a month the ordinances will be effective over every line in the Beebe system. As soon as the ordinances have all been enacted the companies propose to have their special officers ride on the cars and arrest offenders, who will be prosecuted vigorously. As soon as the campaign was determined upon the management requested the support of each daily and weekly newspaper in the territory served by the company. As a result the campaign was given considerable publicity, and the way was paved for the adoption of the desired ordinances without opposition. In order that patrons might have no excuse for expectoration upon the floors of the cars, all cars have been equipped with cuspidors, which are changed at the end of every round trip.

## Personal Mention

**Mr. W. H. Burk** has been elected treasurer and auditor of the Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia., to succeed Mr. E. A. Boggs, resigned.

**Mr. S. S. Straub** has resigned as superintendent of the Schuylkill & Dauphin Traction Company, Harrisburg, Pa., to enter the manufacturing field at Anderson, Ind.

**Mr. S. S. De Camp** has resigned as master mechanic of the Rockford & Interurban Railway, Rockford, Ill., and Mr. Charles Winter has been appointed to succeed him.

**Mr. F. W. McAssey** has resigned as superintendent of the Rockford & Interurban Railway, Rockford, Ill., and Mr. Walter B. Page has been appointed to succeed him.

**Mr. A. B. Clinger**, assistant master mechanic of the Saginaw Bay City Railway & Light Company, Saginaw, Mich., has accepted the position of master mechanic of Toledo & Western Railroad, Toledo, Ohio.

**Mr. James K. Gray** has resigned as superintendent of the lines of the Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, in Mansfield, Ohio, to accept a position with the Illinois Traction Company, with headquarters at Decatur, Ill.

**Mr. J. F. Turner**, for several years assistant superintendent of the northern division of the Pacific Electric Railway, Los Angeles, Cal., has assumed the position of superintendent of the Fresno (Cal.) Traction Company, to succeed Mr. C. B. Jackson, resigned.

**Mr. Leslie R. Coffin** has been appointed acting manager of the Whatcom County Railway & Light Company to succeed Mr. L. H. Bean, who, as announced in the *ELECTRIC RAILWAY JOURNAL* of March 26, 1910, has been appointed manager of the Puget Sound Electric Railway, Pacific Traction Company and the Tacoma Railway & Power Company, Tacoma, Wash.

**Mr. Charles Winter** has been appointed master mechanic of the Rockford & Interurban Railway to succeed Mr. S. S. De Camp, resigned. Mr. Winter was for a number of years general foreman of the Metropolitan West Side Elevated Railroad, Chicago, Ill., and spent several years in expert work on automatic car controls for the Westinghouse Electric & Manufacturing Company.

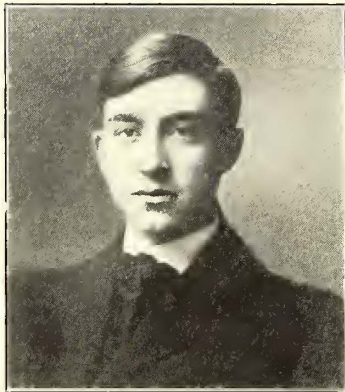
**Mr. Walter B. Page** has been appointed superintendent of the Rockford & Interurban Railway, Rockford, Ill., to succeed Mr. F. W. McAssey, resigned. Mr. Page has had a long experience in the roadway and transportation departments of the Erie Railroad; New York, Ontario & Western Railroad; Lackawanna & Wyoming Valley Railway, passing through the grades of brakeman, conductor and train dispatcher. He was until recently trainmaster of the Interurban Railway, Des Moines, Ia.

**Mr. Stephen Ridlen** was appointed general ticket and freight agent of the Indianapolis, Crawfordsville & Western Traction Company, Crawfordsville, Ind., effective on April 1, 1910. Mr. Ridlen has been connected with steam railroads in various capacities for 23 years. He was with the Cincinnati, Hamilton & Dayton Railroad for seven years and for the last 16 years has been connected with the Chicago, Indianapolis & Louisville Railway. Mr. Ridlen acted as agent of the Chicago, Indianapolis & Louisville Railway at Crawfordsville, Ind., for two years prior to his appointment to the Indianapolis, Crawfordsville & Western Traction Company.

**Mr. B. J. Fallon**, whose appointment as assistant general manager of the Metropolitan West Side Elevated Railway was announced in the *ELECTRIC RAILWAY JOURNAL* of April 2, 1910, was graduated from De La Salle Institute, Chicago, Ill., in 1898, and began work with the Chicago, Burlington & Quincy Railroad as a rodman. In the succeeding years, until 1907, he advanced from rodman to division engineer, and for five years of that period was superintendent of track elevation for the Chicago, Burlington & Quincy Railroad. In 1907 he was appointed engineer of maintenance of way of the Metropolitan West Side Elevated and now as assistant general manager of the company will give his attention particularly to the track, rolling stock and power departments.

**Mr. J. T. Ross** has been appointed engineer to Mr. G. H. Dahl, street railway commissioner of Cleveland. Mr. Ross was born at Watertown, Wis., but concluded his education in the high school at Coshocton, Ohio. He began his railroad career as a rodman on the Coshocton Southern Railroad in 1888. Subsequently Mr. Ross was connected with the Wheeling & Lake Erie Railroad and the Cleveland Frog & Crossing Company. In the fall of 1895 he entered the employ of the Everett-Moore syndicate in Detroit. Later he had charge of the construction of the Shore Line of what is now the Cleveland, Painesville & Eastern Railway and the Lorain & Cleveland line. He was also engineer of maintenance of way of the Cleveland Electric Railway for 18 months, but in 1901 he resigned to take charge of the construction of the Detroit & Toledo Shore Line, after which he was appointed consulting engineer of the Lake Shore Electric Railway, the Northern Ohio Traction & Light Company and the Cleveland, Painesville & Eastern Railway. During the Goff-Johnson negotiations in Cleveland Mr. Ross was employed as an expert adviser by Mr. F. H. Goff. Mr. Ross will give his entire time to the duties of the new office.

**Mr. L. H. McCray**, whose appointment as general manager and purchasing agent of the Atlantic Shore Line Railway, Kennebunkport, Me., to succeed Mr. F. B. Kirk, was announced in the *ELECTRIC RAILWAY JOURNAL* of April 2, 1910, began his railroad work with the Winnebago Traction Company, Oshkosh, Wis., which he served in various capacities from 1904 until 1907, when he resigned as assistant foreman of the transportation department of the company to become superintendent of the Sterling, Dixon & Eastern Electric Railway, Sterling, Ill. Mr. McCray continued with the Sterling, Dixon & Eastern Electric Railway until March 15, 1908, when he was appointed trainmaster and assistant to the general manager of the Atlantic Shore Line Railway, Kennebunkport, Me. The Atlantic Shore Line Railway operates freight and passenger service over 95 miles of line.



L. H. McCray

#### OBITUARY

**Edward Wiebenson**, treasurer of the Stark Electric Railway and president of the United Banking & Saving Company, died at his home in Cleveland on April 1, 1910, after an operation for appendicitis. Mr. Wiebenson was born in Germany in 1859. He conducted a drug business in Iowa for some years, and later went into the same business in Chicago. Returning to Iowa he became a private banker at Gladbrook. Twenty years ago he went to Cleveland as secretary and treasurer of the United Banking & Savings Company, of which he later became president. Mr. Wiebenson held office in some of the companies that were organized in the interest of former Mayor Johnson.

**W. W. Churchill**, who resigned in the spring of 1907 as vice-president in charge of engineering of Westinghouse, Church, Kerr & Company, New York, is dead. Mr. Churchill was graduated from Cornell University in 1889 and soon after became connected with the engineering department of Westinghouse, Church, Kerr & Company, with whom he was associated for about 15 years. For that company he had charge of the engineering work of a number of important contracts. The first large undertaking of this kind was the electrical equipment of the South Station in Boston. Another contract of which he had engineering charge was the erection of the Kingsbridge power station of the Third Avenue Railroad, New York, N. Y., the construction of the Lackawanna & Wyoming Valley Railway and the initial electrical equipment of the Long Island Railroad. Mr. Churchill had been in poor health for the past three years and had been living at Monroe, Wis.

## Construction News

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

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

#### RECENT INCORPORATIONS

**\*Oswego, Columbus & Cherryville Electric Railway, Oswego, Kan.**—Incorporated in Kansas to build a 47-mile electric railway from Columbus to Cherryvale. Headquarters, Oswego. Capital stock, \$50,000. Incorporators: S. B. Miller, Oswego; D. Christman, W. J. Jones and G. Torbert, Altamont; I. M. Hinds, Mound Valley; David Dunbar, Hallowell; C. A. Mitchell, Cherryvale, and T. F. Stice, Oswego.

**\*Virginia City Southern Electric Railway, Virginia City, Mont.**—Application for a charter has been made in Montana by this company to build an electric railway from the Ruby Valley branch of the Northern Pacific Railway via Ruby, Junction, Adobetown and Nevada to Virginia City, a distance of 12 miles, and from Virginia City via Ennis up the Madison Valley to Lyon, about 50 miles southeast of Virginia City. The necessary funds for making surveys and other preliminary matters have been subscribed. Power plants, car houses and principal place of business will be located in Virginia City. Capital stock, authorized, \$200,000. Incorporators: Luther H. Leber, New York, N. Y.; A. J. Bennett, Karl Elling, W. A. Clark and George E. Gohn, Virginia City.

**\*Southwestern New York Traction Company, Bolivar, N. Y.**—Incorporated in New York to build a 20-mile electric railway from Bolivar to Wellsville. Principal office, Bolivar. Capital stock, \$200,000. Directors: Charles M. Van Curen and Albert J. Matson, Bolivar; Benjamin F. Patterson, New York, and James G. Pugh, Baltimore, Md.

**\*City & Suburban Railway, Brooklyn, N. Y.**—Incorporated in New York to build a 23-mile electric railway in Kings, Queens and Nassau Counties from Ridgewood Reservoir, Brooklyn, to Amityville. Capital stock, \$230,000. Directors: W. H. Burroughs, I. T. Platto, L. C. Neuberger and David H. Cagney, New York.

**\*Astoria, Pacific Coast & Southern Railway, Astoria, Ore.**—Application has been made for a charter in Oregon by this company to construct an electric railway from Astoria to Tillamook. Capital stock, \$500,000. Incorporators: B. Van Dusen, E. E. Gray and J. E. Higgins.

**\*Coos Bay Rapid Transit Company, Portland, Ore.**—Application for a charter has been made by this company in Oregon to build an electric railway to connect Marshfield, Empire, North Bend and other towns on Coos Bay. Capital stock, \$1,000,000. Incorporators: L. D. Kinney, Geo. M. Everett and George W. Kitchen.

**\*Fairdale, Trask & Tillamook Railway, Portland, Ore.**—Application for a charter has been made in Oregon to build an electric railway from Fairdale to Tillamook. Capital stock, \$10,000. Incorporators: R. Haskins, A. B. Wastell and J. H. Gearin. Headquarters, Portland.

**Bryan & College Interurban Railway, Bryan, Tex.**—Incorporated in Texas to build a 6½-mile gasoline motor railway between Bryan and the State Agricultural and Mechanical College at College Station. The grade for the railway is finished and the track is being laid. Capital stock, \$20,000. Incorporators: W. H. Hunter, Crowley, La.; O. E. Gammell, W. E. Sounders, J. W. Doremus and J. C. Mahoney, Bryan. [E. R. J., Jan. 22, '10.]

**Middle Island Railroad, Middlebourne, W. Va.**—Incorporated in West Virginia to build an electric railway from Clarksburg to Salem, Middlebourne, Shirley, Center Point, McElroy Creek, and Sistersville. Capital stock, \$5,000. Incorporators: T. Moore Jackson and C. P. Stout, Clarksburg; L. M. Underwood, John F. Shore and T. P. Hill, Middlebourne. [E. R. J., April 2, '10.]

#### FRANCHISES

**Van Buren, Ark.**—Application for a franchise has been made to the City Council by the Fort Smith Light & Traction Company, Fort Smith, to build new lines over certain streets in Van Buren.



\***Easton, Cal.**—Hall C. Ross has applied for a franchise to build an electric railway in Easton.

**Sacramento, Cal.**—The City Trustees have granted a franchise to the Sacramento Electric, Gas & Railway Company to construct and operate a double-track line on Y Street from Tenth to the Riverside Road in Sacramento.

**Suisun, Cal.**—The Town Trustees have granted a 50-year franchise to the Vallejo & Northern Railroad, Vallejo, to construct an electric railway within the town limits. This covers the same privileges given by a similar franchise to the company two years ago, which had recently expired. Work will be commenced within six months on this projected railway from Vallejo to Sacramento via Fairfield and Woodland. [E. R. J., Mar. 5, '10.]

**Woodland, Cal.**—The Board of Trustees has granted the Vallejo & Northern Railway, Vallejo, a franchise to construct a railway in Woodland.

**Kansas City, Mo.**—The City Council has granted a franchise to the Metropolitan Street Railway to build a double-track line on Twenty-fourth Street from Main Street to McGee Street, in Kansas City. W. W. Wheatley, Kansas City, general manager.

**Altoona, Pa.**—The City Council has granted a franchise to the Altoona & Johnstown Street Railway, Johnstown, to build an electric railway over certain streets in Altoona. It has been approved by the Mayor. This 40-mile projected railway will connect Altoona and Johnstown. Geo. L. Holman, Johnstown, general manager. [E. R. J., March 12, '10.]

**Nashville, Tenn.**—Application has been made to the Council for a franchise for the Nashville Railway & Light Company to double-track its line on West End Avenue, Nashville, and to build an extension to Salem and Bosley.

**El Paso, Tex.**—The County Commissioners have been asked by the El Paso & Fort Hancock Electric Railway, El Paso, for an extension of one year's time in which to start construction of its 60-mile proposed electric railway from El Paso down the valley of the Rio Grande to Fort Hancock. C. W. Kellogg, Jr., El Paso, manager.

**Houston, Tex.**—The City Council has granted the Galveston-Houston Interurban Electric Railway a franchise to operate an electric railway over certain streets in Houston. This is part of a plan to connect Galveston and Houston with an electric railway.

\***Victoria, Tex.**—The Council has granted a franchise to operate either electric or gasoline cars over the principal streets of Victoria to J. J. Welder, F. B. Lander, A. A. Sitterle, J. N. Fagan, T. D. Wood, J. W. Rutland and J. K. Hexter, Victoria.

\***Brigham, Utah.**—The County and City Councils have granted franchises to David Eccles to build an electric railway over the principal streets of Brigham and extend it to Hot Springs. Work must be started within six months and the railway completed within a year, according to the provisions of the franchise.

**Walla Walla, Wash.**—The County Commissioners have granted the Northwestern Corporation, Walla Walla, franchises to build electric railways over certain streets and for the transmission of electric power in Walla Walla.

## TRACK AND ROADWAY

**Pacific Electric Railway, Los Angeles, Cal.**—This company has commenced grading on the 12-mile cut-off from La Habra Valley east to a point near Yorba. A contract for the construction of an extension from Pillsbury to Olinda has been let, and it provides for the completion of the work within 90 days.

**Sacramento Electric, Gas & Railway Company, Sacramento, Cal.**—This company advises that during the next six weeks it will rebuild some of its track, which will call for 87-lb. and 60-lb. rails. Most of the work will be done by the company. John A. Britton, San Francisco, president and general manager.

**Egyptian Traction Company, Eldorado, Ill.**—This company has been granted right of way through White County and it is planned to extend the railway to the Wabash River below Maunie, Ill., and into Indiana. It will connect Murphysboro, Marion, Carrier Mills, Harrisburg, Eldorado, Ridgway and New Haven, Ill., and Mount Vernon, Ind.

George E. Leggett, Winchester, president and general manager. [E. R. J., March 5, '10.]

**Rock River Traction Company, Geneseo, Ill.**—This company expects to start construction within 30 days on its proposed railway from Princeton to Geneseo via Wyanet, Buda, Sheffield, Mineral, Annawan and Atkinson. [E. R. J., Jan. 29, '10.]

**Quincy Horse Railway & Carrying Company, Quincy, Ill.**—This company advises that it will soon place contracts for building several miles of new track. W. A. Martin, purchasing agent.

**Bluffton, Geneva & Celina Traction Company, Bluffton, Ind.**—This company has completed surveys from Bluffton to Geneva, 18½ miles, and is now surveying from Celina to Geneva, 21½ miles. The line will also connect Vera Cruz, Linn Grove, Geneva, New Corydon, Ind., and Dublin, Ohio. [E. R. J., Dec. 4, '09.]

**St. Joseph Valley Traction Company, Elkhart, Ind.**—H. E. Bucklen, president of this company, announces that he has arranged with the Chicago, South Bend & Northern Indiana Railway, South Bend, for an extension of this railway from South Bend to Elkhart to connect with the St. Joseph Valley Traction Company, now operating between Elkhart and Angola. The plan is to extend the railway to Pioneer, Ohio, where the St. Joseph Valley Traction Company's line would connect with an electric railway into Toledo.

**Beech Grove Traction Company, Indianapolis, Ind.**—This company has increased its capital from \$10,000 to \$100,000. Its proposed railway will connect Beech Grove and Indianapolis. W. H. Ogan, president. [E. R. J., Jan. 8, '10.]

**Kokomo, Marion & Western Traction Company, Kokomo, Ind.**—This company has recently made all arrangements to extend its railway from Kokomo to Frankfort. Work will commence at once and the railway will ultimately be extended to Terre Haute. The company absorbed the Kokomo, Frankfort & Terre Haute Traction Company a few weeks ago.

**Omaha, Council Bluffs & Sioux City Railroad, Des Moines, Ia.**—This company advises that construction will begin as soon as preliminary work is completed on its proposed 100-mile electric railway which is to connect Omaha, Council Bluffs, Beebeetown, Logan, Magnolia, Little Sioux, Onawa, Oswego, Luton, Morningside and Sioux City. Capital stock authorized, \$10,000. Officers: M. H. Miller, Des Moines, president, secretary and general manager; B. J. Ness, Des Moines, vice-president, and J. W. Russell, Adel, treasurer. [E. R. J., Mar. 26, '10.]

**Louisville & Eastern Railroad, Louisville, Ky.**—This company has practically completed its extension to Shelbyville, 30 miles east of Louisville, and will have cars in operation June 1. The rails have been laid and the overhead work has been completed, and ballasting is now being carried on. An hourly schedule will be put on, and the distance will be covered in 1 hr. and 20 min. It is intended ultimately to extend the line to Frankfort.

**Louisville (Ky.) Railway.**—This company has practically completed the work of putting its feed cables underground. An ordinance directing the company to do this passed several years ago. It required the power cables to be put beneath the surface before Dec. 31, '10. The company has extended the underground system beyond the downtown district provided in the ordinance.

**Western Massachusetts Street Railway, Westfield, Mass.**—This company announces that it is planning to spend \$50,000 for improvements to its line in Westfield this summer.

**Kansas City, Lawrence & Topeka Electric Railway, Kansas City, Mo.**—This company is reported to have awarded a contract to the Guilford Company, Kansas City, Mo., for building 6 miles of track from the present terminal at Shawnee, Kan., southwest to Zarah.

**Gallatin Valley Electric Railway, Bozeman, Mont.**—This company states it will extend its railway 27 miles from Bozeman Hot Springs to Three Forks this summer. The contract for grading has been awarded, and it is planned to have the new line in operation by Oct. 1. It will connect with the Northern Pacific Railroad at Bozeman. [E. R. J., Nov. 6, '09.]

**Utica & Mohawk Valley Railway, Utica, N. Y.**—It is stated that this company plans to build a 6-mile extension up the Sauquoit Valley.

**Ashtabula (Ohio) Electric Street Railway.**—This company advises that it will commence construction about April 20 on its proposed 6-mile railway over principal streets in Ashtabula to Ashtabula Harbor. It will connect with lines to Cleveland, Conneaut and Jefferson. The company is not yet ready for bids for its power plant or car house. The power station will be located on Lake Street. It will operate eight cars and will run to Harmon and Woodland Beach Parks. Capital stock authorized, \$250,000. Officers: A. F. De Mayo, president; Charles J. Starkey, vice-president; Charles Wallin, treasurer; H. B. Stout, general manager, and Chapin & Bryson, engineers, all of Ashtabula. Headquarters, Haskell Building, Ashtabula. [E. R. J., April 2, '10.]

**Eastern Oklahoma Traction Company, Muskogee, Okla.**—This company announces that at present it is planning to build only about 84 miles of its proposed 251-mile electric railway, namely, from Muskogee to Sapulpa, and from Muskogee to Wagoner. Three bridges will be required; two will be built over the Arkansas River, one 3 miles southwest of Muskogee and the other 2 miles south of Tulsa. The third bridge will be built over the Verdigris River, 8 miles north of Muskogee. At a recent election the following officers were elected: H. B. Spaulding, president; J. W. Mattox, vice-president; J. F. Furry, secretary, and Guy Bowman, treasurer. [E. R. J., March 19, '10.]

**Niagara Traction Railway, Niagara Falls, Ont.**—This company states that it will commence construction within a year on its proposed 7-mile railway from Queensboro, Ont., to Niagara-on-the-Lake. The company is planning to install either gasoline or storage battery cars. E. Garrett, general manager. [E. R. J., March 5, '10.]

**Huntingdon, Lewistown & Juniata Valley Traction Company, Huntingdon, Pa.**—This company has opened offices in Huntingdon and preliminary steps are being taken to soon begin construction of its proposed electric railway which will run from Huntingdon to Mill Creek, at which point one branch will go to Mt. Union and another to Lewistown via Belleville, Reedsville and Burnham. Rights of way have been obtained on the main line as far as Union Mills. Capital stock, \$1,500,000. Officers: R. W. Jacobs, Huntingdon, president; Samuel Watts, Belleville, vice-president; John M. Starr, Huntingdon, secretary and treasurer, and J. Murray Africa and L. P. McDonough, engineers. [E. R. J., March 26, '10.]

**Philadelphia (Pa.) Rapid Transit.**—This company is making arrangements to extend its Elmwood Avenue line to Essington.

**\*Grand Belt Interurban Railway, Gallatin, Tenn.**—The Gallatin & Suburban Railway has amended its charter, to build an interurban railway from Gallatin to Nashville, and has changed its name to the Grand Belt Interurban Railway. C. H. Fidler, Gallatin, Tenn., is the promoter.

**Tennessee Traction Company, Memphis, Tenn.**—This company has obtained most of the right of way and is surveying the route of its proposed 210-mile railway from Memphis to Jackson. George E. Busnell, Memphis, general manager.

**Galveston-Houston Electric Railway, Galveston, Tex.**—This company has awarded the following contracts: To the North American Dredging Company, San Francisco, for building 2½ miles of roadbed on Galveston Island; to the Louisiana Red Cypress Lumber Company, Harvey, La., for 100,000 cypress ties; to Pickering & Company, Barnham, La., for 20,000 heart pine ties. These are to be chemically treated and delivered immediately; the right of way grading contract was let to J. C. Kelso, Galveston, and is for a distance of 16 miles, from City Junction to Clear Creek. [E. R. J., March 19, '10.]

**Eastern Texas Traction Company, Greenville, Tex.**—This company, which was recently incorporated, advises that it will commence construction in about six months on its electric railway from Greenville to Wolfe City, Honey Grove, Paris and Dallas. Rights of way are now being secured. It has also authority to furnish power for lighting.

Officers: S. B. Perkins, Greenville, president; J. H. Blocker, Wolfe City, vice-president; Joseph F. Nichols, Greenville, secretary; R. W. White, Greenville, treasurer, and J. B. Murphy, Greenville, general manager. [E. R. J., March 26, '10.]

**Bluestone Traction Company, Bluefield, W. Va.**—It is stated that this company plans to build an extension between Bluefield and Graham.

#### SHOPS AND BUILDINGS

**Riverside & Arlington Railway, Riverside, Cal.**—This company is reported to be planning to build a new car house in Riverside.

**Shore Line Electric Railway, New Haven, Conn.**—This company has almost completed its car house located near Saybrook Junction. The building is 24 ft. high and has a floor space of 13,760 ft. The side walls are of hollow concrete blocks and the roof is of reinforced concrete. Half the space will be used as a machine shop and the rest will be used for storage and for a substation.

**Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.**—This company has awarded to M. F. Reisener, Indianapolis, the contract for building its new car shops at Greenfield. Work has been started.

**Irwin-Herminie Traction Company, Irwin, Pa.**—This company has about completed its car house in Irwin. It is built of brick, 35 ft. x 135 ft., and two stories high. The upper floors will be used for offices and storerooms and the basement as a machine shop.

**Conestoga Traction Company, Lancaster, Pa.**—This company has awarded the contract to Herman Wohlsen for the erection of an office building in Lancaster. The structure will be of brick, 50 ft. x 80 ft. in size and three stories high. The contract calls for its completion by June 1. The old car house on North Queen Street will be used as a repair shop.

#### POWER HOUSES AND SUBSTATIONS

**Colorado Railway, Light & Power Company, Trinidad, Col.**—This company has purchased a 4000-kw turbo-generator from the Westinghouse Electric & Manufacturing Company for installation in its new power house in Columbus. This is in addition to a 2000-kw unit to be delivered in April.

**Rome (Ga.) Railway & Light Company.**—This company will place orders during the next two weeks for about \$30,000 of station equipment, including a 500-kw turbine, a 250-hp boiler, a 300-kw rotary converter and other small station machinery.

**Quincy Horse Railway & Carrying Company, Quincy, Ill.**—This company states it expects to soon purchase a 1000-kw generator, and erect a new steel stack and a condensing plant. It has purchased recently a 1500-hp cross compound condensing engine and an additional 316-hp boiler. W. A. Martin, purchasing agent.

**Boston (Mass.) Elevated Railway.**—This company has purchased a site for the erection of a new power house to take the place of the one on Albany Street, which was recently destroyed by fire.

**Western Massachusetts Street Railway, Westfield, Mass.**—This company has completed plans for an addition to its power house in Westfield. It expects to install another engine, generator and new boilers. L. S. Storrs, Springfield, president.

**Worcester Consolidated Street Railway Company, Worcester, Mass.**—This company has planned to spend \$10,000 in temporary repairs on its Tremont Street power house in Worcester. New machinery will be installed. H. C. Page, Worcester, general manager.

**Sunbury & Selinsgrove Street Railway, Sunbury, Pa.**—This company, which in the past has purchased its power from the Middlecreek Electric Light Company, has decided to erect a power plant at Rolling Green. The structure will be 40 ft. x 84 ft. It will be equipped with three 100-hp boilers, two feed pumps, one closed feed-water heater, two Corliss engines and two d. c. generators. It is expected to have the new plant in operation by the time the park opens in the spring.

# Manufactures & Supplies

## ROLLING STOCK

**Boston & Worcester Street Railway, Boston, Mass.,** contemplates buying five cars in the near future.

**Mill Mountain Incline Railway, Roanoke, Va.,** has ordered two cars for its incline railway from The J. G. Brill Company.

**La Crosse (Wis.) City Railway** has ordered two double-truck cars, with 25-ft. bodies from the American Car Company.

**Colorado Railway, Light & Power Company, Trinidad, Colo.,** expects to buy a number of fenders within a few weeks.

**Union Electric Company, Dubuque, Iowa,** has placed an order for trucks with the Taylor Electric Truck Company, Troy, N. Y.

**Springfield (Mo.) Traction Company** has placed an order with the American Car Company for four single-truck closed cars.

**Vancouver (Wash.) Traction Company** has contracted for one 28-ft. semi-convertible car body with the American Car Company.

**Oakwood Street Railway, Dayton, Ohio,** has placed an order for two cars with the McGuire-Cummings Manufacturing Company, Chicago.

**Cincinnati (Ohio) Traction Company** has placed an order with Wonham, Sanger & Bates, New York, for 18 dump cars for grading purposes.

**Lexington (Ky.) Railways** has purchased one 21-ft. 8-in. semi-convertible car mounted on a Brill No. 21-E truck from The J. G. Brill Company.

**Bluffton, Geneva & Celina Traction Company, Bluffton, Ind.,** has contracted with the Jewett Car Company, Newark, Ohio, for one large interurban car.

**City & Suburban Railway, Brunswick, Ga.,** is having built by The J. G. Brill Company two 10-bench pay-as-you-enter cars to be mounted on Brill No. 39 trucks.

**Omaha & Council Bluffs Street Railway, Omaha, Neb.,** has placed an order with the American Car Company for 25 cars, all to be mounted on Brill No. 39-E trucks.

**Rhode Island Company, Providence, R. I.,** is having 50 closed cars built by the Osgood-Bradley Car Company, Worcester, Mass., in addition to the open cars recently ordered.

**Williamsport (Pa.) Passenger Railway,** reported in the ELECTRIC RAILWAY JOURNAL of April 2, 1910, to be in the market for two cars, it is learned, is not in the market at the present time.

**Columbus, Marion & Bucyrus Railway, Delaware, Ohio,** reported in the ELECTRIC RAILWAY JOURNAL of Feb. 12, 1910, as being in the market for two cars, has placed an order for two interurban cars with the Jewett Car Company, Newark, Ohio.

**Cumberland Railway, Carlisle, Pa.,** which was reported in the ELECTRIC RAILWAY JOURNAL of April 2, 1910, to have ordered three cars, has contracted with The J. G. Brill Company for but two cars of the combination baggage and passenger type.

**Quincy Horse Railway & Carrying Company, Quincy, Ill.,** mentioned in the ELECTRIC RAILWAY JOURNAL of Jan. 8, 1910, as expecting to be in the market for eight single-truck pay-as-you-enter cars complete, will soon place the order for this rolling stock.

**Lehigh Valley Transit Company, Allentown, Pa.,** reported in the ELECTRIC RAILWAY JOURNAL of March 26, 1910, as being in the market for 10 cars, has ordered 10 double-truck car bodies from The J. G. Brill Company, to be mounted on Brill No. 27-M.C.B. trucks.

**Alton, Jacksonville & Peoria Street Railway, Jerseyville, Ill.,** mentioned in the ELECTRIC RAILWAY JOURNAL of Dec. 4, 1909, as contemplating the purchase of four 52-ft. interurban cars, is reported to be planning the immediate purchase of this rolling stock.

**Northwestern Elevated Railroad, Chicago, Ill.,** is asking for bids on the 20 cars referred to in the ELECTRIC RAILWAY JOURNAL of March 26, 1910. These cars will be of a type to conform with the standard now in use on the company's lines, and will have a length over all of 47 ft. 5 in.

**Trenton (N. J.) Street Railway,** recently reported in the ELECTRIC RAILWAY JOURNAL to have ordered 10 closed pay-as-you-enter cars, has decided on the following details:

Seating capacity .....	40	Curtain material...	Pantasote
Weight with trucks...	25,000 lb.	Destination signs....	Hunter
Wheel base.....	4 ft. 6 in.	Fenders....	Philadelphia type
Length of body.....	28 ft.	Gongs.....	Dedenda
Length over vestibule....		Hand brakes .....	Peacock
.....	39 ft. 8 in.	Heaters.....	Consolidated
Length over all....	41 ft. 6 in.	Headlights .....	Neal
Body .....	wood	Journal boxes .....	Brill
Underframe .....	wood	Registers...International	R-7
Car trimmings.....	bronze	Step treads .....	Mason
Curtain fix....	Curtain S. Co.	Trucks.....	Brill 39-E

**Portland (Maine) Railroad,** reported in the ELECTRIC RAILWAY JOURNAL of Feb. 5, 1910, to have contracted with The J. G. Brill Company for three 28-ft. closed cars, has prepared the following specifications for the new rolling stock:

Seating capacity .....	40	Gears and pinions..solid	gears
Weight with trucks..	24,500 lb.	Gongs .....	Dedenda
Wheel base.....	4 ft. 6 in.	Headlights .....	two; Neal
Length of body.....	28 ft.	Journal boxes.....	Brill
Length over vestibule...	37 ft. 5 in.	Motors .....	four, GE-80
Body .....	wood	Registers .....	International
Underframe .....	wood	Roofs.....	monitor deck
Brakeshoes ..	Am. St. & Int.	Sanders .....	Dumpit
Std.		Sash fixtures.....	Brill
Car trimmings.....	bronze	Springs .....	Brill
Couplers .....	Hovey	Steps ..wood, with	Universal
Curtain fix....	Curtain S. Co.	treads.	
Curtain material..	Pantasote	Trucks.....	Brill 27 GE-1

The company also ordered two 12-bench open cars from The J. G. Brill Company. The equipment is the same as on the closed cars, except as follows:

Seating capacity .....	60	Headlights..	Boston Brass Co.
Weight with trucks...	22,000 lb.	Motors.....	two GE-80
Length over all.....	34 ft.	Trucks.....	Brill 39-E
Curtain material..	striped duck		

## TRADE NOTES

**Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.,** has moved its San Francisco office from 425 Market Street to Second Avenue and National Square.

**Goldschmidt Thermit Company, New York, N. Y.,** has obtained the services of William C. Kuntz, sales agent of the Pennsylvania Steel Company, Steelton, Pa., commencing May 1.

**O. M. Edwards Company, Syracuse, N. Y.,** announces that T. P. O'Brien has become connected with its sales department with headquarters at 3099 Broadway, New York City.

**General Railway Signal Company, Rochester, N. Y.,** has secured the services of G. H. Groce, formerly assistant general manager of the Illinois Central Railroad and Indianapolis Southern Railroad.

**Western Electric Company, New York, N. Y.,** has appointed F. X. Cleary advertising manager. Mr. Cleary for the past 20 years has been associated with the Western Electric Company in various offices.

**Lackawanna Steel Company, New York, N. Y.,** has appointed Charles R. Robinson general sales agent to succeed H. Sanborn Smith, who resigned on April 1 in order to devote his time to personal interests.

**American Creosoting Company, Chicago, Ill.,** has elected H. A. Davidson vice-president in charge of sales in the Southwest. Mr. Davidson until November, 1909, was president of the St. Louis & San Francisco Railroad.

**Baldwin Locomotive Works, Philadelphia, Pa.,** advises that R. P. C. Sanderson, formerly superintendent of motive power of the Virginian Railway, has been appointed general superintendent of its new works at Eddystone, Pa.

**Evans, Admiral & Company, New York, N. Y.,** announce that they have engaged F. H. Stevens, formerly central station heating engineer for the American District Steam

Company, as representative of their department of central station heating.

**Northern Engineering Works, Detroit, Mich.**, are increasing the capacity of their plant, by installing new tools and machinery consisting largely of lathes, gear cutters and milling machines. The works report the receipt of many orders, particularly for their standard electric traveling cranes.

**Burton Tracklaying Machine Company, Salt Lake City, Utah**, has been incorporated in Utah with a capital of \$300,000 to manufacture a tracklaying machine patented by Charles W. Burton. The officers are Charles W. Burton, president; H. Borman, vice-president and treasurer, and S. H. Lynch, secretary.

**Idealo Company, 321 The Bourse, Philadelphia, Pa.**, will furnish a sample of its Idealo car cleaner free, express prepaid, to electric railways to prove its claim that the cleaner is free from alkali, acid, grit and water, and will not injure varnish. Idealo is in paste form and there is no loss from drippings. The claim is also made for the cleaner that it is exceptionally efficient because it is a perfect emulsion.

**C. T. Alden, New York, N. Y.**, has become interested in J. B. Taylor & Company, Inc., Hudson Terminal Building, New York, N. Y., and has been elected to the position of general manager and chief engineer of the company. It is understood that under the management of Mr. Alden the business of the company will be enlarged and extended to include the organization, construction and financing of electric and steam railways, gas and waterpower installations and irrigation projects.

**H. M. Byllesby & Company, Chicago, Ill.**, owing to its rapid growth and the constantly increasing number of cities and towns in which it owns, operates and manages utility properties, has opened a department of publicity. The new department will handle both the commercial and educational advertising of the organization, and will be in charge of William H. Hodge. Mr. Hodge formerly was managing editor of the monthly magazine, *Public Service*, and is a specialist in publicity work for utility companies.

**Electric Service Supplies Company, Philadelphia, Pa.**, has secured Fred T. Murphy as salesman in its New York office. Mr. Murphy has had eight years' experience in the electric railway field, having been associated with the National Brake & Electric Company, the General Electric Company and the Merchants' Power Company, of Memphis, Tenn. At present he is taking a trip to the factories of the various companies whose products the Electric Service Supplies Company handles in order to familiarize himself thoroughly with the line.

**McKeen Motor Car Company, Omaha, Neb.**, has received an order from the Charles City & Western Railroad, Charles City, Ia., for a 55-ft. car and from the Woodstock-Sycamore Traction Company, Chicago, Ill., for a similar car. The company has also received the following orders for 70-ft. cars: Minnesota Central Railroad, one car; Rock Island Lines, two cars; Santa Fe Railroad, three cars. Orders have already been received by the company for 32 cars. Two more 70-ft. cars have been delivered to the St. Joseph & Grand Island Railway at St. Joseph, Mo., making a total of five 70-ft. cars in service on that line.

**Dorner Railway Equipment Company, Chicago, Ill.**, has received orders for second-hand rolling stock and equipment as follows: Indiana Union Traction Company, one 20-ft. motor car, two 40-ft. 6-in. motor cars mounted on McGuire No. 39-A trucks, and equipped with G. E. 1200 motors, three open trailers and one closed trail car; Grand Forks Street Railway, one 20-ft. 6-in. motor car, to be mounted on Brill 21-E trucks and equipped with G. E. 1000 motors; Mexico, Santa Fé & Perry Traction Company, two 20-ft. 6-in. motor cars, to be mounted on Brill 21-E trucks and equipped with G. E. 1000 motors; Buckeye Manufacturing Company, one motor car, to be mounted on Brill 21-E trucks and to be equipped with gasoline motors.

**Crocker-Wheeler Company, Ampere, N. J.**, announces the receipt of the following orders for direct current apparatus: One 200-kw engine-type generator, to Lake Copper Company, of Michigan; two 200-kw engine-type generators, to the Watt Mining Car Wheel Company, of Ohio; one 200-kw

engine type, to the Pittsburg-Belmont Coal Company, of Ohio; one 250-kw engine-type generator, to the Pope Tin Plate Company, Steubenville, Ohio; one 250-kw generator, to the Ames Iron Works, of Pennsylvania; one 500-kw engine-type generator, to the Youngstown Iron & Steel Roofing Company, of Ohio; one 100-hp motor, to John A. Roebing Sons' Company, Trenton, N. J., and two 500-kw motor generator sets, to the Carnegie Steel Company, Pittsburgh, Pa.

**Allis-Chalmers Company, Milwaukee, Wis.**, reports that the full capacity of its gas engine shop is required for gas engines alone. Some of the recent sales are two 18-in. x 24-in. engines with generators to the Ware County (Ga.) Light & Power Company; one 18-in. x 24-in. engine and generator to the American Car & Foundry Company, Huntington, W. Va.; three 24-in. x 36-in. engines and generators to the Alpha Portland Cement Company, Alsens, N. Y., and three 18-in. x 24-in. engines and generators to the Guanica Centrale Company, Porto Rico. The company calls attention to a recent decision of the United States Supreme Court refusing to grant a writ of certiorari to review a decision rendered by the Circuit Court of Appeals of the Seventh Circuit in the case of the General Electric Company versus the Richmond Street & Interurban Railway for alleged infringement of reissue patent No. 12241, on electric railway controllers. The court held that the claims of the reissue patent were broader than those of the original patent. The case was defended for the railway company by the Allis-Chalmers Company.

#### ADVERTISING LITERATURE

**W. N. Matthews & Brother, St. Louis, Mo.**, are mailing a card calling attention to their easy lamp changers.

**C. W. Hunt Company, New York, N. Y.**, has issued an 80-page booklet in which the Hunt industrial railway system is described and illustrated.

**Electric Storage Battery Company, Philadelphia, Pa.**, in Bulletin No. 121 describes the installation of the chloride accumulator in the mills of the Indiana Steel Company at Gary, Ind.

**General Fire Extinguisher Company, Providence, R. I.**, in the March issue of the Automatic Sprinkler Bulletin, prints a complete description of its plant at Auburn, R. I. Several views accompany the article. Other articles are "History and Application of Automobile Sprinklers," by W. A. Neracher, and "Annual Convention of Superintendents and Engineers."

**Western Electric Company, New York, N. Y.**, has recently issued Bulletin No. 5132-I, describing its type EC belt-driven Hawthorn generators. A complete description of the construction and operation of its generators is given, with illustrations of the different types. Considerable space is given to a description of the individual parts of these generators. Another bulletin, No. 5360, issued by the company is descriptive of its Hawthorn small power motors. These motors are built on a full line of ratings, ranging in capacities from 1/30 to 1/4 hp.

**Joseph T. Ryerson & Son, Chicago, Ill.**, have issued an 80-page catalog which deals with the invention, function properties, manufacture, and application of glyco metal and contains data on the performance of glyco metal in practice and tests. A supplement to the catalog contains useful information and rules for uses of bearing metal. Another booklet, No. 10, on tool steel, issued by the company, contains a complete description of the various lines of high speed and carbon tool steels manufactured by the company, and directions for treating to insure the best results. Numerous tables for users of tool steel are also published.

**General Electric Company, Schenectady, N. Y.**, in Bulletin No. 4721, describes and illustrates the Thomson direct-current watt-hour meters, type C-6, C-7 and C-Q, which are so constructed as to be easily and quickly installed and sealed. They are made for 2 or 3-wire service, 100 to 120, 200 to 240 and 500 to 600 volts. In Bulletin No. 4720 the company describes its steam and air-flow meters. The following are the titles of several other bulletins issued by the company: "No. 4716, Thomson Watthour Meters, with Prepayment Attachments"; "No. 4722, Electric Drive and Cement Plants"; "No. 4717, G.-I. Flame Arc Lamps" and "No. 4719, Fan Motors."