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NEW YORK, SATURDAY, NOVEMBER 5, 1910.

CONTENTS.

Surface Contact Systems Abroad

For the past three or four months the English electrical papers have been chronicling different stages in the efforts of one of the few tramway companies in England using the surface contact system to get rid of it and to adopt the overhead trolley in its place. Our readers will not be surprised to hear that inefficiency in operation and danger to passers-by were the charges brought against the prisoner at the bar, who is an old offender. The reports of the trial, with the complaints on the one side of dead studs which should be alive and of live studs which should be dead, and on the other side of the objectionable appearance of the overhead system, take one back to the middle ages of electric railroading. The plea of the city that the surface contact system should receive another chance and that "the company alter its studs in accordance with the advice of our experts" was met by the reply that the company had already spent thousands of pounds in attempting to make the system a success and that it now considered itself entitled to relief. It is gratifying to find that the arbitrator appointed by the Board of Trade to hear the testimony gave an award promptly in favor of the company.

Extra Fares in the Pennsylvania Tunnel

The principle of making passengers pay for expensive improvements which they enjoy is strikingly exemplified in the new rates announced by the Pennsylvania Railroad for suburban tickets to be used via the new tube to the station at Seventh Avenue and Thirty-third Street, New York. For tickets from Newark to New York by this route a charge of 12 cents will be imposed in addition to the regular fare, and for the stations beyond Newark but within the suburban district the supercharge will be about 10 cents per trip. Six dollars additional will be charged for 60-trip monthly commutation tickets from suburban stations and $5 additional for 50-trip family tickets. Undoubtedly these fares are based on the calculated pro rata cost per passenger using the new station. While the increase is large on the mileage basis, the time saved by the new route, as compared with the ferry or Hudson tube route, is considerable, and many persons will undoubtedly be glad to pay higher fare. The principle of making each part of the traffic bear its proportion of the cost of operation and of increasing fares where the service given warrants an additional charge could well be copied by many electric railways. Only very unusual circumstances should warrant any road in continuing to carry passengers below cost, or at cost. The difficulties in increasing fares on city railways are undoubtedly much greater than on steam or interurban railways, but with a public sentiment educated to the idea of higher railroad rates through steam railroad example, there should be less difficulty than there has ever been before.

Selection of Transportation Employees

There are almost as many theories as to the class of men who make good platform employees as there are in regard to the cause of rail corrugation. Some of these opinions were expressed during the discussion of the report on the training of transportation employees at the Atlantic City convention, but interviews on the subject with representative managers would disclose a very much larger number of theories. Some railway companies will not hire men who have previously been engaged in steam railroad work, while others decline to accept any other class of employees. Some companies draw the line at a man who has had an accident on another road, whereas their neighbors often believe that a man who has had an accident is more careful and makes a better employee than before. Still other companies prefer men from the country, while on other lines the question of city or country residence has nothing to do with the question of engagement. After all, the principal point is whether the man who enters the service will conform to the rules and discipline of the company cheerfully and faithfully. If his past experience will help him to do this, he is so much the better off, but whether it does or not, if he is always ready to do not only his duty, but more than his duty if the interests of his employers demand it, he should have no difficulty in remaining in their service and winning their respect. There is no doubt that greater attention is being given to the selection and training of employees at present than ever before and that there is a constant tendency toward their more rigorous training. Railway companies are being held to a closer accountability by the courts than in the past for the proper and safe operation of the cars, and the position of the trainman is increasing in responsibility. This fact requires a higher standard of men and of itself should tend to cause them to join the service.

Minor Economies in the Car House

Systematic work in the car house brings as large a reward in proportion to the size of the plant as in the repair shop itself. Labor cost is the striking item of expense in car house operation, and it pays to eliminate every possible waste of time in handling cars at such points, since the mileage is entirely unproductive. Such a simple thing as maintaining spare fuses on transfer tables is a time-saving plan all out of proportion to its cost, especially when a table is shut down during the rush hours. Improved lighting of track switches in important yards is another essential, and the maintenance of first-class overhead work on the short curves and frequent intersections or crossings of tracks is worth a great deal where work is handled under pressure. It is a mistake to assume that cast-off main line overhead material can be advantageously worked to its limit on car house property. The concentration of car movements in modern houses and yards calls for the best standards of design and construction throughout the entire physical plant. There are many small economies possible also in the dealings of scattered car houses with the main repair shop. It is surprising how much material improperly labeled or not tagged in any way whatever will find its way from car houses into the shops. On a large system the practice of relying upon the telephone instead of the tag when repairs are in order leads to the postponement of work often sorely needed, delays in returning finished repairs, and frequently to the going astray of parts and the uneven stocking or over-stocking of sub-storage rooms. Another source of trouble is the return of scrap in a form which makes its subdivision and sale unprofitable. A worn-out brake shoe hanger and malleable iron head sent in bolted together means that some one with tools must be at the scrap pile to effect a separation, or else that the material must be junked at the lowest price. The separation of bins for steel turnings, sheet-steel scraps, iron-pipe scraps, cast-steel scraps, brake shoes, light iron and steel, malleable and cast-iron scraps enables higher prices to be obtained than are given for miscellaneous junk, and on a large system means a gain of considerable money yearly. The cost of erecting bins for storing this junk, suitably marked and located alongside tracks for economical gravity delivery, is little in proportion to the benefits of such a plan.

"THE PUBLIC SIDE OF STREET RAILROADING"

It has been many a day since anything has come from the lips of a railway man which is so important, so encouraging or so significant as the address delivered at the recent Atlantic City convention by Mr. Calhoun, of San Francisco. We urge his contemporaries in the transportation business to read it, to ponder it and to read it again. We hope that the politicians in the cities and that the users of street railways all over the country will read it and have a new conception of the aims and purposes of railway managers.

It would be folly to ignore the fact that public utility corporations have suffered like other large corporations and interests from the venal politician, and in some cases have succumbed to him. But it does not follow that all corporations have done so. Nor does it follow, even in the cases where corruption is known to have existed, that the individual officials charged with the responsibility are alone guilty. More than that; it does not follow that their personal guilt is at all what the public has been led to believe. The controlling motive of railway managers is that of wanting to do right. To quote Mr. Calhoun:

"There is not an intelligent street railway manager in the country who does not desire to keep his corporation per se out of politics. No class of men is more opposed to corrupt alliances between corporations and politicians; no men more earnestly favor the overthrow of the boss system in party management; no men more sincerely desire non-partisan discussion and non-partisan action in regard to the serious business problems involved in city transportation; no men are better equipped to help the people arrive at correct conclusions on this subject; no men have greater selfish interests or broader patriotic motives in seeking the proper solutions of the problems; no men will unite more cordially with their fellow-citizens in an effort to better conditions, materially and morally. They believe earnestly that the railroad companies and the problems involved in their operation should not be made the targets of political attacks, but should be left unmolested, subject to public, non-partisan control, to carry on their business."

Furthermore, many of the corporation managers who have been held up to public scorn, and who by the man in the street are looked upon as ferocious horned beasts, are known by their intimates to be upright citizens. In numerous instances they pursued devious paths under a mistaken sense of loyalty to the

interests confided to their care; under the tremendous pressure of dire consequences that threatened if they held to the straight and narrow path of business and political rectitude. As individuals these men, as a rule, gained nothing by the conduct for which they are now condemned. They did not act merely as individuals. They were acting for the corporations by which they were employed and they were actuated by a code of ethics now happily passing away never to return.

To the extent that the people as a whole elect and retain in public office men who have received or solicited bribes and contributions from corporations, to just that extent the nation as a whole is guilty under the indictment which is now so widely brought. It is well for men to remember that while guilt is individual and personal the responsibility for that guilt may be widespread in the final analysis.

We would not be understood as condoning crookedness or immorality in any form on the part of either individuals or corporations. We are merely stating certain facts which undoubtedly exist and which it may be well for those who are disposed to "throw the first stone" to take into account.

There are several reasons why it is not good policy for corporations to indulge in irregular political practices. One reason is that corruption, like murder, "will out," and when it is out it emits a nasty odor. The man or the party that accepts money for a specific job will not "stay bought." A political bribe taker is of necessity a political striker. He is sure to come back for more, and some day when he fails to get what he wants he will "tell" or "squeal," which is usually embarrassing to somebody. Another reason is that it is unnecessary in the long run for corporations to pay money to get what they are justly entitled to and they should not try to get that to which they are not entitled. The real and final reason is that bribery and the purchase of political favors in any form are morally, legally and eternally wrong.

The opportunity of the corporations at the present juncture is great and their duty is clear. We are in the midst of a great moral awakening in this country. Out of it should come a purer political atmosphere and a higher regard for law. Out of a higher regard for law must come more equitable laws. As the corporation is a creature of the law, it is more dependent upon the just and impartial enforcement of the statutes than any class of citizens. It should, therefore, be the first strictly to observe the law. What can be clearer than that one of the chief attributes of a great business executive should be a high regard for public morality and the courage to stand for what is honest and right at all times? Financially and institutionally the future welfare of the large corporation, and especially of the public service corporation, will depend in no small measure upon the popular belief that the corporation is law-abiding and politically clean.

Again we quote Mr. Calhoun: "I advocate absolutely clean political methods—bold, fearless, courageous methods—and the establishment in every community by the men who manage corporations of a reputation for fearless political courage, until they secure a leadership in civic affairs recognized to be disinterested and for the public good. . . . A bold, frank, open, courageous course will give any man a standing, whether he is a corporate manager or whether he is not, in any American community. The people will listen to what he has to say if they believe truth and honesty are in his words."

THE BROOKLYN RAPID TRANSIT LINE DEPARTMENT

As this issue contains the last of the six articles on the Brooklyn Rapid Transit System's line department, it may be profitable to consider wherein the experiences of this organization could be applied to advantage elsewhere. It is true that many electric railways have special conditions which can be met only by unique solutions, but for all that there is too strong a feeling that most of the line problems of the large and small company are essentially different. In reality, such problems are likely to differ more in extent than in kind. Thus in a large city like Brooklyn several of the congested traffic sections may be over a mile long, whereas in scores of small cities the congested sections are confined to the tracks in the heart of the town. In both cases, however, there is the same problem of maintaining the reliability of the service under abnormal wheel wear. Why, then, should not the smaller companies take advantage of the remedies discovered and applied by the specialists of a large company? Thus, to answer the requirements of abnormal traffic, the Brooklyn Rapid Transit System has developed a complete system of bar-iron overhead conductors, including every accessory such as circuit-breakers, frogs, diagonals, ears and feed-in taps. So far as individual improvements are concerned, the use can be mentioned of copper-clad span wires in districts where steel rapidly corrodes from the presence of acid fumes; the installation of side-feeds which are not made to serve also as span wires; and the use of a long-life ear just as heavy but 5 in. shorter than the customary 15 in. design. These examples will serve to indicate that good mechanical and electrical practice may be just as applicable to 5 miles as to 500 miles of track.

The dependence of the line maintenance on the work of the way and rolling-stock departments is vividly brought out in Brooklyn by records like those relating to wire breakage and abnormal wire wear. If similar records were kept on other railways there would be fewer disputes as to whether an overhead breakdown was due to excessive trolley base tension, the absence of retrievers, a bad piece of track, or simply to failure of proper line inspection. It is hardly necessary to add that when the cause for trouble is known every dollar allowed for maintenance can be placed where it will do the most good.

On its own account the small company cannot undertake to prepare specifications for material, but it can learn much of value from those issued by a large company which operates under a great range of conditions. One important point about the Brooklyn specifications is the omission of such phrases as "——':" or "equal to." Instead there are specified exactly what qualities the material should have so that all bidders are placed on the same footing. The result has been that no one manufacturer's goods have been adopted throughout, although the patterns themselves may be exactly alike. It is worth noticing that an inspection organization is maintained to see that the requirements of the specifications are met. A small company, of course, could not afford to employ permanent inspectors, but it could take advantage of the service of independent testing laboratories from time to time.

There are several other features of this company's practice which commend themselves for imitation, but they need not be dwelt upon here, as they are described at length in the articles themselves.

IS IT A GAMBLE IN SUBWAYS?

Bids for the construction with municipal funds of certain sections of the proposed tri-borough subway, which is the distinctive feature of the rapid transit program of the New York Public Service Commission for the First District, have been opened with public formality. The project is one that will involve an expenditure of "more than $100,000,000" of the funds of the City of New York. How much more no one can state now. The rather indefinite mention by the commission of the large sum which will be required is evidence complete and final of the dimensions of the undertaking. If it will cost an unestimated amount over $100,000,000 for construction only, then the final expense plus the cost of equipment for operation will make the total necessary capital expenditure greatly in excess of the figures that are bandied about so freely. It is with no desire to exaggerate that we state that estimates for such a subway, equipped for operation, have run to $150,000,000 and even $200,000,000.

The only undertaking in New York to which it is possible to turn for comparison is the present subway system of the Interborough Rapid Transit Company—that is to say, the subway lines proper and the elevated extensions in the northern part of the city. This cost the City of New York for construction only in excess of $52,000,000. The additional cost for initial operation is understood to be represented by the $35,000,000 capital stock of the company. Later capital costs have raised the amount about $7,000,000 further. The total length of the present road is about 25 miles. The tri-borough system as projected covers 44 miles of road and is therefore, if carried out, to be 76 per cent greater in length than the existing road which is controlled by the Interborough company.

It may be well to refer incidentally to the history of the tri-borough project as given by the commission. An official statement says that six months after the commission began work it laid down the route for the Broadway-Lexington Avenue subway and "ordered its engineers to push work on the plans. Later this became the trunk line of the so-called tri-borough system. Two years have been spent in getting consents, complying with other legal formalities and perfecting the plans and forms of contract for this colossal work." The commission, therefore, claims the full responsibility for the conception. Its expenditures on this account have been considerable and explain what Chairman W. R. Willcox had in mind when he stated in reference to the criticism of Mr. Sprague and other engineers (published in the issue of the Electric Railway Journal for Oct. 22, 1910, page 878) that the commission was "committed" to the plan. Is it committed because (1) it has the well-founded opinion of competent and experienced men and is reasonably assured that its project will furnish marketable transportation facilities which will return fair interest on the investment, or because (2) it believes that the tri-borough system will be a great public benefit which the City of New York ought to father without respect to the consideration of whether or not the improvement will be self-supporting? If the new subway, when finally completed, is found to be operable from a strict business standpoint, of course, the means for its operation will be found in some way. But if it has to be operated, if at all, partly as a public benefit the city will have to contribute, of course, some part of the annual interest on the great cost of construction and equipment and the expenses.

Mayor Gaynor has shown that he is keenly alive to the fact that in its subway policy the City of New York has come to the parting of the ways. The question, in brief, is whether the city shall expend the funds available for rapid transit work in allowing the Interborough company to supplement its present system or shall construct a new system. If a new system is to be constructed, the question in the main is (1) whether it shall be so built as to be closely competitive with the present system and, from an engineering standpoint, inoperative in connection therewith, or (2) whether it shall meet the needs of certain important districts that are now without transit facilities, and, if necessary, be capable in the future of operation as part of the Interborough system. The city has indicated that it can appropriate for rapid transit purposes this year $60,000,000, and this sum would presumably be available for any approved plan.

In any consideration of the rapid transit situation the Interborough company occupies a position of peculiar advantage. Although the congestion in the subway at the height of the rush-hour periods makes travel therein almost intolerable, the operation of the property, when allowance is made for the fierce public demand upon its restricted facilities, is undeniably superb. When the commission entered office it found that as the Interborough Rapid Transit Company had first choice of routes, it had pre-empted the most valuable route for service of this character in the city. The investment in the present system was made at a time when, as compared with present conditions, prices of labor and materials were low. Rates of interest were also lower, and the company was allowed to use during construction the open-cut method, which greatly restricted the investment. If it were possible to say how much greater the cost of the present system would be if it had to be constructed in 1910 and ensuing years instead of in 1902-06 it would be feasible to estimate the extent of the handicap to the tri-borough system.

Notwithstanding the dominant position of the Interborough company, the commission could have proceeded, without dealing with that company, to develop much more conservative plans than those embraced in the monstrous tri-borough system. If it believed the wisest public policy forbade the construction of lines that would inevitably develop the present system further, it could have mapped out a subway to serve the lower West Side and the upper East Side of Manhattan and capable of operation either as an independent system or as a part of the existing system.

Time is an essential element in a gigantic work of construction, and its prodigal dissipation is a deplorable incident of the recent history of rapid transit progress in New York. Two years or more have been spent in preparations that are of such a nature that the commission regards itself as "committed" to the tri-borough plan. Three years and four months have passed since the commission came into existence. How many more years must elapse before additional important lines of subway will be opened for service? Of time, the commission has all that there is. Of money, a plentiful supply can presumably be provided upon the credit of the City of New York. But plenitude need not and should not lead to waste. Advance estimates of cost on large construction enterprises are frequently, if not usually, far below the final necessary expenditure. The com-

mission should show the same frankness in its estimates of cost that it demands from corporations subject to its jurisdiction.

The conservation of capital is as valuable a public service as the conservation of other resources. The net debt of New York City on April 1, 1910, was $781,000,000, and every thinking person will appreciate the alarming tendency of such debts to increase and the resultant heavy interest charge which must be offset by tax. It is almost an axiom that monopoly in local public utility service, with reasonable regulation, is better for the public than unrestricted competition, and the Commission of the First District has so held in a decision disapproving a proposed investment for a competitive electric lighting and power plant. Will the plan of the commission, daring in conception as it may be, block the economical and logical extension of the present subway system and fail dismally to produce with economy a wise public betterment in transit facilities that will be of real value to the developing city?

THE PEORIA ELECTROLYSIS DECISION

Electric railways have passed through two extended periods of litigation in their fight for the use of the streets. The first of these was with the telephone interests between 1888 and 1892. The second was with the water companies and has lasted some 15 years. The difficulty with the telephone companies arose through the cross induction caused by the railway circuits in the single-wire grounded circuits which were used in the early telephone installations. To overcome this trouble it was essential for one system to install a complete metallic circuit, and the telephone companies, being in possession of the field, thought that the obligation to do so lay upon the railway companies. But the courts held that the purpose for which the streets were primarily dedicated was that of transportation and not that of long-distance conversation and that the user who was there on sufferance could not impose conditions on one whose right to the streets was far greater.

The cost of adequately protecting the telephone wires against induction from the railway circuits was not serious, because the telephone companies soon found that a trunk return circuit would answer their purposes as well as a grounded circuit, but with the water companies a different condition arose. Here the electric railway company was charged with corrosion by electrolysis of underground water pipes and no such simple or cheap solution of the problem was apparent. It can fairly be admitted that many of the early railway return circuits were very inadequate. Large losses in transmission were looked upon with equanimity by railway managements, and undoubtedly in many cases the railway return current made wide excursions and took all sorts of paths to get back to the power station. As in the telephone litigation, the opponents of the electric railway saw no relief, or claimed to see no relief, except through the introduction of a double-trolley system. It was largely through fear of electrolysis that a double trolley was installed in Washington and Havana. The double trolley in Cincinnati, which is often mentioned in this connection, was installed originally with the purpose in view of avoiding telephone disturbance.

Litigation between the water companies and the single-trolley systems soon followed, but the fight raged most fiercely around Peoria, where in 1893 the railway company was charged with injuring the pipes of the water company. Finally in March, 1898, a suit was brought for an injunction against the electric road in Peoria to cease causing the alleged damage. From that date to Sept. 22, 1910, the case has been in the courts continually. In the meantime electric railways in other cities were charged with similar destruction, but by almost general consent Peoria was selected, like Waterloo, to be the decisive battle-ground for supremacy between two systems. The Peoria case went through two references, both by the same master, and in each case, after long and exhaustive hearings, the master recommended a double-trolley system for the railway company as the only solution of the difficulty.

The situation was complicated because laboratory experiments showed that under favorable conditions a fraction of a volt was sufficient to cause electrolysis. Hence the hasty assumption was reached that this slight difference in potential between the rails and the water pipes would cause electrolysis and that the extent of the electrolytic corrosion at any point was always proportional to the difference in potential. The fundamental error in this theory is that current, not potential, causes electrolysis, and this point is clearly brought out in Judge Sanborn's decision, which, we hope, will conclude the litigation between the owners of underground metallic structures and railway companies so far as electrolysis is concerned. In Judge Sanborn's decision, which we printed last week, the court shows that while the operations of the railway company have been constantly increasing during the past five years, there has been a progressively lessening average damage to the water pipes in Peoria, and that the modern methods of electric railway construction warrant the belief that with co-operation between the two interests there should be no difficulty in preventing practically all damage in the future. It also makes clear the important point that the court has no power to prescribe by injunction the use of any particular system. It might require a person or company to refrain from injuring another, but the means by which this should be done is a legislative question which the court has no power to decide. In other words, the court practically declared that all of the technical testimony presented by the experts during the trial was immaterial to its final conclusions.

During this contest the electric railway return circuit has been made the scapegoat for a great variety of corrosion in water systems. It was even gravely alleged in the early part of the Peoria case that electric railway return current had seriously injured the shell of a standpipe at a point several feet above the surface of the ground and some distance from the track. Other charges almost, if not quite, as absurd against the electric railway circuit were made in other cities, and we are glad to see under the sanction of a court ruling the expression of a more sane view in regard to this matter. The adoption of the cumbersome and insufficient double-trolley system was unthinkable and, besides, would not have given assurance that the damage would cease.

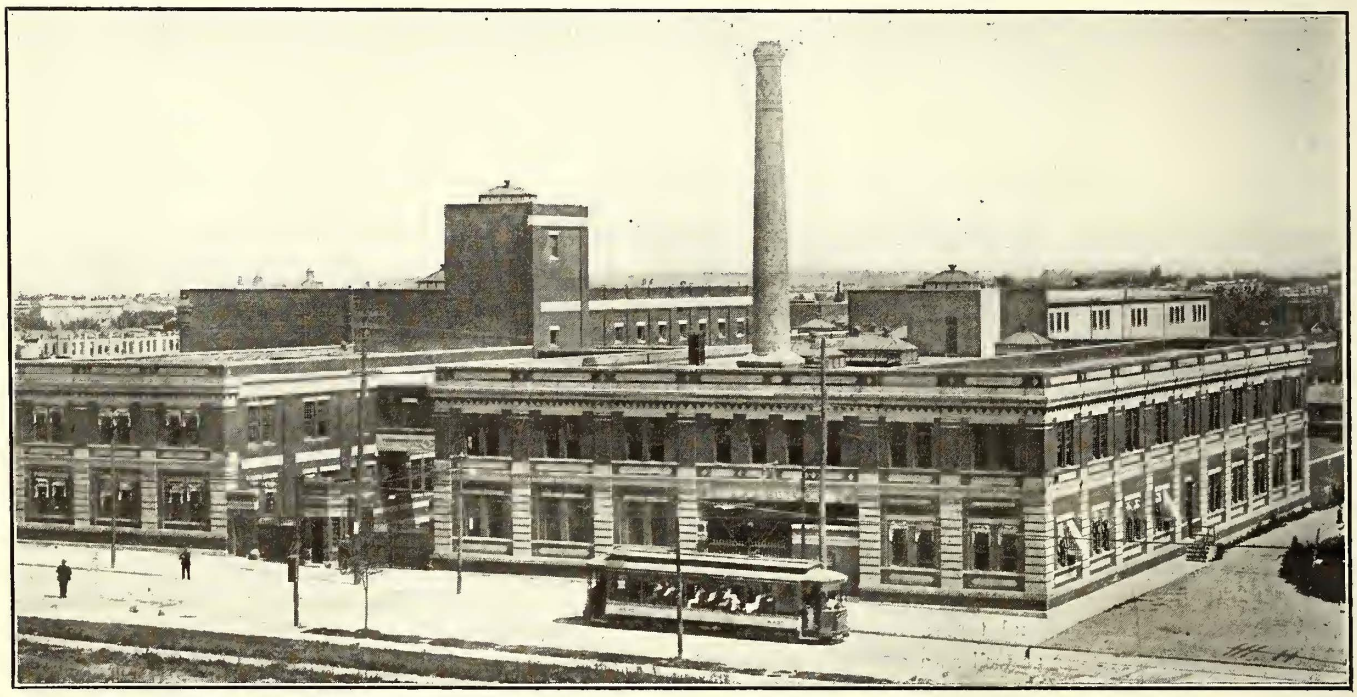
The immense advance in the development of rail bonds has done more than anything else to improve the situation. With good and adequate rail bonds and supplementary return very little else is needed on most systems, but if additional precautions are required, and their need can very easily be determined, there are ample remedies for the trouble which can be applied.

BROOKLYN LINE DEPARTMENT—MANUFACTURING FACILITIES, PURCHASING STANDARDS AND EXPERIMENTAL WORK

The preceding five articles* on the line department of the Brooklyn Rapid Transit system have described the wide variety of construction and maintenance carried on by this organization. The present article, which is the last in this series, will be devoted chiefly to matters dealing with line material manufacture, storage, purchasing and experimental work.

LOCATION OF SHOPS AND STOREROOMS

All of the manufacturing and storage facilities of the line department are located at the Nostrand Avenue headquarters, shown in the accompanying illustration. As this group of buildings was described at length in the Electric Railway Journal for Dec. 5, 19 and 26, 1908, it need only be mentioned here that the shops are located on the second floors of the central and right-hand buildings. Each division is in well-lighted rooms which are isolated from one another by brick walls having gravity fire-door openings, except that there is a wagon passage to the paint shop between the metalworking and woodworking shops. The storerooms for small line material are located on the second floor of the central building convenient to loading platforms and tracks on both sides. The accompanying illustration of the wider of the two track entrances shows several of the supply and service vehicles of the line department, as well as the wagon shelter under the stable of the first building. Heavy line material is stored in a steel-frame and corrugated-metal structure located in the rear of the central building. As shown in the illustration of the interior on page 500, this shed is provided with two galleries on each side. Reels of wire or other heavy articles intended for storage are delivered by cars which run around a loop at the rear and are distributed in numbered sections of the galleries by a 7½-ton Maris crane.



Brooklyn Line Department—Nostrand Avenue Headquarters of the Department, Including a Transfer Printing Plant on the Second Floor of the Front Part of the Building on the Left and Track Department Quarters on the First Floor of the Building on the Right

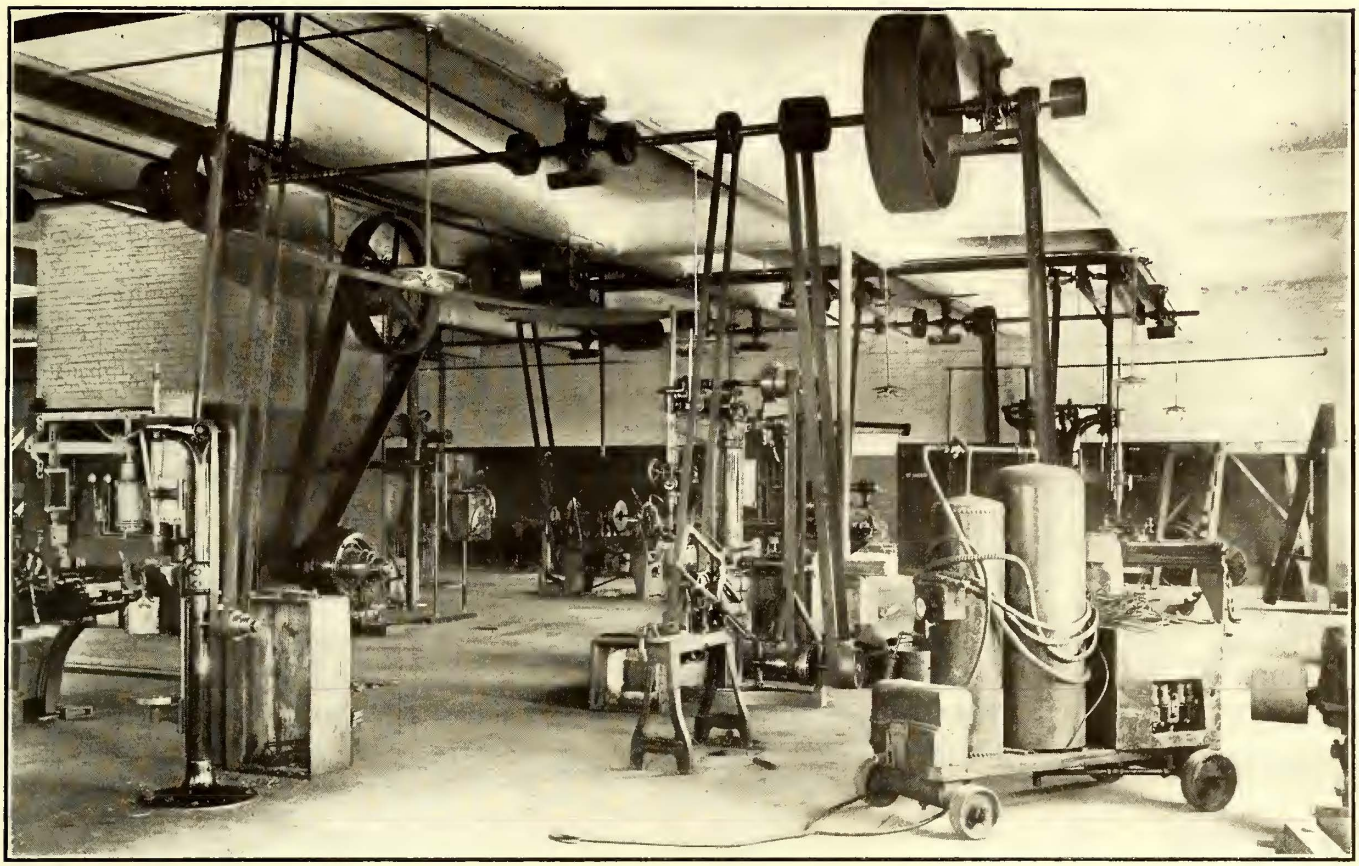
SCOPE OF THE SHOPS

The manufacturing and repair facilities comprise a metalworking shop with a horse-shoeing section, a mill-room, a painting shop and lamp repair quarters. These shops are under the general direction of the line department, but much work is done also for the track department, such as re-edging of picks, bars and chisels, the repairing of portable blacksmiths' wagons, track jacks, wheelbarrows, special compromise plates, switch tongues, etc. A limited amount of track work manufacture is also done here. Shop work requisitions sent in by the track department are accompanied by a tag and instructions which include the proper account number to which the job should be charged. These tags are delivered to the superintendent of the line department, who thereupon issues a shop order for the work. After the job is completed, a statement of the labor and material is forwarded to the track department for the latter's records.

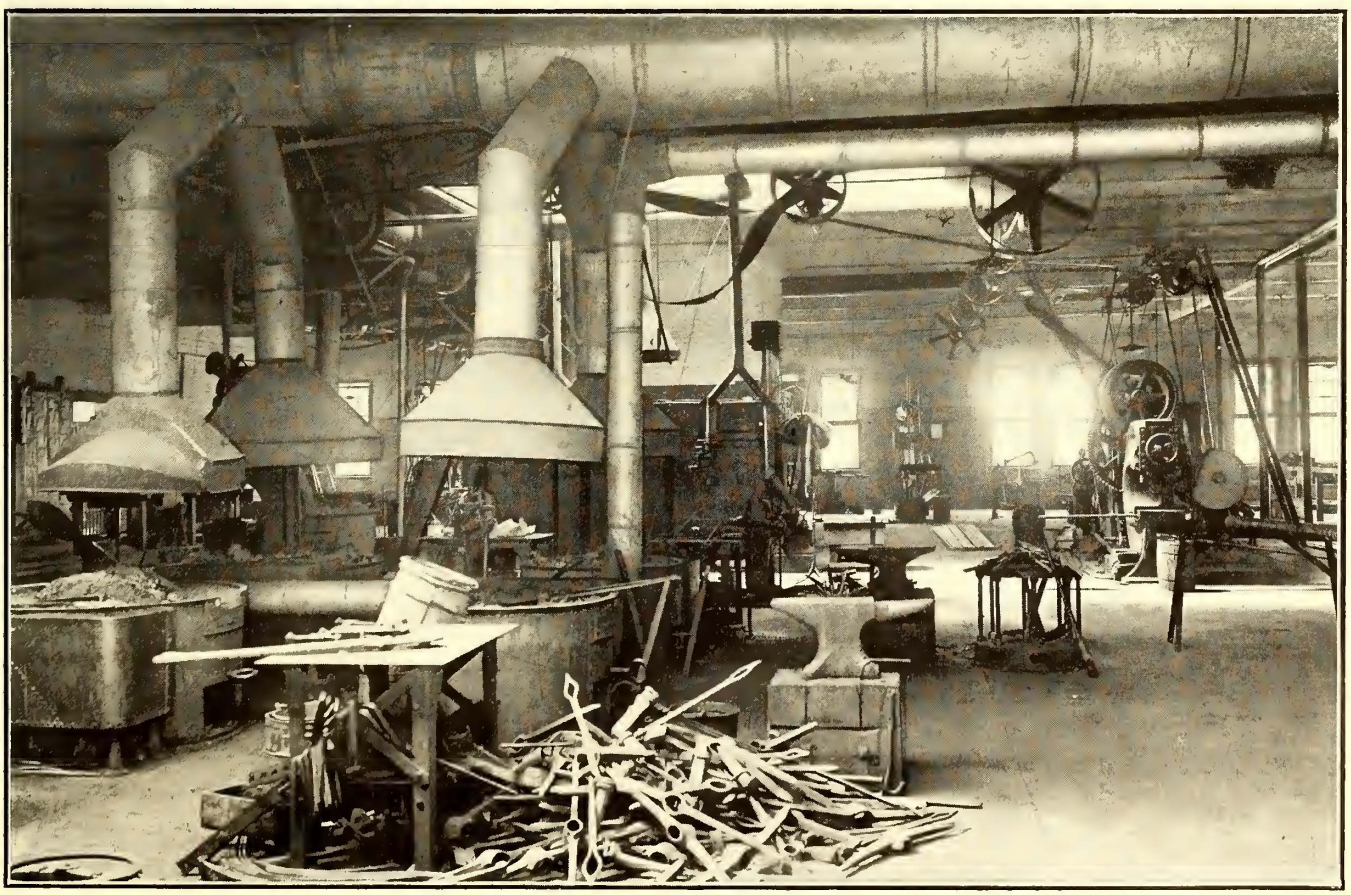
Much of the work done by the line department for its own purposes consists of repairs to the trucking equipment including automobile tower wagons. One blacksmith and helper are employed continuously on wagon repairs; a second blacksmith makes all the hangers used in supporting trough work, special pole supports, bar-iron frogs and other parts required in the bar-iron trolley construction. A third blacksmith who is on the payroll of the trucking department devotes all of his time to shoeing horses.

Views are presented on page 939 of equipments in the metalworking shop. One of the most important tools is a Williams-White double-end punch and shear, which is fitted with a set of dies for the mechanical slotting of the bar-iron conductors. Another large tool is the National "Hercules" hydraulic tire setter, which is illustrated on page 942. This machine permits tires to be set cold in 10 minutes. The company has found it to be very advantageous because the factor of time is so important in the maintenance of its many wagons. Third-rail anchors, compromise plates and other special forms are made by a Williams-White bulldozer, which is used in connection with a Rockwell oil furnace. The metalworking shop also contains eight Buffalo 4-ft. and 3-ft. forges, the blast for which is furnished by a 7-in. Buffalo blower, hung from the ceiling. A 70-in. fan draws the exhaust from each forge to a common header which discharges through a steel plate chimney. The view of the forge section on page 939 shows how effectively this exhaust system keeps the room free from smoke. The balance of the equipment in the metalworking shop comprises the following: One 125-hp Beaudry power hammer; one Le Blond plain miller for slotting and shaping; one Sebastian lathe; one drill press with 26-in. drill; one drill press with 6-in. drill; one sensitive drill; one pipe threader and pipe cutter; one bolt cutter; one Springfield double-wheel emery

*See Electric Railway Journal of June 11, June 18, July 23, Aug. 20 and Sept. 10, 1910.



Brooklyn Line Department—A Portion of the Metalworkin g Shop, with the Portable Compressor in the Foreground

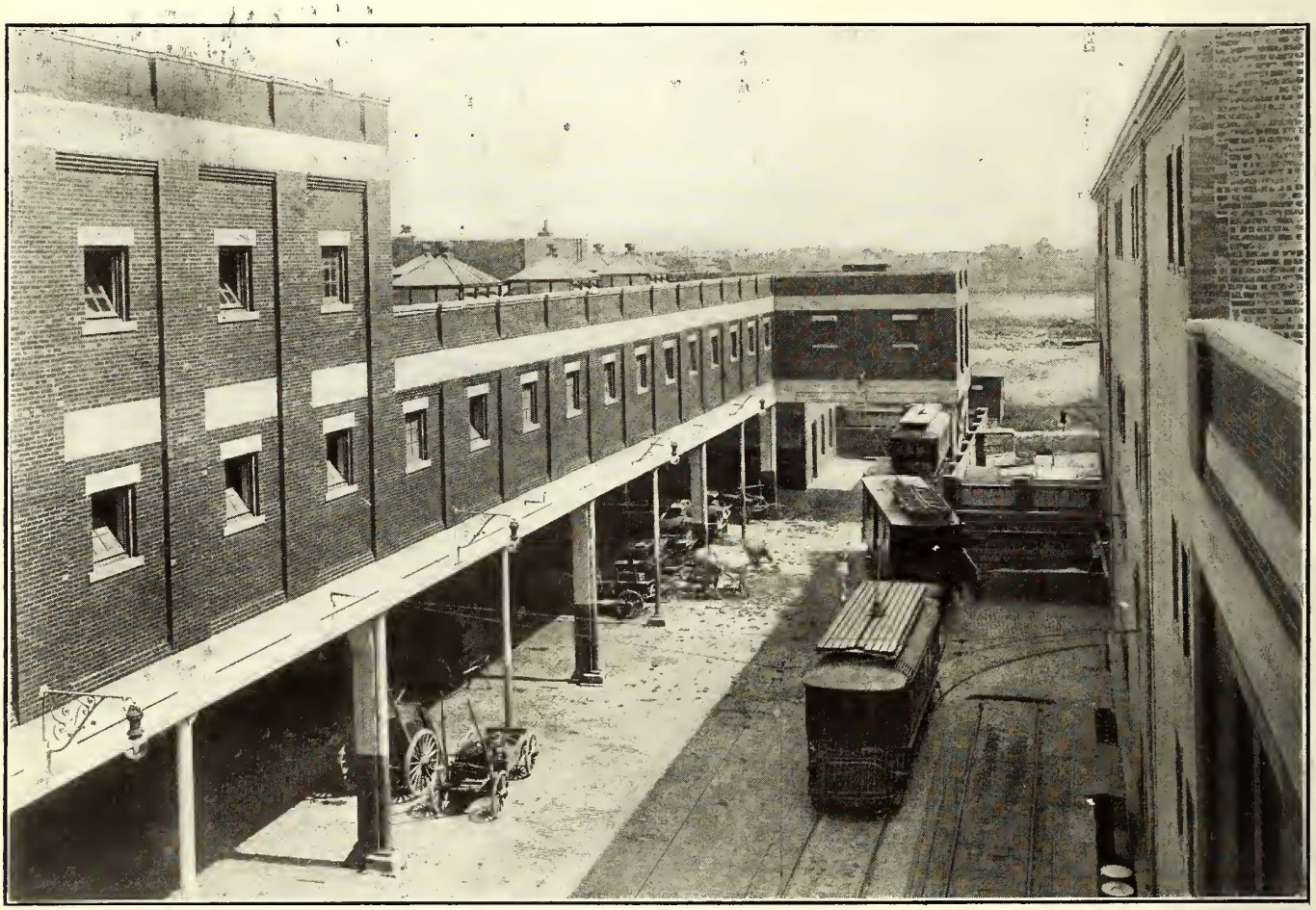


Brooklyn Line Department—The Forge Section of the Metalworking Shop, Showing the Exhaust Piping

grinder and one grindstone. All of the foregoing machinery is driven through line shafting from one 45-hp, 550-volt, constant-speed, compound-wound Northern motor, which is operated at 750 r.p.m.

The mill room employs three carpenters, two for wagon work and one for the construction of switch boxes, special forms of section insulators and miscellaneous work for the electrical engineer. The woodworking tools include one pattern lathe; one borer; one 20-in. planer; one 24-in. circular saw; one 30-in. band saw. All of these tools include one pattern line shafting by a 20-hp, shunt-wound Northern motor.

The paint and lamp shops are on the second floor of the right-hand building in the Nostrand Avenue group. They are separated from each other by a solid brick wall and from the other shops by gravity fire doors. The paint shop opens directly on a passage used to bring in wagons for general repairs and painting. The wagons are brought up to this level by an elevator in the first building and thence over a bridge to the second building. The paint shop is in charge of a foreman painter and helper, who do all the painting required on wagons, automobile bodies, switch boxes, illuminated letters on signs, etc. The lamp room is the headquarters of the lighting repair gang.



Brooklyn Line Department—A View of the Open Passageway Between the First and Second Buildings, Showing the Wagon Shelter Under the Stable on the Left and the Delivery Tracks and Scale on the Right

PURCHASING STANDARDS

The purchasing standards of the line department of the Brooklyn Rapid Transit System are set forth in a series of wire, cable and other specifications, which have been revised from time to time in accordance with extended service trials. These specifications are issued through the electrical engineer, who is designated in all of them as the sole party having the right to accept the manufactured material. Another general feature common to the specifications is that relating to inspections and tests. To see that the standards set by the company are complied with, inspectors are sent to the mills to observe and check the processes of manufacture. In addition to this precaution, the electrical engineer's department maintains a laboratory and certain testing facilities are also supplied directly by the shops of the line department. The following sections will present the current specifications individually with such explanations as may be needed in regard to unusual requirements. It should be stated that all Brooklyn low-tension feeder cables and wires are intended for a normal operating potential of 600 volts, but all sizes above 250,000 circ. mil must be capable of being safely operated at any tension not exceeding 1000 volts.

SINGLE-BRAID AND DOUBLE-BRAID RUBBER-COVERED WIRES

The Brooklyn Rapid Transit System frequently uses single-braid, rubber-covered wires where the conductors do not have to go into conduit, where inside connections are made to switch boxes, for temporary work, etc. Double-braid, rubber-covered wire is installed in conduit work in accordance with the standards of the fire underwriters. The following is an abstract of the two specifications for rubber-covered wires and cables ranging in diameter from No. 14 B. & S. to 2,000,000 circ. mil. These specifications are exactly alike with the exception of the paragraphs on tape and braid, as will be indicated hereinafter.

Conductors.—The cables shall be composed of the number of strands called for in the table I on page 943; each conductor shall be of soft-drawn annealed wire, having a conductivity of not less than 98 per cent of that of pure copper—"Mathiessen's Standard." It shall be continuous throughout its length and shall be provided with a heavy uniform coating of tin without burrs or fins.

Insulation.—The cables and wires shall be insulated with a vulcanized rubber compound containing not less than 30 per cent and not more than 33 per cent by weight of fine dry Para rubber, free from reclaimed rubber or other substitutes making

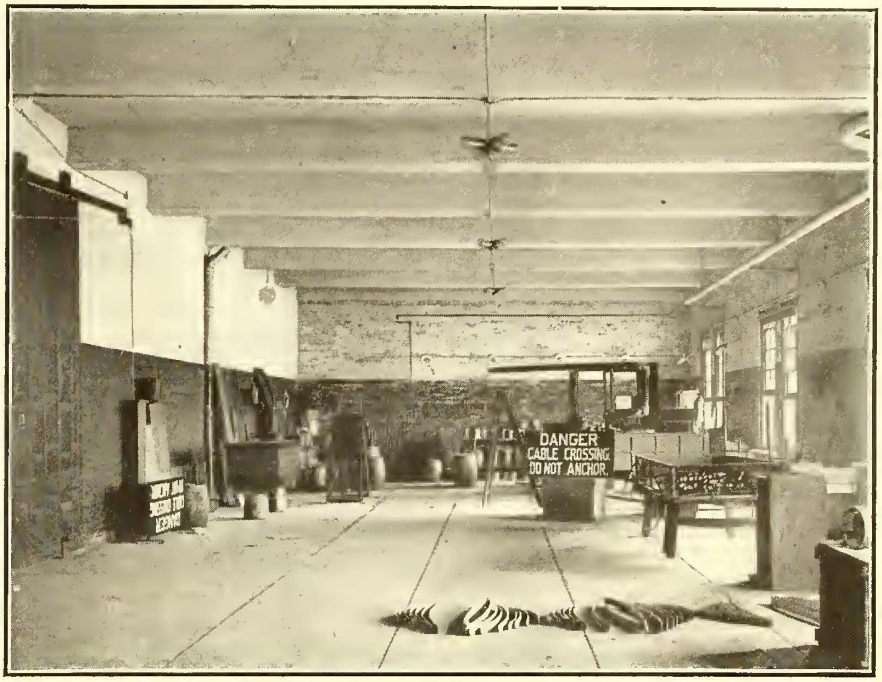
a tough, elastic and homogeneous covering of a thickness not less than that given in the following table. The Para gum itself shall not contain more than 3½ per cent of resinous matter, and the completed vulcanized rubber compound shall contain not more than 5 per cent of extractive matter by weight and not more than 1 per cent of free sulphur. The completed vulcanized compound must show a tensile strength of not less than 800 lb. per square inch.

Tape (Single Braid).—All wires above No. 8 are to receive a single tape over the rubber. This tape is to be at least 1/64 in. in thickness, and is to be applied spirally, lapping at least one-half of its width and making a smooth surface.

Tape (Double Braid).—All cables above and including 1,000,000 circ. mils are to receive a single tape over the rubber. This is to be at least 1/64 in. thick and is to be applied spirally, lapping at least one-half of its width and making a smooth surface.

Braid (Single Braid).—All wires are to be covered with a single braid of closely woven cotton, not less than 1/64 in. in thickness, thoroughly saturated with a black waterproof compound that will not injure the cotton covering or the insulation.

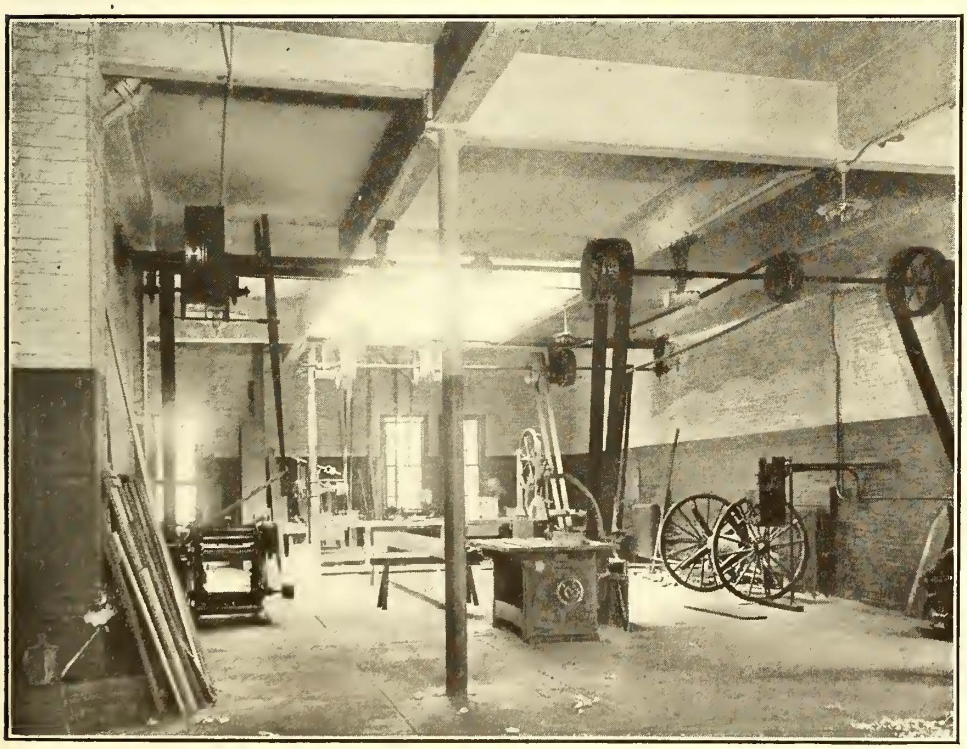
Braid (Double Braid).—All cables and wires are to be covered with two braids of closely woven cotton, each not less than 1/64 in. in thickness, thoroughly saturated with a black waterproof compound that will not injure the cotton covering or the insulation.



Brooklyn Line Department—A Portion of the Paint Shop, Showing the Lighting with Vapor-Proof Five-Lamp Clusters

Inspection and Test.—The high-potential and insulation-resistance tests (at the manufacturer's plant) shall be made upon the wire after 48 hours' immersion in water, before taping or braiding, and while still immersed. The test voltage alternating current, as per the following table, shall be applied for a period of five minutes. After the high-potential test, the insulation resistance shall be measured with a battery of not less than 100 volts or more than 500 volts, and all results corrected for a standard temperature of 15.6 deg. C. (60 deg. Fahr.). The test readings shall be taken at the end of one minute electrification, and shall show a resistance at least equal to that given in table I on page 943.

A sample of the completed vulcanized rubber insulation, not less than 4 in. long, shall have marks placed upon it 2 in. apart. The sample shall then be stretched until the marks are 6 in. apart, and at once released. Five seconds after release the marks shall not be over 2⅜ in. apart. The sample shall then again be stretched until the marks are 9 in. apart without breaking.



Brooklyn Line Department—A Part of the Mill Room

WEATHERPROOF WIRE AND CABLE.

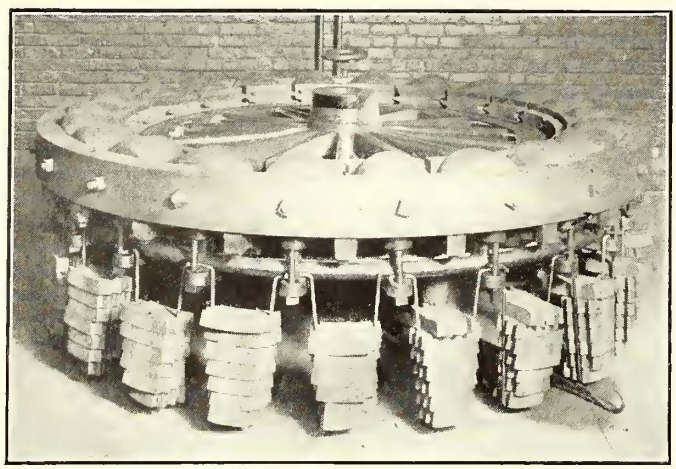
The following is an abstract of the standard specifications for weatherproof wire and cable in sizes from No. 10 B. & S. to 5,000,000 circ. mils:

Conductors.—The conductor shall consist of not less than the number of strands called for in the table given below, stranded concentrically, with the exception of 5,000,000-circ. mil rope-stranded, which consists of 61 strands of seven wires each and having a conductivity of 98 per cent of that of pure copper—"Mathiessen's Standard." The conductor shall have an area of not less than that called for in table II on page 943, to be measured by taking the combined area of the individual strands of the conductor.

Insulation.—The conductor shall be covered with three braids of closely woven cotton, each layer thoroughly saturated with a weatherproof compound that will not injure the cotton covering.

Test for Weatherproof Compound.—The melting test on the weatherproof compound shall be made as follows: Short pieces of the wire are placed on a piece of clean white paper in a chamber which has been heated to 125 deg. Fahr. and the chamber is maintained at this temperature for half an hour. The wire shall be rejected if the compound becomes sufficiently fluid to be transferred to the paper on which the wire was placed in sufficient amount to form a ridge perceptible to the fingers or in case the compound is absorbed by the paper as indicated by a greasy or oily spot on the paper.

Shipment.—The wire shall be shipped in good order in the



Brooklyn Line Department—Hydraulic Tire-Setting Machine

lengths and on reels or in coils as specified in the table given below. Each reel shall have its number, weight and length of wire plainly and indelibly marked on the outside of the reel.

SUBMARINE CABLES

A small amount of submarine cable is required in Brooklyn for installation in crossing various canals under water. One of the features developed by the company in connection with this cable is the use of jute between the rubber and the lead. This jute acts as a cushion to prevent the crushing of the rubber. Another feature of the specification for 500,000-circ. mil cable is the provision of a ⅛-in. lead sheath over the jute. A lesser thickness would not be considered safe, as even a ⅛-in. sheath is subject to porosity. An abstract of the specification follows:

Conductor.—The conductor shall consist of at least 61 soft copper wires stranded into a cable so as to produce a thoroughly flexible conductor. Each cable is to be of the size called for and to have a minimum conductivity of 98 per cent of that of pure copper—"Mathiessen's Standard."

Size of Conductor.—The conductor shall have a combined area of not less than 500,000 circ. mils, to be measured by taking the sum of the area of the individual strands when all the wires are laid out straight.

Insulation.—The insulation shall be 3/16 in. in thickness and shall consist of at least 30 per cent of pure Para rubber. This insulation shall be covered with a layer of jute 1/16 in. in thickness.

Sheath.—A lead sheath ⅛ in. in thickness shall be applied over the jute.

Armor.—The lead sheath is to be covered with a 3/16-in. wall of jute, and the whole then covered with No. 6 B. W. G. double-galvanized iron wires. The armor wire shall show no trace of copper color after four immersions in a saturated solution of sulphate of copper. The wire is to remain in the solution one minute each time and is to be wiped dry after each immersion.

Tests.—The cables shall have a minimum insulation resistance after one minute electrification of 1000 megohms per mile at 60 deg. Fahr. and shall be tested with an alternating current of 15,000 volts for 10 minutes between the conductor and lead sheath. These tests and the tests for conductivity shall be made at the manufacturer's plant under the supervision of an inspector from the railway company, the necessary apparatus for making such tests being furnished by the contractor. The railroad company is to have the privilege of furnishing any part of such apparatus however, if the engineer sees fit to do so.

Guarantee.—The contractor shall guarantee the cables against failure from all causes excepting mechanical injury for a period of five years after their installation.

VARNISHED CAMBRIC OR CLOTH-COVERED CABLES

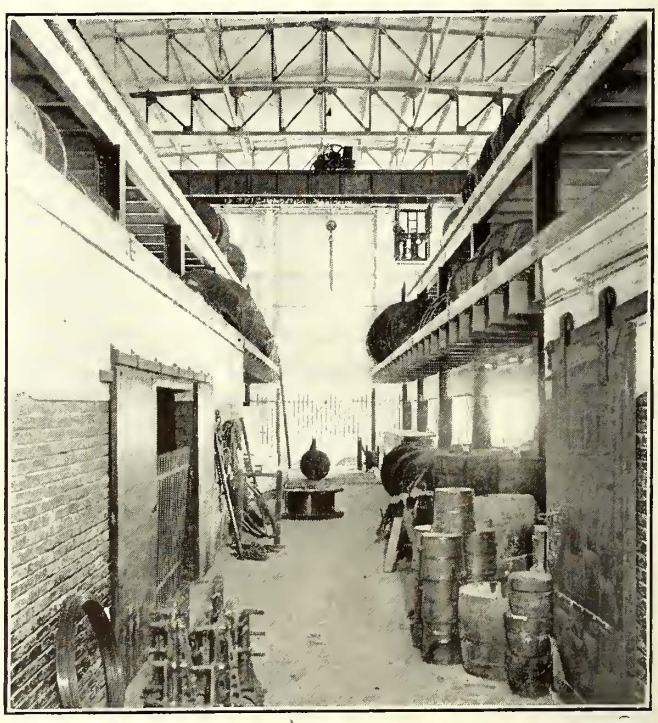
Varnished cambric or cloth-covered 600-volt cables from No. 14 B. & S. to 2,000,000 circ. mils are used principally for short underground runs in dry locations from substations to aerial feeders. An abstract of the specification follows:

Conductors.—The cables shall be composed of the number of strands called for in the table given below. Each conductor shall be of soft-drawn annealed wire, having a conductivity of not less than 98 per cent of that of pure copper—"Mathiessen's Standard." It shall be continuous throughout its length.

Insulation.—The wire shall be insulated with taping or specially prepared varnished cambric or cloth, with multiple films of insulating varnish on both sides which will prevent the absorption of moisture. The insulation to be applied spirally in strips in such a manner as to make a tough, flexible and homogeneous insulating wall of at least the thickness, at all points, given in the following table.

Braid.—All wires are to be covered with a double braid of closely woven cotton, each not less than 1/32 in. in thickness, thoroughly saturated with a black waterproof compound that will not injure the cotton covering or the insulation.

Tests (the conditions with regard to instruments and apparatus are the same as in the like paragraph on submarine cables.)—The high-potential and insulation-resistance tests



Brooklyn Line Department—Storage Galleries for Wire Reels and Other Heavy Material

shall be made upon the wire after 48 hours' immersion in water and before braiding. The test voltage, as per table, shall be applied for a period of five minutes using alternating current. After the high-potential test, the insulation resistance shall be measured and all results corrected for a standard temperature of 15.6 deg. C. (60 deg. Fahr.). In this test readings shall be taken at the end of one minute electrification and shall show a resistance at least equal to that given in the table below.

SPAN WIRE EXPERIMENTS AND SPECIFICATIONS

During the past year the line department has installed copper-

clad span wires in some places where ordinary galvanized wires are entirely corroded in three or four years from the fumes of nearby chemical works, oil refineries and the like. If the new wire proves corrosion-proof, it will be installed more widely despite the fact that it costs at least three times as much as the common span wires. It would save an average cost of $1 per span wire replacement, to say nothing of reducing accidents from defective spans. The customary span wires of the Brooklyn Rapid Transit System are made up of seven strands of double-galvanized iron wire. An abstract of the specification follows:

Galvanizing.—The galvanizing shall consist of a uniform coating of zinc, so applied that it will adhere firmly to the surface of the wire. A sample shall be taken from each reel and be submitted to the following tests:

Tests for Galvanizing.—The sample shall be immersed in a standard solution of copper sulphate for one minute and then removed and quickly wiped dry. This process shall be repeated three times. If, after the fourth immersion, there should be any copper deposited on the sample, all of the wire on that reel shall be rejected.

Solution.—The standard solution of copper sulphate shall be made in the presence of the inspector, and shall consist of a saturated solution of commercial copper—sulphate crystals in water—and shall have a specific gravity of 1.185 at 70 deg Fahr. Solution must have a temperature of from 62 deg. to 70 deg. Fahr. while the samples are being dipped.

Size of Wires.—Wires shall be made up of seven strands, each strand being made up as follows:

Size wire.	Diameter in inches Required.	Max.	Min.	Lay in inches.
¼-in.	.083	.085	.081	3
5/16-in.	.109	.111	.107	4
⅜-in.	.120	.122	.118	4¼
7/16-in.	.134	.136	.132	4½
½-in.	.165	.167	.163	5

Mechanical Tests.—From each reel two samples shall be taken for mechanical tests—one being tested as a whole and the wires of the other being tested separately. All wires must be soft enough to bend easily without breaking and must pass the following test. None of the single strands, as well as none of the made-up samples, will be permitted to fall under the figures given below:

	Seven Strands— Per cent elongation in 10 in.	Breaking weight, lbs.	Single Strands— Per cent elongation in 10 in.	Breaking weight lbs.
¼	14	1,800	12	250
5/16	14	3,500	12	450
⅜	14	4,800	12	650
7/16	14	6,000	12	800
½	14	8,500	12	1,100

TROLLEY WIRE EXPERIMENTS AND SPECIFICATIONS

During the past two years the line department has installed about 6 miles of No. 0000 grooved steel trolley wire having a tensile strength of about 75,000 lb. per square inch. This wire has proved fairly satisfactory in operation except for some trouble from breakage at brazed joints. One strong advantage of the steel trolley wire is the low first cost of 7½ cents per pound as compared with copper at 14 cents; another advantage is the longer life which may confidently be expected. On the other hand, the steel trolley wire possesses several disadvantages, among which the following may be cited: Practically no scrap value; more side feeds than with copper wire owing to the greater voltage drop; greater installation cost on account of its stiffness; danger of having the wire fuse if one end should fall and come into contact with the rail; weakening of insulators from wire rust thrown upon them through the action of the trolley wheel. The line department also put up during July of this year about a mile of bronze wire, which was bought at a figure slightly higher than copper. Up to the present writing this installation has not been in service long enough to form a definite conclusion about its value.

With regard to the following specifications on copper trolley wire it may be remarked that while the company demands a higher breaking weight and more twists per unit of length than are usually specified, the manufacturers have had no difficulty in meeting its requirements with either lake or electrolytic copper. Breaks at brazed joints are remarkably rare. The rods are scarfed first, then the joints are soldered with silver in an oil furnace, and afterward the wires are drawn to size.

A phenomenon noted in the testing of trolley wire is that after the reel is drawn finished and while still very hot the samples then cut off and laid aside for testing will nearly always fail to come up to the acceptance requirements. However, if the samples are not cut off until the reel has cooled, the pieces will pass the tests satisfactorily.

The following is an abstract of the specification for No. 0 and No. 00 copper trolley wire.

Material.—All wire is to be drawn from strictly electrolytic or Calumet & Hecla copper.

Finish.—The wire shall be drawn in lengths not less than 5000 ft. nor more than 1 mile, and shall have only such joints

TABLE I—SINGLE AND DOUBLE BRAID, RUBBER-COVERED

Size.	Strands.	Insulation wall.	Voltage test.	Insulation resistance.
14 B. & S....	solid	3/64-in.	2,000	1,000 megohms per mile
12 B. & S....	solid	3/64-in.	2,000	1,000 megohms per mile
10 B. & S....	solid	3/64-in.	2,000	1,000 megohms per mile
8 B. & S....	7	3/64-in.	2,000	1,000 megohms per mile
6 B. & S....	12	4/64 in.	3,000	1,000 megohms per mile
4 B. & S....	12	4/64 in.	3,000	1,000 megohms per mile
2 B. & S....	19	4/64-in.	3,000	1,000 megohms per mile
1 B. & S....	19	5/64-in.	3,000	1,000 megohms per mile
0 B. & S....	19	5/64-in.	3,000	1,000 megohms per mile
00 B. & S....	19	5/64-in.	3,000	1,000 megohms per mile
0000 B. & S....	37	5/64-in.	3,000	1,000 megohms per mile
250,000 circ. mil...	37	6/64-in.	4,000	750 megohms per mile
500,000 circ. mil...	61	8/64-in.	5,000	750 megohms per mile
750,000 circ. mil...	61	8/64-in.	5,000	500 megohms per mile
1,000,000 circ. mil...	91	8/64-in.	5,000	500 megohms per mile
1,250,000 circ. mil...	127	10/64-in.	6,000	500 megohms per mile
1,500,000 circ. mil...	127	10/64 in.	6,000	500 megohms per mile
1,750,000 circ. mil...	127	10/64-in.	6,000	500 megohms per mile
2,000,000 circ. mil...	127	10/64-in.	6,000	500 megohms per mile

TABLE II—WEATHERPROOF WIRE AND CABLE

Size.	Strands.	Maximum weight per 1,000 ft.	Length of conductor on each reel or coil.
10 B. & S.....	solid	55	1,000 coil
8 B. & S.....	7	78	1,000 coil
6 B. & S.....	12	116	1,000 reel
4 B. & S.....	12	170	1,000 reel
2 B. & S.....	19	271	1,000 reel
1 B. & S.....	19	328	1,000 reel
0 B. & S.....	19	423	1,000 reel
00 B. & S.....	19	525	1,000 reel
0000 B. & S.....	37	759	2,640 reel
500,000 circ. mils.....	48	1,850	1,760 reel
1,000,000 circ. mils.....	61	3,575	1,200 reel
1,500,000 circ. mils.....	91	5,395	1,000 reel
2,000,000 circ. mils.....	127	7,025	600 reel
2,500,000 circ. mils.....	127	8,000	...
5,000,000 circ. mils.....	61 (7 wires each)	Rope strand	...

TABLE III—STRANDING, INSULATION AND RESISTANCES OF VARNISHED CAMBRIC OR CLOTH-COVERED CABLES

No.	Strands.	Wall.	Voltage test.	Insulation resistance.
14.....	solid	4/64-in.	1,500	100 megohms
12.....	solid	4/64-in.	2,000	100 megohms
10.....	solid	4/64-in.	2,000	100 megohms
8.....	7	4/64-in.	2,000	100 megohms
6.....	12	4/64-in.	2,000	100 megohms
4.....	12	4/64-in.	2,000	100 megohms
2.....	19	4/64-in.	2,000	100 megohms
1.....	19	5/64-in.	3,000	100 megohms
0.....	19	5/64-in.	3,000	100 megohms
00.....	19	5/64-in.	3,000	100 megohms
0000.....	37	6/64-in.	3,000	55 megohms
250,000.....	37	6/64-in.	3,000	65 megohms
500,000.....	61	6/64-in.	3,000	60 megohms
750,000.....	61	9/64-in.	5,000	60 megohms
1,000,000.....	91	8/64-in.	5,000	50 megohms
1,500,000.....	127	8/64-in.	5,000	40 megohms
2,000,000.....	127	8/64-in.	5,000	35 megohms

or splices as are required to join the wire bars necessary to make up the above lengths, these joints or splices to be made after the bars have been rolled before drawing the same through the first die. All wire shall be truly cylindrical and fully up to the gage specified for each size, and must not contain any scale, inequalities, flaws, cold shutes seams or other imperfections.

Size of Wire.—The wire shall be truly and fully up to the gage standard as per B. & S. wire gage. It shall be truly cylindrical in every respect. A variation of not more than 1½ mils on either side of the specified wire gage will be allowed, and the wire must be truly round within 1 mil upon opposite diameters at the same point of measurement.

Weight.—Each reel shall have its gross, net and tare weights plainly and indelibly marked on the outside of the reel. The weight per mile for the No. 0 wire shall be 1684 lb. and for the No. 00 wire 2123 lb. A variation of 1 per cent on either side of the above figures will be allowed.

Packing for Shipment.—The wire shall be put on reels of sufficient size to prevent sharp bends, and shall be properly protected so that it shall not be injured in transportation. The reels shall measure over all not more than 48 in. in diameter and not more than 25-in. in width, and they shall have a heavy iron bushing with a hole 2⅜ in. in diameter suitable for carrying the reel on a 2-in. arbor.

Tests.—Tests shall be made by the manufacturer's plant under the supervision of the engineer, the necessary apparatus for making such tests being furnished by the contractor. The railroad company, however, reserves the right of furnishing any part of such an apparatus if the engineer sees fit to do so. The apparatus furnished by the contractor shall be examined by and shall be satisfactory to the electrical engineer. Should the samples selected as provided above fail to come up to the specifications, the electrical engineer may take a second sample at his discretion. If the average results from both samples shall be within the specifications, the reel shall be accepted. If not within the specifications, the reel shall be rejected. The following tests shall be made:

Strength of Wire.—The strength of the wire shall be determined by taking a sample from one end of each reel 30 in. in length. Of this piece 18 in. shall be tested for tension and elongation by breaking the same in a tension machine. The samples shall show a tensile strength as follows:

No. 0, wire-breaking weight...4,700 lb.
No. 00, wire-breaking weight...5,800 lb.

A variation of 1½ per cent on either side of these limits will be accepted by the inspector.

Elongation.—The elongation of these samples shall be at least 3 per cent for No. 0 wire and 2½ per cent for No. 00 wire.

Torsion.—The remaining 12 in. of the above test piece shall be tested for torsion. These pieces shall be twisted in the torsion testing machine to destruction, 10 in. in length being placed between the jaws of the machine. Under these circumstances the wire shall not show less than 18 twists for No. 0 wire and 15 twists for No. 00 wire. The twists are to be made at the rate of not less than 10 per minute.

Conductivity.—The wire shall show a minimum conductivity of 95 per cent of that of pure copper—"Mathiessen's Standard."

WOOD STRAIN SPAN INSULATORS

The specifications for wood strain span insulators offer no features for comment except the requirement that "the eyes in the caps shall be placed at right angles to each other." This arrangement is demanded so that these insulators can be used with double pull-offs and to permit the span wire to slide freely through the eye. If both eyes were in the same place the wire would not slide freely between them to equalize the stress on both wires. An abstract of the specifications follows:

General.—Insulators are to be made from second growth, first quality split hickory and are to have malleable-iron caps compressed on the ends. The minimum dimensions of the finished insulator are shown in the accompanying drawing.

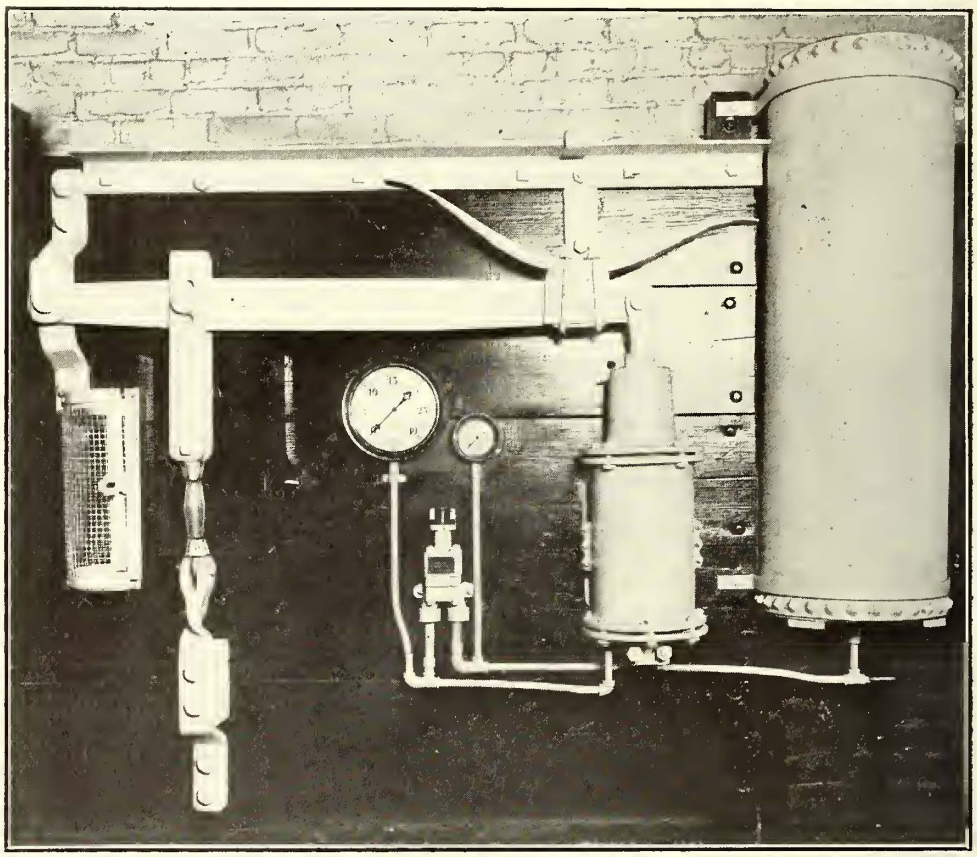
Wood.—The wood is to be thoroughly seasoned and straight-grained, and to be so treated as thoroughly to fill all of the pores with oil. As a finish, it is to be given two coats of clear varnish.

Caps.—The caps shall be compressed so tightly on the ends of the wood as to prevent any moisture working in between the cap and the wood, but not so tightly as to injure the fiber of the wood. The iron shall be protected against rust either by a heavy galvanized coating or by being sherardized. The eyes in the caps shall be placed at right angles to each other.

Tests.—All insulators will be inspected upon delivery. The inspector will first carefully examine each insulator and will reject all in which any defects can be found. Each insulator shall then be tested by having a tensile stress of 4000 lb. applied to it, which shall not damage it in any way. If desired, a representative of the manufacturer may be present during these tests.

Marking.—Upon at least one cap of each insulator there shall be a distinctive mark stamped or cast into the metal.

It will be observed from the specifications that each insulator is tried out for a tensile stress of 4000 lb. These tests are made at the Nostrand Avenue headquarters with a machine designed by H. H. Hilborn, superintendent of the line department. As shown in the accompanying illustration, the device consists of a lever and Westinghouse brake cylinder mechanism, engineer's valve, two gages and a reservoir, all mounted on one board. The air is compressed by the portable compressor shown in one of the illustrations of the metal-working shop. The insulator under test is placed in the jaws of the machine and then air is admitted from the main reservoir of the brake cylinder at the pressure needed to produce the desired stress. A wire-screen door is closed around the insulator under test to prevent injury to nearby persons from flying wood or metal. This device has proven very convenient for the accurate, rapid testing of wood strain insulators. Over 300 specimens have been tested in one hour. It is very successful in picking out insulators with defective wood or defective castings because they will usually break far below the specified stress. The cost of this outfit, exclusive of the compressor, was only $125.

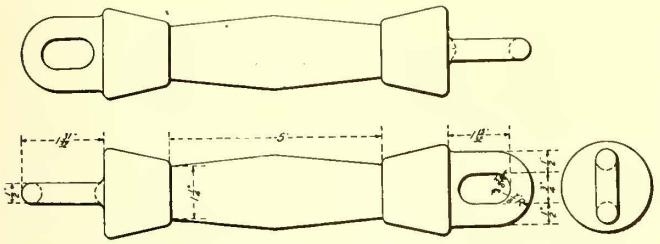


Brooklyn Line Department—Air-Operated Machine Used for Testing Insulators

TROUGH HANGERS

The following specifications relate to the trolley wire and iron-bar hangers, the first of which was illustrated in the ELECTRIC RAILWAY JOURNAL of July 23, 1910, on page 138, and the second in the ELECTRIC RAILWAY JOURNAL of June 11, 1910, on page 1017.

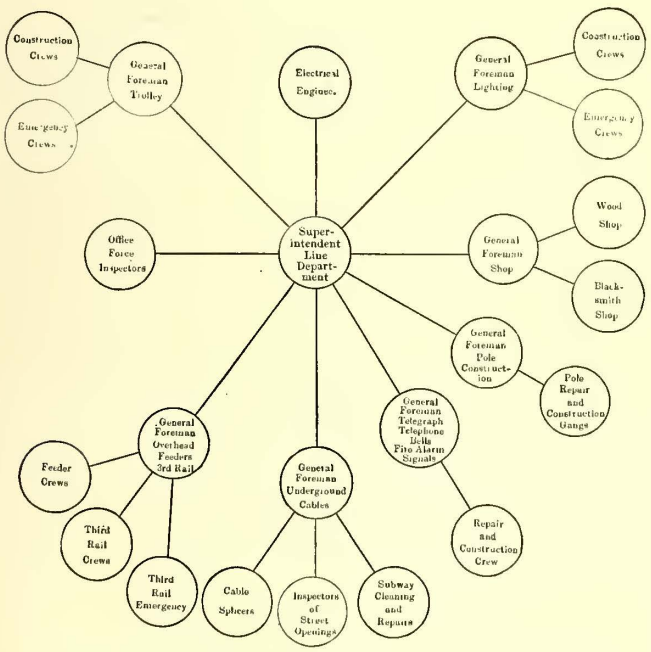
Shells.—The shells are to be made of malleable iron to the dimensions shown in the drawings and are to be plated with zinc.



Brooklyn Line Department—Minimum Dimensions of Standard Wood Strain Insulators

Studs.—For trolley-wire hangers the studs are to be drop-forgings, either shaped as shown in the drawings or to be bolts of the usual shape supplied with washers embedded in the insulation and against which the hub of the ear can be screwed. The stud for use with iron-bar conductors is to be made of malleable iron. The studs can be either electro-galvanized or sherardized. Each iron-bar hanger is to be furnished with one ⅜-in. x 1⅜-in. bolt and nut, both of which must be sherardized or electro-galvanized.

Insulation.—The insulation must be of a composition that will not only withstand the laboratory tests, but also the influence of exposure to the weather. The use of petticoats between the stud and the shell will be left to the judgment of the manufacturer.



Brooklyn Line Department—Organization Diagram

Tests.—Ten per cent of all hangers received will be tested: First, by a direct pull on the stud of 2000 lb. after the insulator has been soaked in water at a temperature of 150 deg. Fahr. for one hour; then, after being wiped and allowed to dry for 30 minutes, with a potential of 5000 volts applied between the stud and shell for one minute.

Marking.—Each hanger shall have some distinguishing mark, either in the shell or the insulation, showing the name of the company by which it is made.

CONCLUSION

While the various articles on the line department have given a fair idea of its scope, the following résumé and accompanying organization diagram may be of interest. The line department is one of the departments under C. E. Roehl, electrical engineer, Brooklyn Rapid Transit System. It employs about 200 men divided as follows herewith: Overhead feeders and third-rail; trolley wire construction, poles; lighting repairs; telegraph, telephone, fire-alarm and crossing signals; shops; office force, including inspectors and draftsmen. On account of the area covered it is found necessary to have more subdivisions of labor than would be needed on smaller systems. Proper supervision could not be given to the different classes of work mentioned unless each was in charge of responsible specialists ready to go to any part of the territory at any time.

Practically all important instructions are issued directly from the office of the electrical engineer except emergency lighting, fire-alarm and trolley trouble calls, which are answered immediately. It may be noted here that the electrical engineer has charge of practically all electrical work on the system except car circuits and some low-tension signal circuits on the elevated structure. Even the electrical repairs and renewals of the lamp clusters in the car shop structures are carried out by the line department, which conforms in this work to the insurance requirements.

TRACTION GROWTH IN ATLANTA

The remarkable growth of Atlanta, Ga., is well shown by the record of the railway department of the Georgia Railway & Electric Company: During the year 1909, 9,020,897 passenger miles were operated over a total of 177 miles of route measured as single track. This represented an increase of 6.83 per cent over the preceding year. During 1909 the company also constructed 11 miles of single track. The number of passengers carried in 1909 was 50,570,953, which was equivalent to an increase of 11 per cent over the preceding year. The total operating cost per car mile for 1909 was 11.59 cents, made up of the following items: Maintenance, 2.07 cents; power plant operation, 1.50 cents; car operation, 5.63 cents; general expenses, 2.39 cents. The gross earnings of the railway department alone increased very rapidly, as shown by the following table of typical years:

1892.....	$351,394	1905.....	$1,419,650
1897.....	372,482	1908.....	1,902,398
1901.....	636,679	1909.....	2,109,565
1902.....	940,006		

The operating expenses of the railway department in 1909 were 49.95 per cent of the total earnings.

MANCHURIAN ELECTRIC RAILWAY

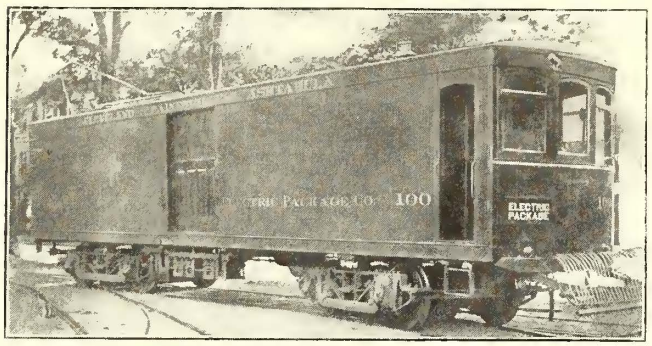
The South Manchuria Railway Company, which supplies current to the general public in Dairen (Dalny), Mukden and Changchun from its own electric power station, also operates the Dairen electric railway system, being also under the same management. The electric line in Dairen has been running since September, 1909, over a standard gage route consisting of 3 miles of single and 5 miles of double track. The available number of cars is 30 with 10 spare cars, all being double compartment vestibule cars with a capacity of 30 passengers each. The fares are uniform all over the town, being 6 cents and 4 cents for first and second class. Thirty trip tickets are issued at 75 cents and 50 cents for the two classes respectively, and time tickets at 8 cents and 5 cents available for one hour can be used for any number of rides and for any direction. No transfers are issued. The present receipts scarcely pay the expenses, but the line certainly provides the city with an excellent means of communication. An electric park near the center of the town, intended to develop the traffic, is equipped with conservatories and menageries, theater, bowling and shooting alleys, roller-skating rink, ponies, camels, etc. The cost of admission is about 2 cents.

ADVERTISING METHODS AND TRAFFIC OF THE CLEVELAND, PAINESVILLE & EASTERN RAILROAD

BY E. L. SCHMOCK, ASSISTANT SECRETARY AND TREASURER

Advertising for promotion of traffic for interurban railways and summer resorts is in a division by itself. We do not advertise a commodity, but a service.

We use practically all different methods of advertising—



Cleveland, Painesville & Eastern—Package Car

newspapers, illustrated folders, timetables and maps, street cars, billboards, post cards, photographs and any other means that appeal to us and that are likely to bring results.

In our newspaper advertising we use display advertisements in the Cleveland papers, accompanied by illustrations whenever possible; in the other towns through which our line passes we run smaller display advertisements and have several small items in the local news columns. These advertisements refer to special events along the line, large picnics at the park and special excursions.

With every change of schedule a new time folder is issued. At present we are issuing a folder containing the time of trains on all interurban railways in Northern Ohio, and giving connections for through trips between Buffalo, N. Y., and Detroit, Mich. Our part of this through trip is from Cleveland to Ashtabula. We also issue a vest-pocket folder giving time on our lines in a concise form.

We keep a supply of blotters on hand for enclosing in letters and other mail matter which is sent out. We also distribute the blotters in hotels and banks. These blotters are 3¼ in. x 6 in. in size and are made from the best blotting paper on the market, for I believe in sending out blotters that will blot, and will, therefore, be used and serve their purpose as an advertising agent. The reading matter on these blotters is changed from time to time, say, every three months. During the last year we have put on blotters our limited train schedule, express and baggage schedule, photographs showing different types of cars and also showing different scenes at our park. At the beginning of the summer season I had the express and baggage schedule printed on shipping tags, as illustrated herewith. These tags were tied to packages handled by our different agents, and to empty milk cans by the messengers on the cars. In this way the timetables of express trains were delivered to the people that used them.

The Cleveland, Painesville & Eastern road extends from Cleveland to Ashtabula, a distance of 60 miles. Two lines extend from Cleveland and connect at Willoughby, 20 miles east. The main line leaves Cleveland by way of Euclid Avenue; the shore line leaves via St. Clair Avenue and follows the shore of Lake Erie. Willoughbeach Park, located 17 miles east of Cleveland on the shore of Lake Erie, is reached by our shore line. An illustrated booklet is issued each year telling about the beauties of the park and why it is the best place for picnics, outings, etc. New photographs are taken each summer to be used in the booklet of the following year. These booklets are mailed to fraternal orders, ministers, Sunday school superintendents, members of clubs and other people who would be interested in getting up picnics or private dancing parties. A short letter stating a few facts about the park is mailed to all people who receive booklets. These letters are made to look as nearly like personal letters as possible, and 2-cent stamped envelopes are used in mailing them. We feel that we are repaid for this extra expense by getting the people to read the letters. If a 1-cent stamp were used a great number of the letters would not be opened.

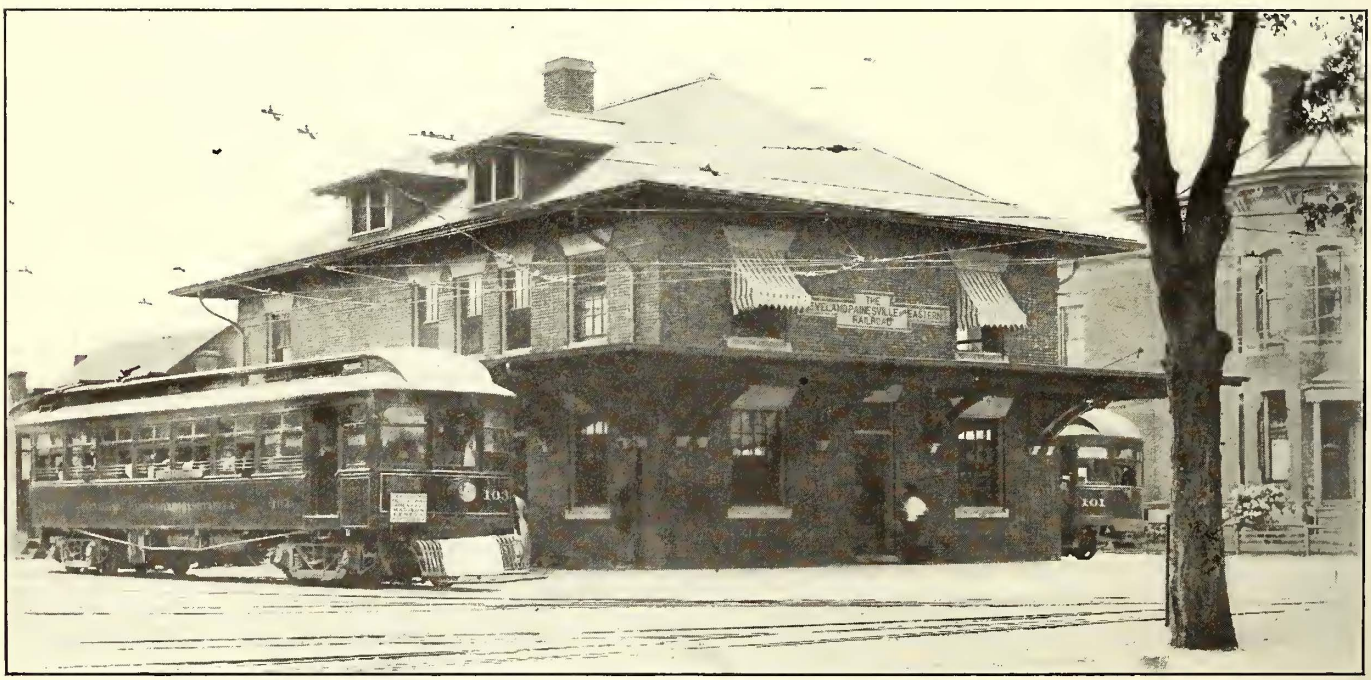
The text of one of these letters follows:

LETTER ADVERTISING PARKS SENT TO CLUBS

"Many of the churches, lodges and societies of the city hold their picnics annually in Willoughbeach Park, and we thought you would be interested to know our proposition this year.

"Special round-trip tickets from Cleveland to Willoughbeach Park good on regular cars are as follows: 20 or more, 30 cents each; 500 or more, 25 cents each. From Collingwood the rates are 10 cents less.

"Special cars may be obtained for $16 round trip, allowing 55 passengers on each car.



Cleveland, Painesville & Eastern—New Station and Office Building at Willoughby, Ohio

"The special cars may be arranged to leave from place most convenient for the picnickers and at time and schedule to suit them. Cars leaving west of the river will be $2.50 extra.

"The dance hall and music can be reserved on Monday, Wednesday and Friday evenings for private parties for $18.

"Our solicitor is at your service to help you make arrangements for any outing or picnic you may be interested in."

Special leaflets and small folders are issued from time to time for special events. During 1908 we distributed in various ways 50,000 leaflets telling about a newspaper reporter's trip by trolley from Cleveland to New York. Part of this trip was made over our line. During a convention in Cleveland we distributed several different folders about points of interest along the line. Although the attendance at this convention was not as large as was expected, we could see that our folders accomplished results.

Any number of postal cards giving views of our park have been furnished to fraternal orders and other societies and were used by them in notifying their members of their picnic.

We find that the work of a solicitor is valuable in the advertising department, in following up inquiries for picnic dates or chartered-car rates, and in assisting people in making arrangements for picnics.

Some time ago this company offered a prize of $25 for the best trade-mark design which could be used for practical purposes. This contest was advertised in the newspapers and the railway journals. We also sent leaflets, stating conditions of contest, in all letters mailed from the office. We received 186 designs from people in our neighborhood and in various other sections of the country extending as far west as Madison, Wis., east to Maine and south to New Orleans. A committee of five newspaper men awarded the prize. This trade mark is being put on all of our stationery and on our cars.

I am a firm believer in the policy of keeping the company's name before the public all the time, and we take advantage of every opportunity to advertise it. On the front of stamped envelopes we have our trade mark, and on the back some little advertisement pertaining to the road which can be read at a glance. There are very few letters which take up all the weight allowed for the 2-cent stamp; we, therefore, have blotters or leaflets to enclose in all outgoing mail.

Special attractions are booked for the park on holidays, and on Sundays we have the city league ball teams play there. The ball games are advertised by cards placed in our cars. These are changed weekly. For special attractions and large picnics we put a cloth banner 36 in. square on the fenders of the cars and a sheet poster, 10 in. x 15 in., on the front windows in the cars. We also have cards in the regular advertising racks in the cars.

A company in Cleveland publishes in one booklet the timetables of all of the interurban roads which enter that city. This company distributes the timetables and furnishes us 10,000 copies a month, enough for our cars and various agents. Before this contract was made we published our own timetables, which cost, with two publications a year, for 20,000 large timetables and 10,000 of small size, each time, $230 annually. There is no expense for timetables now as the company which publishes them secures its remuneration from advertising in the booklets. Whenever new schedules are issued they are advertised in the cars. Extra service for holidays or other special occasions is advertised by posters in the cars and stations.

FIRST SERIES

May 1
L. S. & M. S. R'y Co. vs Gary Clothing Co ..... Luna Park
The Bailey Co. vs Hinkels ..... WILLOUGHBEACH
Widlar Co. vs Krumbars ..... Valley View
Meyer's Prospects vs Turtle Club ..... Salem Rink

May 8
L. S. & M. S. R'y Co. vs The Bailey Co ..... Valley View
Gary Clothing Co. vs Hinkels ..... Salem Rink
Widlar Co. vs Meyer's Prospects ..... WILLOUGHBEACH
Krumbars vs Turtle Club ..... Luna Park

May 15
L. S. & M. S. R'y Co. vs Widlar Co ..... Salem Rink
Gary Clothing Co. vs Krumbars ..... WILLOUGHBEACH
Meyer's Prospects vs The Bailey Co ..... Luna Park
Hinkels vs Turtle Club ..... Valley View

May 22
L. S. & M. S. R'y Co. vs Krumbars ..... WILLOUGHBEACH
Gary Clothing Co. vs Meyer's Prospects ..... Valley View
The Bailey Co. vs Turtle Club ..... Salem Rink
Hinkels vs Widlar Co ..... Luna Park

May 29
L. S. & M. S. R'y Co. vs Meyer's Prospects ..... Luna Park
Gary Clothing Co. vs Turtle Club ..... WILLOUGHBEACH
The Bailey Co. vs Widlar Co ..... Valley View
Hinkels vs Krumbars ..... Salem Rink

May 30
L. S. & M. S. R'y Co. vs Turtle Club .. WILLOUGHBEACH
Hinkels vs Meyer's Prospects ..... Luna Park

June 5
L. S. & M. S. R'y Co. vs Hinkels ..... Valley View
Gary Clothing Co. vs The Bailey Co. ..... Salem Rink
Widlar Co. vs Turtle Club ..... Luna Park
Krumbars vs Meyer's Prospects ..... WILLOUGHBEACH

June 12
L. S. & M. S. R'y Co. vs Turtle Club ..... WILLOUGHBEACH
Gary Clothing Co. vs Widlar Co ..... Valley View
The Bailey Co. vs Krumbars ..... Luna Park
Hinkels vs Meyer's Prospects ..... Salem Rink

DANCING
on Tuesday, Thursday and Saturday evenings; also on Holiday and Saturday afternoons.

SECOND SERIES

June 19
L. S. & M. S. R'y Co. vs Gary Clothing Co ..... WILLOUGHBEACH
The Bailey Co. vs Hinkels ..... Valley View
Widlar Co. vs Krumbars ..... Salem Rink
Meyer's Prospects vs Turtle Club ..... Luna Park

June 26
L. S. & M. S. R'y Co. vs The Bailey Co ..... Salem Rink
Gary Clothing Co. vs Hinkels ..... Luna Park
Widlar Co. vs Meyer's Prospects ..... Valley View
Krumbars vs Turtle Club ..... WILLOUGHBEACH

July 3
L. S. & M. S. R'y Co. vs Widlar Co ..... Luna Park
Gary Clothing Co. vs Krumbars ..... Valley View
Meyer's Prospects vs The Bailey Co. ..... WILLOUGHBEACH
Hinkels vs Turtle Club ..... Salem Rink

July 4
Gary Clothing Co. vs Widlar Co ..... WILLOUGHBEACH
The Bailey Co. vs Krumbars ..... Luna Park

July 10
L. S. & M. S. R'y Co. vs Krumbars ..... Valley View
Gary Clothing Co. vs Meyer's Prospects ..... Salem Rink
The Bailey Co. vs Turtle Club ..... Luna Park
Hinkels vs Widlar Co ..... WILLOUGHBEACH

July 17
L. S. & M. S. Co. vs Meyer's Prospects ..... WILLOUGHBEACH
Gary Clothing Co. vs Turtle Club ..... Valley View
The Bailey Co. vs Widlar Co ..... Salem Rink
Hinkels vs Krumbars ..... Luna Park

July 24
L. S. & M. S. R'y Co. vs Hinkels ..... Salem Rink
Gary Clothing Co. vs The Bailey Co ..... Luna Park
Widlar Co. vs Turtle Club ..... WILLOUGHBEACH
Krumbars vs Meyer's Prospects ..... Valley View

July 31
L. S. & M. S. R'y Co. vs Turtle Club ..... Valley View
Gary Clothing Co. vs Widlar Co. ..... Salem Rink
The Bailey Co. vs Krumbars ..... WILLOUGHBEACH
Hinkels vs Meyer's Prospects ..... Luna Park

Special Chicken Dinner
on Sundays Stay for the ball game in the afternoon.

Cleveland, Painesville & Eastern—Schedule of Baseball Games at Willoughby Park

In soliciting passenger traffic I write to officials of different lodges and societies, which furnish a good deal of business in the winter. During the winter months theater parties are frequently organized in the different towns and we furnish cars for trips to Cleveland at a charge of $1 a track mile and an allowance of 55 people to the car. For all passengers over this number carried on excursions of this kind we charge the regular fare.

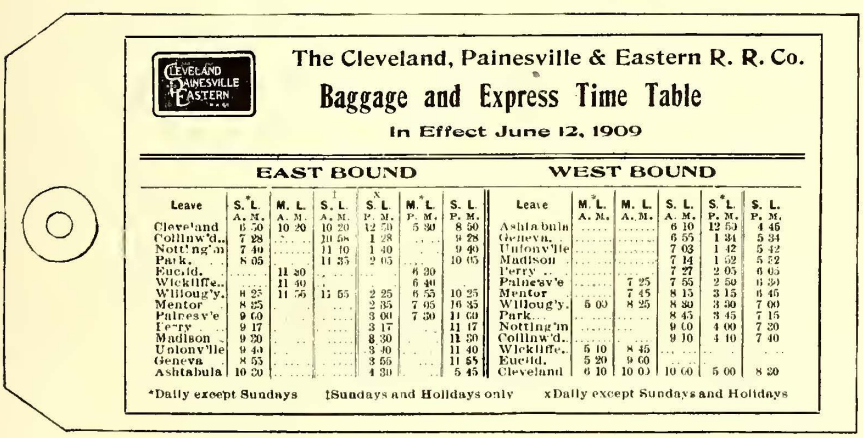
In inviting some excursion business for country picnics or similar events we advertise in the newspapers and also distribute bills at the houses in the interested communities.

When an industrial exposition was held in Cleveland we gave reduced rates on three days of the week. Special tickets, including transportation and admission to the grounds, are sold for baseball games in Cleveland at prices that make admission to the grounds cost the purchaser 15 cents net instead of the regular price of 50 cents. We had one special car arrangement that was a failure. We advertised that a special car would be operated from Ashtabula to Cleveland on Thursdays in June. The car was very poorly patronized, but we continued to operate it for the period we had advertised, preferring to stand the loss rather than disappoint any patrons.

The colors of tickets are in accordance with the recommendation of the Central Electric Railway Association, green for single trip, gray for round trip and orange for excursion. A special form of ticket is used for excursion tickets.

On business to Willoughbeach Park 20 or more round-trip tickets are sold at a reduction of 25 per cent from double the regular single-fare rate. A reduction of 37½ per cent is made if the number of tickets purchased is 350 or more.

Interline business is transacted with all of the interurban companies that enter Cleveland and with all of the Ohio mem



The Cleveland, Painesville & Eastern R. R. Co.

Baggage and Express Time Table

In Effect June 12, 1909

EAST BOUND							WEST BOUND					
Leave	S.* L. A. M.	M. L. A. M.	S. L. A. M.	N.† S. L. P. M.	M.* L. P. M.	S. L. P. M.	Leave	M.* L. A. M.	M. L. A. M.	S. L. A. M.	S.* L. P. M.	S. L. P. M.
Cleveland	6 50	10 20	10 20	12 50	5 30	8 50	Ashtabula	.....	.....	6 10	12 55	4 45
Collinw'd..	7 28	.....	10 58	1 28	.....	9 28	Geneva	.....	.....	6 55	1 34	5 34
Nott'ng'm	7 40	.....	11 10	1 40	.....	9 40	Unionv'lle	.....	.....	7 03	1 42	5 42
Park	8 05	.....	11 35	2 05	.....	10 05	Madison	.....	.....	7 14	1 52	5 52
Euclid	.....	11 30	.....	.....	6 30	.....	Perry	.....	.....	7 27	2 05	6 05
Wickliffe	.....	11 40	.....	.....	6 40	.....	Painesv'le	.....	7 25	7 55	2 50	6 30
Willoug'by	8 25	11 55	11 55	2 25	6 55	10 25	Mentor	.....	7 45	8 15	3 15	6 45
Mentor	8 25	.....	.....	2 35	7 05	10 35	Willoug'by	6 00	8 25	8 30	3 30	7 00
Painesv'e	9 00	.....	.....	3 00	7 30	11 00	Park	.....	.....	8 45	3 45	7 15
Perry	9 17	.....	.....	3 17	.....	11 17	Notting'm	.....	.....	9 00	4 00	7 30
Madison	9 20	.....	.....	8 30	.....	11 20	Collinw'd.	.....	.....	9 10	4 10	7 40
Unionv'lle	9 40	.....	.....	3 40	.....	11 40	Wickliffe	5 10	8 45	.....	.....	.....
Geneva	9 55	.....	.....	3 55	.....	11 55	Euclid	5 20	9 00	.....	.....	.....
Ashtabula	10 20	.....	.....	4 30	.....	5 45	Cleveland	6 10	10 00	10 00	5 00	8 20

*Daily except Sundays ‡Sundays and Holidays only xDaily except Sundays and Holidays

Cleveland, Painesville & Eastern—Shipping Tag with Baggage and Express Timetable

ber-companies of the Central Electric Railway Association. We do not have more than five through tickets a year, however, to lines beyond the roads with which we make direct connection at Cleveland. With the other lines that enter Cleveland we do a large business. Baggage is checked through. We receive about as much of this business as we give.

A record is kept of the car-mile earnings of limited cars, as shown in a statement published herewith.

THE CLEVELAND, PAINESVILLE & EASTERN RAILROAD COMPANY—EARNINGS OF LIMITED TRAINS BY TRIPS FOR SATURDAY, AUG. 6, 1910

Train No.		C. P. & E.	C. P. & A.	Total.
	Eastbound			
80	Leave Cleveland 7:50 a. m., arrive Ashtabula 10:26 a. m.	$12.55	$7.65	$20.20
82	Leave Cleveland 12:50 p. m., arrive Ashtabula 3:26 p. m.	{ 14.75 / 18.35	6.95 / 15.60	21.70 / 33.95
84	Leave Cleveland 3:50 p. m., arrive Ashtabula 6:26 p. m.	19.05	10.65	29.70
86	Leave Cleveland 4:55 p. m., arrive Painesville 5:27 p. m.	7.75	....	7.75
88	Leave Cleveland 6:55 p. m., arrive Ashtabula 9:25 p. m.	10.30	4.05	14.35
	Westbound			
81	Leave Painesville 6:35 a. m., arrive Cleveland 7:55 a. m.	9.15	....	9.15
83	Leave Ashtabula 6:30 a. m., arrive Cleveland 8:55 a. m.	14.35	12.50	26.85
85	Leave Ashtabula 8:05 a. m., arrive Cleveland 10:25 a. m.	13.45	12.15	25.60
87	Leave Ashtabula 1:05 p. m., arrive Cleveland 3:25 p. m.	30.40	26.30	56.70
89	Leave Ashtabula 4:05 p. m., arrive Cleveland 6:26 p. m.	19.30	14.80	34.10
91	Leave Painesville 7:05 a. m., arrive Cleveland 8:25 a. m.	9.90	....	9.90
	Total	$179.30	$110.65	$289.95
	Car-miles	270	229	499
	Earnings per car-mile	$0.67	$0.48	$0.58

At the end of each month a statement is made showing the amount of ticket sales in each agency as compared with the record of the corresponding month of the previous year. A comparative statement is also made of the through passengers between Cleveland and Ashtabula. Samples of these statements are published herewith.

CLEVELAND, PAINESVILLE & EASTERN RAILROAD
COMPARATIVE STATEMENT OF AGENTS' TICKET SALES FOR THE MONTH OF AUGUST

	1908	1909	Increase	Decrease
Cleveland	$3,720.70	$5,007.55	$1,286.85	
Willoughby	1,299.99	1,330.80	30.90	
West Mentor	137.49	217.30	79.81	
East Mentor	409.06	438.88	29.82	
Painesville	2,505.75	3,351.51	845.76	
Perry	1,080.76	984.77		95.99
Madison	389.15	455.09	65.94	
Unionville	323.75	237.80		85.95
Geneva	1,205.73	1,425.60	246.93	
Ashtabula	1,534.50	2,105.08	570.58	
Totals	$12,606.79	$15,581.44	$3,156.59	$181.94

CLEVELAND, PAINESVILLE & EASTERN RAILROAD
THROUGH TICKETS, CLEVELAND TO ASHTABULA AND ASHTABULA TO CLEVELAND AUGUST

	1908				1909			
	Cleveland to Ashtabula		Ashtabula to Cleveland		Cleveland to Ashtabula		Ashtabula to Cleveland	
	S.T.	R.T.	S.T.	R.T.	S.T.	R.T.	S.T.	R.T.
1	12	10	23	1	13	14	10	2
2	1	3	18	5	15	5	24	8
3	16	4	20	7	14	5	29	3
4	11	2	11	1	12	10	17	5
5	11	14	24	7	14	6	28	2
6	4	7	22	4	12	6	24	11
7	6	3	15	2	25	22	32	5
8	7	6	26	7	5	9	21	..
9	5	7	11	6	30	9	58	6
10	17	3	22	9	15	5	27	10
11	9	7	13	6	5	7	23	8
12	26	4	30	7	17	11	35	5
13	10	3	15	3	4	9	18	10
14	4	7	25	8	20	10	31	10
15	17	19	17	3	17	5	15	5
16	5	4	12	2	38	11	20	9
17	12	9	20	10	26	11	30	7
18	17	8	17	3	14	10	36	6
19	14	28	26	1	27	13	22	6
20	15	6	19	1	17	12	34	10
21	17	9	35	6	11	7	36	9
22	11	8	15	5	17	10	23	6
23	5	10	14	1	..	8	38	4
24	5	11	30	10	5	5	30	13
25	12	4	10	5	11	3	24	5
26	21	10	29	15	12	10	26	4
27	10	9	12	3	14	6	23	10
28	7	6	17	7	17	4	30	3
29	4	9	20	15	19	10	32	2
30	3	2	14	1	27	5	23	6
31	8	1	41	9	11	3	17	5
	322	233	623	170	484	261	836	195

Cleveland to Ashtabula, S. T. increase, 162.
Cleveland to Ashtabula, R. T. increase, 28.
Ashtabula to Cleveland, S. T. increase, 213.
Ashtabula to Cleveland, R. T. increase, 25.

A sheet is also kept to show each day the number of passengers on every trip.

A schedule of the cars of the Electric Package Agency, which carry baggage, is shown on the timetable. As an accommodation to shippers express is carried occasionally on regular cars, so that if an agent has made a mistake it can sometimes be rectified with little delay. The package business includes large quantities of groceries, meats and merchandise shipped from Cleveland to merchants in the different towns. On the return trips of the cars to Cleveland fruits, vegetables and nursery stock are a conspicuous part of the business. There are a number of nurseries on the line and one, located near Painesville, has 1700 acres of land under cultivation. At Perry a special siding was constructed this year so that cars could be loaded with fruit easily, and next year similar facilities will be provided for nursery stock. We have started an early morning car from Cleveland for the accommodation of shippers of meat.

The new station building of the company at Willoughby, which is illustrated herewith, is an attractive feature of the system. The first floor contains a waiting room, ticket office, package office and employees' room. The second floor is occupied by the offices of the officials of the company and the third floor is used by the engineering department. The building is 30 ft. x 80 ft. in size and is heated by hot water. The basement extends under the entire building, and, with the exception of one room, is used for storage purposes. This room, measuring 10 ft. x 12 ft., contains a machine which is used to destroy tickets. The building contains a 3-story vault. The basement vault is used for storing valuable papers, letters, etc., which may be needed only occasionally. The vault on the first floor is used for tickets, stationery and cash and the vault on the second floor is used for the records of the accounting and engineering departments.

In order to get more people into the country and along the lake shore we are going to compile a list of people who have cottages for rent, those who keep boarders or have camping grounds for rent, giving the names, addresses and the stop number at which the place is located on the line. This material will be put in leaflet form for distribution.

It is best to give the advertising man all the freedom possible, to tell the truth in advertisements and have the best work in printing.

SIGNAL PROTECTION FOR ILLINOIS TRACTION SYSTEM

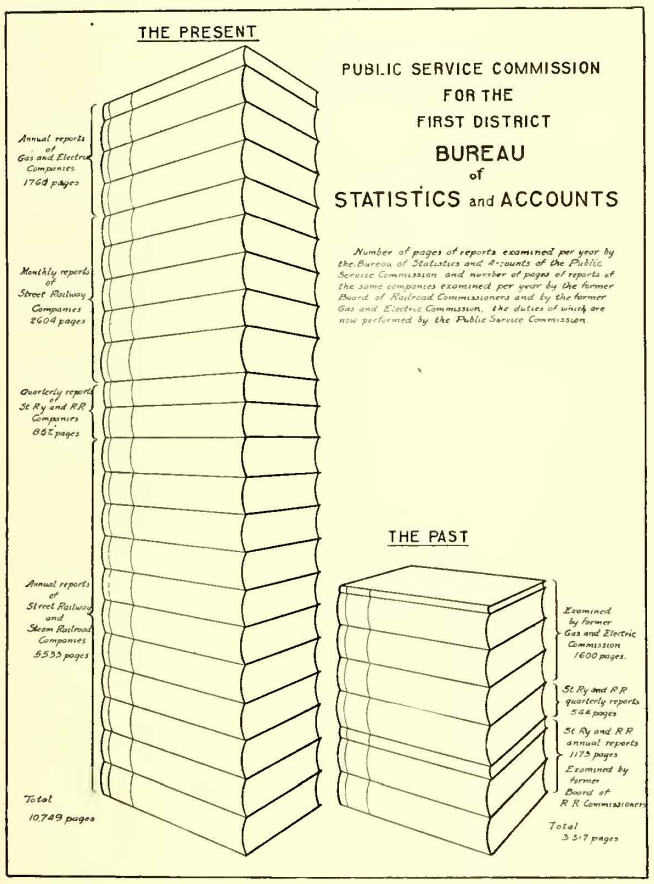
The Illinois Traction System is now completing plans for the largest block signal and dispatching signal installation ever made by an electric railway. It is proposed to protect 100 continuous miles of track on one portion of the system with automatic block signals and to install similar signals on all curves and other dangerous places on other lines operated by this organization. The automatic block signals will be in addition to the Blake dispatching signals which the company has been installing at each siding during the past summer. The selection of the type of automatic block signals is the hands of H. E. Chubbuck, general manager of the Illinois Traction System. It is likely that the contracts will be announced within a few days. It is the ambition of the Illinois Traction System to be known in the future as the "Signal Road" because of the comprehensive system of protection which will be installed.

EXHIBIT OF PUBLIC SERVICE COMMISSION

A unique exhibit has been given in New York under the auspices of the Board of Estimate and Apportionment of the city. It was entitled a "Budget Exhibit" and was given for the purpose of showing the citizens how their money is spent. Various departments of the city were represented. The exhibit was opened on Oct. 3 and was closed on Oct. 28. It was held in a building at 330 Broadway, Manhattan.

One of the principal features of the exhibit was the section devoted to the Public Service Commission for the First District. The commission showed by chart, circular and demonstration various features of its work since organization on July 1, 1907. The regulation division of the exhibit included a demonstration of testing gas meters, photographs of fender and wheel guard tests, a profile chart of ticket sales at subway and elevated stations and charts showing the cost of regulation and giving illustrations of economical management by the commission. In the rapid-transit division of the exhibit a full set of plans and specifications of the proposed tri-borough subway, a model of the existing subway and photographs showing views during construction of the present subway were given. Representatives of the commission were present to furnish information to visitors.

A profile chart was displayed showing ticket sales at subway and elevated stations and the Brooklyn and Williamsburg bridges and East River ferries, as illustrated in the issue of the ELECTRIC RAILWAY JOURNAL for May 29, 1909, page 979.



Public Service Commission Exhibits—Development of Statistical Work

This chart was originally exhibited at the Conference on City Planning and Municipal Art, held in New York in May, 1909. It has also been exhibited at the New York State Fair at Syracuse.

Diagrams were presented showing the distribution of the daily traffic by half hours on the surface lines of Greater New York. These were entitled "Homeward" and "Workward" charts. An explanatory poster stated in part:

"The difference in distribution between the morning and evening rush is well shown by these charts. The workward chart shows for three consecutive hours about 6 per cent of the total one-way movement. The homeward chart shows for two successive half hours about 7½ per cent of the total one-way movement. If the traffic were uniformly distributed each period would have about 2 per cent of the total, but during the morning rush the maximum is three times and during the evening rush three and three-quarter times this average."

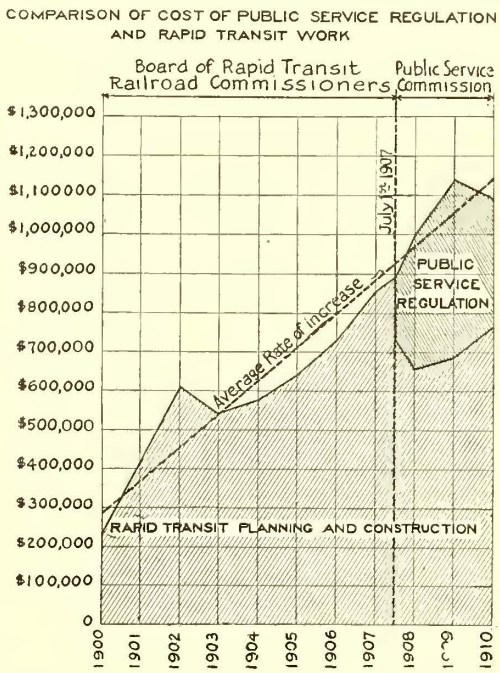


Chart Shown at Exhibit of Public Service Commission

A leaflet distributed among the visitors said in part:

"At the office of the Public Service Commission:

I. You can see—

"The certificates of incorporation, franchises, mortgages, deeds, agreements, leases, maps and other corporate and franchise papers of the railroad, street railway, gas and electric companies operating in Greater New York, all carefully indexed by companies and by subjects so that you can get them on a moment's notice—more than 5000 of them.

"Historical charts, showing the interrelations of all the companies—75 companies in the Brooklyn Rapid Transit system alone.

"Franchise charts and maps, showing when, where and from what authority each company acquired its franchises—over 60 franchise maps for Queens, 30 for the Bronx, 50 for Manhattan, 200 for Brooklyn.

"Territorial maps, showing the history and boundaries of the old towns, villages and cities whose franchise grants are now effective in any part of Greater New York—about 40 of them.

"Trackage and operating maps, showing the extent and location of each company's tracks, pipes or wires owned or operated.

"Indexes of legislative and local franchise grants, trackage agreements and street railway operation by streets, of car routes and of companies—700 railroad and street railway companies incorporated to do business in Greater New York.

"Historical route book, showing the route of every street car line operated in Greater New York since the Public Service Commission was established, with name of company and dates of changes in route or in operating company.

"II. You can find out—

"What companies have franchises in your section or on your street, and what their rights and obligations are.

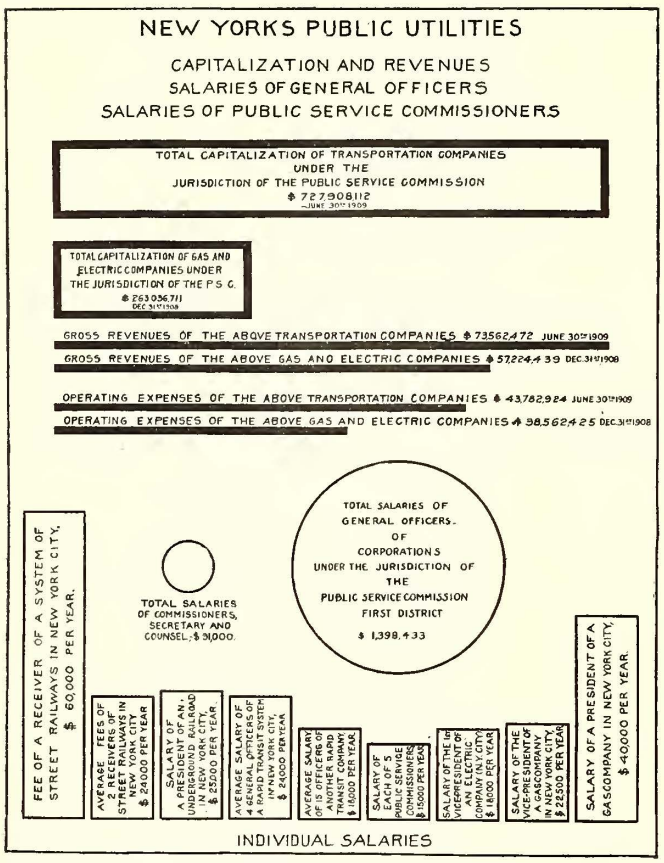
"What company or companies operated cars on a given street on a given day, where their offices are located, and who their officers are.

"What rapid-transit routes have been laid out in various sections of the city, and their present status.

"At what points street railway companies are required to give transfers, and at what points they do it voluntarily.

"III. You can get—

"An abstract of the monthly report of each street railway company operating in the City of New York, showing its earnings and expenses and the extent of passenger travel during the month.



Public Service Commission Exhibit—Comparison of Public and Corporation Salaries

"An abstract of the quarterly report of each railway company operating in the city, showing not only revenue, expenses and gross and net profits, but also assets and liabilities.

"The annual report of the Bureau of Statistics and Accounts, showing in complete detail the operating, financial and property statistics of every railroad, street railway, stage coach, gas and electric corporation (operating or lessor) in the City of New York, together with analyses and summaries of the statistics for each borough prepared by expert statisticians and accountants.

"Investors find this information indispensable.

"This is a public service commission.

"It has taken the Bureau of Franchises three years, with an average of nine persons at work, to get together the franchise information that is now available for public use.

"In the Bureau of Statistics and Accounts on the average 15 persons are constantly employed checking up and tabulating the financial reports of the companies for the information of the public.

"The personal attention of competent employees is given to every inquiry, and no one seeking legitimate information can get away without it, if the commission has it."

A poster called attention to the collection of books, pamphlets and articles from technical periodicals relating to public utilities and rapid transit contained in the commission library. The library comprises 2600 volumes and 6000 pamphlets. The commission employees refer to 300 of these volumes and pamphlets per week, or about 15,000 per year.

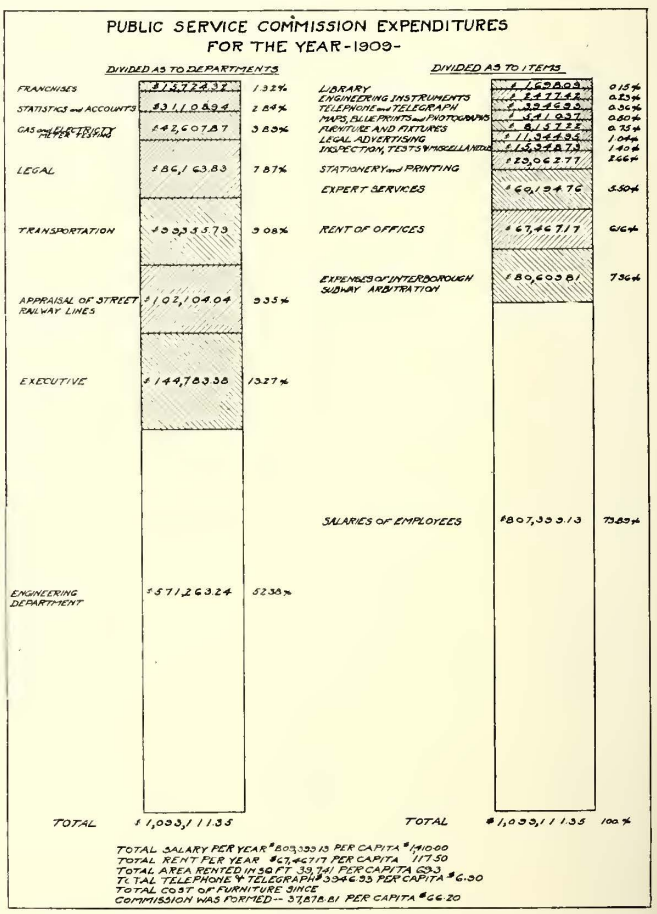
On a chart entitled "Commission Stationery, Quantity and Cost," samples of the different classes of stationery and of pencils, etc., were displayed together with figures showing the average cost of each.

A statement was presented showing the increase in service on the surface lines in New York since the organization of the commission.

One display which attracted attention related to economy in drinking water. On a water cooler in the section of the building devoted to the exhibit of the commission a placard was displayed reading as follows: "Cost of bottled spring water for 600 employees, 1909, $407.50, discontinued in 1910. Cost of Croton water, filtered, including coolers, bottles, filters, etc., good for five years, per year, $35.90. Saving per year, $371.60."

The statistical department presented the forms of reports required now and those used by the preceding State bodies. A poster stated: "Formerly only a few general statements were required of the companies. Now the facts which are essential to public control are required to be recorded in detail. The constant supervision of corporation bookkeeping exercised by the Public Service Commission requires a staff of extra accountants and statisticians to make critical examinations of the companies' reports and books of account, but saves the heavy expense attending special investigations which had to be made at intervals when no permanent supervision was provided."

In connection with photographs of the fender tests made at Schenectady, N. Y., and in East Pittsburgh, Pa., in 1908, the commission exhibited a poster stating that the steady decrease in the number of lives lost each year showed the beneficial results of the orders of the commission for the installation of efficient life-saving devices, the overhauling and repair of cars,



Public Service Commission Exhibit—Expenditures by Items and Departments

the maintenance of equipment in effective condition, and the better protection of grade crossings. The figures for the number of lives lost are shown in the following table:

Fiscal year.	Steam, Subway and Elev.	Street Surface.	Total.
1907-1908	203	303	506
1908-1909	184	199	383
1909-1910	189	152	341

Other charts shown by the Public Service Commission at the exhibit are reproduced herewith.

RECENT CAR HOUSE CONSTRUCTION IN CHICAGO

The second annual report of the Board of Supervising Engineers, Chicago Traction, presents interesting descriptions of several new car houses built during the last three years by the Chicago Railways and the Chicago City Railway companies. A number of these structures have been illustrated and described in this paper, but the observations of the board regarding principles of design and some remarks on the types of construction are abstracted from the report.

CAR HOUSE CONSTRUCTION FOR YEAR 1908

During the year 1908 the Chicago City Railway Company completed the work on two fireproof car houses located at Seventy-seventh Street and Vincennes Road and at Thirty-eighth Street and Cottage Grove Avenue. These buildings are described in detail in the first annual report. In addition this company built modern, fireproof car houses at Sixty-ninth Street and Ashland Avenue and at Thirty-eighth Street and Archer Avenue, giving this company a total of four new, modern, fireproof car houses capable of housing 1095 cars. The capacity required by the ordinance is 1051 cars; therefore, the Chicago City Railway Company, with the completion of these four new car houses, will have complied with its ordinance requirements relating to car houses.

The Chicago Railways Company during the year 1908 built two new car houses. The West Twenty-fifth and Leavitt Streets car house has a capacity of 142 cars, while the Lincoln Avenue car house as originally planned has a capacity of 94 cars. During the year 1908 only three bays of the Lincoln Avenue car house were built. Each bay has a capacity of 18 cars, making a total for the three bays of 54 cars. This car house may be further extended if desired.

Work has also started on a new car house at Kedzie Avenue and Van Buren Street, which will have a capacity of 291 cars. Plans have also been made for a new car house at Ogden and Fortieth Avenues, known as the Lawndale car house, which when completed will have a capacity of 187 cars. Plans have been made for the construction of a new car house at North Clark Street and Dewey Place, known as the Limits car house, which will have a capacity of 86 double-truck and seven single-truck cars. These five modern, fireproof car houses will have a capacity of 807 double-truck cars.

Several of the old car houses have been temporarily reconstructed by the moving of posts, rearrangement of tracks, etc., so as to permit the entrance of the large new cars. It is the intention to house some of the new equipment as it is received at these reconstructed car houses until such time as new, modern, fireproof car houses shall be built.

The Burnside car house of the Calumet and South Chicago Railway Company was partially rehabilitated during the year 1908 by the building of two new pits and changing of entrance columns and tracks. The determination of car house requirements for this company is to be made during the year 1909.

GENERAL BUILDING FEATURES

In the construction of all the new buildings of the companies the general building ordinances of the city of Chicago have been complied with and all buildings have been built substantially fireproof, thus guarding against great loss of cars and obtaining the minimum rate of insurance. All the new car houses of the Chicago City and the Chicago Railways companies have been designed with the double-end feature, so that cars may be turned into the car house at the rear end. The car then moves progressively through the hands of inspectors and cleaners, and is thoroughly inspected, washed, cleaned and disinfected, and placed at the forward end of the car house ready to go out on the line as the service may demand. This design of house permits of the rapid handling of cars without any unnecessary shifting from track to track and enables the work to be done on the cars at a minimum expense.

It has been the special effort of the Board of Supervising Engineers to improve the architectural features of both substation and car house buildings. Such buildings, if architecturally well designed, are an asset beyond their intrinsic value; they have a definite effect for good, not only among the employees, but also upon the general public. Particular attention has been paid to meeting the recommendations of the Chicago Board of Fire Underwriters, so as to reduce to a minimum the rates of insurance. By reducing the number of cars stored in each bay it has been possible to minimize the amount of equipment which could be damaged in case of fire, so as not to cripple the service to any serious extent.

GENERAL DESIGN OF CAR HOUSES

In the first annual report of the chief engineer of the work the following points regarding car house design were discussed in full: Closed storage versus open storage of cars; single and double-end car houses; pit area and washing facilities; architectural features; fireproof construction; area between fire walls.

Further points regarding the latest approved design of car houses will now be taken up:

DESIGN

In considering the question of the design of the new car houses of the railway companies the following conclusions were reached:

(1) All car houses that are to be permanent should be divided into bays or sections, so as to reduce the loss in case of fire to a minimum.

(2) All new car houses to be built should be divided into bays or sections of fireproof construction.

(3) When an old car house is to be remodeled so as to become a permanent structure, involving the expenditure of considerable money, such building shall be fireproof.

(4) When it is necessary to remodel an old car house which will probably be abandoned in the near future such modifications should be made with as little expense as possible and yet make it reasonably safe for the property within it. Such temporary structure should be replaced by a new car house at the proper time, at the same or a more desirable location.

(5) Wherever conditions will permit car houses should be of the double-end type.

FLOORS, PITS AND ROOFS

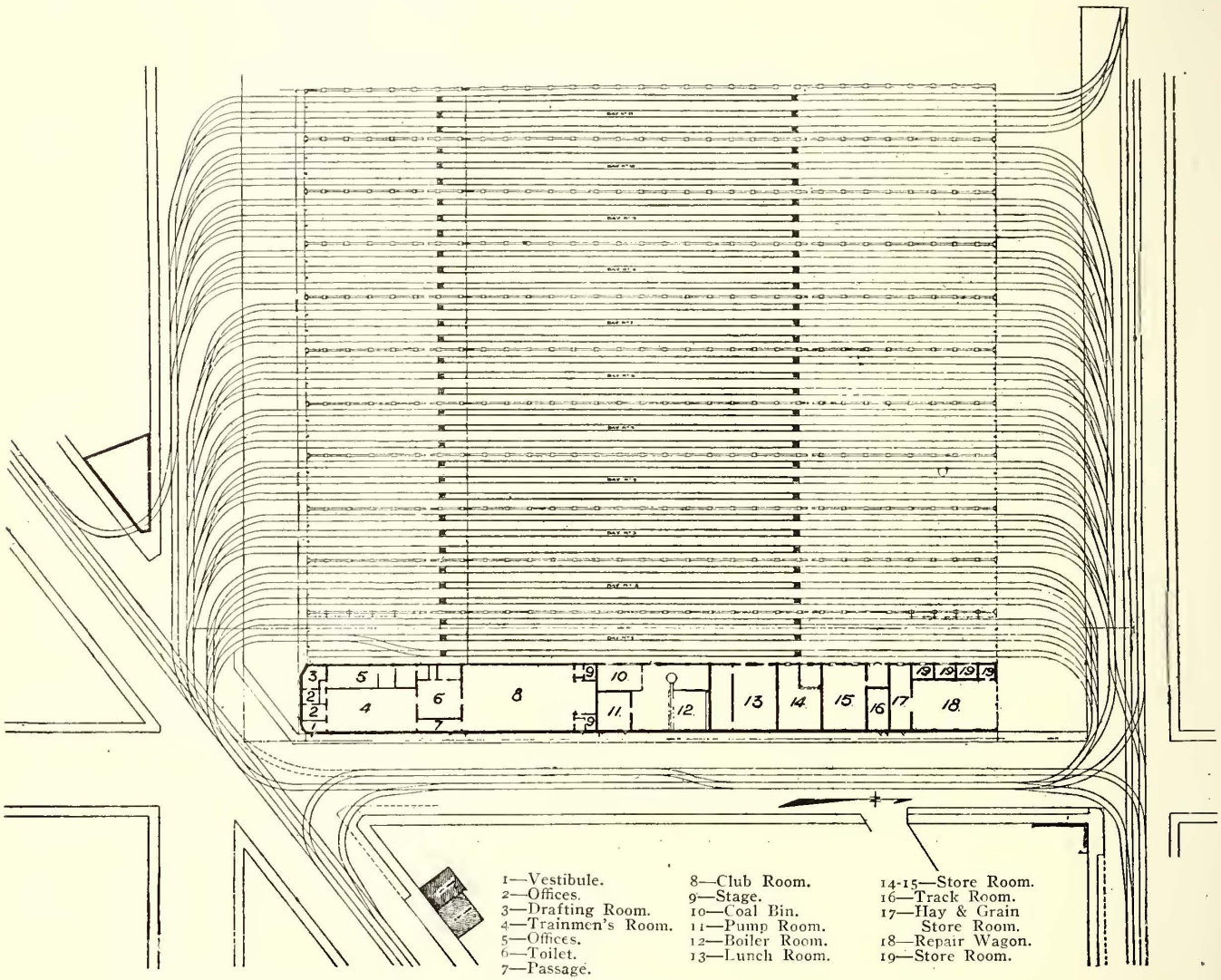
In all new car houses concrete floors are being laid throughout the entire house. Open pits have been used in all car house bays, with a reinforced concrete floor between rails of the adjoining tracks and with concrete sub-floors for all pits. All floors have been graded so that water will flow readily to the drains. This is a great improvement over the old car houses, where cinder or dirt floors were the rule. Very little drainage was provided in the old car houses, and the men in washing the cars, especially in the winter time, were compelled to wear rubber boots. The water stood in all the pits, and the interior of the house was in an undesirable and unsanitary condition. This condition was often made worse by the storing of material in the pits. The new car houses with the well-drained concrete floors are very easily kept clean, dry and in a healthful condition.

The open-pit construction which has been adopted in the new car houses has a great many advantages over the old construction. Inspectors and repair men can readily pass from one pit to the other as they go over the cars without going up and down the stairs. Men working in adjoining pits can pass tools, etc., to each other with ease.

Reinforced concrete slab roofs have been decided upon as the best fireproof roofs for car houses. Reinforced concrete forms ample protection against the flames from burning cars, and by the use of skylight monitor openings with plain glass sides, which automatically open in case of fire, the flames have a vent. For car houses a flat type of roof is greatly to be desired on account of the large area to be covered. The roof is placed as close to the trolley wire as possible, so that the cost of the building is decreased. A uniform height of 18 ft. to the reinforced concrete girders supporting the roof slabs has been used, with all door openings of the same clear height. By this construction it is possible to bring the trolley wire in from the street on the same level and the chances of the trolley pole

leaving the wire in passing from the street to the overhead special work entering the car house are minimized.

The earlier car houses which were built with concrete roofs, for example the Cottage Grove Avenue and Thirty-eighth Street and Seventy-seventh Street and Vincennes Road car houses of the Chicago City Railway Company and the Lincoln Avenue and the West Twenty-fifth and Leavitt Streets car houses of the Chicago Railways Company, were 47 ft. 6 in. between fire walls. On account of this long span the cost of the entire roof was rather high, especially in the girder construction. Later car houses have been built on property such that a longer house could be obtained and bays built three tracks wide, giving 37 ft. 6 in. span for the concrete roof girders; thus it is possible to get the same storage capacity in each bay, approximately $200,000 money value in rolling stock, and allow of a greater saving in the concrete roof construction.



Final Plan of Chicago City Railway's Car House at Archer Avenue and Rockwell Street, Chicago

SKYLIGHTS

In the most lately designed car houses skylights have been placed in the center of the bays, extending the full length of the house, except for the last pilaster bent of 16 ft. at each end. Skylights have been built over approximately 20 per cent of the area of the storage bays. In the case of the Lincoln Avenue and the West Twenty-fifth and Leavitt Streets car houses a different type of skylight construction was tried out. This construction, briefly stated, was the placing of small 2 ft. by 3 ft. skylights over each aisle between cars and over the aisles between the cars and the fire walls, these skylights being uniformly placed in each 16-ft. pilaster bent. The advantage to be gained by the use of this construction was a more uniform distribution of light and the placing of the light where it was most needed. It was found, however, after these two car houses had been built that this type of car house construction was more expensive than the central skylight construction, and that the lighting obtained from its use was not a sufficient improvement to warrant the increase in cost. It has, therefore, been decided to use central skylights in all standard fireproof car houses. The increased cost of the distributed skylights is due to the concrete curbing which is required at each end of the great number of small skylights. It is also due to the increased cost in sheet-metal work on the greater number of skylights and to the increased amount of flashing required in the roofing. The roofing felt has to be cut, fitted and placed around the greater number of small skylights, while with a central skylight the felt is applied in one continuous stretch on each side of the skylight.

HEATING

Both the blast system of heating car houses and the pipe-coil direct-radiation vacuum system have been used. A blast-heating system has several advantages over a direct-radiation system. In car houses the doors are open for a considerable time when cars are leaving or entering. At each time, however, the doors are open at only one end of the house, as the case may be. When the doors are again closed and warmth is desired the blast-heating system raises the temperature more quickly; with a direct-radiation system a large quantity of piping becomes necessary, which requires considerable attention in order to keep the joints tight. A vacuum pump is also required in order to return the condensation to the boilers, while with a blast system the heater can be placed at such an elevation that the condensation will return to the boilers by gravity.

Direct radiation, however, has one great advantage over the blast system, in that the pipes can readily be laid in the pits under the concrete floor decks, out of the way, and a more even heating obtained with less inconvenience to the men working in the pits. Further, with a direct-radiation system pipe coils can be placed around the walls and directly over the doors to temper the incoming cold air.

REPAIR BAY

Every car house has been provided with one bay equipped for the general repairing of cars. This repair bay is generally placed next to the office and storeroom bay. Overhead traveling cranes spanning the entire repair bay have been installed so that car bodies may be shifted from one set of trucks to another with little delay. These cranes are also useful for the moving of trucks, etc.

General repair tools are provided for the overhauling and repairing of cars, such as motor-driven lathes, drill presses, emery stones, etc. If a car is in need of extensive repairs it is not handled at the car house, but is taken to the main repair shops.

CLUB ROOMS AND ACCOMMODATIONS FOR TRAINMEN

The question of providing ample accommodations for the division superintendents, car house foremen, repair men, clerks and trainmen has been carefully considered. Separate offices have been apportioned to the division superintendents and car house foremen, as well as to the receivers and callers or dispatchers. These rooms face on large well-lighted assembly rooms for the trainmen, and are provided with suitable counters where trainmen can make out their reports. In addition, club room facilities are being provided at all of the large and most important car house sites. The club rooms consist of a large hall, with a stage at one end, and anterooms which can be used for committee, chess or card rooms.

ARCHER AVENUE AND ROCKWELL STREET CAR HOUSE

This car house now has seven fireproof bays, six of which are storage bays of three tracks each and the seventh is a repair bay. The trainmen's quarters, club rooms, toilet rooms and the division superintendent's office are provided on the first floor in the office section, which parallels the repair bay. The storage capacity inside this house is 210 cars, with an additional temporary capacity of 28 cars outside of the building on the special work at each end. The repair bay is practically a duplicate of the storage bays, except that a sand storeroom is built at one end of the wheel storage track. This bay has two 3-motor traveling cranes. There are 5040 ft. of inspection pits provided in these seven bays, which have a total straight trackage of 10,220 lin. ft., making 49.3 per cent of all straight track inside of the car house pit tracks. The construction of this building was started in August, 1908. The accompanying cut shows the final plan of this car house.

The entire house is built of fireproof construction. The roof is of reinforced concrete slab construction and is carried on reinforced concrete girders of the same design as those used in the Sixty-ninth Street and Ashland Avenue car house. Skylights have been provided in this car house to the extent of 20 per cent of the total square foot area of the building. These skylights are similar to those used on the Sixty-ninth Street and Ashland Avenue car house. It has been the idea of the Chicago Board of Fire Underwriters that the use of thin glass would be advantageous in car houses, for the reason that such glass would act as an automatic door, providing a hole in the roof for the escape of smoke and gases in case of fire.

The building is heated by a direct steam vacuum system. Three 100-hp horizontal tubular boilers have been installed and they are connected by means of a steel breeching to the concrete stack. The office section has been built adjoining the repair bay, and facing on Thirty-ninth Street is the trainmen's assembly room, with offices of the division superintendent and clerks extending around the side of this room. To the rear of the assembly room is the toilet room, in which room has been provided for one barber's chair. The floors of both the assembly room and the toilet room are of concrete with a red wearing surface. To the rear of the toilet room is a club room with a stage at one end. By means of the passageway from the assembly room to the club room, which has a door from this passageway to the street, access is gained to the club room without passing through the assembly room.

Automatic steel fire doors have been provided in all of the car houses in all fire walls so that direct passageway can be obtained throughout the entire building. This plan has been provided in all of the four new car houses of this company.

LINCOLN AND WRIGHTWOOD AVENUES CAR HOUSE

This building has been erected partly on the site of the old Lincoln Avenue cable power house and partly on the site of the old Lincoln and Wrightwood Avenues car house. To make room for the new car house the old power house building and stack were torn down. The dismantling of this brick stack was required to be done without any damage to adjoining property. In order to remove the stack a ladder was built inside by which workmen could reach the top. The bricks were loosened at the top and thrown down inside of the chimney, a deflecting board being placed at the bottom so that the bricks would pile up outside, whence workmen could haul them. It was found that by this method the stack could be torn down very rapidly and economically without danger to persons or property.

This car house has been built with five standard storage bays, with four tracks in each, and one repair bay, with one single repair track and an industrial track. The total length of straight track inside of the building is 5251 lin. ft., of which 3350 ft. is over pits, making 63.8 per cent of the total trackage inside of this car house over pits. Skylights were placed throughout the building to the extent of 11.31 per cent of the entire ground area of the building. These skylights (2 ft. by 3 ft.) were arranged so as directly to light up the aisles between cars, a large number of them having been required under this scheme of lighting. It had been found that a smaller percentage of the entire area could be used and give a better lighting effect than is ordinarily obtained with a center skylight. The cost of these skylights was increased, as more framing was required. It was also found that the roofing was more expensive, as more flashing was required, there being no large straight area to be roofed. It has, therefore, been decided that, while this diffused lighting scheme gives a fine lighting effect, yet from the standpoint of cost and general utility the central skylight is much to be preferred.

A reinforced concrete slab roof carried on reinforced concrete girders was placed over the entire car house. On account of the large number of small skylights, longitudinal reinforced concrete beams were required to carry the roof loads to the large reinforced concrete girders spanning the bays. A five-ply, coal-tar pitch, felt and gravel roof was laid over the entire building, the same as at the West Twenty-fifth and Leavitt Streets car house.

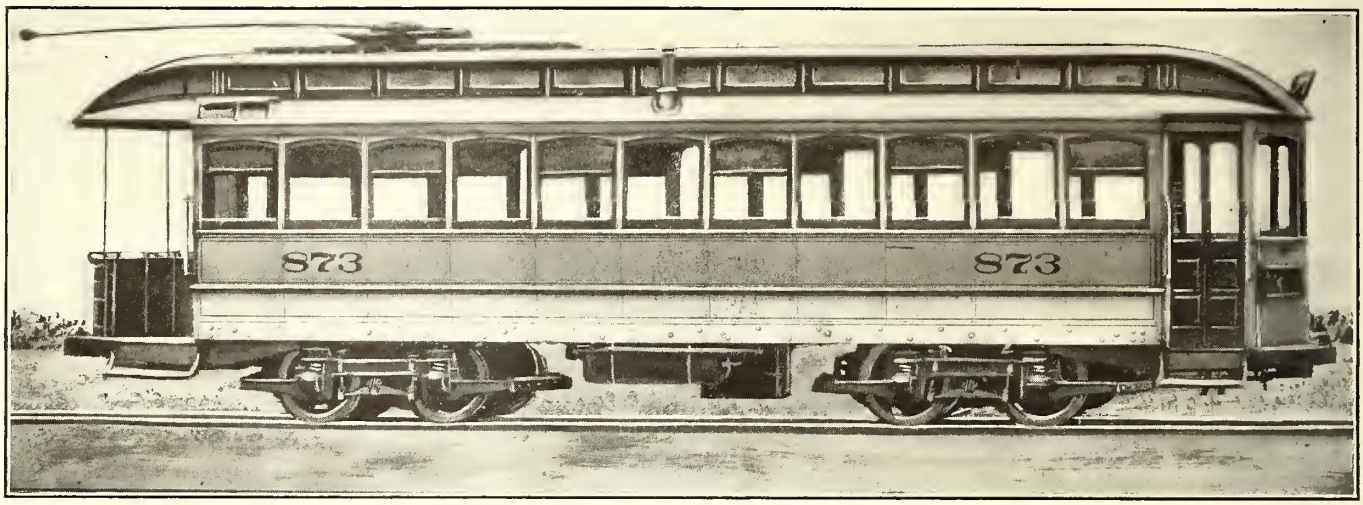
The heating plant consists of blast apparatus, which occupies two rooms in the office section. Hot air is distributed throughout the car house from the blowers, which discharge into large underground concrete ducts. Automatic steel fire doors were placed in the concrete heating ducts, where they pass through the fire walls, the same as at the West Twenty-fifth and Leavitt Streets car house. Two 100-hp horizontal tubular boilers complete the heating apparatus. These are connected to a concrete stack by means of a steel breeching.

In the repair bay a traveling crane was installed, spanning both the repair track and the industrial track. On account of the shallowness of the property it was found necessary to have the tracks near the car house on a curve, two doorway openings only being used for each bay, the tracks in each bay branching off just inside of the building. This building was started in the year 1908 and three car storage bays were completed.

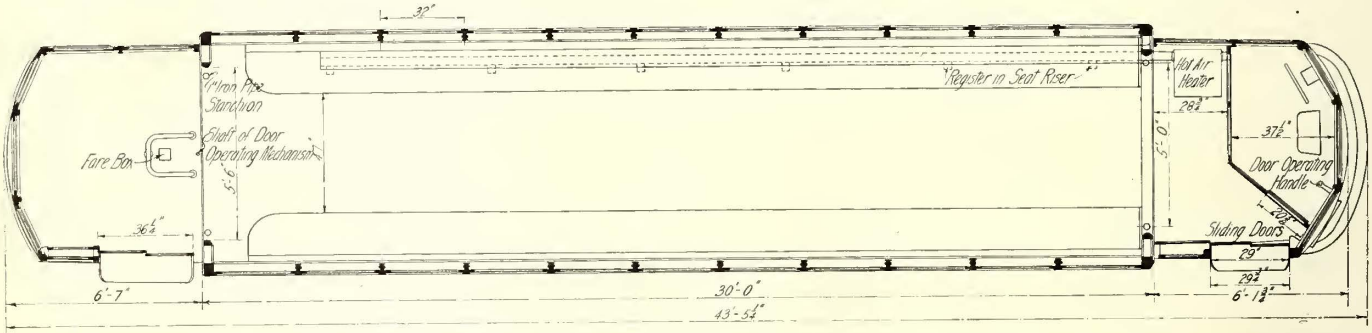
The advertising literature which is being sent out from a popular seaside resort on the southeast coast of England conspicuously states among other advantages that there are no electric tramways in the town. Why should electric street cars be a negative attraction?

PAY-WITHIN CARS IN CLEVELAND

The Cleveland Railway is rebuilding 300 of its double-truck, single-end closed cars with 28-ft. and 30-ft. bodies for pay-within operation under license from the Pay-Within Car Company. Fifty of the cars are to be fitted with collapsible sliding doors over the steps operated manually by a mechanism designed and patented by Terrance Scullin, master mechanic of the railway company. The remaining 250 cars will be fitted with double folding doors and manual operating mechanism furnished by the Pay-Within Car Company. Ten cars with sliding doors and 50 cars with folding doors were rebuilt by the G. C. Kuhlman Car Company, Cleveland; the other cars are being rebuilt in the railway company's shops at the rate of eight or ten a week. As fast as the cars are turned out of the shops they are being put in service.



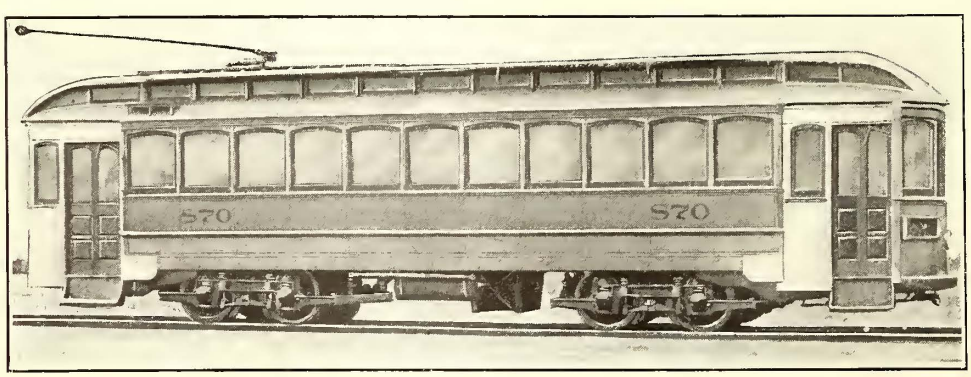
Cleveland Pay-Within Cars—Type of Car Rebuilt



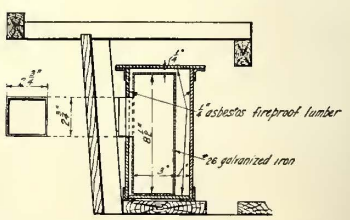
Cleveland Pay-Within Cars—Floor Plan of Car with Sliding Doors

The bodies of these old cars were only 7 ft. 5 in. wide over side sills and they were furnished with longitudinal seats. Only minor alterations in the car bodies were required to adapt them for pay-within operation. The front and rear end bulkheads and sliding doors were removed and the body corner posts and end plates were furred out to form arched openings 5 ft. 6 in. wide. At the rear end the longitudinal seats were cut away for a distance of 13¼ in. and the corners were rounded off to facilitate entrance from the platform. Iron pipe stanchions were put in just inside the corner posts to serve as grab-handles when stepping up or down from or to the platform floor.

Most of the old cars had short enclosed front platforms and open rear platforms. Both platforms have been lengthened and entirely enclosed and this necessitated reinforcement of the platform underframing. The old center knees were left in place and two new knees, 2¾ in. x 7 in., were attached just outside of the old ones. The new side knees, which were also 2¾ in. x 7 in., were reinforced with 3-in. x 4-in. angles on the bottom. The rear platforms were lengthened to 6 ft. 7 in. and the front platforms to 6 ft. 10¼ in. over the bumpers. The motorman's vestibule on the front is formed by a glass and wood partition. Between the partition and the end of the car body on the left-hand side is placed a Peter Smith hot-air heater. On the rear platform is mounted a fare box surrounded on three sides by a pipe railing. The conductor stands inside the car facing the fare box.



Cleveland Pay-Within Cars—Rebuilt with Sliding Doors



Hot Air Duct Under Seats

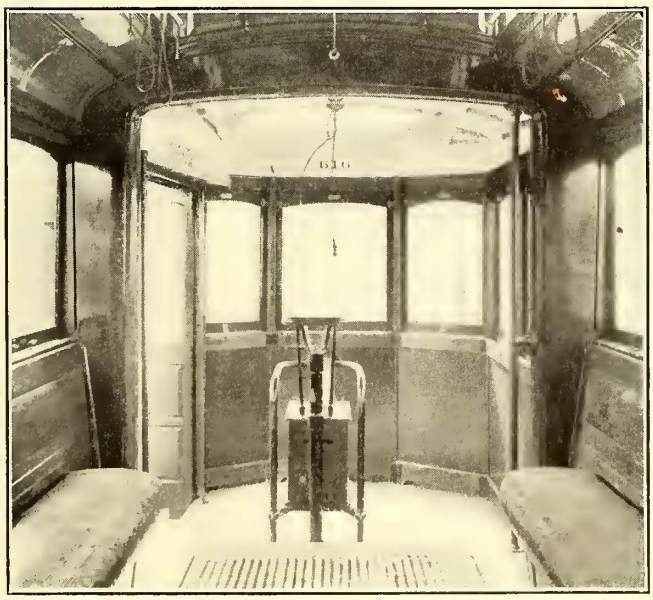
On the cars equipped with sliding doors the entrance opening is 36¼ in. wide and the exit opening on the front platform is 29 in. wide. The cars with folding doors have an entrance

opening 48 in. wide, and the doors fold outwardly in pairs. The entrance and exit steps are stationary for both types of doors. The Cleveland Railway did not believe that the complication of apparatus and the extra weight and expense of folding steps was warranted, as no trouble had been experienced in the past from attempts to board moving cars with doors closed.

The operating mechanism is very similar for both types of

Cleveland Pay-Within Cars—Rear Platform with Folding Doors

doors. A crank on the upper end of a vertical rod which projects down through the floor is turned by the motorman or conductor, as the case may be. This motion is imparted to the doors through a series of rods, levers and bell cranks under the platform floor and across the top of the door openings. The conductor's operating stand is immediately in front of the fare box and the motorman's handle is mounted on the



Cleveland Pay-Within Cars—Rear Platform Showing Fare Box and Control Stand

front of the vestibule just to the right of the air-brake valve.

The heater, which is mounted on the front platform, is connected to a hot-air duct, 3 in. x 8½ in., built under the left-hand longitudinal seat. Six registers in the seat riser admit the warm air into the body of the car.

The London County Council has decided to apply for Parliamentary powers for the construction of 22½ miles of new tramway lines. It now operates 113½ miles of electric lines and 19 miles of horse-car lines.

NOTES ON THE MAINTENANCE OF ELECTRO-PNEUMATIC CONTROL

BY A CONTROL INSPECTOR

Within the past four years multiple-unit control apparatus of the electro-pneumatic type has been brought to a high state of efficiency. While this control has been fully described from time to time in the ELECTRIC RAILWAY JOURNAL, little or nothing has been published regarding its maintenance. Nevertheless, this subject should be a live one at present because this apparatus is so extensively used in heavy electric traction. It may, therefore, be of interest to present some particulars based on experience with the maintenance of electro-pneumatic control from the time when it was in the experimental stage up to and including the development of the present standard apparatus.

MASTER CONTROLLER

The starting point in a discussion of the electro-pneumatic control is the master controller. This is a very efficient piece of apparatus owing to the low operating potential of 14 volts. Consequently it requires no blow-out coils, arc shields or renewal drum segments. The only trouble for which master controllers are ever reported is the breakage of the return spring, which is easily repaired. The only maintenance needed by the master controller is a semi-annual cleaning, when the tension in the fingers should be adjusted, the bearings oiled, and the drum wiped clean with a rag moistened with machine oil and then wiped dry with cheese cloth. However, master controllers which have run 18 months without receiving such attention have been found in good operating condition at the end of that time.

JUNCTION BOXES

The junction boxes are usually located under each master controller and at the unit switch group. They should always be kept dustproof and should be blown out with compressed air at each regular overhauling. On the latter occasions the connection nuts should be tightened with a small special T-socket wrench. This wrench is a very useful tool, for it also fits all interlock connections and its use saves the terminals from destruction by gas pliers or pincers.

STORAGE BATTERIES.

The next detail in order is the storage batteries which supply the 14-volt current used to operate the control magnets. Some railway men consider this use of storage batteries an undesirable feature of the electro-pneumatic control and prefer a control system in which the train line receives its energy from the trolley circuit and operates at a voltage much higher than the battery potential; but the writer's experience with both seven-wire, 14-volt and seven-wire and 10-wire, 600-volt train lines convinces him that a low train line voltage is one of the most valuable features of a control system. Aside from the daily throwing of the battery switches, which is done so that the two sets will alternate daily in charging and discharging, the maintenance of these batteries requires very little time or trouble. The battery switch throwing is just as much the duty of the motorman as it is for him to cut in more than one air compressor.

Although the maintenance of the storage batteries does require very little time or trouble, whatever work is necessary should be carefully followed up, for slack methods will not suffice. At each inspection a voltage reading of each set of batteries should be taken from the battery switches. Then once a month the batteries should have a half-hour inspection, to include taking the voltage and specific gravity of each cell, adding distilled water or chemically pure acid to restore the specific gravity and proper acid level of each cell, cleaning the wire terminals at the end of each tray and tightening all connections. Once a year each cell should be overhauled, at which time the individual plates should be brushed clean, the mud cellars emptied and the electrolyte replenished; further, each battery terminal should be carefully cleaned, tightened and coated with petroleum jelly, the battery trays and

boxes should be cleaned and coated with a heavy asphaltum paint, and the battery set should not be put in use until fully charged.

Several points require special mention in connection with battery maintenance: First, to avoid broken electrode straps each set of plates should fit snugly in the battery cells and each cell should fit snugly in the battery trays; second, it is very easy to reverse the polarity of a tray of batteries when assembling them, and as this not only injures the batteries but interferes with train operation, the possibility of such an error should be minimized by painting a large plus sign on the positive end of each tray and a corresponding plus sign on that end of the battery box having the positive leads; third, the batteries should be placed in an accessible position, as much time can be lost in handling inconveniently located batteries; fourth, the battery boxes become acid-soaked in time and consequently ground through the iron hangers. This grounding not only allows a leakage of battery current but aggravates serious control trouble; it should be prevented by insulating the hangers from the body frame by insulated bolts such as are used for resistances.

Batteries may be charged from the ground side of the car lights, the ground side of the air-compressor motor or from a tap taken off a trolley contact on the unit switch group through a high resistance. In any case the charging line should be fused. The second and third methods are preferable, as they give a charge more nearly proportionate to the amount of discharge. However, charging from the switch group eliminates the delay required with the air-compressor method. The charging relay and fuses should be examined at each regular inspection.

SWITCH GROUP

The most important feature of the electro-pneumatic control is the switch group. The maxim of the successful maintainer of this control is: "Keep the magnet valves clean," but this is not as generally recognized as it should be. The neglect of the magnet valves means switch contacts welded, increased burning of contacts, slow operation of the switch group and failure of switches. These various troubles arise from the condition that the shoulder of the magnet needle valve is designed to limit the flow of air to the switch cylinder. Hence any gum on this shoulder decreases the amount of air which can enter the cylinder and operate the switch. Troubles from this source may be entirely prevented by removing the magnet valve needles every two months and cleaning them thoroughly with cheesecloth. In addition, the valve seat casting should be removed at each regular overhauling and boiled in a solution of potash to remove the accumulated gum.

The next detail in the order of its importance is the piston packing leathers. These should be taken out and soaked in oil about once a year or whenever they develop leaks. The pistons should not be allowed much lost motion in the cylinder bushings, and it is a good plan to renew these bushings at each regular overhauling. The magnet comes next. The armature cups should be kept free from dirt and the magnet armatures and stems should be kept clean. If the stems become cut at the valve seats they should be replaced, for grinding the seats tends to allow the magnet armatures to come down on the pole pieces, thereby causing a sluggish release of the magnet armatures due to residual magnetism. This should be further prevented by renewing worn copper plating on the magnet armature.

When control equipments are furnished the manufacturer specifies the correct magnet armature travel. This travel should be checked at regular overhaulings, the necessary adjustment being made by lengthening or shortening the needle valve stem since the length of this stem determines the amount of travel. Again, after the magnet armature travel has been properly adjusted it may be found that the magnet armature is slow in pulling down. This effect most likely is due to a long magnet armature stem, but in shortening this stem great care must be taken to keep the armature clear of the pole piece when attracted.

The interlocks of the switch group require very little attention. Of course, the contacts should be kept clean and the fingers should be watched when the switches operate to note if they have sufficient tension to follow the contacts quickly. A large amount of interlocking used in the low-voltage electro-pneumatic control has been criticised by some railway men, but the writer's experience proves that when these interlocks are maintained properly and are not meddled with they give practically no trouble whatever.

The whole switch group should be overhauled about every two years. While two years may seem a long time between overhaulings, it is even practicable to increase this period if all the details noted have been carefully followed. At these overhaulings all magnets, cylinders, switches, arc chutes and interlocks should be taken apart and all worn parts renewed. This should include the rebushing of worn fingers and switch arms, the renewal of all pins, cotter pins, lock washers and wiper springs and the retinning of shunt terminals. The motor-circuit terminals and connections should be carefully inspected, cleaned and tightened. The blow-out coils and control magnets should be given an ohmmeter test for short-circuits. The magnets should be treated as hereinbefore noted and the terminals and terminal insulators inspected and cleaned. All worn gaskets should be renewed and the pipe insulators should be inspected very closely. The interlock contacts should be cleaned and smoothed with crocus cloth. Interlock fingers should be taken down and renewed in all cases where the contact surface has worn enough to increase the length of contact. This is important, as increased contact surface on the interlock fingers interferes with the original adjustment of the interlocks. In all cases the tension should be restored to each interlock finger before replacing it. In reassembling the switch group all moving parts subjected to wear should be sparingly oiled, and finally it is advisable to give each overhauled switch group a breakdown test of from 2000 volts to 3000 volts.

All those points of the switch group which require particular attention have now been noted; otherwise the switches practically take care of themselves, although carelessness in tightening screws, etc., will give trouble as in any other apparatus. However, the important point of ventilation remains to be mentioned. Some control apparatus has been turned out in utter disregard of the fact that an electric arc generates gases which on cooling deposit soot on adjacent surfaces, and that this soot, particularly in damp weather, will conduct an electric current. It is essential, therefore, that some means be provided to allow the rapid escape of these gases. Such provision will materially reduce the amount of cleaning which the switch group requires.

REVERSER AND LINE SWITCH

The magnets, valves and cylinders of both the reverser and line switch require no attention in addition to that previously suggested for the switch group, but the reverse interlock, owing to its location, is apt to be neglected, so care should be taken to inspect the fingers and contacts on each inspection. The moving contacts and the fingers of the electro-pneumatic reverser require little attention. The two contacts on each side, which are easily reached, occasionally should receive a thin coating of petroleum jelly and about once a year all the fingers should be taken down for cleaning and the restoration of the spring tension.

The electro-pneumatic line switch, type No. 222 or similar, is a very efficient piece of apparatus. The superior ventilation of the arc chutes, the powerful magnetic blow-out and the heavy piston spring combine to give a current breaker which remains unaffected after breaking the heavy currents caused by grounded armatures. It is advisable to take out the switch head about every two months and examine wiper springs, shunts, contacts, cotter pins and finger pins, replacing all parts, except contacts, which show the least signs of wear or overheating. This is also a good time to remove the brass side pieces and blow out the interior with compressed air.

Some control equipments are designed so that the line switch

operates merely as a circuit-breaker and the motor circuit is normally broken by the switch group. Other equipments have the line switch and switch group drop out together and the rupture of the motor circuit is supposed to be divided between the switch group and the line switch, while in still other equipments the line switch is arranged to drop out ahead of the switch group and the motor circuit is thereby normally broken by the line switch. The writer's experience has included the care of equipment arranged according to each of these methods and he strongly believes that the last method is the most desirable, because the line switch is perfectly capable of handling this arc and thus carbonization and tip burning in the switch group is avoided.

RESPONSIBILITY FOR MAINTENANCE

Different roads pursue different methods in caring for electro-pneumatic control. The writer knows of one large company which employs an experienced inspector to do nothing but inspect the control, while other less experienced men do the cleaning, adjusting and repair work noted by the inspector. In this case the inspector is the only man responsible for the condition of the equipment. This company further places all pneumatic parts of the equipment under the care of the pipe fitters and the wiremen are not allowed to touch these parts. Another large company has all inspection and light maintenance repairs made by inspectors who are held accountable for their work until the next inspection, and all important repairs and adjustments are made by experienced controller men. This company places the entire control, both electric and pneumatic, under the care of wiremen, but the writer believes that the best results are obtained by placing a certain definite number of cars under the care of one experienced controller man who is thoroughly familiar with both the principles and details of the entire control. This man can then be held responsible for all the control equipment on each car under his charge. If the number of cars warrant it, he is provided with a helper, as numerous jobs require the assistance of a second man. Wherever this method of maintenance has superseded some other method there has resulted a marked improvement in control efficiency.

PROPOSED SYSTEM OF UNIFORM STREET RAILWAY ACCOUNTS IN NEW JERSEY

A short account of the proceedings before the Board of Public Utility Commissioners of New Jersey in relation to a uniform system of accounts for street railways was published in the ELECTRIC RAILWAY JOURNAL of Aug. 27, 1910. During the proceedings depreciation was discussed briefly by representatives of the commission and the companies. This subject was brought up by Philander Betts, chief inspector of the utilities division of the commission.

C. L. S. Tingley, second vice-president of the American Railways Company, which controls the Bridgeton & Millville Traction Company, said that the question of the most vital importance to the companies was that of depreciation. It must be recognized that depreciation existed and it should be accounted for in some way. On the other hand, the very practical question had to be met that a very large majority of the roads were what are known as small roads.

Mr. Tingley's recollection was that something like 90 per cent of the roads in New Jersey had gross receipts of less than $100,000 each and some had not more than $5,000 or $10,000. These properties earned nothing for their stockholders. The only justification for their existence was that they served the community. It was a question whether it would be wise to try to develop the properties or whether they should be forced into the hands of receivers, which would be the unquestionable result of a hard and fast rule regarding depreciation. Mr. Tingley thought that the commission should lean very largely on the judgment of the officers in actual control of the properties. After the commission had seen that the property was conserved and adequate service given, it should not enforce a hard and fast rule respecting depreciation. The Bridgeton & Millville road earned a very small return, possibly 5 per cent on the investment. The company did not maintain a depreciation account but did try to keep the property up. Wastage of the property was made good from time to time out of the earnings. Following this practice, the outlay for upkeep was taken out of a good year. In a lean year as little as possible was done. Since 1907 the company had paid no dividends but had met the interest on its obligations. The company must serve the community as best it could, and if the property was maintained in good operating condition the company was entitled to a fair return on the money invested.

L. R. Isenthal, Central Passenger Railway of Atlantic City, endorsed the remarks of Mr. Tingley. He said that he would like to have the fiscal year coincide with the calendar year.

Mr. Tingley said that he would be glad to accept the calendar year as a fiscal year, although it would conflict with the practice of railway companies in other States. The company operated roads in Pennsylvania, Ohio, Illinois and Virginia and its fiscal year ended on June 30, the fiscal year of the Interstate Commerce Commission. To complete the year either on June 30 or Dec. 31 might make very much less trouble than to have it end with some other month.

Walter H. Bacon, Millville Traction Company, said that his company had never paid dividends on the stock or interest on the bonds. It was operated as a matter of local pride to the owner, a man of large interests in Millville. It was kept in good condition and money was expended on the property. The company was interested, of course, in the subject of depreciation, but if a material depreciation charge should be added to its other troubles, he thought that the road would not be operated except under direction of the courts. As the public was well served it would seem to be unnecessary to prescribe a depreciation account. An arbitrary rule of accounting should not be enforced without some excellent reason when the result would be to put a large number of small roads out of business.

George B. Cade, Atlantic Coast Electric Railroad, said that that company had no depreciation account. The property was maintained but no charge for depreciation was made. The company paid its bond interest and for seven years had paid dividends. The position of the directors was that, as the property was maintained properly, it was not necessary to keep a depreciation account.

M. R. Boylan, Public Service Railway, said that the fiscal year of the company ended on Dec. 31. At the present time two sets of classifications of accounts were used. One was the old classification of the American Street & Interurban Railway Accountants' Association and the other was the new classification of the association. It was intended to use the new classification altogether, beginning on Jan. 1, 1911.

Mr. Cade said that the Atlantic Coast Line Electric Railroad used the classification adopted in 1907.

Commissioner Hillery, who presided at the hearing, asked the names of companies whose fiscal year ended on Dec. 31. Representatives of the Riverside Traction Company and the Camden & Trenton Traction Company said that date ended their fiscal year. It was announced on behalf of the Millville Traction Company that the company could change its fiscal year to end on Dec. 31.

J. A. McCarthy, New Jersey & Hudson River Railway & Ferry Company, said that the new classification of the Interstate Commerce Commission had been adopted and the fiscal year of the company ended Dec. 31.

In response to an inquiry from Commissioner Hillery, it developed that no companies represented at the meeting kept depreciation accounts. Mr. Betts asked Mr. Tingley whether his company did not charge to various accounts among maintenance and replacement items which would be charged to depreciation account if such an account existed. Mr. Tingley said that the company had determined by the condition of the business on all of its properties about what average expenditure for maintenance of track and roadbed per annum would provide for replacement of ties and rails and the renewal of

special work. This amount was divided by 12 and the resulting sum charged each month to the maintenance of track and roadway and credited to accrued maintenance. As renewals were actually made, they were charged to "accrued maintenance of track and roadway."

Mr. Betts said that the commission did not have power now to make rates arbitrarily. It had power, however, to decide questions in regard to discrimination in rates. A case might be brought up where the board would have to investigate the costs of operation. The company would make a report showing certain net results from operation that appeared to be large. A certain rate might appear to be excessive. If the board should announce that upon investigation it had been found that the company was receiving an excessive net return there would immediately be a public outcry that would compel the company to reduce the rates. If a different method of accounting had been employed, it would show that the apparent excessive net return was apparent only after proper arrangements were made to take care of maintenance charges which might have to be met in future years. It appeared to Mr. Betts to be a question of an account that would protect the company against trouble of that nature. If one company, for instance, was not earning a proper return, the board would probably authorize, if it had rate-making power, an increase of fares. The proper method of accounting would show a reserve fund, which would provide for continuous operation.

Commissioner Hillery asked the companies what system of accounts they used.

The Bridgeton & Millville Traction Company used form C of the new association classification. The Jersey Central Traction Company uses a classification of its own. The Millville Traction Company uses the Interstate Commerce Commission classification. The Ocean Street Passenger Railway uses the Interstate Commerce Commission classification. The Phillipsburg Horse Car Railroad uses classification B of the Interstate Commerce Commision. The Camden & Trenton Traction Company uses classification C of the Accountants' Association. The Central Passenger Railway has postponed putting a new classification into effect until the board takes action on this subject. The Riverside Traction Company uses classification C of the Accountants' Association.

L. R. Isenthal, Central Passenger Railway, said that the matter of depreciation should be left entirely to the judgment of the companies. That was practically the condition recognized by the Interstate Commerce Commission classification.

Mr. Betts believed that a proper depreciation account, called by that name, was really a protection to the companies. He referred to the depreciation requirements of the accounting system prescribed by the New York Public Service Commissions. In this system companies were free to adopt their own rule for computing depreciation. The commissions had no rule by which depreciation should be declared or estimated but simply definitely prescribed that an account should be kept.

Mr. Tingley said that the case was really one of the machinery by which depreciation should be accounted for. Unless some good end would be served, it appeared to him to be an unnecessary hardship to increase the accounting requirements of a small company with a slender organization. If the commission had the power to order improvements and they should be charged to maintenance, it appeared to Mr. Tingley that the principal point which was sought would be attained. He thought that there was one vital defect in the suggestion to change the rate, if the income of the company was inadequate. The companies operate under municipal franchises granted for a definite length of time with definite rates of fare. He did not believe that the contracts with the municipalities could be ignored. Increases in fare were made in States where indeterminate franchises were granted directly by the commissions.

The total registration of delegates from street railway companies at the Atlantic City convention, just compiled by the secretary of the association, shows between 400 and 500 in excess of those registered at the Atlantic City convention of 1908.

AUTOMATIC STOPS AND CAB SIGNALS

At the annual meeting of the Railway Signal Association held in Richmond, Va., Oct. 11-13, a committee presented a report outlining certain requisites and desirable characteristics for automatic stop and cab signal systems, for steam and electric railways. The report stated that the committee believed the difference between the requisites of installation for systems of automatic stops on steam and electric lines to be so slight that recommendations could be made covering both steam and electric roads. The committee also expressed its opinion that in the present state of the art automatic stop and cab control signal systems should be used only in connection with a complete installation of fixed block signals.

The following are the requisites and desirable characteristics which the committee believes form an adequate basis on which to design and construct the system of automatic stops and cab signals which will meet the requirements of railways:

REQUISITES

1. Apparatus so constructed that it may be used on either steam or electric roads, and under any physical conditions to be encountered.

2. Apparatus and circuits so constructed that the removal or failure of any essential part will cause the display of a stop indication and the application of the brakes.

Note—This requisite is intended to apply only within the limits of the strength of material and good designing practice.

3. Apparatus so constructed that it may be used with either absolute or permissive operation.

With either system the restoration of the stopping device and the release of the brakes must be within the control of the engineman or trainmen, but only after the speed of the train has been reduced to —— miles per hour.

4. Apparatus so constructed that it will be operative under all weather conditions that permit of the operation of trains.

5. Apparatus so constructed that it will conform to the standard clearance on the road on which it is to be used. The roadway parts should not extend within the lines of maximum equipment of rolling stock, and the engine or train parts should not extend outside the lines of minimum clearance for structures, but at the same time the proper operative relations should be obtainable under all conditions of speed, weather, wear of rolling stock, train oscillation or shock.

6. Apparatus so constructed that two or more engines may be used with one train or a train may be allowed to assist another train without causing the brakes to be set on the second or following engine when passing a signal which indicated "proceed" when the head of the train passed it.

7. Apparatus so constructed as to be capable of control by the means used for indicating the condition of the block about to be entered, such as an electric track circuit.

8. The automatic stopping device should be operative only in the normal direction of traffic, except in connection with signals governing reverse movements.

9. The cab signal should be a visible signal of prescribed form, the indication being given continuously by not more than three positions or colors.

10. The cab signal should indicate the condition of the block about to be entered.

11. An audible signal should be provided in addition to the visual signal, and where "stop" and "proceed with caution" indications are given, separate and distinct audible signals should also be provided.

DESIRABLE CHARACTERISTICS

1. Apparatus so constructed that "speed control" may be used if desired; that is, if the speed of the train has been reduced to a pre-determined rate, it should, without being stopped, be allowed to pass a stop which would apply the brakes if the train were moving at more than the said pre-determined rate of speed.

2. Apparatus so constructed that the release of the brakes by the engine or train crews can be accomplished only after the train has been brought to a stop; or if the speed control is

used, when the speed of the train has been reduced to the predetermined speed in effect, or when the cause of stopping has been removed.

3. Apparatus so constructed that an audible alarm shall be given in the cab each time the stopping device has supplied the brakes.

4. Apparatus so constructed that the cab signal shall give an indication of the condition of the next block in advance of the block about to be entered.

5. Apparatus so constructed that the cab signal shall be correctly displayed when the engine is moving either forward or backward.

6. Proper apparatus should be provided on the engine to record the number of times the automatic stopping devices have applied the brakes.

REDUCTION OF FARES DENIED BY MARYLAND COMMISSION

A decision has been rendered by the Public Service Commission of Maryland denying an application for a reduction of fares on a line of the United Railways & Electric Company of Baltimore. The commission holds that any material reduction of the fare would jeopardize the interest on the bonds of the company, and under the provisions of the law under which the commission was created "it would require a clear case to warrant any action on the part of this commission that would tend to 'disturb the value of any bonds of any of said corporations issued prior to the passage of this act.'" The opinion was written by James M. Ambler, chairman.

The line on which the reduction of fare was asked extends from Baltimore to Ellicott City, 11 miles. It is divided into three 5-cent fare zones; on the west-bound trip the first zone extends about 4 miles from Baltimore to Roguel Heights, a little beyond the city limits of Baltimore; the second is about 4½ miles in length, and the third about 2½ miles. On the return trip the end of the first zone from the Ellicott City terminus is a little different. The complaint centered on the rates of 10 cents for a single trip or 20 cents for a round trip between Ellicott City and Roguel Heights, which were said to be greater for the length of haul and schedule time than the rate of fare charged on other suburban lines of the company. It was also complained that no commutation tickets were sold on this line as on other suburban roads of the company.

Witnesses testified that on other lines longer rides were given for a single fare than on the Ellicott City line. On one line divided into two fare zones residents of Catonsville, the outlying terminus, can secure books of tickets at a rate of 5 cents a ticket, good for a round trip on the outlying fare zone and therefore making, with the additional fare of 5 cents for the other zone, a net rate of 7½ cents for the trip to or from Baltimore. None but residents of Catonsville, the outlying terminus, however, can secure the books of tickets. It was also testified that on most of the other suburban lines a similar concession is made to residents, although on the Ellicott City line, which also passes through Catonsville, even residents of Catonsville must pay the full fare of 10 cents to reach Baltimore. The decision of the commission continues:

"So far as unjust discrimination is concerned, it is to be observed that the public service commission law does not absolutely prohibit all discrimination. To be unlawful discrimination must be unjust or unreasonable. The law does not undertake to put all persons and all localities on exactly the same footing at all times and under all circumstances. It prohibits only 'undue or unreasonable preference or advantage' and requires the charge to be the same to all only when there is 'like and contemporaneous service in the transportation of a like kind of traffic under the same or substantially similar circumstances and conditions.' If there is any substantial difference in time or in kind of service or traffic or in the circumstances or conditions under which the service is rendered, discrimination may be both fair and reasonable. The owners of a railroad are not entirely deprived of all share in the management of the enterprise in which their money is invested. Much is necessarily still left to their discretion, subject only to the limitation that the exercise of this discretion must be honest.

"It could serve no useful purpose to compare the zones on the various suburban lines running out of Baltimore. All are now combined in one system and are under the same management, but originally they were separate and independent, and each differs in some particular from almost every other line. Some compete with steam railroads. Some run through thickly settled districts. Some lead to industrial centers or pleasure resorts or have some special attractions to increase the amount of traffic. According to the complainants' own testimony, the Ellicott City line for a considerable part of its length runs through a sparsely settled country with physical irregularities that make the cost of operation at least above the average.

"No motive has been suggested for any unjust discrimination against Ellicott City, and it is not easy to perceive how residents of Ellicott City or other persons using the Ellicott City line are prejudiced by the fact that on this line no special favor is shown to residents of Catonsville, but all are required to pay the same price for the same service. It was admitted by all of the complainants' witnesses that since this line came into operation the property along its route has 'developed' rapidly and steadily in the western part of the city and almost as far out as Catonsville. That the 'development' has not extended to the country west of Catonsville cannot be attributed wholly to 'excessive' or 'discriminatory' fares; for the railroad is unquestionably of some benefit to Ellicott City. All of the witnesses stated that they are residents of Ellicott City or its neighborhood and have occasion to come to Baltimore quite frequently, and yet not one of them ever comes by the Baltimore & Ohio Railroad, which competes with the defendant for Ellicott City patronage. Each has some special reason which makes it necessary or more convenient for him to use the electric road. It would seem that proximity to the city rather than any action of the defendant has created a discrimination in favor of the country east of Catonsville, and it is beyond the power of this commission to overcome that by ordering a reduction of fare to the remoter points. We can find no unjust discrimination and, desirable as it may be to have all of the country thickly settled, we have no right to impose the burden of its 'development' upon the railway company.

"Nor do we think that the charge of 10 cents for a ride of 7 miles on a suburban road can justly be called excessive. This is at the rate of less than 1½ cents a mile and at the most favorable season of the year yields to the defendant 24 cents a car mile for this line, while the average receipts from its entire system amounted to 26 cents a car mile during the year 1909, when, for the first time in its history, the annual report showed a small balance of income after providing for expenses and the interest on its outstanding bonds. Any material reduction of the fare would therefore jeopardize the interest on the bonds and, under the provisions of Section 30 of the public service commission law, it would require a clear case to warrant any action on the part of this commission that would tend to 'disturb the value of any bonds of any of said corporations issued prior to the passage of this act.'

"We are somewhat fortified in the view that the present rate is not excessive by the fact that the complainants themselves appear to consider the charge reasonable and proper for all persons who are so unfortunate as not to be 'residents of the section traversed by said line.' It is altogether beyond our power to order one rate of fare for 'residents' when for precisely the same service, at the same time and under the same conditions, a higher rate is applied to the general public. That would be a gross form of the unjust discrimination which the law creating this commission expressly forbids.

"If it be true that it is the custom of the defendant to issue such 'residents' tickets' on other suburban lines, it may not be proper for us to order a discontinuance of the custom without giving the parties interested an opportunity to be heard in its defence, but it is clearly our duty to bring the question to a prompt determination, and we will request our counsel to take whatever steps may be necessary to that end. In the meantime we must deny the prayer of the complainants in this case."

REORGANIZATION OF THE ST. LOUIS CAR COMPANY

The St. Louis papers announce that the plans for the reorganization of the St. Louis Car Company, which have been mentioned in previous issues of this paper, have been consummated, through the co-operation of John I. Beggs, president and general manager, Milwaukee Electric Railway & Light Company, David May and M. Shoenberg, of St. Louis. These gentlemen will take a large financial interest in the company. The only remaining step is for the unsecured creditors to give their assent to the refinancing plan. A number of them have already agreed to do so and the consent of all is expected.

It is understood that the Beggs, May and Shoenberg syndicate has agreed to take $850,000 of the preferred stock of the company, of which Mr. Beggs will purchase personally $350,000. It is also reported that George J. Kobusch, the president of the company, will continue to hold a very large stock interest in the company and will be chairman of the board of directors and that Mr. Beggs will be president and general manager. Mr. Beggs has not announced whether he will go to St. Louis or remain in Milwaukee if the deal is consummated. The letter sent to the creditors Oct. 31 and signed by Messrs. Beggs, May and Shoenberg and Mr. Kobusch for the St. Louis Car Company follows:

"An arrangement has been made, dependent upon receiving the consent of the creditors, for re-establishing the St. Louis Car Company and enabling it at once to resume active business operations.

"Under this arrangement $850,000 of new money is to be put in by Messrs. John I. Beggs, D. May and M. Shoenberg and associates. For this they are to receive 7 per cent cumulative preferred stock at par.

"The co-operation of the creditors is essential to carrying out this plan, it being necessary that they take 7 per cent cumulative preferred stock for their claims at the face or principal sum of their claims. The preferred stock issued to the creditors will stand on the same footing as the preferred stock issued for the new money at par.

"The result of the arrangement will be to discharge all the indebtedness of the company, except $1,000,000 of bonds and a mortgage on the automobile plant of $40,000, and leave a cash balance of $400,000 for working capital.

"Messrs. Beggs, May and Shoenberg will be in control of the company, and Mr. Beggs will be president and general manager.

"Messrs. Beggs, May and Shoenberg show their faith in the future of the company by their willingness to put in their money for preferred stock on the same footing with like stock for the claims of the creditors.

"The time from which dividends on the preferred stock shall begin to accrue is Jan. 1, 1911.

"Please send in at once a statement of your claim and your assent to take preferred stock therefor, to Messrs. Beggs, May and Shoenberg, 310 Security Building, St. Louis, Mo. As the consummation of this plan depends on creditors consenting immediately, please sign the enclosed and return not later than Nov. 10."

Accompanying the letter is the following endorsement, signed by the heaviest creditors:

"The undersigned creditors of the St. Louis Car Company have considered the proposed arrangement for reorganizing the St. Louis Car Company, and are firmly persuaded that it is very much the best that can be made. We believe the preferred stock to be issued is worth par.

"The gentlemen proposing to furnish the needed capital are men of ripe experience, recognized ability and character in business, and their direction of the company is the strongest possible assurance of success.

"We urgently recommend acceptance of the proposition by all creditors. The alternative is an adjudication of bankruptcy and a forced sale of the property."

It is reported that the St. Louis Car Company did a business of more than $10,000,000 in 1907 and that its earnings that year exceeded $1,000,000. The reorganizers are confident that the production will increase to such an extent as to necessitate an enlargement of the plant in a few years.

HEARING ON BROOKLYN TRANSFER SYSTEM

The hearing in the case affecting the revised transfer system of the Brooklyn Rapid Transit Company lines before the New York Public Service Commission for the First District, on Oct. 24, was devoted principally to the testimony of C. D. Meneely, secretary and treasurer of the company.

John J. A. Rogers, the complainant, said that a subpœna had been served upon the secretary and treasurer of the companies calling for "all and singular any and all reports, recommendations or plans originally submitted to the defendant companies for their consideration by any officer or employee thereof, and also all and singular the minutes or other records of each of the defendant corporations, showing what action was taken thereon by the board of directors or executive committee of each of the defendant corporations; and also any report, document or other instrument in the possession of the defendant companies relative to the proposed tariffs or transfer rules and regulations, filed Sept. 15, 1910, and also copies of letters that have been written between the defendant companies relative to the said tariffs or transfer rules and regulations, and also a transcript of the minutes of said corporation, wherein some memorandum is made of the oral agreement which exists between the defendant companies as to the reciprocal privileges named in said transfer rules and regulations, and such other books, documents, memoranda and writings in your custody and under your control as may be required in the investigation of said subject."

Mr. Rogers said he had been supplied with information on various matters connected with the transfer system, but that he wanted the original plan that was submitted to any or all of the companies.

George D. Yeomans, counsel for the company, said that the question of change in the transfer system had been a subject of conference between the officials of the various companies for a year and a half or two years. After the plan was matured it was submitted, not on paper, but in its general terms, to the directors or executive committees, who authorized the change.

Mr. Rogers said he had been unable to form an exact opinion as to the purpose of the companies. The schedules said that the reciprocal privileges were not established under the obligation of law and the notices in the cars said they were established in accordance with existing law.

Mr. Meneely was then called as a witness. Mr. Rogers stated that his chief object in examining Mr. Meneely was to show that the schedules were too indefinite and uncertain to be understood by the public and to be binding upon the companies. He asked certain questions based upon the schedules.

Mr. Meneely called attention to a paragraph reading: "The issue of transfers on the lines of this company is based upon affording passengers a continuous trip in the same general direction, with a maximum of two transfers and three rides and with an additional privilege to and from feeder lines." He said that if in any case the company had not given passengers if they desired the benefit of a continuous trip in the same general direction anywhere in the city it stood ready to do so.

An adjournment was taken until Oct. 27, but on that date another adjournment was taken until Nov. 3.

The Mexico City Tramways Company has obtained a concession to extend its suburban lines from Santa Fe, a suburb of Mexico City, to Toluca, a distance of 32.25 miles. For a period of five years the company will be allowed to import construction materials for the new line free of duty. The concession provides that the passenger fares shall be based on the following: First-class, 3 cents per kilometer; second-class, 2¼ cents, and third-class, 1½ cents, with a minimum fare of 5 cents.

NEW TYPE OF CAR FOR METROPOLITAN STREET RAILWAY, NEW YORK

The Metropolitan Street Railway, New York, has in trial service on its Madison Avenue line a new car, No. 556, which differs in several important respects from the company's standard pre-payment-type closed cars. The new car is an improved form of the Brill semi-convertible car, and is fitted with cross seats instead of longitudinal seats. There are nine cross seats on each side and longitudinal seats for four passengers in each corner, giving 52 seats within the car body. In addition there is a folding wooden-slat seat on one side of the front platform which will hold five passengers and a single folding seat in one corner of the front platform, making 58 seats in all.

The car is designed for double-end operation and both platforms are alike. The arrangement of platform doors, steps and railings is very nearly the same as on the present standard prepayment cars. On the right-hand side is a stationary step 5 ft. 6 in. wide and the opening above this is closed with a two-piece door which folds inward against the controller. A pipe stanchion on the edge of the platform divides the step opening into entrance and exit passageways of approximately equal width. Two iron-pipe stanchions about in the center line of the platform support the curved horizontal pipe railing on which the fare box is attached. When not in use this horizontal railing is lifted and latched under the platform hood. On the left-hand side of the platform are a single sliding exit door and a folding step. In the new car the sliding body end doors are made in two halves which open and close independently of each other. No dividing post is used in the center of the door opening.

The body framing of the car is designed to be as light as possible. The window posts are bolted at the bottom to a ¾-in. steel sill plate and at the top they are attached to the side plate with pressed steel corner angles. The curved sash runways at the top are made of separate pieces of wood and the curtain roller boxes are omitted entirely. A thin inside lining is applied directly on the outside panels between the posts, thus reducing the thickness of the car side to a minimum. The center aisle, in consequence, is unusually wide for a car only 8 ft. 3 in. wide over all. The head lining is of painted composition board and all the interior trim is white ash finished in the natural color. A row of six lights is placed in the center line of the upper deck and five lights are mounted under the deck sill on each side. Four automatic ventilators are provided in the deck sash openings on each side of the monitor deck and in addition there are five pivoted deck sash on each side. The exterior of the car is painted green and resembles very closely in appearance the present standard pre-payment cars of the Metropolitan Street Railway.

The car is mounted on Brill 39-E single-motor trucks and is equipped with Westinghouse air brakes. Some of the other special equipment includes Pantasote curtains, Curtain Supply Company's curtain fixtures, International registers and Hunter destination signs.

THIRD AVENUE REORGANIZATION CASE

A rehearing on the reorganization plan for the Third Avenue Railroad System has been granted by the New York Public Service Commission, First District A preliminary hearing took place on Oct. 31. The proceedings are presumably to be of a routine nature and to serve as a basis for an appeal to the courts, as the commission is expected to reaffirm its disapproval of the plan.

At the hearing on Oct. 31 testimony was offered for the committee of holders of the consolidated 4 per cent bonds of the Third Avenue Railroad Company. Upon behalf of the commission, its counsel asked the committee to rearrange the statement of earnings for the system for the year ended June 30, 1910, so as to eliminate the inter-company accounts and thus arrive at the actual net revenue. The commission also desires a statement in reference to the franchise taxes of the system.

BLOCK SIGNALING FOR ELECTRIC RAILWAYS

At the annual meeting of the Railway Signal Association, held in Richmond, Va., Oct. 11-13, a committee of the association made an exhaustive report on automatic block signals for electric railways. The report described the first attempts at controlling block signals through track circuits, where the track rails were utilized for the return circuit of the compulsion current. The first installation in which direct-current track circuits were used in connection with direct-current compulsion was on the Boston Elevated Railway. This system, which included 175 electro-pneumatic signals and 61 switches, was installed in 1901. Among the other installations of later date which were described in the report are the signals in the London Underground Railways, Metropolitan Underground Railroad of Paris, North Shore Railroad in California, West Jersey & Seashore Railroad, New York Subway, Long Island Railroad, Philadelphia Subway, New York Central & Hudson River Railroad, New York, New Haven & Hartford Railroad and the Hudson & Manhattan Railroad. The report is accompanied by numerous diagrams of track circuits and illustrations of special types of relays employed.

BOSTON AND ALBANY ELECTRIFICATION AT BOSTON

Studies of the electrification of the main line and suburban circuit track of the Boston & Albany Railroad from Boston to South Framingham were filed on Nov. 1 with the special commission authorized at the last session of the Massachusetts Legislature to deal with the electrification of all the steam roads within the Metropolitan district. The motive-power equipment will be substantially of the type now in use by the New York Central Railroad, the lessee of the Boston & Albany, at the Grand Central Station in New York, but with one important difference, namely, that a direct current of 1200 volts will be used instead of the 600 volts for which the Central road's distribution system was planned. For the local service on what is known as the Newton circuit there will be provided multiple unit cars, while for local trains running direct between Boston and South Framingham and for through trains to the latter point there will be electric locomotives of the New York Central type.

Although the limits of the Metropolitan district, within which the electric hauling of passenger trains is considered, do not include Framingham, it was necessary to plan for electrification to that junction point. Framingham is the western terminus of the four-track section of the Boston & Albany main line. At this point, therefore, all through trains bound for Boston will drop their steam locomotives and complete their trip to Boston behind an electric locomotive; and the opposite change will be made for outgoing through trains. On the basis of present traffic the proposed electrified section would include about 65 per cent of all the trains entering or leaving Boston over the Boston & Albany.

Much construction work and some relocating of tracks will be involved in the carrying out of this plan. The local circuit traffic, which now has the two southern tracks on the main line, will have to be carried on the outside tracks of the group of four, leaving the two middle tracks for through traffic. This change will involve building considerable additional station accommodation and a large number of overhead crossings. Just outside of the South Station at Boston there will be need of rather extensive relocating of tracks and a combining of two of the present stations in order to avoid the existing "bottle neck" and to give four tracks all the way into the South Station.

Financially the change offers no early promise of being advantageous to the railway company. Operating and fixed charges under the proposed scheme will apparently much exceed the earnings possible in the near future from the electrified traffic. There are, however, large possibilities of increased earnings in a reduction of fares and quick trains at short intervals.

A SPIRIT-LEVEL ACCELEROMETER

A simple form of pocket accelerometer has lately been designed by A. P. Trotter, and placed on the market by Everett, Edgecumbe & Company, London, England. The instrument is particularly well adapted for railway tests. It is made on the spirit-level principle, with a curved glass tube containing a bubble, which is deflected over a scale from its zero position. The position of the bubble is affected, of course, both by the grade and by the acceleration to which the instrument is subjected, so that the scale can be calibrated to read direct either acceleration on the level or grade at rest or constant speed. The acceleration and grade scales are on opposite sides of the tube, and the zero is in the center, so that acceleration or deceleration and grades up or down can be measured with equal ease. In use, the instrument has only to be placed on a window-ledge or on the floor, so that the bubble is at zero when the car is at rest, and the tube points in the direction of motion. Starting acceleration or braking retardation can then be read direct in feet per second per second, and calculations of the distance

Spirit-Level Accelerometer

in which a car can be stopped at any speed can be made without the necessity for speed or distance measurements. Tractive resistances may be measured for cars coasting by noting the retardation. The draw-bar pull and brake horse-power during acceleration and running can then be deduced. It is important to notice that the instrument will always indicate the retardation due to frictional resistance, etc., of a coasting vehicle only, whether on the level or on a grade, as the effect of the part of the acceleration or retardation due to gravity is canceled by the effect of the grade on the instrument. In like manner in the case of a train starting up a grade the acceleration due to the propelling power only is indicated, and not the actual acceleration relatively to the track. The instrument should be useful in connection with tests of electric railway equipment and brakes and for studying traffic conditions, as well as to test cars on the road. In addition to the pocket instrument illustrated, another form, fitted to a bracket for attachment to the car, is made.

INTERURBAN CARS WITH HAND-OPERATED, UNIT-SWITCH CONTROL

The development of the Westinghouse hand-operated unit switch control, by affording a simple means of obtaining multiple unit operation, has placed in the hands of railway companies an important means of effecting economies by the use of small cars. The size of the cars can be based on the average rather than the maximum load, since two-car trains can readily be operated whenever the traffic conditions warrant. On this account quadruple equipments of 50-hp motors can often be used where four 75-hp motors or even four 100-hp motors would otherwise be necessary.

A typical case where this principle has been applied to advantage is that of the Fairmont & Clarksburg Traction Company, of Fairmont, W. Va. The line of this company extends from Fairmont to Clarksburg, a distance of 32 miles. Formerly large cars equipped with four 75-hp motors were operated singly. About a year ago, however, six additional cars were purchased and on account of the adoption of hand-operated unit switch control smaller quadruple equipments of Westinghouse No. 306 motors were considered sufficient. When the traffic requirements exceed the capacity of single cars, two-car trains are operated.

These cars are of the combination type, 46 ft. 6 in. long over all, and seat 48 passengers. While answering every requirement of the larger cars, they represent an important saving both in original cost and operating expense. The motor and hand-operated unit switch control is a particularly light one for its output and is well adapted for moderate speed interurban work.

Where the use of larger equipments is necessary on account of the speed or traffic requirements, a quadruple equipment of No. 317 or No. 304 motors, with hand-operated unit switch control, offers similar advantages of light weight per unit output.

EXTENSION OF THE HUDSON RIVER TUNNELS TO THIRTY-THIRD STREET

At 3 a. m. Thursday, Nov. 10, trains of the Hudson & Manhattan Railroad will begin operating from the new station at Broadway, Sixth Avenue and Thirty-third Street. The new station at Twenty-eighth Street and Sixth Avenue will also be opened and the temporary terminal at Twenty-third Street and Sixth Avenue will be converted into a way station. All trains to Hoboken, Henderson Street and Cortlandt Street terminals will use the easterly track northbound to Thirty-third Street and the westerly track southbound from Thirty-third Street, so that all southbound trains will stop at the platforms on the west side of the Twenty-eighth Street and Twenty-third Street stations.

The new station at Thirty-third Street was originally designed as the northern terminal of the Sixth Avenue line. When plans were made to extend the Sixth Avenue line north to Forty-second Street and east to Lexington Avenue the design of the Thirty-third Street station was changed somewhat so that instead of being a terminal station it will eventually be used as a way station. Just south of the Thirty-third Street station the northbound and southbound tracks are connected by a double cross-over, and they branch out into three station tracks which are served by two island platforms and two side platforms. The island platforms will be used for loading, and the side platforms for unloading. The platforms will be about 400 ft. long, but at the present time only about 200 ft. of their length has been completed. Stairways lead from the platforms up to the concourse floor, which is about 18 ft. below the street level. This concourse floor will have an area of 33,000 sq. ft. Five stairways lead from the street down to the concourse, and in addition there are two entrances from the basement floors of each of two large department stores on the west side of Sixth Avenue. Space around the wall in the concourse will be rented to merchants and proprietors of small booths. Almost the entire wall area on the west side of the concourse is occupied by show windows of the department stores which adjoin the station.

The roof of the concourse is formed by groined arches, and is supported by reinforced-concrete columns which have been given a finish closely resembling terra cotta. All of the balusters around the stair openings are made of similar material. The ticket booths and barrier gates are made of ornamental iron painted a delicate shade of green.

Arrangements have been made in this station for handling at some future time the baggage of passengers to or from the steam railroad stations reached by the Hudson & Manhattan trains on the New Jersey side of the river. A baggage room has been built in one side of the station on the level of the track floor, and a baggage checking booth is provided on the concourse floor. Baggage will be raised to the street level by an escalator and will be delivered from the street to the baggage room through a chute. Retiring rooms for men and women have also been provided in the station, and the Erie Railroad, Lehigh Valley Railroad and the New York, Susquehanna & Western Railroad will establish ticket offices on the concourse floor for the convenience of outgoing passengers.

The station at Twenty-eighth Street has platforms on each side which are reached by stairways entered through kiosks on the sidewalk of Twenty-eighth Street. This station does not differ in its decorative treatment or general design from the other way stations on Sixth Avenue.

ELECTRIC RAILWAY LEGAL DECISIONS

CHARTERS, ORDINANCES AND FRANCHISES

Alabama.—Eminent Domain—Compensation—Consequential Damages—Allowing Benefits.

In assessing consequential damages to abutting property from the grading of a street and constructing a street railway thereon, special benefits accruing to the property must be considered and set off against the damages. (Bragan v. Birmingham Ry., Light & Power Co., 51 S. Rep., 30.)

Indiana.—Street Railroads—Crossing Steam Railroad.

A street and interurban railroad carrying freight and passengers, and having the lawful right to construct its lines in a city street, had the right to cross at a grade the tracks of a steam railroad, which owned in fee the land sought to be crossed. (Pittsburgh, C., C. & St. L. Ry. Co. v. Muncie & Portland Traction Co. et al. (No. 20,929), 91 N. E. Rep., 600.)

Massachusetts.—Municipal Corporations—Rights in Street—License—Termination—United States—Occupation of Premises for Governmental Purposes—Eviction by Owner—Site for Post Office—Rights of Government.

Where the owner of a building let to the government for a post office was granted permission by the city to excavate and occupy part of a basement room lying under the sidewalk, the owner's license to continue so to use the street was terminated by a subsequent notice from the mayor to remove everything belonging to him under the sidewalk within the street line which interfered with a street railway company's construction of a subway under authority granted by Acts Massachusetts 1906, chapter 520, authorizing it to locate and construct the subway wherever it might deem best within the limits of the street, subject only to the approval of the railroad commissioners.

The owner of premises, by virtue of his title, may evict and dispossess officers of the government, though occupying and using the premises by governmental authority and in the performance of governmental functions.

Laws Massachusetts 1906, Chapter 520, conferring on a street railway company the right to locate and construct its subway anywhere within the limits of a street, took effect by acceptance of the company Aug. 23, 1906. The plans of the company showing the location at the point in question were filed Jan. 28, 1907. These plans were finally approved April 30, 1909, with some alterations, not, however, affecting the point in question. In June and October, 1908, the owner of abutting property obtained a license from the city to use the space under the sidewalk, which would necessarily be encroached on by the subway when built. On Oct. 7, 1908, the owner rented the premises, including the space under the sidewalk, to the government for a post office. Held, that the United States was chargeable with notice of the railroad's rights in the premises so that it could not maintain a bill to enjoin the railroad from interfering with the space beneath the sidewalk. (United States v. Boston Elevated Ry. Co. et al., 176 Fed. Rep., 963.)

Missouri.—Street Railroads—Alienation of Franchises—Constructions—Corporations—Alienation of Property—Mortgages—Statutes—Constitutional Law Construction—Street Railroads—Requisites—Municipal Consent—Powers—Issues Raised—Forfeiture of Franchises—Remedy—Abandonment—Equitable Remedy.

A corporation cannot without statutory authority alienate its franchise to construct, maintain and operate a street railroad.

An ordinance granting to a street railway a franchise to construct, maintain and operate a street railroad must be strictly construed.

A corporation mortgaging its property alienates it, since the mortgage may culminate in the absolute alienation of the property.

Under Rev. St. 1879, Sec. 706, providing that every corporation may hold, purchase, mortgage or otherwise convey such real and personal estate as the purposes of the corporation shall require, etc., a street railroad company may mortgage its property, including its franchise.

Statutes must be construed in the light of the Constitution.

Rev. St. 1879, Sec. 706, authorizing every corporation to hold, purchase, mortgage or otherwise convey its real and personal property, when construed in connection with Const. 1875, Art. 12, Sec. 20 (Ann. St. 1906, p. 309), prohibiting the Legislature from granting the right to operate a street railroad in a city without acquiring the consent of the local authorities, and providing that the franchise so granted shall not be transferred without similar assent first obtained, prohibits a street railway company from mortgaging its franchise obtained from a city without first obtaining the assent of the city.

Where plaintiff, in a suit against a city, pleaded an ordinance granting a street railway franchise, and the mortgaging of the franchise by the street railway company, and the city only pleaded and proved an abandonment of the franchise, the question of the invalidity of the mortgage for want of the assent of the city thereto did not arise.

A street railway franchise is granted by the State through the agency of the city granting it.

The forfeiture of a street railway franchise granted by a city can only be taken advantage of in quo warranto, and neither the city nor its officers can declare a forfeiture.

Equity in a suit to restrain a city from removing from a street the poles, wires, etc., of a street railway company having a franchise to operate a street railroad has no jurisdiction to declare a forfeiture of the franchise on a cross-bill alleging an abandonment. (Kavanaugh v. City of St. Louis, 119 S. W. Rep., 552.)

New Jersey.—Highways—Right of Public—Street Railroads—Use of Highway by Traction Company.

When a highway is laid out of a certain width, the entire width becomes subject to the public easement of passage; if a less width is graded and worked for travel, or if a bridge or culvert does not extend to the entire width, the public rights of passage are not thereby limited in favor of one who places an unauthorized or improper structure within the highway limits.

Consent granted to a traction company under P. L. 1893, p. 302 (Gen. St. p. 3235), for the construction, maintenance and operation of a street railway along certain streets and highways, does not warrant the construction and maintenance, within the limits of the highway, of a bridge for the accommodation of the tracks that in design and construction is dangerous to ordinary travel and calculated to entrap and kill horses and other animals that may attempt to pass over it. (Opdycke v. Public Service Ry. Co., 76 Atl. Rep., 1032.)

New York.—Carriers—Penalties for Overcharging Passengers—Right of Action Therefor—Construction and Operation of Railroad—Presumption of Lawful Consent—Action Therefor—Burden of Proof.

Railroad Law (Laws 1890, C. 565), Sec. 39, provides that any railroad corporation which shall ask or receive more than the lawful rate of fare, unless such overcharge was made through inadvertence or mistake not amounting to gross negligence, shall forfeit $50, etc. Held, that action would not lie thereunder for a penalty if the overcharge was the result of an honest mistake in the construction of its statutory rights.

When a railroad has been constructed and operated for a long period of years, it is presumed such construction and operation were in accordance with some lawful consent.

Where there are two acts or ordinances under which a railroad may operate within city limits, one of which imposes no restriction as to rate of fare and the other does, if action is brought under Railroad Law (Laws 1890, C. 565), Sec. 39, to recover the penalty for excessive fare charged, the burden of proof is on plaintiff, who asserts the charge to be illegal, to establish by a fair preponderance under which defendant is operating. (Enton v. Coney Island & B. R. Co., 121 N. Y. Sup., 793.)

New York.—Street Railroads—License Fees—Franchise and Ordinances.

Laws 1860, C. 511, having granted a street railway company a franchise to construct and operate a railroad on certain streets in the city of New York, subject to such reasonable rules and regulations as the Common Council may from time to time prescribe, with a provision as to payment to the city of an annual license fee, on which the parties put the practical construction of meaning a fee of $50 per car, based on the greatest number of cars in daily use at the busiest season of the year, and not on every car used during the year, and with a provision authorizing and requiring the City Council to grant the company permission

to construct and operate the road, and there having been in force at the time Laws 1860, C. 10, declaring it to be unlawful to construct and operate a railroad on a street of such city, except under the authority and subject to the regulations and restrictions which the Legislature may grant and provide, so that the Legislature, as the sole source of the rights of franchise for such a construction and operation, could alone prescribe the regulations and restrictions therefor, the city had no right to collect, or to impose a penalty for failure to pay a greater license fee, because of the permission of the Common Council to lay the tracks providing that the company should be subject to certain ordinances, providing that every passenger car running in the city should annually pay it $50 for a license, and declaring a penalty for failure to exhibit in the car the certificate of payment. (City of New York v. New York City Ry. Co., 127 N. Y. Sup., 457.)

New York.—Street Railroads—Receivers—Right to Use Income for Operating Expenses.

Receivers for the lessee of a street railroad system comprising lines owned by different companies are entitled to use the income from the entire system for the purpose of operating and maintaining the same as a unitary system, notwithstanding the provisions of mortgages on the property or parts thereof. (Barber Asphalt Paving Co. v. Forty-second St., M. & St. N. Ave. Ry. Co. et al., 180 Federal Rep., 648.)

CONTRIBUTORY NEGLIGENCE

Alabama.—Crossing Track—Injuries to Traveler—Instruction.

In an action for injuries to a traveler while crossing a street railway track, the complaint counted on simple negligence and on a wanton, wilful or intentional injury. The court charged that if a pedestrian is negligent in crossing or attempting to cross a street railway track on a public highway, and such negligence proximately contributes even in the slightest degree to an injury received by him by being struck by a car, he cannot recover because of the motorman's failure to keep a lookout for him, nor on account of a mere failure to sound the gong of the car; that one walking on a street railway track must first look to see if a car is approaching, and if his view is obstructed he must look from a point where by looking he can see the track in such direction; and that if plaintiff stopped on the east side of the east track to permit a wagon to pass him along the street, and while there looked toward another avenue, and could not see the car because his view was obstructed by the wagon, and could not hear the car because of the wagon noise, and after the wagon had passed him he then proceeded onto or dangerously near the track without again looking to see if the car was coming from that direction, he was negligent, and that the motorman's mere failure to keep a lookout ahead did not constitute wantonness. Held, that such instructions were correct. (Jaffe v. Birmingham Ry., Light & Power Co., 52 S. Rep., 311.)

Delaware.—Street Railroads—Collision with Vehicle—Declaration—Sufficiency.

In an action against a street railroad company for injuries sustained when a horse and wagon with which a car had collided was dragged along the street and collided with plaintiff's wagon, counts in the declaration from which it was impossible for the defendant to know, or for the court to determine, first, what act of negligence caused either collision, and, second, whether there was one act of negligence that caused the first collision and another act that caused the second, or whether the act of negligence that caused the first collision was continuing in its nature and was the same act that caused the second collision, were subject to demurrer. (Loteman v. People's Ry. Co., 76 Atl. Rep., 478.)

Georgia.—Carriers—Injuries to Passengers—Perilous Situation—Instructions.

It was not an accurate statement of the doctrine of an emergency created by a carrier of passengers, placing a passenger in a perilous condition, on account of which he leaped from a car, to charge: "If you believe that the plaintiff, at the time that he jumped from the car, was acting under a reasonable apprehension—that is to say, the apprehension of a prudent man—that he was under circumstances where he might receive an injury, he would not be guilty of contributory negligence in jumping from the car." (Georgia Ry. & Electric Co. v. Gilleland, 66 S. E. Rep., 944.)

Indiana.—Street Railroads—Injuries to Travelers—Contributory Negligence—Duty to Look and Listen at Crossings—Question for Jury.

The look and listen rule applicable to steam railroads crossing public highways is not applicable in all its strictness to persons crossing a street railway track in a city street.

Where a street car by which decedent was struck was at the middle of the block when decedent started to cross the open space between the tracks at a crossing, whether he was negligent was for the jury, he being only required to exercise reasonable care under all the circumstances. (Duetz v. Louisville & S. I. Traction Co. (No. 7003), 91 N. E. Rep., 622.)

Kentucky.—Operation of Cars—Care Required.

To relieve a street railroad company from liability for killing a child struck by a car, on the ground that the child came on the track so close to the car that the motorman, by ordinary care, could not stop it in time to prevent the injury, it must appear that the car was run at a reasonable speed. (Netter's Adm'r v. Louisville Ry. Co., 121 S. W. Rep., 636.)

Kentucky.—Master and Servant—Injuries to Servant—Fellow Servants—Street Railway Motorman—Death of Servant—Street Railway Collision—Contributory Negligence.

Motormen of colliding cars of a street railway system, though employed by the same company, are not fellow servants so as to preclude a recovery for injuries to one by the negligence of the other.

In Kentucky there are two exceptions to the rule that all employees of a common master engaged in a common pursuit are fellow servants, viz., where a servant is injured by the gross negligence of another servant superior in authority to him, and where he is injured by the negligence of another servant in a different department or grade of employment.

M., a street railway motorman operating a car ahead of that operated by decedent, left the car barn on time at 6:10 a. m. on the morning of the accident. After proceeding 1300 ft. from the barn at about eight miles an hour he discovered he had forgotten his fare box and started to return to the barn to procure it, having been out three and one-half minutes. Decedent's car was not due to leave the car barn until 6:17, but decedent on going to the barn discovered that M. had left his box, and so he took the box and started to deliver it to M. at a point where he expected to meet him at 6:17. There was a heavy fog, and M. reached the point of collision not later than 6:14½ a. m., the cars coming together with great force and so injuring decedent that he died. Held, that notwithstanding his negligence, decedent was also negligent in leaving the barn ahead of his schedule time, and hence there could be no recovery for his death. (Milton's Adm'x v. Frankfort & V. Traction Co., 129 S. W. Rep., 322.)

Massachusetts.—Carriers—Injuries to Passengers—Evidence—Question for Jury—Gross Negligence.

Where a street car stops, or almost comes to a stop, at the usual place where it stops to take up passengers the jury may find that one attempting to board such a car while the conductor was in the middle thereof facing the rear, with eight or ten people in the car, became a passenger, authorizing a recovery at common law for his conscious suffering resulting from his being thrown from the car suddenly starting with a jerk.

A strong, healthy man about 18 years of age attempted to board a street car, which had stopped, or almost stopped, at the usual place for passengers. The car, while he was in the act of boarding it, started with a jerk, and he was thrown off backward and killed. The conductor was in the middle of the car, facing the rear, with eight or ten passengers. Held not to show that the conductor was guilty of gross negligence, under the statute authorizing actions for death for gross negligence. (Marshall v. Boston Elevated Ry. Co. (two cases), 88 N. E. Rep., 1094.)

Massachusetts.—Collision—Duty of Motorman—Contributory Negligence.

Evidence that the driver of a team, when turning to cross diagonally a street car track to drive off the street, looked and saw a car, 400 or 500 ft. away, coming on a down grade, with an unobstructed view, and that the motorman saw the movements of the team, and that the driver as he continued on his course continued to look and nodded his head to the motorman, makes the question of his negligence contributory to the collision one for the jury, as he might well assume the motorman would slacken speed, he not necessarily being negligent if he made an error of judgment in deciding to cross at once, and travelers on public ways being required to exercise only ordinary care to avoid collisions. (O'Brien v. Lexington & N. St. Ry. Co., 91 N. E. Rep., 204.)

Michigan.—Negligence—Imputed Negligence—Action by Child—Negligence of Parent—Loss of Services of Child—Contributory Negligence of Parent.

In an action by a child for injuries, the negligence of the parent cannot be imputed to the child.

The contributory negligence of a parent will bar an action by him for the loss of services of his child resulting from personal injuries. (Feldman v. Detroit United Ry., 127 N. W. Rep., 687.)

Mississippi.—Collisions — Presumptions — Statutes — Construction of Track—Negligence—Contributory Negligence—Children.

Code 1906, Sec. 1985, providing that, in actions against railroads for damages to persons or property, proof of injury inflicted by the running of locomotives or cars shall be prima facie evidence of want of reasonable care, does not apply to a street railroad.

The rails of all street railroads ought to be flush with the surface of the ground.

A child six years of age, killed by a street car, cannot be charged with contributory negligence, so as to defeat an action by the parents for negligent death. (Pascagoula St. Ry. & Power Co. v. Brondum (No. 13,743), 50 S. Rep., 97.)

Missouri.—Use of Streets by Travelers and Street Cars—Care Required of Motorman.

Neither a driver nor a street railway company possesses a superior right to the part of the street occupied by the tracks, but drivers of vehicles must leave the track to permit the passage of cars.

A motorman may assume that a driver of a vehicle will leave the track in time to permit the free passage of the car. (Gessner v. Metropolitan St. Ry. Co., 119 S. W. Rep., 528.)

Missouri.—Carriers—Companies Liable for Injuries to Passengers—Lease—Effect—Knowledge of Conductor.

Where by an agreement between two street railroads one of them as lessee took possession of the tracks, cars, plant and former business of the other, and continued to operate the road, the lessor company was thereby relieved of liability for the negligence of the servants and employees of the lessee resulting in injuries to passengers.

Where a street car stopped to permit a passenger to alight, and she attempted to do so in the presence of the conductor, he was bound to know that she was in the act of alighting, and to operate the car accordingly. (Westervelt et al. v. St. Louis Transit Co. et al., 121 S. W. Rep., 114.)

New York.—Instructions—Sudden Start.

In an action for negligence in stopping a street car and starting it while plaintiff was alighting, an instruction that if the motorman slackened the speed of the car, and suddenly increased it without notice to plaintiff while she was preparing to alight, the jury might find negligence, nullified a previous instruction that plaintiff could not recover if the car did not stop until after she fell. (McGrane v. Nassau Electric Ry. Co., 118 N. Y. Sup., 896.)

Oregon.—Operation—Care Required—Reciprocal Rights—Contributory Negligence—Burden of Proof.

More care is essential to the proper operation of street cars than is usually required on the part of steam railroads.

The rights of travelers on a street on which street cars are operated, and the right to operate street cars, are reciprocal; and the travelers and the car men must act with due regard for the rights of others, and the public may assume that in the operation of the cars municipal ordinances will be observed.

The burden of proving contributory negligence of a traveler, struck by a street car while attempting to cross the track in front of an approaching car, is on the street railroad. (Palmer v. Portland Ry., Light & Power Co., 108 Pac. Rep., 211.)

Pennsylvania.—Negligence — Dangerous Premises — Trespassers—Electricity—Electric Third Rail—Injury to Trespassers.

Though the owner of premises is not bound to guard or protect a trespasser from dangers lurking thereon, he is liable for an injury to the trespasser, if wilfully inflicted.

Defendant's railroad was equipped with the third-rail electric system, the rail carrying the power being similar to and parallel to the other rails. The rail was not covered or protected, except at crossings and stations, and normally carried 675 volts, which was sufficient to injure or kill a person coming in contact therewith. Plaintiff was between seven and eight years old, and while playing in the back yard of the house of friends he was visiting, which abutted on the right of way, was attracted by flowers growing on the far side of the rails, whereupon plaintiff's companion opened the gate in the right-of-way fence and started to pluck the flowers. Plaintiff in some manner fell on the rail and was shocked and burned, receiving permanent injuries. Held, that there was no implied invitation or license by defendant to children to enter the premises, and that defendant owed plaintiff no duty to cover the rail, nor did the facts show wilful injury. (Riedel et al. v. West Jersey & S. R. Co., 177 Federal Rep., 374.)

South Carolina.—Negligence—Contributory Negligence—Carriage of Passengers—Personal Injuries—Alighting from Car.

A charge that one cannot recover for personal injuries if his negligence concurred with the negligence of the defendant and contributed to the injury as a proximate and immediate cause is correct.

A charge that it is negligence on the part of a passenger to step off of a moving street car when the circumstances are such as to make the danger obvious to a person of ordinary prudence and sense is correct. (Norton et al. v. Columbia Electric St. Ry., Light & Power Co., 64 S. E. Rep., 962.)

Texas.—Use of Tracks—Care Required of Pedestrians.

Though one has the right to use a street car track as a part of the street for crossing or other purposes, he cannot station himself on the track, and remain there heedless until he is struck by a passing car, and claim that he was in the exercise of care. (El Paso Electric Ry. Co. v. Adkins, 120 S. W. Rep., 218.)

Washington.—Operation of Cable Cars—Presumption of Negligence.

A jerk of a cable car, which is an incident of frequent occurrence in the operation of such cars, and consistent with care and proper equipment, does not raise any presumption of negligence. (De Yoe v. Seattle Electric Co., 102 Pac. Rep., 446.)

Washington.—Collision with Vehicle—Contributory Negligence—Questions for Jury.

It cannot be said as a matter of law that one approaching a street railway crossing on a busy street in a populous city and seeing a car approaching on an upgrade at the ordinary rate of speed, half a block away, is guilty of contributory negligence in assuming that he can cross in safety, so as to bar his recovery for injuries through being struck by the car. (Snowdell v. Seattle Electric Co., 103 Pac. Rep., 3.)

Wisconsin.—Injuries to Persons on Tracks—Contributory Negligence.

Where decedent drove his team onto a street railway track in front of an approaching car, or went so near that the car collided with his wagon, without looking and listening for the approach of the car from the rear, when he could by the exercise of ordinary care have seen it in time to have avoided the accident, he was guilty of contributory negligence precluding recovery for his resultant death. (Vetter v. Southern Wisconsin Ry. Co., 122 N. W. Rep., 731.)

LONDON LETTER

(From Our Regular Correspondent)

Leeds, which had the first overhead trolley system in the United Kingdom, will probably be the first city in the United Kingdom to adopt the trackless trolley. Bradford, Watford, Bushey, Rotherham, West Ham, Northampton and Glasgow are also considering the use of the trackless trolley.

It has been decided to take up the surface contact system in Torquay and to install the overhead trolley. The dispute between the Council and the local company at Torquay having been arbitrated, the terms of the award have been published. The Council objected to the company changing the system from the surface contact to the trolley. The ratepayers will have to pay £2,000, the cost of the arbitration and award, as the consent had been unreasonably withheld. The point was raised in the Council that an appeal would hold good, as it was claimed that the arbitrator had no jurisdiction, but the Council will come to terms with the company in spite of this objection.

At a meeting held in Glasgow to protest against the practice of using tramway profits to reduce rates one of the speakers said: "The tramway rate is really the heaviest of all. It is not levied direct; but if the workingman calculates the sum he spends in one year on tram rides he will find that it is the heaviest rate in Glasgow. If there is anything to which the surplus should be put it is to the relief of that rate on the workingman." Several other speakers contended that the people who paid for tramway enterprise in Glasgow were the shareholders, and that they ought to get the dividend in the form of reduced fares. It was asserted that the Caledonian Railway would gain £1,000 by the reduction of the rates, while other railways and large companies would benefit similarly. Three resolutions were passed by acclamation disapproving the action of the Council and calling upon that body to take steps to rectify the inequitable arrangement and suggesting a reduction of fares.

In Leicester and in Manchester the question has arisen as to what extent municipalities can "provide" electric fittings in one case and tramcars in the other. In the Leicester case Justice Nevill decided that the corporation could undertake work incidental and necessary to the delivery of the electric power to the receiver's terminal—the meter—but not beyond. In the Manchester case the ratepayers' association objected to the corporation "making" its own cars, claiming that the municipality was only entitled to "provide" them. An expert in municipal questions considers that the local officers should have specific authority for everything they do, and instanced the attempt by the corporation to carry parcels beyond the terminus of its system.

The Cheltenham Chamber of Commerce has passed a resolution protesting against a proposal to promote a bill in Parliament to give local authorities permission to provide and maintain all kinds of electric fittings for lighting and motive power and to charge for the same, but not to manufacture them. The Town Clerk said that there was a good deal of misapprehension about the bill. It seemed to be the impression that the object was to obtain powers to enable local authorities to compete with the wiring contractors. This was not so. The object was to enable corporations to obtain more consumers. There were a number of mains in Cheltenham that were not fully utilized. By passing this bill the corporation would be able to arrange for wiring, not necessarily doing it itself, and recover from the consumer, the cost being prorated over a number of years. Out of 26 corporations which possessed such powers, only two did wiring. In all the other cases the work was done by contractors. With regard to hiring motors, contractors were not inclined to risk having them thrown back on their hands, whereas corporations could hire them again to others.

At a meeting in York Councillor Morrell, who presided, gave a very favorable account of the tramways in that city. Although the lines there had been in operation only a short time the receipts were sufficient to enable a contribution to be made to the sinking fund. The very people who objected to the corporation constructing lines were now advocating extensions.

A suggestion has come from India that the physical research committee at Kew should collate all the data on rail corrugations presented recently before scientific bodies and with the help of a general grant from all the bodies which are interested in the problem appoint someone to consider further any abnormal cases of corrugation.

Congestion in London continues to increase. It really seems that nothing will meet the case but the banishment of all slow traffic from the streets at certain hours of the day. Then, as has been suggested, the sidewalks could be supported by cantilevers at the level of the first floors of buildings. This would enable foot-passengers to cross streets without risking their lives. It would follow that the display fronts of the shops would have to be shifted to the level used by pedestrians. Carts and carriages could stand under the sidewalk under cover, and those who entered buildings from the carriage level could be taken to the showrooms by elevators or escalators. This would enable the tramways to enter the heart of the city and deliver parcels and goods and do a general express business after business hours.

The London County Council still encounters the same obstacles to its proposals regarding transit lines which are so often used to thwart private enterprise. The principal weapon is the power of veto which the local authorities exercise. The estimate of the Council for its tramway plans in 1911 amounts to £829,040 for construction and equipment and £354,350 for improvements, making altogether £1,183,390 for about 30 miles of single track railway.

In connection with the plans of the City of London for a new bridge over the Thames leading up to St. Paul's Cathedral, the London County Council has offered, on conditions connected with the laying of tramways over the bridge, to contribute £300,000 toward the cost of the structure. The state committee on bridges of the House, at whose cost the bridge and its approaches will be constructed, does not agree to this, mainly, it is supposed, because the Council proposes to charge the expenditure to the rate account, whereby the city, as ratepayer, would have to bear its share of the cost of building the structure.

The triangular conflict between motor buses, tramways and tubes is still going on vigorously in London. The objections to the buses are that they are noisy, malodorous, difficult to catch and that they do not run up to the curb to discharge passengers. The first two objections are being gradually eliminated. The objection about discharging passengers could be met by having fixed stopping places like the trams. The objections to the trams are their noise and their slow speed. This restricted speed is due to vehicles being allowed to occupy main thoroughfares at all hours of the day and night. The size of the cars, the interdict against strap-hanging, and the enforced absence of trailers are also factors in restricting the speed of the trams.

The tube and underground railways, though sorely hit by the competition of the surface lines, are constantly improving their service. It has been found possible to run trains which do not stop at every station. Escalators are being installed at some stations, and the speed of all elevators is to be increased.

With a view to applying for Parliamentary powers in November, the Southend Town Council has provisionally approved the recommendations of the light railways committee for extensions to the tramway system. These recommendations refer to three sections, each of which is to be converted into a circular route. Included in the proposals is a new road 100 ft. wide and extending for nearly 1 mile. A double track tramway will occupy 14 ft. in the middle, the rails being laid upon sleepers, while the track is to be fenced in and screened by shrubs. On each side of the tramway will be a carriage road 22 ft. in width, flanked by a 10-ft. pathway, the 100 ft. being made up by the addition of an 11-ft. shrubbery outside each pathway. Another similar improvement consists in laying a double line of tramways in Leigh Road, also screened by shrubs. A carriageway 18 ft. wide will be provided on each side of the tramway, with 8-ft. pavements. Considerable widening of the existing road is involved by this scheme.

A. C. S.

News of Electric Railways

Bids Opened for Subway Construction in New York with Municipal Funds.

The Public Service Commission of the First District of New York opened bids on Oct. 27, 1910, for the construction of the Broadway-Lexington Avenue, Canal Street and Broadway-Lafayette Avenue subways with municipal funds. The question of operation was not involved. In all 77 bids were received. The Bradley Contracting Company was the only bidder on all the sections in the three routes. The bids were all on the unit basis, and the aggregate figures are not yet available. In the following table the three routes are given arranged by sections with the names of the contractors who bid on the various sections:

ROUTE 5.

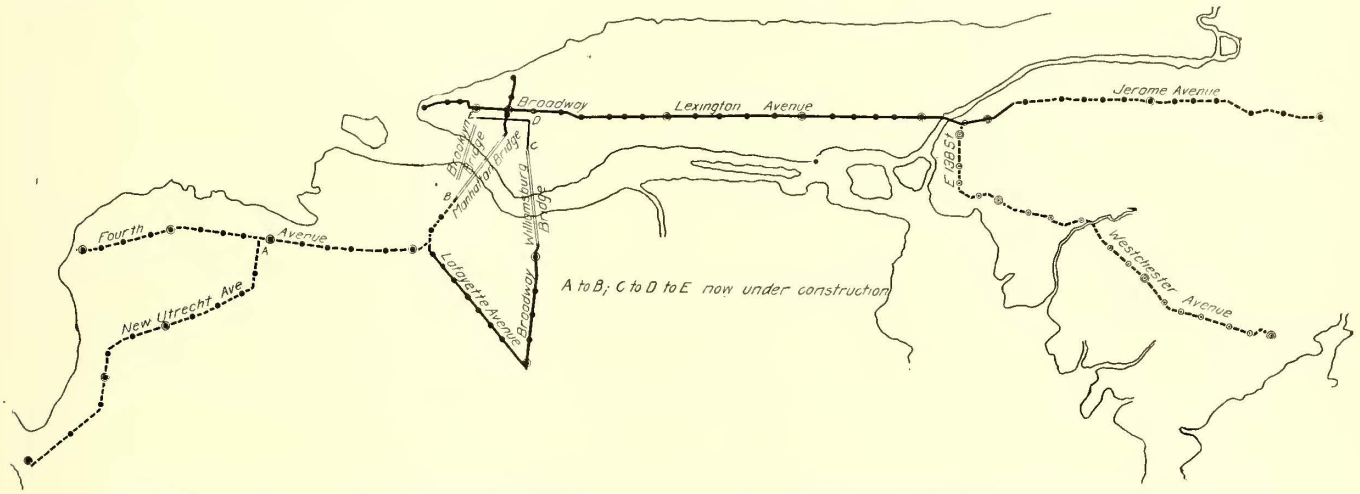
Sec. 1—Degnon Contr. Co.; Bradley Contr. Co.; McArthur Bros.; O'Rourke Contr. Co.
Sec. 2—F. L. Cranford; Bradley Contr. Co.; McArthur Bros.; O'Rourke Contr. Co. (?)
Sec. 2A—F. L. Cranford; Bradley Contr. Co.; McArthur Bros.; O'Rourke Contr. Co.
Sec. 3—F. L. Cranford; Bradley Contr. Co.; McArthur Bros.
Sec. 4—Bradley Contr. Co.; McArthur Bros.
Sec. 5—Metropolitan Contr. Co.; Bradley Contr. Co.; McArthur Bros.
Sec. 6—Degnon Contr. Co.; Bradley Contr. Co.; McArthur Bros.
Sec. 7—Degnon Contr. Co.; Bradley Contr. Co.; McArthur Bros.; Chas. H. Peckworth.
Sec. 8—Degnon Contr. Co.; Bradley Contr. Co.
Sec. 9—Bradley Contr. Co.

The Canal Street crosstown subway will run from West Street, through Watts Street to Canal Street and thence easterly under Canal Street and under the existing subway to a point 40 ft. east of the Bowery, where it will join the Brooklyn Loop subway. The length of this road is eight-tenths of a mile.

The Broadway-Lafayette Avenue route will run from the Williamsburg Bridge out Broadway, Brooklyn, to Lafayette Avenue and back through Lafayette Avenue to a junction with the Fourth Avenue subway at Fulton Street. The total length of this road, including the tracks over the bridge, is about 8 miles. Thus the total length of subway for which bids were asked is about 18 miles.

The Broadway-Lexington Avenue subway will be double-decked for almost the entire length of Lexington Avenue. The Broadway-Lafayette Avenue subway in Brooklyn and the Canal Street line in Manhattan will be two-track construction, but in the Broadway-Lafayette plans provision is made for the addition of two tracks in the future.

The parts of the tri-borough system for which bidding will be deferred until next year or later are the Fort Hamilton and Coney Island branches in Brooklyn and the Jerome Avenue and Pelham Bay Park branches in the Bronx. These will be largely elevated construction and can be completed in two years after work is begun.



Tri-Borough Subway, New York. The Routes on Which Bids Were Received Are Shown by Solid Lines

Sec. 10—Henry Steers; Bradley Contr. Co.
Sec. 11—Henry Steers; Bradley Contr. Co.
Sec. 12—Behrman & Rodgers; Bradley Contr. Co.; Oscar Daniels Co.
Sec. 13—Brody & Adler; Bradley Contr. Co.; McArthur Bros.; Hugh Nawn Contr. Co.
Sec. 14H—S. Pearson & Sons; Bradley Contr. Co.; McArthur Bros.; O'Rourke Contr. Co.
Sec. 14K—Arthur McMullin; Bradley Contr. Co.; McArthur Bros.; O'Rourke Contr. Co.
Sec. 15—Godwin Constr. Co.; Bradley Contr. Co.; Hugh Nawn Contr. Co.; Haggerty, Drummond & Co.

ROUTE 20.

Sec. 1—Metropolitan Contr. Co.; Bradley Contr. Co.
Sec. 2—Bradley Contr. Co.

ROUTE 9.

Sec. 1—Degnon Contr. Co.; Bradley Contr. Co.; F. L. Cranford; Patrick McGovern; Newman & Carey.
Sec. 2—Degnon Contr. Co.; Bradley Contr. Co.; Patrick McGovern; Newman & Carey; Hugh Nawn Contr. Co.
Sec. 3—Degnon Contr. Co.; Bradley Contr. Co.; S. Pearson & Sons; Smith, Scott, Harmon & Hickey; Oscar Daniels Co.; Hugh Nawn Contr. Co.; Newman & Carey; Smith, Pennock Contr. Co.; J. H. Holmes; Creamer, Cranford & Donovan; Walter H. Gahagan.

The Broadway-Lexington Avenue route will be constructed with two tracks from the Battery to Chambers Street and four tracks from Chambers Street to and beyond the Harlem River. The route is from the Battery, up Church Street and Vesey Street to Broadway, up Broadway to about Tenth Street and through private property and Irving Place to Lexington Avenue and up Lexington Avenue to 157th Street and River Avenue on the Jerome Avenue branch and to 138th Street and Third Avenue on the Southern Boulevard branch. The length of this road is about 9 miles.

The time for the completion of the Broadway-Lexington Avenue route is 42 months from the time of the delivery of the contract except in the case of Section IV, which is 36 months. Bidders on this work were required to deposit certified checks ranging from $10,000 to $15,000 for each section. The contractor will be required to give a bond from $250,000 to $500,000 for each section. The time for the completion of the Canal Street road is 42 months. In this case bidders were required to deposit a certified check for $15,000, and the contractor will have to file a bond for $500,000 for each section. The time for the completion of the Broadway-Lafayette Avenue route is 30 months. The certified check required from each bidder in this instance was from $10,000 to $15,000 for each section and the amount of bond which will be required from the contractor will be from $350,000 to $500,000 for each section.

The Board of Estimate and Apportionment has indicated that $60,000,000 will be available for rapid-transit construction this year. Of this $45,000,000 will come from the release of self-sustaining subway bonds from the operation of the debt limit under the constitutional amendment adopted at the last election and $15,000,000 will come from the increased margin of debt limit due to the last year's increase in assessed valuation of real estate. With only $60,000,000 available, it was impossible to solicit bids for the entire tri-borough system, the cost of which is estimated at more than $100,000,000. Accordingly, the commission selected the principal parts of that system and the parts which it will take the longest to build.

Welfare Work in Boston

In reply to a request of Mayor Fitzgerald of Boston that it should maintain an ambulance corps, the Boston Elevated Railway through Gen. William A. Bancroft, president of the company, has written a letter to the Mayor showing the activities of the organization in welfare work. The letter points out that for many years the company has made an annual contribution to large hospitals in the Boston district, has paid and is paying the expenses of sick and injured employees and has furnished free medical attendance to many of its men. It has paid the expense of conducting two mutual aid associations among its employees, so that the proceeds of the associations go to their members in sick or death benefits without any diminution whatever for expense. The company has for years pensioned employees no longer able to perform their duties and now has 48 persons in its employ who receive such allowances. Last year the company paid $500,000 in accident claims.

General Bancroft states in his letter that in many cases the company's payments, not only where it has been held liable but elsewhere, have been most liberal, and that they are vastly more than purely legal obligation requires. The company, besides paying $125,000 a year for the privilege of using the streets, etc., contributes annually to the community $1,150,000 in taxes, which help to maintain fire, police, hospital and ambulance facilities. While the company has many physicians in its employ, it contributes for humane purposes, has organized its employees for fire protection, employs many special policemen and maintains a quick service repair department, and it believes that the statutes of the community to which it contributes such large sums ought in the main to afford ample service for such needs as the Mayor suggests. The public and private ambulance service and the public police, health and fire protection service can do better work than any service which the company could maintain. Any service suggested by the Mayor that would be comprehensive enough to be efficient would duplicate the existing public facilities. The company is, however, adopting every precaution which intelligence and experience suggest and is accepting its responsibilities in a humane spirit and continuing to put forth its best efforts to relieve suffering.

Traction Matters and the Political Campaign in Detroit

A feature of the street railway situation in Detroit is the stand taken by the candidates for the various city offices. On Oct. 25, 1910, William B. Thompson, Democratic candidate for Mayor, for the first time defined his position in the matter in an address in which he referred to the Codd-Hutchins franchise ordinance, which was defeated in Council four years ago. He was glad that he shared in voting the Codd-Hutchins ordinance down. He also spoke of the plan to give the Detroit United Railway an extension grant in 1891 to insure rapid transit. The failure to pass this ordinance, according to Mr. Thompson, was followed by the construction of the so-called 3-cent fare lines. Rapid transit came, he said, notwithstanding the defeat of the extension grants. He argued that further extensions will come as needed and advocated carrying the disputed questions to the courts if they can be settled in no other way to the satisfaction of the public. He reviewed the contentions of the past few months and the test that is being made of the claims of the city to rental on the routes on which franchises are said to have expired.

Letters to the newspapers of Detroit indicate that some of the residents feel that the city suffered a considerable loss when the proposition of the company made four years ago and proposing a fare of 2½ cents for certain periods morning and evening was refused.

Alderman Watson has introduced an ordinance in the Council to require the cars on the Jefferson, Sherman, Fort, Michigan-Mack, Hastings and Fourteenth Street routes to carry route signs on the rear and sides. He claims that the company has not lived up to an agreement which was made some years ago to do this. The penalty for violating the ordinance is a fine not to exceed $100, and, in default of payment, imprisonment for a period of not more than three months.

Association Meetings

Massachusetts Street Railway Association—Boston, Mass., Nov. 9.

Central Electric Traffic Association—Indianapolis, Ind., Nov. 14.

Alabama Light & Traction Association—Anniston, Ala., Nov. 21, 22, 23.

New England Street Railway Club—Boston, Mass., Nov. 24.

Central Electric Railway Association—Dayton, Ohio, Dec. 1.

Toronto Not to Purchase Street Railway.—At a meeting held on Oct. 24, 1910, the Council of Toronto decided not to proceed further with the negotiations looking to the purchase of the Toronto Railway by the city.

New England Street Railway Club Meeting.—The first fall meeting of the New England Street Railway Club was held at the American House, Boston, Mass., on Oct. 27, 1910. Franklin Woodman, vice-president of the club, presided in the absence of C. H. Hile, the president. The meeting was devoted to a discussion of aviation. The speakers were Adams D. Claflin, president of the Boston Suburban Electric Companies and general manager of the recent Harvard-Boston Aviation Meet, and A. A. Merrill, secretary of the contest committee of the meet.

Police Expenses in Connection with Columbus Strike.—Director of Public Safety McCune, of Columbus, Ohio, has reported to the City Council of Columbus that police expenditures to Oct. 20, 1910, during the strike of the employees of the Columbus Railway & Light Company were $40,114.52, leaving a balance of $9,885.48 out of the $50,000 which was appropriated by Council to pay strike expenses. Included in the reported expenditures were $11,835 for the pay roll, $25,422.72 for rented automobiles, $2,329.53 for meals of policemen who were unable to go home for them while lawlessness lasted and $527.27 for miscellanies, including clothing and uniforms purchased for the special patrolmen. The report has been placed on file.

Exhibit of Denver City Tramway at Electrical Show.—At the electrical show which was held under the auspices of the Colorado Electric Club at the Auditorium, Denver, Col., from Oct. 8, 1910, to Oct 15, 1910, the Denver (Col.) City Tramway had an elaborate exhibit in charge of W. G. Mathews, superintendent of overhead wires of the company. The evolution of the street car system in Denver was portrayed by photographs of the different types of street cars from the horse car to the present electric car. Photographs of the new buildings to be erected at the Central Loop, the suburban terminal depot across Arapahoe Street from the Central Loop and the new office building were exhibited, and evolution in registers and rails was shown. Armatures used in 1889 and those used to-day were also exhibited. A map of the city containing the tramway lines, etc., gave an accurate idea of the number of lightning arresters in use to protect trolley wires. Buttons were given to the ladies asking them not to get off the cars backward. Cartoons reproduced from the Denver *Times* and the Denver *Post* showed the embarrassment of ladies who get off street cars backward.

Progress of Toledo Appraisal.—Carl Nau, of Nau, Tanner & Rusk, who reported on the finances of the Toledo Railways & Light Company, Toledo, Ohio, for the last eight years, explained to a number of members of the Council at Toledo on Oct. 25, 1910, the details of the report. According to Mr. Nau, the natural increase in travel for the next 25 years on a 5-cent fare would make the receipts $7,500,000 in 1935 without a corresponding increase in expenses. The report shows that the gross earnings of the company for 1909 were $1,695,902.06, the operating expenses $958,343.98 and net earnings, without deducting taxes, up-keep and interest on the investment, $737,588.08. The cost of operation in Toledo, without including taxes and interest on bonds, is 13.82 cents per car mile, and a rate of fare fixed upon the present basis of travel and operation would be high in 10 years and prohibitive in 25 years. At the meeting of the directors of the company on Oct. 27, 1910, A. E. Lang, president, said that the inventory of the physical property by Ford, Bacon & Davis, New York, N. Y., would soon be completed, and that the report will be furnished the city and then be made public.

Financial and Corporate

New York Stock and Money Market

Nov. 1, 1910.

The Wall Street market is in the usual pre-election condition of inactivity. Trading is rather light and price changes are, in the majority of cases, unimportant. This is not due to any uneasiness over the outcome of the election, but is attributable to a conservative desire to wait and see what happens.

The bond market continues to be duller than it was a few weeks ago and the money market is considerably closer. Quotations to-day were: Call, 3½@4¼ per cent; 90 days, 4¾@5 per cent.

Other Markets

The activity in traction shares on the Philadelphia market has ceased. Only small lots of Rapid Transit and Union Traction are being traded in and these are at prices only slightly higher than the low level of two weeks ago. Every one is apparently willing to wait until some definite action is taken upon Mr. Stotesbury's suggestions.

There has been quite active trading recently in Series 1 and 2 of the Chicago Railways certificates. Prices have changed very little, although Series 2 has been stronger than Series 1. Other tractions have been practically out of the market.

Massachusetts Electric and Boston Elevated continue to be the traction features of the Boston market. These shares are offered freely almost every day, but prices so far have remained practically unchanged.

In the Baltimore market there has been very little dealing in traction shares during the week, and even the trading in United Railways bonds during the week has not been as brisk as usual. Prices for the bonds are unchanged.

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

	Oct. 25.	Nov. 1.
American Railways Company	a43½	a42¾
Aurora, Elgin & Chicago Railroad (common)	a50	44
Aurora, Elgin & Chicago Railroad (pref.)	a50	a90
Boston Elevated Railway	a128	a128
Boston & Suburban Electric Companies	*14¼	*14¼
Boston & Suburban Electric Companies (preferred)	*72	*72
Boston & Worcester Electric Companies (common)	*10½	10½
Boston & Worcester Electric Companies (preferred)	*36½	43
Brooklyn Rapid Transit Company	77¼	77
Brooklyn Rapid Transit Company, 1st pref. conv. 4s	83⅞	83¼
Capital Traction Company, Washington	a130	a129¾
Chicago City Railway	a160	a170
Chicago & Oak Park Elevated Railroad (common)	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7¼	*7¼
Chicago Railways, ptcptg., ctf. 1	a75	a77½
Chicago Railways, ptcptg., ctf. 2	a19	a21¼
Chicago Railways, ptcptg., 3	a10	a11
Chicago Railways, ptcptg., ctf. 4	a6	a6
Cleveland Railway	*91½	*91½
Consolidated Traction of New Jersey	a73	a73
Consolidated Traction of N. J., 5 per cent bonds	a104	a104
Detroit United Railways	*45	*45
General Electric Company	155	155
Georgia Railway & Electric Company (common)	a122	a122
Georgia Railway & Electric Company (preferred)	87	a89
Interborough-Metropolitan Company (common)	22⅞	22⅛
Interborough-Metropolitan Company (preferred)	59½	56⅞
Interborough-Metropolitan Company (4½s)	81½	81⅜
Kansas City Railway & Light Company (common)	a23½	a23½
Kansas City Railway & Light Company (preferred)	*80	75
Manhattan Railway	a143	a143
Massachusetts Electric Company (common)	a20	a20
Massachusetts Electric Companies (preferred)	a85	a85½
Metropolitan West Side, Chicago (common)	a21	*21
Metropolitan West Side, Chicago (preferred)	a64	*64
Metropolitan Street Railway	22	*22
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	*67½	*67½
Northwestern Elevated Railroad (common)	a22	a23
Northwestern Elevated Railroad (preferred)	a63	a63
Philadelphia Company, Pittsburg (common)	a45¾	a45
Philadelphia Company, Pittsburg (preferred)	42½	a43
Philadelphia Rapid Transit Company	a15⅞	a16¼
Philadelphia Traction Company	a83	a82
Public Service Corporation 5 per cent col. notes	a94½	a95
Public Service Corporation, ctfs	a101	a101
Seattle Electric Company (common)	*109	*109
Seattle Electric Company (preferred)	*98½	*98½
South Side Elevated Railroad (Chicago)	a65	a65
Third Avenue Railroad, New York	12¾	*12¾
Toledo Railways & Light Company	*8¼	*8¼
Twin City Rapid Transit, Minneapolis (common)	*112½	*112½
Union Traction Company, Philadelphia	38½	a40
United Rys. & Electric Company, Baltimore	a15	a15⅝
United Rys. Inv. Co. (common)	*15	*15
United Rys. Inv. Co. (preferred)	*60	*60
Washington Ry. & Electric Company (common)	a38	a37½
Washington Ry & Electric Company (preferred)	a89	a89⅜
West End Street Railway, Boston (common)	a86	a86½
West End Street Railway, Boston (preferred)	*100¾	*100¾
Westinghouse Elec. & Mfg. Company	72¾	73¼
Westinghouse Elec. & Mfg. Company (1st pref.)	*129	a124

aAsked. *Last sale.

Annual Report of the Tri-City Railway & Light Company

Gross and net earnings of the Tri-City Railway & Light Company, Davenport, Ia., compare as follows for three years:

YEAR ENDED DEC. 31.	1909.	1908.	1907.
Gross earnings	$2,039,488	$1,819,077	$1,782,356
Operating expenses	1,140,908	1,069,317	1,132,392
Net earnings	$898,580	$749,760	$649,964

The gross earnings of 1909 increased 12.12 per cent over the record of the previous year. Against the net earnings for 1909 there were charged $472,388 for interest and discount on bonds and loans and $50,000 for sinking fund payment, leaving a divisible surplus of $376,192. Dividends of $169,572 were paid on the capital stock, leaving a surplus of $206,620. Joseph F. Porter, the president, says in the report:

"During the coming year, aside from the necessary expenditures for new business and railway extensions and reconstruction, the principal items of construction will be a 6000-kw turbine and accessories for the Moline power station and a new gas generating plant for Rock Island and Moline.

"During the year some of the franchises were changed and amended at our request and a new 20-year gas franchise was obtained in the City of Moline.

"General business, and particularly the business of the various manufacturing industries in the territory served by your company, have very materially improved during the past year and are now in normal condition with every prospect of the continuance of the general prosperity now enjoyed.

"Several interurban railways from interior points to connect with various lines of your railway system are being actively promoted by outside interests.

"The relations between your company and the public and municipal authorities are of a cordial nature, and the loyalty and efficiency of your officers, agents and employees are worthy of your fullest approval.

"During the year a total sum of $521,007 was expended on the property of the various subsidiary companies for construction, betterments, improvements, replacements and renewals, as follows: Railway department, $255,330; electric department, $118,571; gas department, $146,616; heating department, $490; total, $521,007."

The new improvements included a new car house in Davenport, 10 new Tri-City type cars and equipment, built by the Cincinnati Car Company, and approximately nine miles of reconstructed track and special work.

Atlantic Shore Line Railway, Sanford, Maine.—The United States Circuit Court at Portland, Maine, has ordered the sale of the property of the Atlantic Shore Line Railway at Alfred, Maine, on Dec. 1, 1910, under foreclosure proceedings instituted by the Knickerbocker Trust Company, New York, N. Y., as trustee for the holders of the first mortgage bonds of the company.

Boston (Mass.) Elevated Railway.—The stockholders of the West End Street Railway have subscribed to 26,751 shares of common stock of the company out of 27,800 shares of a par value of $50 each authorized to be offered to them by the Railroad Commission at $75 a share on the basis of one new share of stock for every eight shares held. As stated in the ELECTRIC RAILWAY JOURNAL of Sept. 24, 1910, page 482, the new stock is issued to reimburse the Boston Elevated Railway for improvements.

Chicago (Ill.) Consolidated Traction Company.—In relation to the suit brought by Mrs. Adelaide Yerkes, widow of Charles T. Yerkes, to enjoin Louis S. Owsley, executor of the Yerkes estate, from exchanging $4,594,000 of bonds of the Chicago Consolidated Traction Company for new securities to be issued by the Chicago Railways, the Chicago *Tribune* says: "All opposition has been withdrawn to the merger of the Chicago Railways and the Chicago Consolidated Traction Company. There now remain of those who originally started out to circumvent the reorganization plan only the scattered holders of 10 per cent of the general mortgage bonds of the Chicago Consolidated Traction Company, the same class of bonds that are owned by the Yerkes estate, and the members of the Foreman-Harrity commit-

tee. Of these the so-called McHenry holding of approximately 90 bonds is the largest. That these holders will shortly accede to the proposals of the reorganization committee is practically a foregone conclusion. The terms of the settlement have not been made public, but it is intimated that there has been a compromise, and that instead of receiving only 50 per cent of face value of the general mortgage bonds of the Chicago Consolidated Traction Company in 4½ per cent income bonds of the Chicago Railways, the holders of these bonds will realize something more substantial for their holdings." The date for the sale of the property of the company under foreclosure has not yet been set.

Chicago (Ill.) Railways.—At the annual meeting of the stockholders on Oct. 28, 1910, F. L. Hupp, W. H. Clark, W. W. Jones and John Reese were chosen directors to succeed Hempstead Washburne, W. N. Eisendrath, F. H. Rawson and J. W. Gary, retired. The other directors, Henry A. Blair, A. B. Jones, John M. Roach, Wallace Heckman and Seymour Morris, were re-elected.

Columbus, New Albany & Johnstown Traction Company, Columbus, Ohio.—The option on the property of the Columbus, New Albany & Johnstown Traction Company, which constituted a part of the assets of the Queen City Savings Bank & Trust Company, Cincinnati, Ohio, which is being liquidated, has been closed by the Eastern representative to whom it was given and the property has been sold for $187,000, the amount of the loan. The option was taken in the name of A. T. Herd, New York, N. Y. The Queen City Savings Bank & Trust Company holds $440,000 of the bonds, $150,000 of the preferred stock and $354,000 of the common stock of the Columbus, New Albany & Johnstown Traction Company as security. Part of the purchase price was in cash and the remainder in 60-day notes.

Georgia Railway & Electric Company, Atlanta, Ga.—The directors of the Georgia Railway & Electric Company have declared a quarterly dividend of 2 per cent on the common stock of the company, payable Nov. 19, 1910, to holders of record on Nov. 15, 1910. The dividend rate since 1907 has been 6 per cent a year.

Hartford & Springfield Street Railway, Hartford, Conn.—The directors of the Hartford & Springfield Street Railway have declared a semi-annual dividend of 2 per cent on the $285,000 of 6 per cent non-cumulative preferred stock of the company, payable on Nov. 1, 1910. On May 1, 1910, the company paid a semi-annual dividend of 1 per cent on the preferred stock, the first dividend paid since Nov. 1, 1907.

Hornell (N. Y.) Traction Company.—The Public Service Commission of the Second District of New York has approved an agreement whereby the Hornellsville Electric Railway, Hornellsville & Canisteo Railway and Canisteo Valley Electric Railway are consolidated as the Hornell Traction Company, which has been authorized to issue common capital stock to the amount of $120,000, which is to be exchanged for the stock of the consolidated companies.

Indianapolis, Crawfordsville & Western Traction Company, Indianapolis, Ind.—The report of Harry J. Milligan, receiver of the Indianapolis, Crawfordsville & Western Traction Company, for September, 1910, shows gross earnings of $20,118, operating expenses of $9,821 and net earnings of $10,297. The revenue from passengers amounted to $17,853, the revenue from freight to $1,571 and the revenue from express to $558. Under operating expenses the following items were included: Conducting transportation, $4,097; maintenance of way and structures, $962; rent of tracks and terminals, $1,708. An expense of $706 was incurred for construction, ballasting, grading, etc. On Oct. 1, 1910, the balance on hand was $13,557.

Janesville (Wis.) Street Railway.—T. S. Nolan, representing the bondholders of the Janesville Street Railway, purchased the property of the company recently at receiver's sale for $125,000, subject to $10,000 of receiver's certificates.

Los Angeles (Cal.) Railway.—The stockholders of the Los Angeles Railway have voted to increase the capital stock of the company from $5,000,000 to $20,000,000 and to change the name of the company to the Los Angeles Railway Corporation.

Montreal (Que.) Street Railway.—H. S. Holt, president of the Montreal Light, Heat & Power Company, has announced that the proposed merger of that company and the Montreal Street Railway will not be concluded on account of opposition by the public to the consolidation.

New Orleans Railway & Light Company, New Orleans, La.—The directors of the New Orleans Railway & Light Company have declared a dividend of 2½ per cent on the $10,000,000 of 5 per cent non-cumulative preferred stock out of the earnings of the year which will end Dec. 31, 1910. The dividend is payable on Jan. 16, 1911, to holders of record on Dec. 31, 1910. This is the first distribution since October, 1907, when ⅝ of 1 per cent was paid.

Ocean Shore Railway, San Francisco, Cal.—Judge Van Fleet, of the United States Circuit Court at San Francisco, has postponed the sale of the property of the Ocean Shore Railway under foreclosure to Nov. 18, 1910, and has granted Lilly & Heins permission to appeal from the order of the court which directs that the property of the company be sold.

Oklahoma Railway, Oklahoma City, Okla.—It is understood that negotiations which have been pending for some time for J. G. White & Company, Inc., New York, N. Y., to take over the Oklahoma Railway, as operating managers have been concluded.

Philadelphia (Pa.) Rapid Transit Company.—Action on the plan to have E. T. Stotesbury, of Drexel & Company, Philadelphia, Pa., become a director of the Philadelphia Rapid Transit Company and the Union Traction Company, Philadelphia, will not be taken until the report of the special committee of directors of the Union Traction Company composed of Robert A. Balfour and George W. Elkins has been received regarding the proposal of Mr. Stotesbury that the stockholders of the Union Traction Company should guarantee the obligations of the Philadelphia Rapid Transit Company for capital requirements and that a sufficient amount should be appropriated from the earnings of the Philadelphia Rapid Transit Company to maintain the physical integrity of the property properly.

Quakertown (Pa.) Traction Company.—A protective committee consisting of Julius Vetterlein, Theodore J. Lewis, William A. Brown, Albert W. Morton and George B. Atlee has been formed by the bondholders of the Quakertown Traction Company to oppose the proposal of the Lehigh Valley Transit Company to exchange bonds of that company for those of the Quakertown Traction Company in accordance with the terms given in the Electric Railway Journal of Oct. 29, 1910, page 926.

Washington, Baltimore & Annapolis Electric Railway, Washington, D. C.—The reorganization committee of the Washington, Baltimore & Annapolis Electric Railway has announced that more than half of the bonds of that company and about an equal number of the bonds of the Baltimore Terminal Company have been deposited with it, as well as a considerable amount of the stock of the Washington, Baltimore & Annapolis Electric Railway.

Winona Interurban Railway, Winona Lake, Ind.—Edward Beyers, Warsaw, Ind., has been elected a director of the Winona Interurban Railway to fill a vacancy in the board.

Dividends Declared

Dartmouth & Westport Street Railway, New Bedford, Mass., quarterly, 2 per cent.

Georgia Railway & Electric Company, Atlanta, Ga., quarterly, 2 per cent, common.

Hartford & Springfield Street Railway, Hartford, Conn., 2 per cent.

Lincoln (Neb.) Traction Company, quarterly, 1½ per cent.

New Orleans Railway & Light Company, New Orleans, La., 2½ per cent, preferred.

Ohio Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred.

Portland Railway, Light & Power Company, Portland, Ore., quarterly, 1 per cent, common.

Union Street Railway, New Bedford, Mass., quarterly, 2 per cent.

Traffic and Transportation

Commutation Rates to the New Pennsylvania Railroad Terminal in New York

The Pennsylvania Railroad has made public the regular and commutation rates of fare which will prevail between points in New Jersey and the new station of the company at Seventh Avenue and Thirty-third Street, New York, N. Y. The following table shows the difference between the present single-trip rates to the existing terminals and the announced rates for the new station:

	New station rates, cents.	Present rates, cents.
Harrison	27	15
Newark	27	17
South Street, Newark	27	17
Waverly	35	30
North Elizabeth	40	30
Elizabeth	40	30
South Elizabeth	40	30
Lindon	48	35
Scott Avenue, Rahway	54	40
Rahway	54	40
Colonia	60	50
Iselin	63	57
Menlo Park	67	60
Metuchen	72	65
Stelton	80	73
New Brunswick	86	78

The increases in commutation rates are shown in the following table:

	New station 50-trip family or firm.	Present rates.	New station 60-trip monthly.	Present rates.
Harrison	$11.00	$6.00	$12.00	$6.00
Newark	11.00	6.00	12.00	6.00
Waverly	14.00	9.00	12.50	6.50
Elizabeth	15.25	10.25	12.50	6.50
Lindon	18.50	13.50	14.00	8.60
Rahway	21.00	16.00	15.00	9.00
Avenel	22.50	17.50	15.50	9.50
Edgar	22.50	17.50	15.75	9.75
Woodbridge	23.00	18.00	16.00	10.00
Spa Spring	23.90	18.90	16.25	10.25
Perth Amboy	25.00	20.00	16.50	10.50
Colonia	22.50	17.50	15.50	9.50
Iselin	23.50	18.50	16.00	10.00
Menlo Park	24.50	19.50	16.50	10.50
Metuchen	27.00	22.00	17.00	11.00
Stelton	30.00	25.00	17.50	11.50
New Brunswick	32.00	27.00	18.00	12.00

The Interstate Commerce Commission has designated Nov. 16, 1910, as the date for the hearing in New York City on the petition of the various bodies which represent commuters in regard to rates over the railroads operating between points in New Jersey and New York. Commissioner John M. Harlan will preside. Edmund Wilson, Attorney-General of New Jersey, will represent the State Board of Public Utility Commissioners in the proceeding, and Frank Lyon will act as attorney for the Interstate Commerce Commission.

Sale of Transfers Between Separate Intersecting Lines Suggested in New York

Adrian H. Joline and Douglas Robinson, receivers of the Metropolitan Street Railway, New York, N. Y., have sent to the Public Service Commission of the First District of New York with the consent of the bondholders' reorganization committee an offer to establish a modified transfer system between the Fifty-ninth Street crosstown line of the Central Park, North & East River Railroad and the north and south lines of the Metropolitan Street Railway. The offer is made pursuant to a transfer order of the commission affecting the two roads adopted Aug. 2, 1910, and extended to Nov. 1, 1910. The receivers sent to the commission a letter from Chairman Tripp, of the reorganization committee, representing the bondholders of the Metropolitan Street Railway, embodying the offer as accepted by the bondholders. Mr. Tripp's letter follows:

"Acting under authority conferred on me by resolutions of the bondholders' committees of general and collateral 5 per cent bonds and refunding 4 per cent bonds in the matter of the order of the Public Service Commission for the establishment of a joint rate between the Metropolitan Street Railway and the Central Park, North & East River Railroad as to the lines of the Metropolitan Street Railway which intersect the Fifty-ninth Street crosstown line of the Central Park, North & East River Railroad, I recommend that the present charge of 10 cents for traffic to and from Fifty-ninth Street and of 15 cents for through traffic via Fifty-ninth Street be reduced to 8 cents and 10 cents, respectively, by the following arrangement:

"1. That the rate between the Metropolitan lines and the Fifty-ninth Street line for those passengers that originate or stop on Fifty-ninth Street shall be 8 cents, the Metropolitan lines collecting 3 cents for each transfer issued to the Fifth-ninth Street line and the Fifty-ninth Street line charging 3 cents for each transfer issued to the Metropolitan lines.

"2. For those passengers who travel on the Fifty-ninth Street line en route from a Metropolitan line to some other Metropolitan line (this journey being in the same general direction) there shall be a charge of 10 cents. In other words, the Metropolitan Street Railway charges 3 cents for a transfer issued to such a passenger, which is good on the Fifty-ninth Street line, and the Fifty-ninth Street line charges 2 cents for an additional transfer, which is good on another line of the Metropolitan Street Railway going in the same general direction.

"The method of the issuance of transfers described above is used simply for the purpose of illustration, and is not intended to suggest a specific method of collection of fares.

"This approval is based upon our desire to meet the wishes of the commission and the public, because the Metropolitan Street Railway cannot afford, from a purely business standpoint, to reduce its already insufficient revenues, and is not to be construed as in any way prejudicing our rights to contest the constitutional right of the Public Service Commission to establish a joint rate between independent companies."

The Central Park, North & East River Railroad has sent to the Public Service Commission a letter agreeing to the terms of transfers between its Fifty-ninth Street line and the intersecting north and south lines of the Metropolitan Street Railway, as proposed by the receivers of that company.

Company Sustained in South Framingham Fare Case

The Massachusetts Railroad Commission has issued a decision sustaining the Milford & Uxbridge Street Railway, Milford, Mass., in the petition of the Framingham Board of Trade for reduced fares between Holliston and South Framingham. The finding states:

"After a hearing the Milford & Uxbridge Street Railway was requested to furnish the Railroad Commission with a report of its income under the newly established fares and, in view of the enactment of the statute making the present financial year a 9-month term, was also requested to tabulate its returns to Sept. 30, 1910, for the purpose of making an exact comparison of financial years of the same duration. This information is now before us and we are convinced, upon a careful review and study of all the evidence, that the existing unit of fare for a single ride is not unreasonable. We believe, however, in view of the close commercial and social relations existing between the towns of Hollister and South Framingham, that some concession should be made with respect to the workingman's ticket, so called. Without undertaking to fix the price arbitrarily we recommend a reduction."

Freight Petition Granted in Massachusetts.—The Railroad Commission of Massachusetts has approved the petition of the Haverhill & Amesbury Street Railway, Merrimac, Mass., to act as a common carrier of baggage and freight in Salisbury, Amesbury, Merrimac, Haverhill and Newburyport.

Wind Shields in Louisville.—The Louisville (Ky.) Railway is placing wind shields on cars which are without rear vestibules to protect conductors and passengers. The shields extend from the front to the rear of the platform along the inside. They were built in the shops of the company.

Clearing Right of Way.—The Indiana Union Traction Company, Anderson, Ind., is clearing its right of way of brush wherever the view of the line is obstructed. In one instance the company bought an orchard on a farm near Alexandria and removed all the trees so as to make it possible for motormen to have an unobstructed view of a curve.

Congestion in Louisville.—Owing to the congestion on Fourth Avenue, the principal retail thoroughfare in Louisville, the Commercial Club of Louisville has asked the Louisville (Ky.) Railway to operate its Fourth Avenue cars north on Fourth Avenue and return by way of Fifth Street. The club has also requested the company to arrange to transfer passengers on suburban cars to its cars.

Date Set for Hearing on Injunction to Prevent Overcrowding in Pittsburgh.—At the joint request of attorneys representing the city and the Pittsburgh (Pa.) Railways in the injunction proceedings which the company instituted against the city to prevent the enforcement of the two ordinances regulating the overcrowding of streets cars Common Pleas Court No. 1 has fixed on Nov. 9, 1910, for the argument.

New Subway Station Opened in New York.—The new terminal station on the West Farms line of the subway division of the Interborough Rapid Transit Company, New York, N. Y., was opened on Oct. 28, 1910, at 12:01 a. m. It will be known as Zoological Park-180th Street station and is the permanent terminal station of the West Farms division. It is equipped for the 10-car express trains and 6-car locals.

Indiana Commission to Recommend Improvements.—The Railroad Commissioners of the State of Indiana conferred with J. L. Jones, Philadelphia, Pa., president of the Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind., on Oct. 24, 1910, about the ability of the company to carry out recommendations which the commission proposes to make for improvement of the physical property of the company.

Proposed Revision of Central Association Passenger Tariff.—The members of the Central Electric Traffic Association have decided to consider the revision of Joint Passenger Tariff No. 3 at a meeting which will be held on Nov. 14, 1910, in the office of the chairman of the association at Indianapolis. A special endeavor is being made to have representatives present from all lines that are interested in the tariff, with the idea of completing the work at this meeting.

Complaint Against Catskill Traction Company Closed.—The Public Service Commission of the Second District of New York has closed upon its records the complaint of Catskill against the Catskill Traction Company regarding the dangerous conditions of track along the State highway in that town. After conversation with the State Highway Commission and other parties interested a satisfactory adjustment of the matter has been made and the roadway placed in safe and proper condition.

"Timely Tips for Patrons of Toledo's Street Cars."—This is the title of an 8-page folder 3 in. x 6 in. issued by the Toledo Railways & Light Company, Toledo, Ohio, principally to inform patrons of the company of the schedules maintained on the various lines of the company. The publication also contains the time over the Toledo & Western Railroad and information regarding the company's owl car schedule, special cars, Toledo Beach and Point Place, express, baggage and freight, the display room and the interurban station.

Switch Targets and Lights in Michigan.—The recent order of the Michigan Railroad Commission regarding the use of switch targets and lights at all main line switches of interurban railroads owned and operated by the Detroit United Railway in Michigan outside of cities and villages confirms the practice which has been followed by the company for some time. The switches on the interurban lines of the company are already equipped with targets and lights, except at places where the tracks run into the highway in villages and hamlets. The order of the commission in this connection was published in the Electric Railway Journal of Oct. 22, 1910, page 891.

Circular on Deportment of Trainmen.—The Railroad Commission of Indiana has recently addressed the following circular to the interurban railways of Indiana, in which attention is called to the complaints that have reached the commission of inattention to passengers on the part of trainmen: "Continual complaints reach this commission of the inattention and rudeness of some of your conductors to passengers on your lines. Whether this arises from the character of some of the men in your employment or the fact that you have not sufficient trainmen to do the work, it is the general demand of the people of the State that it shall be corrected. The commission therefore directs that your superintendents and trainmasters shall proceed at once to supervise this matter of operation and to require and see that your conductors shall extend to all passengers and especially women and children the care, courtesy and attention that should be given in all such cases."

Through Service Over Lake Shore Electric Railway and Western Ohio Railway.—E. W. Moore, president of the Lake Shore Electric Railway, Cleveland, Ohio, has denied that negotiations are under way for the consolidation of the Lake Shore Electric Railway and the Western Ohio Railway. Mr. Moore states that the idea that the companies were to consolidate probably originated in the arrangement made with the Cleveland Chamber of Commerce to establish a through fast passenger and freight service between Cleveland and Lima by a traffic agreement between the Lake Shore Electric Railway and the Western Ohio Railway. In order to do this connection must be made between Fostoria and Findlay over the Toledo, Fostoria & Findlay Railway. The Western Ohio road is constructing a line between Findlay and Fremont which will furnish trackage for the through service, but it is possible that the Western Ohio Company may build a connecting link between Fostoria and Findlay. The plan of wholesale houses of Cleveland to develop business in the western part of the State resulted in the arrangements being made for through service.

Circular Regarding Watches and Time Cards.—The Railroad Commission of Indiana has recently issued the following circular, in which reference is made to the report of the inspectors of the commission about the inclination of motormen to disregard their time cards and watches: "Upon investigation by our inspectors we find that your motormen in many cases do not use their time cards and watches. In one case reported by our inspector he stated that a motorman passed 19 switches, or side tracks, without looking at his watch, and that at no time on the entire trip did he consult his time card. It appears that many motormen and conductors attempt to memorize the time of trains and meeting points at sidings. It is well for them to learn the time of the trains at sidings, but they should never depend on memory altogether and should consult the time card furnished to them that there may be no mistake. They should also look at their watches when they pass stations or side tracks where trains are likely to be met. This is especially necessary, as the companies generally reserve a right to run extra trains at any time without notifying regular trains. The commission trusts that you will take this matter up promptly and direct your men to comply with this circular. Our inspectors will report such omissions to us."

Cincinnati Committee Reports Against No-Seat-No-Fare Ordinance.—The committee on street railroads of the Council of Cincinnati recently asked that action on the no-seat-no-fare ordinance by the Council be indefinitely postponed and that the Director of Public Service be instructed to see that better service is provided during the rush hours. The report of the committee has since been adopted. In advocating the rejection of the ordinance, the committee on street railroads said: "Your committee will state that it is of the opinion that it would be unwise to pass this ordinance for the good and sufficient reason that it would interfere with the citizens of this city by not allowing them to use their best judgment about boarding a crowded car and standing, as it prohibits them from boarding any car that has on it the maximum number of passengers according to the ordinance. Your committee is of the opinion that it would be doing an act of injustice to the people of Cincinnati to recommend this ordinance for passage, as the cars would pass by on stormy nights when the sleet would be falling and the streets would be covered with slush, and the public would be compelled to wait from 30 minutes to one hour, during which time the cars would pass with standing space in at least one-half of them not occupied. Your committee recommends that the Director of Public Service be requested to see that the street car service is improved during the rush hours in the morning and evening, so that the general public can get the best car accommodations that can possibly be given. Your committee further recommends that the ordinance referred to in the foregoing, introduced June 13, 1910, be indefinitely postponed."

Personal Mention

Mr. Ferdinand Williams has been elected president of the Cumberland & Westernport Electric Railway, Cumberland, Md., to succeed the late C. L. Bretz.

Mr. William Everdell, Jr., assistant secretary of the Hudson & Manhattan Railroad, New York, N. Y., has been appointed acting secretary of the company to succeed Mr. Charles W. King, resigned.

Mr. M. Techlilner, formerly dispatcher of the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., has been appointed superintendent of the company with headquarters at Elkhart, Ind.

Mr. R. R. Smith has been appointed general superintendent of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., with headquarters at Erie, Pa., in charge of operation, and not assistant manager of the company, as previously reported.

Mr. F. W. Laas, chief engineer of the Cedar Rapids & Marion City Railway, Cedar Rapids, Ia., for the last nine years, has resigned to become chief engineer of the Cedar Rapids & Iowa City Railway, Light & Power Company, Cedar Rapids, Ia.

Mr. James E. Cowles has resigned as superintendent of lighting of the Little Rock Railway & Electric Company, Little Rock, Ark., to become manager of the lighting department of the Shreveport Gas, Electric Light & Power Company, Shreveport, La.

Mr. Alfred Craven has been appointed engineer in charge of subway construction by the Public Service Commission of the First District of New York to succeed Mr. George S. Rice, who retired recently to take up private practice as a consulting engineer. At the same time Mr. Craven's designation as acting chief engineer of the commission is continued.

Mr. J. S. Badger, general manager Brisbane Tramways, Brisbane, Australia, spent a few days in New York last week. Mr. Badger was formerly connected with the original Sprague Electric Railway & Motor Company and later with the Edison General Electric Company and was constructing engineer for a number of the early electric railway lines in this country. About 14 years ago, however, he accepted the office of general manager of the Brisbane Tramways, which under his supervision have been developed into one of the most important electric railway systems in Australia. He revisited this country seven years ago and at the time attended the convention of the American Street Railway Association at Saratoga, N. Y. This year he came by way of London and returned to that city on Oct. 29, 1910. Mr. Badger expects to revisit the United States again about Dec. 1 and spend about six weeks here before sailing for Australia.

Mr. R. A. Crume, treasurer, purchasing agent and claim agent of the Dayton & Troy Electric Railway, Dayton, Ohio, has been appointed general manager of the Dayton & Troy Electric Railway, Dayton, Ohio, to succeed Mr. C. M. Paxton, resigned, who has accepted the management of the branch of the Dayton Electrical Manufacturing Company, Dayton, Ohio, in Des Moines, Ia. Prior to his connection with the Dayton & Troy Electric Railway, Mr. Crume was for three years engaged in the manufacturing business. He entered the service of the Dayton & Troy Electric Railway on Dec. 26, 1902, as assistant superintendent in charge of the company's lines in Piqua. In 1904 he was appointed purchasing and claim agent of the company and the following year the duties of general auditor were added to his office. On January 6, 1906, he was elected a director of the company, and in January, 1908, he was elected treasurer of the company, continuing also as purchasing agent and claim agent. On Dec. 1, 1910, Mr. Crume will assume his new position with the company with the title of treasurer and general manager, and to facilitate the work of that office he has arranged to make his headquarters at Tippecanoe City, Ohio, where the shops and power station of the company are located.

Mr. Robert J. Clark has been appointed comptroller of the Kansas City Railway & Light Company, Kansas City, Mo. Mr. Clark entered the employ of the Toronto (Ont.) Railway as pay clerk in 1894 during his second year at the University of Toronto, and was permitted to complete his course. After graduation he remained one year with the Toronto Railway in the comptroller's department and in 1899 was appointed chief accountant of the National Trust Company, Toronto. In 1902 Mr. Clark returned to the office of the Toronto Railway as assistant to the secretary of the Sao Paulo Tramway, Light & Power Company and the Rio de Janeiro Tramway, Light & Power Company, two hydroelectric tramway, light and power companies located in Brazil and developed and owned by Mr. William McKenzie, Toronto, and Dr. F. S. Pearson, New York, and their associates. In 1904, during the visit of Mr. J. M. Smith, the comptroller of the Toronto Railway, to Brazil, in connection with his duties as secretary of the companies at Rio de Janeiro and Sao Paulo, Mr. Clark was appointed acting comptroller of the Toronto Railway. In 1907 Mr. Clark inspected the properties in Brazil for Mr. McKenzie and returned to Toronto in January, 1908. On account of the growth and importance of the Brazilian companies, it was decided in 1908 to open new offices for them, but Mr. Clark decided to remain as assistant comptroller of the Toronto Railway, which position he resigned in October, 1910, to become comptroller of the Kansas City Railway & Light Company.

Mr. Peter E. Hurley has resigned as general manager of the Trenton (N. J.) Street Railway after continuous service from June 24, 1885, during which time he rose from transfer agent to general manager. After serving as transfer agent Mr. Hurley became in turn stable boss in the horse car days, then superintendent, and about 10 years ago general manager. On May 24, 1892, Mr. Hurley ran the first electric car in Trenton. He was also particularly active in building the electric railway through West State Street, the city's wealthy section. Since the introduction of electricity for motive power the Trenton Street Railway has extended its lines into the suburbs, covering practically the territory within a dozen miles of Trenton on the Jersey side of the Delaware River. Mr. Hurley has directed the work of securing rights of way and the construction of these lines. More than 50 of the employees of the company have been with it over 25 years. Mr. Hurley has always come into close contact with the people of Trenton, and expressions of regret at his retirement from the company are general. Mr. Hurley will go into the paving contracting business with the Filbertine Paving Company. To the ELECTRIC RAILWAY JOURNAL Mr. Hurley expressed his reasons for retiring from the Trenton Street Railway as follows: "My only reason for making a change is to get into other business. Twenty-five years is long enough in any one line of work. My relations with the Trenton Street Railway have been most pleasant, and I am leaving the company with the best of feeling for its future welfare."

OBITUARY

David J. Evans, who was prominently connected with one of the constituent companies of the Brooklyn (N. Y.) Rapid Transit System in the horse car days, is dead.

W. D. Smith, general manager, purchasing agent and claim agent of the Athol & Orange Street Railway, Athol, Mass., is dead. Mr. Smith was born in New Salem, Mass., in 1845. In 1850 his parents moved to Athol and he lived there continuously from that time until he died. He served in various public capacities in Athol.

James Jourdan, president of the Brooklyn (N. Y.) Union Gas Company and a director of the Interborough Rapid Transit Company, New York, New York & Long Island Traction Company, New York & Queens County Railway and the New York & New Jersey Telephone Company, died at his home in Brooklyn on Nov. 1, 1910, at the age of 79 years.

Mr. Alexander Henry Davis, the largest single holder of stock in the Louisville (Ky.) Railway, died recently at his home in London, England. For several years prior to 1889 Mr. Davis was president of the Louisville City Railway, but he resigned as president of the company when the Louisville City Railway and the Central Passenger Railway were consolidated. Mr. Davis was represented on the board of directors of the Louisville Railway by Mr. John Stites.

Construction News

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

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

RECENT INCORPORATIONS

***Los Angeles-Western Railway, Los Angeles, Cal.**—Incorporated in California to build an electric railway to connect Hermosa Beach and Culler. Capital stock, $500,000. Incorporators: A. W. Taylor, W. C. Wallace, L. Metzger and M. Conway.

***Springfield & Central Illinois Traction Company, Springfield, Ill.**—Incorporated in Illinois to build an electric railway from Springfield to Nashville, Ill. Headquarters, Springfield. Capital stock, $20.000. Incorporators: I. A. Smith, G. W. White, N. E. McMillan and Alfred Lynch, St. Louis, Mo.; James Gullett, H. B. Williams, John B. Conant, Oscar Ansell and William J. Barrett, Springfield.

***Iowa Traction Company, Oskaloosa, Ia.**—Application for a charter has been made in Iowa by this company to build a 65-mile electric railway to connect Oskaloosa and Tama. Capital stock authorized, $2,000,000. Incorporators: G. E. Wodehouse, Oskaloosa; Jefferson C. Mabey, Albis, and Irving T. Hunter, Newark.

Wicomico Electric & Power Company, Salisbury, Md.—Chartered in Maryland to build a 25-mile electric railway to connect Salisbury, Hebron, Quantico, Wetipquin, Tyaskin, Bivalve and Nanticoke. Capital stock, $500,000. Officers: M. V. Brewington, president; H. James Messick, vice-president; William Cooper, treasurer; Mark Cooper, secretary. Directors: Jesse D. Price, Levin W. Dorman, Whitefield S. Lowe and J. B. Culver. [E. R. J., March 6, '10.]

***Union Terminal Railway, Rockport, Tex.**—Application for a charter has been made in Texas by this company to build a 25-mile electric or steam railway to connect Rockport, Aransas Pass, Navy City, Port San Antonio and to and over Shell Bank and Harbor Island. Capital stock, $25.000. Officers: Charles F. Hoff, Rockport, president; W. H. Verner, vice-president; W. D. Newberry, secretary, and Thomas E. Mathis, treasurer.

***Spokane, Portland & Northern Railway Company, Spokane, Wash.**—Application has been made in Washington by this company for a charter to build an electric or steam railway from Spokane to the international boundary near Nighthawk via Bridgeport and Duffin's Ferry. Incorporators: A. M. Dewey, E. P. Spauling, S. A. Skinner, George D. Needy, A. M. P. Spaulding and Arthur B. Lee, all of Spokane.

FRANCHISES

Alhambra, Cal.—The Pacific Electric Company has been granted a franchise by the Board of Trustees to build an additional track on Huntington Drive, Alhambra.

Oakland, Cal.—The Oakland Traction Company has applied to the City Council for franchises to build several extensions to its lines in Oakland.

Hartford, Conn.—The Norwich, Colchester & Hartford Traction Company, Norwich, has been granted a franchise by the Board of Selectmen to extend its lines over certain streets in Hartford. H. M. Pollock, secretary. [E. R. J., Sept. 24, '10.]

Gary, Ind.—The Gary & Southern Interurban Railway has been granted a franchise by the City Council to extend its tracks in Gary, provided work is begun on the line within six months.

Mt. Carmel, Ind.—The Evansville, Mt. Carmel & Olney Electric Railway, Evansville, has asked the City Council for a franchise to build its tracks through the main street of Mt. Carmel. This proposed 65-mile railway will connect Mt. Carmel, Highland, Darmstadt, Cynthiana, Owensville, Friendsville, Lancaster, Berryville and Olney. E. Q. Lockyear, Evansville, secretary. [E. R. J., July 2, '10.]

Covington, Ky.—The Covington, Big Bone & Carrollton Traction Company has asked the Council for a franchise to build its tracks on Second Street in Covington from Johnson Street to the western corporation line. [E. R. J., Oct. 22, '10.]

Springfield, Mass.—The Springfield Street Railway has been granted a franchise by the Board of Aldermen to extend its tracks into the Armory Grounds in Springfield via St. James Street and Magazine Street.

Billings, Mont.—John A. Connolly, representing the Billings Traction Company, has been granted a franchise to build an electric railway in Billings. [E. R. J., Oct. 15, '10.]

Chatham, N. J.—The Morris County Traction Company, Morristown, has been granted a 35-year franchise by the Common Council to build its tracks through Main Street in Chatham.

Syracuse, N. Y.—The Syracuse Rapid Transit Company will ask the Common Council for a franchise to double-track some of its lines in Syracuse.

Utica, N. Y.—The Utica & Mohawk Valley Railway has asked the City Council for a franchise to extend its line from its present terminus in Genesee Street to its North Genesee Street line in Utica.

***Salem, Ore.**—Santiani Valley Development Company, Salem, has asked the Council for a franchise to build an electric railway over certain streets in Salem.

Erie, Pa.—The Northwestern Traction Company, Erie, has asked the Common Council for a franchise to build its tracks over certain streets in Erie. James Burke, president. [E. R. J., Aug. 6, '10.]

Richmond, Va.—The Richmond, Urbanna & Peninsula Railway has been granted a 2-year extension of its franchise by the State Corporation Commission in which to begin construction of its proposed line from Crest Point to Urbanna. John C. Robertson, Chesterfield, Va., president. [E. R. J., Nov. 21, '08.]

***Seattle, Wash.**—J. Frederic Thorne and associates have asked the County Commissioners for a franchise to build a 40-mile electric railway from Kirkland to Tolt.

TRACK AND ROADWAY

Texarkana Gas & Electric Company, Texarkana, Ark.—Press reports state that this company will double-track its entire line through the business section of Texarkana from Hazel Street and Broad Street, extending to Maple Street, Texas. It is also planned to extend the line out beyond Rose Hill, a distance of about 2 miles.

***Fresno, Cal.**—S. N. Griffith, Fresno, is making surveys and is said to have secured financial backing for building a proposed 50-mile electric railway to connect Fresno and Clovis. It is expected to begin construction as soon as the right of way is obtained.

Pacific Electric Railway, Los Angeles, Cal.—It is reported that this company will extend its La Habra railway about 3 miles beyond Yorba Linda, the present terminal. It has completed surveys for an electric railway to Burbank.

Denver (Col.) City Tramways.—It is said that this company will soon begin grading for a new line to Park Hill from Colorado Boulevard and Seventeenth Avenue in Denver.

***Pueblo, Col.**—It is said that surveys are being made to build a proposed electric railway to extend from Pueblo east of La Junta, a distance of about 70 miles. J. S. Vail, Pueblo, is interested.

Connecticut Company, New Haven, Conn.—This company is planning to double-track its line near White Oak in Plainville.

West Chester & Wilmington Electric Railway, Wilmington, Del.—It is reported that this company has secured rights of way and arrangements for construction have been made to build its proposed 17-mile railway to connect West Chester and Wilmington. Lewis Dalmas, Morris Building, Philadelphia, Pa., president. [E. R. J., Feb. 12, '10.]

Chicago (Ill.) Railways.—This company has made a special contract with the Chicago Transfer & Clearing Company, Chicago, Ill., to extend its tracks from its present terminus at the corner of Sixty-third Street and Fifty-sixth Avenue, at Clearing, to the corner of Sixty-third Street and Archer Avenue, at Argo, Ill. The grading for this extension is well under way.

***Savanna, Ill.**—W. Usborne, Chicago, it is reported, is interested in a plan to build an electric railway to connect Sterling, Coleta, Milledgeville and Lanark and from Lanark east and west to Freeport and Savanna.

Waukegan, Rockford & Elgin Traction Company, Waukegan, Ill.—This company advises that it will let contracts for building the first branch of 15 miles from Palatine to Wauconda. This proposed 150-mile electric railway will connect Palatine, Lake Zurich, Wauconda, Vols, Fox Lake, Round Lake, Gray's Lake, Druce Lake, Gurnee, Waukegan, Lakeville, Antioch, McHenry, Woodstock and Marengo, Ill., and Wilmot and Lake Geneva, Wis. Capital stock, authorized, $1,500,000; issued, $300,000. Officers: Charles H. Patten, Palatine, Ill., president; R. D. Wynn, Waukegan, vice-president; J. K. Orvis, Waukegan, secretary; Theo H. Durst, treasurer, and Henry J. Farmer, Lake Zurich, Ill., engineer. [E. R. J., Sept. 10, '10.]

Southern Michigan Railway, South Bend, Ind.—It is reported that this company will soon build a 4-mile extension to Buchanan, Mich. It is also said to be considering plans for building a bridge over the St. Joseph River at Niles.

Fort Dodge, Des Moines & Southern Railroad, Fort Dodge, Ia.—Press reports state that this company will soon place in operation its new line to connect Fort Dodge Junction and Rockwell via Rockwell City, Piper, Rinard, Easley, Gowrie and Lanyon. It has electrified 27 miles of the old Newton & Northwestern Railroad. J. L. Blake, manager.

Hagerstown, Md.—It is reported that L. N. Downs, New York, H. L. Kirby and James B. Kreps, Hagerstown, are making surveys for a proposed 27-mile electric railway to be built from Hagerstown to Clear Springs, Md., and thence to Mercersburg, Pa. [E. R. J., Oct. 22, '10.]

Holyoke (Mass.) Street Railway.—This company, it is said, has begun work double-tracking High Street and Appleton Street in Holyoke.

Wicomico Electric & Power Company, Salisbury, Md.—This company is said to have been assured the necessary capital by foreign capitalists for beginning work on its proposed 25-mile electric railway to connect Salisbury, Hebron, Quantico, Wetipquin, Tyaskin, Bivalve and Nanticoke. The Industrial Engineering Company, Drexel Building, Philadelphia, Pa., is in charge of engineering work. J. D. Price, Salisbury, general manager. [E. R. J., Feb. 27, '10.]

St. Paul-Mankato Electric Railway, Mankato, Minn.—It is reported that this company is securing rights-of-way for its proposed electric railway to connect Mankato, St. Paul and Minneapolis. J. J. Davy, Mankato, engineer. [E. R. J., Nov. 20, '09.]

Electric Short Line Railroad, Minneapolis, Minn.—This company, it is said, will place in operation in November its railway to connect Minneapolis and Medicine Lake. It is also making plans to extend this line to Lake Minnetonka, Watertown and Winsted next year. Frank E. Reed, Glencoe, secretary. [E. R. J., Sept. 3, '10.]

Meridian Light & Railway Company, Meridian, Miss.—It is said that this company is double-tracking its line on Eighth Street in Meridian and that it will probably be extended to Highland Park.

Nebraska Transportation Company, Omaha, Neb.—It is reported that this company has completed surveys and secured the necessary capital to build a proposed electric railway to connect Omaha, Elk City, Arlington, Craig, Oakland and South Sioux City. A branch will be built from Elk City to Clarkson. Stanton, Norfolk, Clarkson and Madison and another branch will be built to Decatur. The Baker Construction Company has the contract for building the line and it is stated that construction will begin in the spring. C. W. Baker, Omaha, Neb., president. [E. R. J., Nov. 20, '10.]

***Riverside Traction Company, Trenton, N. J.**—This company is said to be rebuilding its track between Trenton and Camden.

***Jamestown, N. Y.**—James Hughes and Benjamin Straus, Jamestown, are said to be taking preliminary steps to secure right-of-way for an electric railway to connect Dunkirk and Jamestown via Fredonia, Cassadaga, Laoana, Gerry and Sinclairville. This proposed railway would parallel the Dunkirk, Allegheny Valley & Pittsburgh Railroad.

Cleveland, Alliance & Mahoning Valley Railroad, Cleveland, Ohio.—It is reported that this company has secured complete right-of-way in Ravenna, where connections will be made with the Ravenna-Akron line of the Northern Ohio Traction & Light Company for Akron and Cleveland. This proposed railway will connect Cleveland, Alliance and Mahoning, and it is expected to start construction work on this electric railway in the near future. [E. R. J., May 22, '09.]

Fostoria & Fremont Railway, Fostoria, Ohio.—This company, it is said, has finished grading and began track laying Nov. 1. This proposed 21-mile electric railway will connect Fostoria and Fremont via Havens, Burgoon, Kansas and Amsden. It parallels the Lake Erie & Western Railroad and will provide a connection between the Western Ohio Railway and the Lake Shore Electric Railway. J. W. S. Riegle, Findley, Ohio, chief engineer. [E. R. J., Aug. 6, '10.]

***Newark, Ohio.**—E. A. Nesbit, Pittsburgh, and A. E. Townsend, Doyleston, are said to be promoting a plan to build an electric railway to connect Newark, Coshocton and Uhrichsville.

Coffeyville-Nowata Railway & Power Company, Nowata, Okla.—This company is reported to have awarded the contract to Robert L. Plunkett, Coffeyville, for building its proposed 23-mile electric railway to connect Coffeyville, Kan., and Nowata, Okla. W. V. Thraves, Nowata, general manager. [E. R. J., Sept. 10, '10.]

Ottawa (Ont.) Electric Railway.—This company is said to be planning to extend its line into the Bayswater district. The company has agreed to build extensions through South Ottawa as soon as a high level bridge is constructed over the Rideau Canal at Bank Street, Ottawa.

Sherbrooke (Que.) Street Railway.—This company's work is progressing rapidly on the extension of its tracks in Sherbrooke. The rails are now being laid on Frontenac Street, while on several other streets excavating is being done.

***Kenneth Square, Pa.**—It is reported that interest has again been revived in the project of building an electric railway to connect Kenneth Square, Londongrove and Coatsville.

***Oxford, Pa.**—M. C. Martin, New York, it is said, is considering plans for building an electric railway to connect Newark, N. J., and Wilmington, Del., and to connect with the railway extending from Philadelphia to Kennet.

Sunbury, Lewisburg & Milton Railroad, Sunbury, Pa.—It is said that this company will soon build four extensions of its tracks amounting in all to about 6 miles near Sunbury. W. H. Lyons, Sunbury, President. [E. R. J., May 1, '09.]

Sunbury & Northumberland Electric Railway, Sunbury, Pa.—This company, it is said, will soon build a 2-mile extension of its tracks from Northumberland to Tuckahoe Springs.

Greenville Railway & Light Company, Greenville, Tex.—This company advises that it has begun construction on its 7-mile electric railway in Greenville. Capital stock, authorized, $300,000. Bonds, authorized, $300,000. It will operate seven cars and its power station and repair shops will be located at Greenville. Headquarters: Conover Building, Dayton, Ohio. Officers: Albert Emanuel, Dayton, Ohio, president; L. A. Clark, Greenville, Tex., vice-president; W. F. Breidenbach, Dayton, Ohio, treasurer, and A. B. Coryell, Greenville, Tex., general manager. [E. R. J., Oct. 15, '10.]

Burlington (Vt.) Traction Company.—It is reported that this company is considering plans to extend its tracks through South Burlington, St. George, Shelbourne and Hinesburgh.

Seattle-Tacoma Short Line Railway, Tacoma, Wash.—This company, it is said, has awarded the contract to Homer Crosby for building an 8-mile extension from Youngstown to Lake Burien.

Spokane (Wash.) Traction Company—It is said that this company is preparing plans to build a 2-mile extension of its Corbin Park line northwest and beyond the city limits.

Middle Island Railroad, Middlebourne, W. Va.—This company is said to have awarded a contract to T. Moore Jackson, Clarksburg, W. Va., for the building of a 11-mile section between Sisterville and Middlebourne. This proposed 60-mile railway will connect Sisterville, Kidwell, Middlebourne, Shirley and Clarksburg. John F. Shore, Middlebourne, secretary. [E. R. J., July 9, '10.]

SHOPS AND BUILDINGS

Beech Grove Traction Company, Indianapolis, Ind.—This company is said to have begun work on the erection of its car house on First Avenue, between Alton Avenue and Bellefontaine Street, Beech Grove. The structure will be 30 ft. x 92 ft., of brick construction and one story high. The cost is estimated to be about $5,000.

Hudson & Manhattan Railroad, New York, N. Y.—This company has filed plans and will soon build a new Grove-Henderson Street station at Grove Street, Jersey City. The structure will be 85 ft. x 35 ft. and 12 ft. high, and of steel and concrete construction. The cost is estimated to be about $6,000.

Cincinnati (Ohio) Traction Company—It is stated that this company has begun the construction of a new station at Rural Avenue and Wayne Avenue on the Millcreek Valley line in Hartwell.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—It is said that this company has completed plans and will soon begin the construction of its new car house on Federal Street, in Youngstown.

Du Bois Electric & Traction Company, Du Bois, Pa.—This company advises that it has placed the contracts for building its car house and repair shop in Du Bois. This structure will also be used by the United Traction Street Railway.

Reading (Pa.) Transit Company.—This company has awarded a contract to H. F. Cilley, Lebanon, for the construction of a new passenger station at Palmyra.

Fairmont & Clarksburg Traction Company, Fairmont, W. Va.—It is reported that this company will soon let contracts for the construction of an addition to its car house and repair shops in Fairmont. The structure is to be a modern building in every particular. James O. Watson, Fairmont, general manager.

Grafton (W. Va.) Traction Company.—This company reports that it has recently removed its car house from its former location on Main Street to the west end of Grafton.

POWER HOUSES AND SUBSTATIONS

Southern Pacific Railroad, Los Angeles, Cal.—This company has begun work on the construction of a new subsidiary power plant in its West Oakland yards. The structure is 90 ft. x 60 ft. It will be used as a reducing station for the high-power tension wires from the Fruitvale power house. The wires will extend from the Fruitvale power house to the West Oakland structure, where the voltage will be reduced to 1200. Estimated cost of building and equipment will be about $100,000.

Chicago, Lake Shore & South Bend Railway, Michigan City, Ind.—This company advises that it is building a new substation at Charleston and a new 3-phase 60-cycle power line from its Michigan City power plant to Hammond, Ind. It has purchased from the General Electric Company two 1000-kw motor generator sets and frequency changers with necessary transformers. C. N. Wilcoxon, general manager.

Exeter, Hampton & Amesbury Street Railway, Hampton, N. H.—This company reports that it expects to soon purchase one 1000-gal. per minute electrically driven centrifugal type fire pump.

Columbus, Delaware & Marion Railway, Columbus, Ohio.—This company advises that during the next four months it expects to purchase a 360 or 400-hp second-hand Heine boiler, 160 to 175 lbs. pressure. It will also purchase one General Electric 73 motor. J. M. Hamgan, general manager.

Toledo Railway & Light Company, Toledo, Ohio.—This company, it is said, has awarded the contract to A. Bentley & Sons for building a new substation on 408 Front Street, Toledo. The structure will be of brick and concrete construction. The estimated cost of building and equipment is about $15,000.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis.—This company advises that it expects to soon purchase 300 kw rotary for 600-volt dc. street railway work with transformers. George B. Wheeler, Eau Claire, general manager.

Manufactures & Supplies

ROLLING STOCK

Lincoln (Neb.) Traction Company is in the market for a snow plow.

Norfolk & Portsmouth Traction Company, Norfolk, Va., is reported to be considering the purchase of 12 cars.

Exeter, Hampton & Amesbury Street Railway, Hampton, N. H., expects to purchase four new noses for its single-truck snow plows.

Macon Railway & Light Company, Macon, Ga., reported in the Electric Railway Journal of Oct. 22, 1910, as considering the purchase of several new cars, has ordered eight cars of the prepayment type from The J. G. Brill Company.

Oklahoma (Okla.) Railway is having four closed cars built by the Danville Car Company. They will be 20 ft. long over bodies and 30 ft. over the vestibules. The specifications include Van Dorn couplers, Hunter destination signs, Consolidated heaters and Brill 21E trucks.

Oakland (Cal.) Traction Company has ordered 60 double-truck car bodies equipped with prepayment platforms from the St. Louis Car Company. They will also be equipped with Brill 39E trucks ordered through Pierson, Roeding & Company, coast representatives of The J. G. Brill Company.

Hudson & Manhattan Railroad, New York, N. Y., noted in the Electric Railway Journal of Oct. 8, 1910, as being in the market for passenger cars, has ordered 30 steel cars from the Pressed Steel Car Company. They will be operated between Newark and New York and will be of the same type and arrangement as those now being used. The Pennsylvania Railroad has also ordered 40 steel passenger cars from the American Car & Foundry Company for the same service.

Elmira Water, Light & Railroad Company, Elmira, N. Y., noted in the Electric Railway Journal of May 21, 1910, as having ordered six closed pay-as-you-enter cars from The J. G. Brill Company, has specified the following details for these cars:

Seating capacity	28	Destination signs	Hunter
Length of body	20 ft.	Fenders	Providence
Over vestibule	31 ft. 8 in.	Gongs	Brill dedenda
Width over sills	6 ft. 9 in.	Hand brakes	Sterling
Over posts at belt	8 ft.	Heaters	Consolidated
Underframe	wood	Headlights	Neal
Bumpers	Brill	Motors	G.E.-78
Couplers	Brill	Step treads	Mason
Curtain fixtures	Forsyth	Trucks	Brill 21E

TRADE NOTES

T. H. Symington Company, Baltimore, Md., has moved its Chicago offices from the Railway Exchange to 623-625 Peoples' Gas Building.

Federal Storage Battery Company, New York, N. Y., has placed in operation one of its storage battery cars on the Washington, Spa Springs & Gretta Railroad, Washington, D. C.

R. D. Nuttall Company, Pittsburgh, Pa., has recently made a considerable increase in its factory facilities. A new wing has been added to its building at the corner of Garrison and Fayette ways, Pittsburgh, Pa.

Pennsylvania Steel Company, Steelton, Pa., has appointed G. S. Vickory, chief draftsman of the frog and switch department, to the position of acting superintendent of the department, succeeding C. W. Reinoehl, deceased.

Wonham, Sanger & Bates, New York, N. Y., have received an order from the Mobile Light & Railroad Company, Mobile, Ala., for 85 sets of H-B universal life guards to equip all of the cars of that company.

Birmingham Rail & Locomotive Works, Birmingham, Ala., will soon begin operating its new $100,000 plant at North Birmingham. The plant has been in course of construction for several months. It is of steel and concrete construction.

Root Spring Scraper Company, Kalamazoo, Mich., is delivering this week to the Michigan United Railways 100 Root spring snow scrapers, which completes the equipment with this type of scraper of all the cars operating over that system.

American Steel & Wire Company, Chicago, Ill., has under construction at Corey, Ala., a new wire and rod mill, 480 ft. x 1600 ft. The plant, it is estimated, will have a daily capacity of 450 tons of finished product, and will cost about $4,000,000.

Ackley Brake Company, New York, N. Y., reports the receipt of an order from the Rio de Janeiro Tramway, Light & Power Company for 100 Ackley brakes. The company has shipped Ackley brakes during the past few days to Buenos Ayres, Paris, London, Zurich and Brussels.

Vacuum Impregnating Works, Chicago, Ill., have secured a contract from the Chicago City Railway for impregnating 10,000 coils. It is expected that this contract will cover a period of three years. The firm has also secured a contract from the Milwaukee Electric Railway & Light Company for impregnating 1000 coils.

Western Electric Company, New York, N. Y., has decided to spend $1,000,000 in extending its Hawthorne plant. These improvements will consist of telephone and cable shops and will give 300,000 ft. of additional floor space, increasing the Hawthorne capacity 20 per cent. The company employs 24,000 men at present as compared with a maximum of 29,000 in 1906.

Allis-Chalmers Company, Milwaukee, Wis., in its annual report for the year ended June 30, shows profits from operations of $2,576,818, which is a gain of $767,809 over the previous year and exceeds by about $3,000 the returns of 1907-8. A large increase in maintenance and depreciation charges, however, which brought that item up from $1,673,578 to $2,081,086, cut net profits down to $495,732. This is equivalent to 3.09 per cent on the $16,500,000 preferred stock, as compared with last year's showing of eight-tenths of 1 per cent earned in the previous year. The addition of this amount to the previous surplus brought the profit and loss surplus at the close of the year up to $1,017,161.

Ford, Bacon & Davis, New York, N. Y., have just closed a contract with the Westinghouse Machine Company for two 1000-kw turbines and Le Blanc condensers, ten 300-kw 6600-250-volt, 60-cycle motor generators, switchboard, wiring and all electrical auxiliaries for the Clinchfield Coal Company, of Dante, Va. The firm is also asking in behalf of this company for bids for boilers, stacks and feed pumps. The electrical system will consist of a power station and four substations, with power distribution at 6600 volts within a radius of about six miles from the power station. The work is in connection with large coal developments in Virginia.

ADVERTISING LITERATURE

Ackley Brake Company, New York, N. Y., has issued a folder describing and illustrating the Ackley adjustable brake.

Indian Refining Company, Cincinnati, Ohio, is mailing a bulletin featuring the merits of Indian timber asphalt oil for wood preservation.

Dossert & Company, New York, N. Y., have issued an 8-page folder which illustrates and describes a number of new Dossert specialties, particularly a new type of anchor connector for use with strain insulators and a new insulated cover for cable taps.

Bristol Company, Waterbury, Conn., has issued Bulletin No. 126, in which the company's Class II recording thermometers are described and illustrated. Perhaps the most extensive use of these thermometers is for recording the temperature of feed water for steam boilers. A list of several hundred users of the thermometers includes many electric railways, power companies and central stations.

Stone & Webster Engineering Corporation, Boston, Mass., in a book just issued, entitled "Steam Power Stations," shows a number of exterior and interior views, accompanied by plans and elevations of some of the steam power stations which it has designed and built. Among the new plants shown are those of the Seattle (Wash.) Electric Company, Boston (Mass.) Elevated Railway, Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., and Tampa (Fla.) Electric Company.

John C. Dolph Company, Long Island City, N. Y., has issued a catalog describing Dolph insulating varnishes and compounds with directions for using them. Among the many products listed are the following: Coil black insulating varnish, both for air drying and baking; black insulating paint, clear coil varnish for air drying, electric lacquer, elastic vaculite oilproof compound and armature coil compound. A folder containing a price list and index of the company's products, also a special formula inquiry blank, accompanies the catalog.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has issued its circular 1098 on the subject of switchboard indicating meters. The publication outlines the cardinal points to be kept in mind in the selection of meters. It describes direct-current and alternating-current indicating meters, including frequency meters and power factor meters; synchroscopes, and instrument transformers. The company has issued a revision of its circular 1118 on the subject of its type CCL polyphase induction motors. The circular describes the electrical and mechanical features of these motors and shows some interesting views of their application. It also includes some short descriptions of the various starting devices used with squirrel cage induction motors. Another circular, No. 1122, describes a line of standard grid resistors which are constructed to operate with entire satisfaction under the most severe conditions. In addition the company has issued a circular, No. 1161, on the subject of its type G, belt-driven alternating-current generators. These generators are especially designed to meet the needs of industrial plants and smaller central stations.

NEW PUBLICATIONS

Experimental Electricity. By S. W. Ashe. D. Van Nostrand Company, New York, 1910. 349 pages with index. Price, $2 net.

The author has had wide experience as an instructor among lighting and railway employees whose knowledge of electricity has been confined to the narrow limits of their daily work, such as meter reading and testing, switchboard manipulation, machine attendance and the like. To aid this class of practical students, Mr. Ashe has produced a book which explains electrical facts in the simplest manner. Nevertheless, this volume is also valuable for high school and college laboratories owing to the attention given to original experimental work.

Standard Handbook for Electrical Engineers. Third edition, revised. McGraw-Hill Publishing Company, New York, 1910. 20 sections and index, totaling 1497 pages. Price, $4 net.

The preface to the third edition of the handbook states that it has been revised and brought up to date in practically every department. This process was facilitated through the adoption in the original edition of a unit plan which is a great convenience to the reader. The electric traction section, written by the well-known engineer A. H. Armstrong, has been revised and enlarged, with special attention to the subject of electric locomotives. A valuable addition to the section on "Standards" is offered by the standard specifications for rubber insulation, copper conductors and transformers. The third edition is 200 pages larger than before, with about 40 per cent new material.

Controller Prendergast, of New York, has approved the basis of settlement previously agreed on by the corporation counsel of New York and the Metropolitan Street Railway of special franchise taxes for 1900 to 1909, inclusive, of $5,568,508. From this amount the deductions under Section 48 of the tax law, amounting to $2,653,666, were subtracted, leaving the balance of taxes due the city $2,914,836, to which is added the interest, $835,163, as computed to March 31, 1910, according to the terms of the compromise, $3,750,000. On the principal, interest will be payable from March 31, 1910, to the date of actual payment.

The stockholders of the New York, New Haven & Hartford Railroad, at their annual meeting on Oct. 26, 1910, voted to increase the directorate by two members, making the total 27, and elected a board, of whom the new members are Thomas De Witt Cuyler, representing the Pennsylvania Railroad, who takes Mr. Whittemore's place, and August S. May and Arthur E. Clark, the treasurer and secretary of the company, respectively. The directors organized by re-electing the former officers.

TABLE OF MONTHLY EARNINGS.

Notice—These statistics will be carefully revised from month to month, upon information received from the companies direct, or from official sources. The table should be used in connection with our Financial Supplement, "American Street Railway Investments," which contains the annual operating reports to the ends of the various financial years. Similar statistics in regard to roads not reporting are solicited by the editors. *Including taxes. †Deficit. ‡After allowing for other income received. §Includes dividend on preferred stock.

Company	Period	Gross Income	Operating Expenses	Gross Income Less Operating Expenses	Deductions From Income	Net Income
AKRON, O. Northern Ohio Tr. & Light Co.	1m., Sept. '10	$224,902	$117,857	$107,044	$43,391	$63,653
	1 " " '09	202,156	102,990	99,166	42,928	56,239
	9 " " '10	1,837,406	1,009,858	827,548	390,161	437,387
	9 " " '09	1,634,172	887,730	746,442	393,342	353,100
ALLENTOWN, PA. Lehigh Valley Tr. Company.	1m., Sept. '10	112,540	49,401	63,139	25,433	37,706
	1 " " '09	100,340	43,521	56,819	26,650	30,169
	10 " " '10	872,076	476,546	395,530	356,860	§140,965
	10 " " '09	800,274	468,933	331,341	345,633	§73,847
BANGOR, ME. Bangor Ry. & Elec. Co.	1m., Aug. '10	58,065	24,185	33,880	13,525	20,355
	1 " " '09	57,593	22,436	35,157	13,060	22,097
	8 " " '10	112,073	47,230	64,843	27,177	37,666
	8 " " '09	108,548	45,027	63,526	26,284	37,242
BATON ROUGE, LA. Baton Rouge Elec. Co.	1m., Aug. '10	9,155	5,855	3,300	1,945	1,355
	1 " " '09	8,681	5,519	3,162	1,951	1,211
	12 " " '10	108,202	69,974	38,228	22,893	15,335
	12 " " '09	94,020	67,378	26,643	.....	.....
BELLINGHAM, WASH. Whatcom Co. Ry. & Lt. Co.	1m., Aug. '10	32,470	21,065	11,405	8,905	2,501
	1 " " '09	36,841	19,175	17,667	8,064	9,603
	12 " " '10	412,022	242,330	169,692	103,200	66,492
	12 " " '09	390,818	222,204	168,614	101,903	66,711
CHAMPAIGN, ILL. Illinois Tr. System	1m., Aug., '10	523,558	294,749	228,809	.....	.....
	1 " " '09	462,266	254,956	207,310	.....	.....
	8 " " '10	3,874,962	2,292,290	1,582,672	.....	.....
	8 " " '09	3,415,017	1,970,832	1,444,185	.....	.....
CHATTANOOGA, TENN. Chattanooga Ry. & Lt. Co.	1m., Sept. '10	77,022	38,386	38,636	23,692	14,944
	1 " " '09	67,806	37,110	30,696	23,512	7,184
	9 " " '10	650,947	333,519	317,428	210,901	106,527
	9 " " '09	574,785	334,462	240,313	193,063	47,250
CHICAGO, ILL. Aur., Elgin & Chic. R.R.	1m., Aug. '10	178,730	87,477	91,254	33,039	58,215
	1 " " '09	163,698	76,448	87,250	29,351	57,899
	2 " " '10	361,118	175,089	186,029	65,608	120,421
	2 " " '09	331,312	154,343	176,969	58,250	118,719
CLEVELAND, O. Cleveland, Painesville & Eastern R.R.	1m., Sept. '10	33,647	*18,167	15,480	8,116	7,364
	1 " " '09	31,361	*17,212	14,149	7,850	6,299
	9 " " '10	269,381	*139,046	130,335	72,607	57,728
	9 " " '09	242,206	*128,585	113,621	67,600	46,021
Lake Shore Electric Ry.	1m., Sept. '10	115,009	*54,417	60,592	34,928	25,664
	1 " " '09	108,207	*49,842	58,365	34,804	23,560
	9 " " '10	913,664	*473,160	440,504	313,008	127,495
	9 " " '09	835,062	*439,691	395,370	309,093	86,277
DALLAS, TEX. Dallas Electric Corporation.	1m., Aug. '10	118,257	82,637	35,620	25,659	9,961
	1 " " '09	112,802	72,271	40,532	28,648	11,883
	12 " " '10	1,414,199	934,210	479,989	319,229	160,760
	12 " " '09	1,265,739	791,838	473,901	341,711	132,189
DETROIT, MICH. Detroit United Ry.	1m., Sept. '10	857,441	540,051	317,390	178,802	138,588
	1 " " '09	763,581	477,851	285,730	158,124	127,606
	9 " " '10	7,141,185	4,485,425	2,655,760	1,511,120	1,144,640
	9 " " '09	6,071,637	3,702,532	2,369,105	1,409,507	959,598
DULUTH, MINN. Duluth-Superior Trac. Co.	1m., Sept. '10	93,570	50,224	43,346	‡20,936	22,410
	1 " " '09	87,217	48,267	38,950	‡20,757	18,193
	9 " " '10	810,727	460,815	349,912	‡178,583	171,329
	9 " " '09	723,602	429,984	293,618	‡168,090	125,528
EAST ST. LOUIS ILL. East St. Louis & Suburban Ry.	1m., Sept. '10	211,249	101,989	109,260	48,394	60,866
	1 " " '09	176,402	87,324	89,078	49,345	39,733
	9 " " '10	1,756,761	926,751	830,010	450,695	379,315
	9 " " '09	1,481,078	818,006	663,072	445,112	217,960
EL PASO, TEX. El. Paso Elec. Co.	1m., Aug. '10	46,897	30,730	16,167	8,215	7,952
	1 " " '09	46,447	28,546	17,901	8,259	9,642
	12 " " '10	630,070	363,810	266,260	101,256	165,004
	12 " " '09	567,906	369,541	198,364	93,326	105,038
FAIRMONT, W. VA. Fairmont & Clarksburg Trac. Co.	1m., Sept. '10	62,032	18,716	43,316	13,112	30,204
	1 " " '09	47,695	15,094	32,601	12,655	19,946
	9 " " '10	445,992	156,447	289,545	113,627	175,918
	9 " " '09	346,441	119,312	227,129	111,148	115,981
FT. WAYNE, IND. Ft. Wayne & Wabash Valley Trac. Co.	m., Aug. '10	140,625	73,926	66,699	45,845	20,854
	1 " " '09	133,412	74,255	59,157	45,112	14,045
	8 " " '10	998,040	563,417	434,623	360,441	74,182
	8 " " '09	905,614	537,475	368,139	338,773	29,366
FORT WORTH, TEX. Northern Texas Elec. Co.	1m., Aug. '10	119,813	63,952	55,860	20,301	35,560
	1 " " '09	109,422	57,893	51,529	17,190	34,339
	12 " " '10	1,377,638	743,535	634,102	221,411	412,692
	12 " " '09	1,203,508	667,601	535,907	197,997	337,910
GALVESTON, TEX. Galveston-Houston Elec. Co.	1m., Aug. '10	124,764	65,932	58,832	25,965	32,867
	1 " " '09	111,295	62,976	48,319	21,679	26,640
	12 " " '10	1,268,767	769,333	499,434	278,143	221,291
	12 " " '09	1,181,351	682,277	499,074	254,495	244,579
HOUGHTON, MICH. Houghton County Trac. Co.	1m., Aug. '10	29,709	13,537	16,171	6,637	9,534
	1 " " '09	32,925	15,588	17,337	6,216	11,122
	12 " " '10	317,014	167,787	149,228	76,978	72,249
	12 " " '09	305,706	165,775	139,931	69,556	70,375
HARRISBURG, PA. Central Penn. Trac. CO.	1m., Sept. '10	68,199	46,848	21,351	.....	.....
	1 " " '09	62,979	44,045	18,934	.....	.....
	9 " " '10	623,109	442,942	180,167	.....	.....
	9 " " '09	564,747	418,640	146,107	.....	.....
KANSAS CITY, MO. Kansas City Ry. & Lt. Co.	1m., Sept. '10	628,685	365,790	262,895	189,119	73,776
	1 " " '09	584,287	323,079	261,209	172,512	88,697
	4 " " '10	2,491,370	1,488,174	1,003,196	749,726	253,470
	4 " " '09	2,302,242	1,306,500	995,742	690,337	305,405
MILWAUKEE, WIS. Milwaukee Elec. Ry. & Lt. Co.	1m., Sept. '10	407,650	272,701	134,949	46,785	88,164
	1 " " '09	375,426	241,213	134,213	48,746	85,467
	9 " " '10	3,504,128	2,458,017	1,046,110	421,647	624,463
	9 " " '09	3,154,103	2,067,043	1,087,060	422,970	664,089
Milwaukee Lt., Ht. & Trac. Co.	1m., Sept. '10	154,076	61,602	92,474	54,747	37,727
	1 " " '09	144,942	54,668	90,274	52,183	38,091
	9 " " '10	1,227,795	489,937	737,859	498,176	239,682
	9 " " '09	1,112,207	411,967	700,241	460,809	239,432
MINNEAPOLIS, MINN. Twin City Rapid Transit Co.	1m., Aug. '10	660,656	298,323	362,333	140,113	222,221
	1 " " '09	641,062	262,479	378,583	140,251	238,332
	8 " " '10	4,925,516	2,365,045	2,560,470	1,121,367	1,439,104
	8 " " '09	4,531,223	2,162,532	2,368,690	1,108,259	1,260,431
NASHVILLE, TENN Nashville Ry. & Lt. Co.	1m., Sept. '10	163,307	89,522	73,785	33,390	40,395
	1 " " '09	155,899	84,444	71,455	33,023	38,432
	9 " " '10	1,341,847	777,993	563,854	302,267	261,597
	9 " " '09	1,266,683	747,129	519,554	295,283	224,271
NORFOLK, VA. Norfolk & Portsmouth Trac. Co.	1m., Aug. '10	188,834	100,500	88,334	64,866	23,469
	1 " " '09	174,211	96,336	77,874	63,118	14,756
	2 " " '10	385,733	207,553	178,179	131,442	46,738
	2 " " '09	354,438	197,499	156,938	126,469	30,469
PADUCAH, KY. Paducah Trac. & Lt. Co.	1m., Aug. '10	20,780	11,806	8,973	7,071	1,902
	1 " " '09	19,930	11,281	8,649	6,618	2,031
	12 " " '10	241,341	143,931	97,410	82,864	14,546
	12 " " '09	222,988	130,335	92,653	81,929	10,725
PENSACOLA, FLA. Pensacola Elec. Co.	1m., Aug. '10	24,178	14,483	9,695	5,243	4,452
	1 " " '09	22,205	12,515	9,691	4,371	5,319
	12 " " '10	260,452	153,157	107,306	57,949	49,357
	12 " " '09	235,626	136,388	99,237	51,881	47,356
PHILADELPHIA, PA. American Railways Co.	1m., Sept. '10	350,519	.....	.....	.....	.....
	1 " " '09	323,566	.....	.....	.....	.....
	3 " " '10	1,096,843	.....	.....	.....	.....
	3 " " '09	1,020,013	.....	.....	.....	.....
PLYMOUTH, MASS. Brockton & Plymouth St. Ry.	1m., Aug. '10	16,057	7,458	8,598	1,602	6,997
	1 " " '09	17,912	11,195	6,717	1,661	5,056
	12 " " '10	121,870	87,016	34,853	21,038	13,815
	12 " " '09	129,734	88,254	41,480	22,963	18,517
PORTLAND, ORE. Portland Ry. Lt. & Power Co.	1m., Sept. '10	490,209	222,582	267,627	150,627	117,000
	1 " " '09	420,777	193,437	227,340	128,924	98,416
	9 " " '10	4,106,489	1,767,269	2,339,220	1,246,965	1,092,255
	9 " " '09	3,547,647	1,651,228	1,896,419	1,111,335	785,084
ST. JOSEPH, MO. St. Joseph Ry. Lt., Ht. & Power Co.	1m., Sept. '10	92,034	46,332	45,702	23,158	22,544
	1 " " '09	88,285	40,809	47,476	22,058	25,418
	9 " " '10	766,750	414,450	352,300	203,759	148,541
	9 " " '09	722,808	374,530	348,278	192,080	156,198
SAVANNAH, GA. Savannah Elec. Co	1m., Aug. '10	56,871	38,681	18,190	18,181	9
	1 " " '09	53,931	36,385	17,547	17,435	112
	12 " " '10	618,104	403,951	214,153	213,940	214
	12 " " '09	610,720	387,043	223,677	209,247	14,430
SEATTLE, WASH. Seattle Elec. Co.	1m., Aug. '10	479,573	258,749	220,824	111,081	109,743
	1 " " '09	610,816	312,119	298,697	108,588	190,109
	12 " " '10	5,720,820	3,366,691	2,354,129	1,290,010	1,064,118
	12 " " '09	5,409,933	3,142,929	2,267,003	1,207,198	1,059,805
SYDNEY, N. S. Cape Breton Elec. Co.	1m., Aug. '10	30,777	15,703	15,074	6,174	8,900
	1 " " '09	26,669	13,805	12,863	6,208	6,656
	12 " " '10	314,788	171,075	143,712	74,015	69,697
	12 " " '09	279,930	168,478	111,453	73,867	37,585
TACOMA, WASH. Puget Sound Elec. Ry.	1m., Aug. '10	173,989	100,169	73,820	52,145	21,675
	1 " " '09	194,383	113,867	80,516	48,800	31,716
	12 " " '10	1,922,895	1,267,097	655,798	602,661	53,137
	12 " " '09	1,785,615	1,190,781	594,834	548,091	46,743
TAMPA, FLA. Tampa Elec. Co.	1m., Aug. '10	50,346	25,070	25,276	5,958	19,318
	1 " " '09	48,468	28,804	19,665	4,594	15,070
	12 " " '10	621,395	345,983	275,412	58,674	216,738
	12 " " '09	579,095	351,939	227,156	55,862	171,294
TOLEDO, OHIO Toledo Rys. & Lt. Co.	1m., Sept. '10	239,860	153,407	86,453	78,192	8,261
	1 " " '09	218,097	121,779	96,318	75,484	20,834
	9 " " '10	2,180,690	1,353,566	827,484	690,710	136,774
	9 " " '09	1,983,635	1,134,049	849,585	652,202	197,383
TORONTO, ONT. Toronto Railway	1m., Sept. '10	428,580	199,503	229,077	.....	.....
	1 " " '09	379,981	178,077	201,904	.....	.....
	9 " " '10	3,195,938	1,634,760	1,561,178	.....	.....
	9 " " '09	2,857,291	1,449,635	1,407,656	.....	.....