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### Increase in Commutation Rates in New York

The steam railroad companies entering New York which announced increases in their commutation fares two months ago put these rates into effect on Aug. 1. There was a delay of a month at the request of the Interstate Commerce Commission which decided, however, not to interfere at present, but stated that it might order decreases in fares later in individual cases where proof was offered that the rates were too high. Naturally, there has been some grumbling among commuters at the higher prices charged for tickets, but as a whole the increases have been accepted without serious opposition, confirming the statement which we made editorially in our issue of Oct. 31, 1908, immediately after the collapse of the Mayor Johnson's 3-cent fare enterprise in Cleveland, that the first desire of the public, not only in Cleveland but elsewhere, is for good service and not a low rate of fare. The commuters around New York realize that the operating expenses of all the railroad companies have increased during the past few years and that most of them have also greatly bettered their service through the installation of expensive improvements. Hence the increases in fare are accepted as a legitimate result of the present era of higher prices.

### Rowdyism in Cars

If a street railway almanac should be prepared along the lines of those traditionally used by farmers, the months of July and August would undoubtedly contain the admonition "about this time look out for rowdyism." We do not know whether the warm weather brings the spirits of the average hoodlum to a state of ebullition until they boil over, or relaxes the feelings of restraint which at other times keep him within the bounds of propriety. At any rate he is very apt, especially when returning from a Sunday afternoon baseball game or an evening's outing, to show disregard for the feelings of his fellow passengers by acts of rowdyism which are anything but pleasing to others on the car. If these performances are confined, as they often are, to the last car or last few cars at night, an effective way of stopping them is to assign to these cars conductors who are able physically to keep order, supplementing them on certain cars, when necessary, with an officer of the law. Complete success, however, depends upon the attitude which the courts take in regard to such disorderly cases. Last summer there seemed in New York and Brooklyn to be an epidemic of turbulence of this kind. Arrests, followed by lectures and fines, did but little good until the judges commenced to sentence offenders to 30 days in the workhouse when the practice abruptly stopped. This year there were evidences of a recurrence of the trouble, but the courts had learned the best medicine in the pharmacopeia to cure the disorder and have applied it in a number of cases, so that its efficacy has been demonstrated again this year. It is warranted to cure if administered promptly and often.

### Unprofitable Suburban Extensions

In these days when the limit of the 5-cent fare has been stretched to the breaking point, it behooves electric railways to beware the blandishments of the suburban realty operator. Even offers from the latter to defray the construction cost of a desired extension should not blind the railway to the fact that a line which does not show even a reasonable prospect of earning its operating expenses is not worth construction. An extension made to satisfy contiguous house-to-house growth is an entirely different matter from building through several miles of non-revenue territory to Lonesomehurst. Special caution should be exercised in cases of the latter kind. If the new suburb is directly in line with the growth of the better-class sections of the city, it is reasonable to hope that the gap eventually will be bridged, and the average length of haul reduced while the traffic increases. On the other hand, if the new suburb can be reached only through a manufacturing or slum district people will be discouraged from moving out of the city, partly on account of the slow, unpleasant ride and partly because with the growth of the city they feel their residences will be less desirable. We have in mind several instances where erroneous developments of this kind have proved a heavy burden on the railways.

### Riot and Disorder in Columbus

The striking trainmen of the Columbus (Ohio) Railway & Light Company and their sympathizers lost no time in resorting to assault upon life and property, but, although the State troops have been in Columbus since July 28, they seem to have been unable, for some cause not entirely clear in the dispatches, to repress disorder. This fact is a reflection upon the worth of the public officials who with the force at their disposal should have been able to have safe-guarded the peace of the community. Equally responsible with these delinquent officials in such cases are the vicious and turbulent among the public who seize upon occasions of this kind to gratify their desire for murder and destruction of property, but the ultimate responsibility must be placed upon those in authority who fail to repress the lawless element with force. It is upon their representatives, the public authorities, that the majority of the people, incommoded and worried by the conditions of siege that they see, depend for enforcement of the law. If this majority becomes tired of the indifference which it finds in its chosen representatives and uprisings in its indignation, political expediency will be less of a consideration than it is at the present time. The issue is plainly drawn and no especial keenness of understanding is required for appreciation of the fact. In the main the question in Columbus now is whether the cars shall be operated. Both the corporation and the traveling public desire the maintenance of the regular service. That they desire also protection while patronizing the service is merely a statement of the fact that they desire life, not death. The striking employees or their sympathizers, however, determined to prevent operation of the cars, collection of revenue by the company and comfort for the public, promote turbulence so successfully that they create a temporary condition of terrorism which satiates their instincts with dangerous pride. Present conditions in Columbus are an unwholesome advertisement of the city and their rapid betterment is a problem to which the authorities will do wisely to devote themselves before further overt acts on the part of the rioters cause greater disgrace.

### PRECAUTIONS WITH HIGH-VOLTAGE DIRECT CURRENT LINES.

In spite of the continual discussion regarding the relative merits of alternating and direct current for long railway lines, both are making sufficient headway to enable the engineer within a few years to get adequate data on both systems. Meanwhile the direct-current system at 1200 volts or higher is making material progress, as reference to our columns during the past year will readily show. Lines of this type are mostly longer interurban lines using overhead conductors and with substations spaced at far more liberal distances than are feasible with the lower voltages. The increase in the number of systems of this character necessarily brings to the operators a new class of precautions to be taken both in the upkeep of the rolling stock and in the line of construction. Doubling the customary working pressure means either the development of new insulating material for overhead work or the lessening of the factor of safety on the old insulating material. The use of 1200 or 1800 volts imposes far greater strain on insulation than has heretofore been usual.

As to the motors themselves, they are apparently made secure against the increase without great difficulty; nevertheless, there is increased possibility of failure of insulation and particularly increased possibility of commutator troubles, which superintendents of rolling stock will have duly to look out for. The change probably means a somewhat more elaborate and thorough system of motive power inspection than is now necessary. Car wiring should be and is carried out with greater precautions and must be correspondingly followed up. Abrasion which could go until the next trip at 600 volts should be attended to immediately at 1200 or 1800. Controllers in good condition to the eye of the ordinary inspector may not be so against the persuasive influence of increased voltage. It is proper, therefore, to direct sharp attention to these points, because while it is absolutely certain that 1200 or 1800 volts can be made to give good results for railway purposes, it is equally certain that there are possibilities of failure not directly due to the motors themselves which can be avoided by close attention and not otherwise. It would indeed be a pity to see a high voltage direct-current system get a black eye from lack of suitable inspection.

The same caution to an equally great degree must be extended to the overhead construction. It is safe to assume that this construction will initially be planned to take care of the extra voltage comfortably. It is not so sure that the necessary vigilance will be kept up in operation. The chances of a short circuit at high voltage are somewhat increased and if there is any falling off in the character of the overhead work short circuits are pretty likely to come. This is specially true in case of systems which are in close relation with urban systems at termini, where undesirably large amounts of the older forms of spare parts are available.

The higher voltage, too, is distinctly dangerous and this is one of the things regarding which the operating foremen must be thoroughly instructed. Five hundred or six hundred volts is as it were on the border line of serious risk. There have been a good many fatal accidents first and last with even this lower voltage, but they are sufficiently in the minority to make line-men and employees generally somewhat careless of them. In working with a tower wagon, for example, conditions which would be perfectly safe at 500 volts would involve at least a

risk of nasty shocks at 1800. A fallen wire at the higher pressures involves very real dangers, and employees should be brought to understand them and to feel as do employees on other high-tension lines that they are dealing with real danger which can be only obviated by reasonable amount of care that must never under any circumstances be forgotten. Unless caution is inculcated there is certain to come with increase in number with these very useful high-voltage roads an increase of accidents to persons and of failures in operation which would tend to discourage development which might otherwise most usefully go on.

#### BELL SIGNALS FOR CITY AND INTERURBAN CARS

Last year it was considered important that the codes of city and interurban rules should agree in all particulars affecting in any way the operation of city and interurban cars over joint city tracks. This applied especially to such details as communicating bell signals and the 1908 interurban code rule was amended to make it conform to the long-established practice prescribed in the city code rule. In recommending the adoption this year of the wording and numbering of the American Railway Association code rules, the committee on interurban rules sanctions a set of communicating signals very different from those now in universal use on street railway cars. If it is still important that the interurban and city codes should agree on this point at least—either the city code rule should be revised accordingly or the present interurban code rule should be let alone. We believe that there has been no change of opinion on the part of managers of city lines over which interurban cars operate that the bell signals used on all cars should be the same. We are also convinced that the use of one code of signals while running on city tracks and another code on interurban tracks is unwise and tends to create confusion and cause accidents. Men who have been trained on a car for years obey bell signals by instinct rather than as the result of deliberate thought. Instinct cannot be changed at the city limits.

It would be unreasonable to ask the city companies to change their signals merely to permit the interurban companies to use a code of steam railway signals intended for use with air signals and long trains. The city companies employ probably 90 per cent of all the electric railway trainmen in the country and their established and perfectly satisfactory practice in this detail of operation is entitled to first consideration. The communicating bell signals included in the 1909 interurban code meet all ordinary requirements, while the steam railway signals which it is proposed to substitute provide no communicating signals from the motorman to the conductor, and contain at least one entirely superfluous signal used in testing air brakes on long trains. At times it is necessary for the motorman of an electric car to communicate with the conductor on the rear platform. The most serious objection to the steam railway signals, however, is the use of three bells as a signal to stop at the next station. This is the emergency stop signal in general use and its adoption as a regular stop signal on interurban cars might cause serious accidents through misunderstanding. The code of communicating signals is a simple but vital detail of the rules, which should not be changed offhand to conform to steam railway practice merely because it may be desirable to adopt other parts of the steam code.

#### SCIENCE IN TRANSPORTATION METHODS

The president of a steam railroad which was considering the question of the electrical equipment for some of its suburban lines recently expressed considerable incredulity at the claim of an electrical engineer who was making a report on the proposed electrical equipment of the road that many if not most of the operating details, after the contemplated change, could be determined very closely in advance. It did not seem possible to a man schooled in steam railroad methods, as was this executive, that anyone could predict from a given line, number of cars and composition of train the exact amount of power which would be required to operate each train at different speeds and at different points on the line, or to calculate closely the amount of fuel consumption and cost of power station operation for a given schedule. It is safe to say, however, that no electric railway installation of any magnitude or importance is now undertaken until a careful study has been made of the future engineering conditions and that the preliminary figures thus determined usually coincide very closely with those subsequently found in practice.

This application of scientific principles in electric railway engineering, whether related to construction or operation, is so common as to excite little surprise except when observed for the first time by one who has not been particularly in touch with electric railway matters, like the president of the steam railroad already mentioned. But if we should carry our investigations further we doubt whether the same scientific exactitude in the determination of the relations which exist between cause and effect would be found as generally present in the transportation department as in the engineering department in spite of the fact that the expenses of the transportation department are about 40 per cent of the entire expenses of the average road. Probably this condition is due largely to the fact that the engineering department has to deal with materials and forces which are amenable to well-known physical and mechanical laws, whereas the transportation department is concerned principally with men whose motives and actions cannot easily be reduced to mathematical formulas. It may in part also be due to the fact that the relations of cause and effect being more complicated under circumstances of this kind sight is sometimes lost of the fact that there is any connection between them. We believe, however, that the larger economies of the future for electric railway companies lie principally in the transportation department and that, at least for the present, the same application of thought, scientific analysis and experience in that field will have a greater effect on the total efficiency of the system than when exerted in the engineering department.

For example, we believe that rule of thumb or guesswork methods have no more place in the work of drafting a schedule for different days than in designing a power station or in laying out a feeder system. The power lost in operating an unnecessary amount of dead mileage or of empty car seats is just as serious a drain upon the treasury of the company as the escape of an excessive amount of combustible gases through the stack of the power station or the loss of heat units through the inefficient operation of a condensing apparatus. In a sense the loss in power is much more serious when caused in the way outlined, because it has then undergone several conversions and has reached its final form at the car wheel.

### ELECTRIC LOCOMOTIVE PROBLEMS

While remarkable progress has been made in the design of heavy high-speed electric locomotives, both in this country and in Europe, the builders of these machines have by no means exhausted the possibilities of new wheel arrangements, driving mechanisms and general proportions in their efforts to create an ideal type. The locomotives which have been built up to the present time have all been in the nature of experiments, and from their performances many lessons have been learned and some theories upset. There still exist wide differences of opinion among engineers regarding some of the fundamental details of electric locomotive construction, and these differences will not be reconciled until further experiments are made and the disputed points cleared up by the success or failure in actual trials of some of the designs which are now in process of development on the drawing board and in the shops. It is a costly method of acquiring knowledge and experience for each new design represents the expenditure of not less than \$100,000 before it can turn a wheel to demonstrate the correctness of the principles embodied in its construction.

The riding qualities of a new design are perhaps the most difficult to predict accurately in advance of its trials. Not all engineers are agreed that a high center of gravity is essential for easy riding. In the discussion of Messrs. Storer and Eaton's paper before the American Institute of Electrical Engineers last month Frank J. Sprague stated emphatically that the hard riding of the original New York Central locomotives was not due in any way to their low center of gravity, but rather to the absence of sufficient resistance in the pony truck centering springs to prevent nosing. He attributed the nosing effect to the tendency of a pair of coned wheels to travel from side to side on the top of the rails. The effect of a high center of gravity is to cushion the side shocks on the rail when the wheels are displaced laterally by some defect in the track. Whether the shocks produced even by a low center of gravity locomotive from this cause approach in magnitude the side stresses due to nosing and centrifugal force is open to question.

The cause of nosing by electric locomotives does not seem to have been satisfactorily explained by any one. The same effect in steam locomotives has been generally conceded to be caused by the reciprocating motion of the side rods and the unbalancing of the piston effort on the two sides of the cylinder saddle, but this explanation would not apply to an electric locomotive. It has appeared in the long, rigid wheelbase locomotives of the New York Central and in short, coupled bogie truck designs, but it has not proved serious in the case of long cars mounted on two centrally pivoted trucks, such as are operated at high speed in interurban and subway service. In the discussion of this phenomenon the effect of angular drawbar pull does not seem to have been considered. The New York Central locomotives have a length over buffers of 37 ft., which offers a moment arm of 18 ft. 6 in. for side pressure on the drawbar, tending to revolve the mass of the locomotive about its central vertical axis. The drawbar pull is intermittent and in running around a curve has an appreciable lateral component. This component acting with a long lever arm could easily set up destructive harmonic vibrations in a horizontal plane. A symmetrical wheelbase would materially assist the amplifying of these vibrations to a dangerous degree. With short coupled bogie trucks the center of rotation would be

about the center pin of the rear truck and the lever arm would be shorter, but still long in proportion to the moment arm of the mass in front of the rear truck. The lever arm is very short in comparison with the moment arm of the car body mass in the case of a long double-truck car, and hence the lateral component of the drawbar pull would have little, if any, effect.

The wheel arrangement of an electric locomotive seems to affect the riding qualities and influences the size, location and driving mechanism of the motors. The Pennsylvania Railroad high-speed tests indicated that an unsymmetrical wheel arrangement, such as is used in an "American" type steam locomotive, produced less nosing and the high center of gravity obtained by mounting the motors above the frames eased off the side shocks due to lateral displacement of the wheels from track defects. Two pairs of driving wheels of large size are well adapted for side-rod drive with a single large motor mounted on the frame above them. Geared or gearless motors of moderate size can be used with almost any wheel arrangement, but the limited space between frames and the fact that the motors are in an inaccessible place for inspection and repair are disadvantages. The latest proposed form of drive is a combination of the side-rod drive and the geared drive. This affords a very flexible arrangement suitable for one or more motors of any type and for any number of driving wheels. The motors can be mounted above the frames and by the use of reduction gearing they can be operated at higher speeds, resulting in reduced weight and first cost. The gears are on the outside of the frames and a large gain in the width of the motor over the width available with a side-rod drive is possible. The gear teeth also can be made wide enough with this arrangement to keep the unit pressures well within safe working limits. A locomotive with this type of drive has been built in Austria for a track gage of only 2 ft. 6 in. Each of the two single-phase motors is of 275 hp, geared down in the ratio of 1:2.9 and coupled to three pairs of driving wheels, 31½ in. in diameter. The efficiency of this form of drive should be fairly high and its maintenance should not be excessive as there are no torsional stresses involved which would tend to wear the gears or the rod bearings.

### MAINTAINING MULTIPLE-UNIT CONTROL EQUIPMENT

On account of its relative complexity, multiple-unit control apparatus often presents considerable annoyance to shop officers and employees charged with its maintenance. Everyone concerned with this type of equipment desires to anticipate troubles as far as possible by close inspection and proper adjustment, but the best method of procedure is often difficult to determine. In a discussion of this subject before a group of car-house foremen not long since, the advocates of inspection on a time basis made a strong plea in its favor. The work is now handled by two different shops at opposite ends of the system; the cars have to be kept separate in relation to the shops and the mileage of the individual cars varies greatly, some running 80 or 90 miles per day and others making over 200 miles every 24 hours. With daily inspection, it is not difficult for one man to look over 30 or 40 cars, but all the control apparatus is blown out by compressed air before the inspection begins. If an inspector comes across a job that will take so long as to interfere with the rest of his work an extra man is put on the task. The general shop foreman of this company

advocated inspection on a time basis, and pointed out in defense of this plan that breakage rather than wear should limit the periods of inspection. He also recommended a yearly overhauling of the control with the taking down of every piece, renewal of worn parts, and adjustment of imperfect fits and contacts, which, if carefully done, should greatly reduce the amount of work to be done on the daily inspection.

Multiple-unit control equipment is particularly susceptible of "over-inspection," notably through a too liberal use of the file and sandpaper. Unless contact tips are pitted or burned by some unusual cause they are seldom helped by filing, for the surfaces which they acquire by being hammered together and then slid make a far better contact than can be secured with a tool. It is also better to let interlock disks and studs alone unless they are burned badly. If controller fingers show the proper fit after being brushed out it is rare that filing will do any material good. The control parts most susceptible to breakage and failure are shunts, disks, spindles and springs, and as an inspector cannot tell when these will break, the periodic examinations should be frequent enough to take care of the broken parts before they can cause trouble or damage to other adjacent or connected parts. The daily inspection enables the maintenance department to keep a close watch for such troubles as loose terminals, worn-out parts, mechanical binding, and inaccurate lining.

#### SPECIFICATIONS FOR CITY RAILS

The recent conference between the committee on way matters of the American Street & Interurban Railway Engineering Association and the principal rail makers emphasized the fact that hitherto the street railways have been following too closely the rail specifications of the steam railroads. It has been the fashion to assume that the compositions found best for steam railroad service would prove equally superior in street railway traffic. The two conditions are hardly comparable, however. The principal qualification demanded of a steam railroad rail is that it shall be capable of withstanding unbroken the impact of heavily loaded wheels and axles moving at high speed. Brittleness in such a rail would result in the worst kind of disaster. Hence the ideal rail for steam railroads is one having high carbon content to give hardness, but a low phosphorus content to avoid brittleness. Thus the Pennsylvania Railroad is quoted as paying \$2 a ton extra to insure a metal with not more than 0.03 per cent phosphorus. In general, the highest carbon content of steam railroad rails does not exceed 0.7 per cent. While the rail used by the Pennsylvania Railroad may be the very best possible for steam railroad work it is not necessarily the best for city street railways. For the latter, hardness is the prime essential because of the greater amount of wheel movement over the track in a given time. The possibility of breakage is remote, due to the absence of severe shocks; even if a rupture did occur, whether from shocks or low temperature, it would be simply an inconvenience and not a disaster.

The proposed rail specifications of the Engineering Association are a great step in advance in specifying for the better grade rail a carbon content with a minimum limit of 0.72 per cent, a desired content of 0.77 per cent and a maximum of 0.85 per cent. But as the carbon is increased it becomes much more difficult to keep the phosphorus and sulphur to such low limits as 0.03 per cent and 0.06 per cent, respectively. According to the rail makers, it is not possible to roll such a rail at

standard prices because of the large proportion of metal which would fail to come within the specified limits of composition. It can hardly be expected that the mills should take all the risk and the railways all the profit due to rolling a rail with very high carbon yet low phosphorus. If such a rail will give longer life it should be worth an increase in price mutually agreed upon by both parties. It is quite likely, however, that further consideration of the problem will show that it is safe to allow the phosphorus and sulphur limits to remain higher for rail in city service and consequently it would not be necessary for the mills to charge more for a rail averaging 0.77 per cent carbon.

#### THE SUPPLY MAN AND THE PURCHASER

The supply man in the electric railway field occupies a position very different from that of simply the medium through which a sale is effected. He should be, and usually is, an expert, not only in the manufacture, but also the use of the apparatus which he sells. Hence he can very often be of the greatest assistance to an electric railway manager and engineer in advising in regard to the correlation of the apparatus which he supplies to the rest of the equipment on the line, the method of obtaining the best results from it and the most economical way of keeping it in repair. The duties of the average railway man are so multifarious that he cannot expect to be as thoroughly informed on these details of every part of the equipment as a man who is devoting his entire time to the subject. Moreover, the electric railway man does not have the same opportunities of seeing this kind of apparatus in use on different roads or of getting reports of it under various conditions as the supply man. While the supply man thus can be and is of great assistance to railway companies outside of the question of the sale of equipment, competition in this part of his work is so keen that there is danger of considerable "lost motion" when it comes to sales between him and the electric railway company. This phase of the subject is discussed in this week's issue by E. P. Roberts, of Cleveland.

Mr. Roberts points out the fact that the consulting engineer as a purchaser of equipment has necessarily to depend upon contractors and manufacturers and their agents to know the quotations on the equipment which they have for sale and the most recent improvements which they have made in the apparatus which they make for use on electric railways. But this fact does not change the vital relation which always exists between buyer and seller. That is to say, competition to make a sale in practically every case is greater than the competition to buy, hence the seller has every inducement to make the purchase of his apparatus easy for the buyer.

In spite of this fact, the seller, in his anxiety to make a sale, not only often puts the buyer to considerable unnecessary work and expense in answering inquiries, but frequently incurs as large or a greater expense himself by trying to accomplish his purpose in the wrong way. The remedy, in our contributor's opinion, is the establishment of a systematic instead of a haphazard method of exchanging the information which each of the principals to the bargain requires.

Of course, the suggestions in the article are made from the standpoint of the purchaser, and their primary purpose is to economize his time and labor, but the ultimate result of the establishment of such a systematic relation as outlined should be equally if not more beneficial to the manufacturer, partly because he meets the requirements of the buyer and partly because he economizes the time of his representatives.

## CARS, SCHEDULES, POWER CONSUMPTION, RUNNING TESTS AND SIGNALS IN LONDON SUBWAYS

The London Underground Electric Railways Company operates, under Albert H. Stanley, general manager, four distinct underground railways, as follows: Metropolitan District, 24 miles; Baker Street & Waterloo,  $4\frac{1}{4}$  miles; Charing Cross, Euston & Hampstead, 8 miles, and the Great Northern, Piccadilly & Brompton, 9 miles. This makes a total of  $45\frac{1}{4}$  miles, and as the total length of all the London subways is 89 miles, it will be seen that more than half the mile-

$3\frac{1}{4}$  in. from rails to roof. The cars are variously divided, some having luggage compartments, and others being arranged for smokers or for first and third-class passengers. All of the doors, including those in the center, are hand-operated, and are frequently manipulated by the passengers. The standard trailer, which is also shown in a sketch, weighs over 18 tons, and has the same general dimensions as the motor cars. The locomotives referred to weigh about 76 tons complete, and were built originally to haul London & Northwestern steam trains through the city to Mansion House. As these foreign cars have been excluded for the time being, the independent



London Underground—Five-Car Express Train Leaving the Tube at Golder's Green

age is in the hands of one company. The Metropolitan District runs partly through open cuts and partly through a shallow, roofed subway, and up to the latter part of 1905 was operated by steam. The other three lines are deep underground

halves of the electric locomotives are used to haul trains of four trailers each on the inner circle division, so that they always run in the same direction.

The individual motor cars have two GE-69 motors, which are

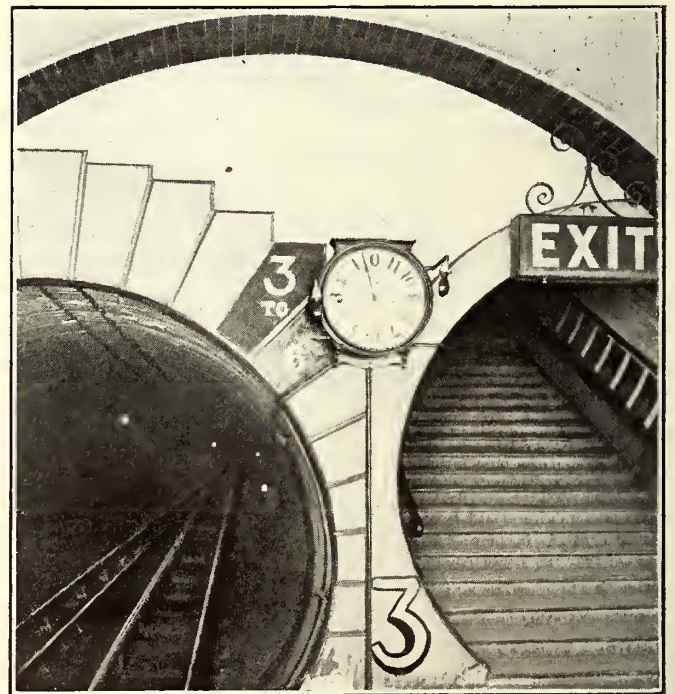


London Underground—Signal Interlocker and Illuminated Diagram at Camden Town

or tube railways, and were opened for electric service on the following dates: Bakerloo, March 10, 1906; Piccadilly, Dec. 15, 1906; Charing Cross, June 22, 1907.

### CAR STANDARDS AND TRAIN COMPOSITION ON THE METROPOLITAN DISTRICT

The rolling stock of the Metropolitan District Railway comprises 197 motor cars, 235 trailers and five twin electric locomotives. As shown in the accompanying sketches, the greater portion of the motor cars weigh about  $29\frac{1}{2}$  tons each, are 49 ft.  $6\frac{1}{2}$  in. long over all, 8 ft. 10 in. wide and 12 ft.



London Underground—Headway Clock Installed Near Important Stations

mounted on one truck. These motors are operated at 580 volts to 600 volts for maximum speeds of 35 m.p.h. to 40 m.p.h. Every motor car is also provided with a 10-hp Christensen compressor. All main and control cables are carried under the car body in iron conduit. The cars themselves, whether motors or trailers, are built of fireproofed wood with aluminum panels. Additional steel cars are now being built.

The Metropolitan District Railway runs the longest underground trains in the world, the maximum train composition now consisting of four motor cars and six trailers. It is

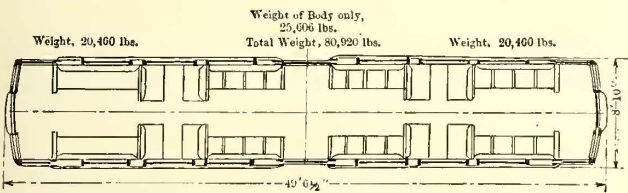
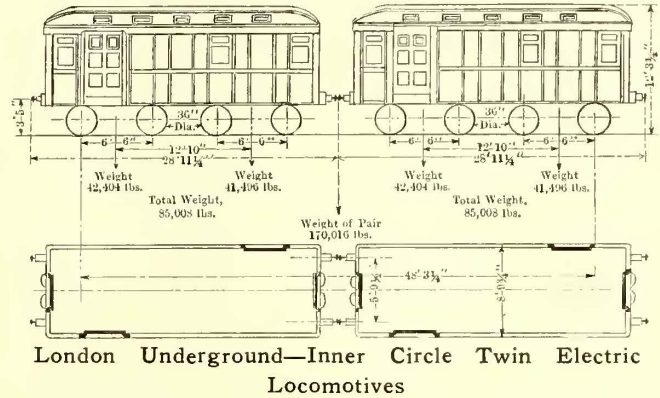
now intended to make the length of the trains in the east end of the city 12 cars, and to split these trains into trains of six cars at Whitechapel station. The customary heavy service train is composed of three motor cars and three trailers, and the train is adjusted for light traffic by dropping one coach of each type. A seventh car is added to many of the heavy trains.

CAR STANDARDS AND TRAIN COMPOSITION ON THE TUBE LINES

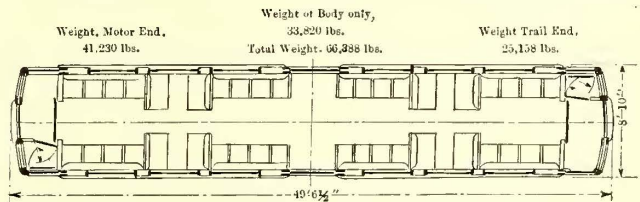
The cars of the three tube lines are substantially alike in design, construction and size. The chief differences are the use of a steel instead of a canvas-wood roof for the Charing Cross cars, and that the Bakerloo cars are finished in cream and red in place of the brown body color considered more desirable for tube service. All motor cars carry two GE-69, 200-hp motors on one truck, and have all the multiple-unit apparatus in the motorman's cab. The Charing Cross line has 60 motor cars and 90 trailers; the Piccadilly line, 72 motor cars and 146 trailers, and the Bakerloo line a total of 108 cars of both classes. The cars are of steel, with an internal paneling of non-inflammable mahogany mounted on asbestos millboard. The length of each car over all is 49 ft. 1½ in.; the extreme width, 8 ft. 4 in. to 8 ft. 7¾ in.; height from rail to roof, 9 ft. 5 in., and the inside height 6 ft. 4½ in. The seating is of rattan, and is both transverse and longitudinal. The motor cars seat 42 passengers, the trailers 52. A complete motor car weighs 27.50 tons (2240 lb. per ton), and a trailer 16.55 tons.

The makeup of the tube trains differs as follows: Bakerloo line, three-car trains, composed of one motor car, one trailer with control equipment and one ordinary trailer, with six-car theater traffic trains made up of two of the foregoing, with the motors at each end and the control trailers in the center; Piccadilly line is similar to the Bakerloo; Charing Cross line

the trains are the following: Ealing, 113 instead of 63; Hammersmith, 237 instead of 109; Putney Bridge, 256 instead of 92. The closest headway is 1¾ minutes, and is maintained over the main line between South Kensington and the Mansion House for all western branches. The total daily number of trains on this line is 494 against 273 for steam in 1905. There are 2 stops per mile on the inner circle division and 1.7 stops per mile between Earl's Court and Mansion House.



London Underground—Inner Circle Trail Car



London Underground—Inner Circle Middle Motor Car

varies from two-car to five-car trains, according to traffic. These Charing Cross trains are composed of the following types of cars: Two-car train, one motor and one control trailer; three-car train, one of each kind; four-car train, two motor and two control trailers; five-car train, two motors, two control trailers and one ordinary trailer. The great majority of the trains are short, so that the management can give the very frequent service detailed in the following paragraphs.

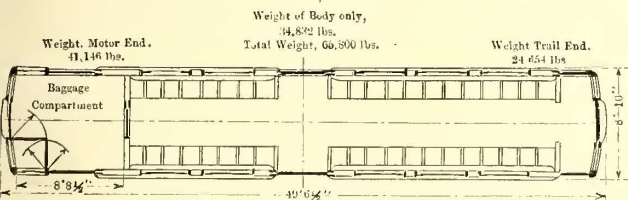
SCHEDULES, SPEEDS, STOPS AND SIGNALS

The introduction of electricity and modern automatic signaling on the Metropolitan District line has had a most fa-

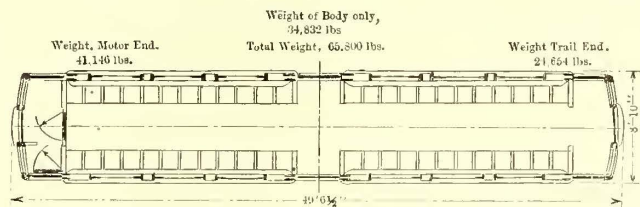
vorable influence on running time and frequency of service. The 11-mile trip from the suburb of Ealing to the Mansion House is now made by local trains in 40 minutes, as against 50 minutes by steam. This has been further reduced to 32 minutes by "non-stop" or express trains, which can easily be run on this line owing to the presence of loops and four-track sections at various places. Another "non-stop" run is the one from Hounslow Town to Mill Hill Park, a distance of 4½ miles, which is run in 8 minutes. One run with local trains has been reduced from 26 to 19 minutes, and a second from 32 to 22 minutes. Some typical increases in the numbers of

with 1¾ minutes when it has heavy amusement travel; total trains a day in each direction, 417. Charing Cross, main line, 1½ minutes (2½ minutes) and 2 minutes (2½ minutes), corresponding to intervals of double length on the two branches. Within the last two years the schedule speed on all the tube lines has been increased 1 m.p.h. to 2 m.p.h., and now ranges from 15.04 m.p.h. on the Bakerloo line to 17.79 m.p.h. on the Golder's Green branch of the Charing Cross line. The character of service in each tube is shown in detail in the tables on the following page.

A record of train-miles, car-miles, cars per train in service



London Underground—Inner Circle End Motor Car with Baggage Compartment



London Underground—Inner Circle End Motor Car without Baggage Compartment

and kilowatt-hours per car-mile is made out weekly by the superintendent of lines on the forms on the next page, and afterward for semi-annual and annual periods. The power consumption in kilowatt-hours per car-mile differs on each line. The power figures and the stops per mile were as follows:

	Bakerloo.	Piccadilly.	Charing Cross.
For 12 months' period, ending Dec. 12, 1908.	2.27	1.97	2.32
For six months, ending June, 1909.	2.13	1.92	2.35
For one week, ending July 10, 1909.	2.12	1.93	2.39
Stops per mile.	2.35	2.35	2.57

SIGNALS AND RECORDING DEVICES

The signal system which permits the frequent train service

given on the four underground railways is of the well-known Westinghouse electro-pneumatic type, including automatic train stops. The average number of complete signal movements per annum is about 120,000,000, and the average number of such movements per failure is 400,000. A rather novel auxiliary to the signal system is afforded by the use of illuminated headway indicating dials which have been installed near congested stations. Each dial has 12 numbers on it to indicate minutes. When the motorman comes into a section he can see by the clock just how many minutes have elapsed since the train ahead passed by, and thus regulate his running accordingly. When the second train enters the section it cancels the first record and begins to make a new record, since the dial hand moves as soon as the signal hand goes to "danger." This scheme is particularly valuable near stations where some of the stops are unusually long because of the arrival of many baggage-laden steam railroad passengers. The automatic signals at some points are connected with a relay device for making perforations on record ribbons to show the intervals between succeeding trains.

TRAIN STOP TESTS

During October and November, 1908, signal train stop tests were made on these tube lines to determine the feasibility of shortening blocks, especially near terminals and cross-overs. The results of the trial runs detailed in the accompanying tables proved that it would be safe to cut down the distances of the home signal and trip arms from the crossing points as desired.

Referring now to the five Bakerloo tests as presented in the table on the next page. Tests Nos. 1 and 4 were made under ordinary service conditions, the power being shut off at white marks which indicated the beginning of non-current runs; tests 2, 3 and 5 were made under the conditions which would

BAKER STREET & WATERLOO RAILWAY RUNNING TIME.

Location.	Slack service stops, seconds.	Busy service stops, seconds.	Running time between stations, minutes and seconds.	Distance between stations, miles.	Average speed between stations, m.p.h.
Elephant & Castle - Westminster Bridge	..	..	1.55	.54	16.87
Westminster Bridge-Waterloo	10	12	1.24	.40	17.14
Waterloo Embankment	15	19	1.28	.42	17.14
Embankment-Trafalgar Square	10	12	0.55	.24	15.64
Trafalgar Square-Picadilly Circus	15	19	1.22	.35	15.33
Picadilly Circus-Oxford Circuit	15	19	1.53	.60	19.15
Oxford Circus-Regents Park	15	19	1.48	.55	18.33
Regents Park-Baker Street	10	12	1.41	.57	20.37
Baker Street-Great Central	15	19	1.4	.32	17.94
Great Central-Edgware Road	10	14	1.5	.27	15.00
	1.55	2.25	14.35	4.26	17.53

Slack time speed, including stops, 15.49 m.p.h. Busy time speed, including stops, 15.04 m.p.h. Speed and running time same on both roads, 1 minute lay-over at each end, making 35 minutes for round trip in slack time and 36 minutes in busy time.

GREAT NORTHERN, PICCADILLY AND BROMPTON RAILWAY RUNNING TIME, AVERAGE SERVICE.

Location.	Busy service sec-onds.	Slack service, sec-onds.	Running time allowed between stations, minutes and seconds.	Average running speed station to station, m.p.h.	Distance in miles, station to station.
West Bound Road.					
Finsbury Park-Gillespie Road	..	..	1.29	17.84	.44
Gillespie Road-Holloway Road	15	10	1.30	18.40	.46
Holloway Road-Caledonian Road	15	10	1.14	18.54	.38
Caledonian Road-York Road	15	10	2.1	23.28	.73
York Road-King's Cross	15	10	1.24	21.00	.49
Kings' Cross-Russell Square	15	15	1.44	19.47	.57
Russell Square-Holborn	15	12	1.21	20.89	.47
Holborn-Covent Garden	15	12	1.21	16.00	.36
Covent Garden-Leicester Square	15	12	0.45	12.80	.16
Leicester Square-Piccadilly Circus	15	12	1.4	19.07	.34
Piccadilly Circus-Dover Street	15	15	1.9	17.74	.34
Dover St.-Down St.	15	12	1.10	17.44	.34
Down St.-Hyde Park Corner	15	12	1.4	17.94	.32
Hyde Park Corner-Knightsbridge	15	12	1.7	16.79	.33
Knightsbridge-Brompton Road	15	11	1.16	19.84	.42
Brompton Road-South Kensington	15	12	1.15	16.80	.35
South Kensington-Gloucester Road	15	12	1.21	20.00	.45
Gloucester Road-Earl's Court	15	12	1.30	20.40	.51
Earl's Court-Baron's Court	15	12	2.30	23.76	.99
Baron's Court-Hammersmith	15	12	2.00	13.20	.44

(Minutes (Minutes and seconds.)

Totals	4.45	3.45	28.15	18.88	8.89
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Time for round trip, busy service, 68 minutes. Time for round trip, slack service, 66 minutes. Average speed, including stops, busy service, 16.22 m.p.h. Average speed, including stops, slack service, 16.73 m.p.h.

CHARING CROSS, EUSTON & HAMPSTEAD RY. RUNNING TIME.

Golder's Green to Charing Cross Division.

Stations.	Running time.	Stops.	Lapsed time.	Dis-tance.	Speed.
Golder's Green-Hampstead	4.00	15	4.15	1.47	22.05
Hampstead-Belsize Park	2.10	15	6.40	.74	20.46
Belsize Park-Chalk Farm	1.55	15	8.50	.69	21.56
Chalk Farm-Camden Town	1.40	15	10.45	.52	18.68
Camden Town-Mornington Crescent	1.20	15	12.20	.40	18.04
Mornington Crescent-Euston	1.20	15	13.55	.52	23.46
Euston-Warren Street	1.05	15	15.15	.36	20.00
Warren Street-Goodge Street	0.55	15	16.25	.29	19.33
Goodge Street-Tottenham Court Road	1.15	15	17.55	.39	18.72
Tottenham Court Road-Leicester Sq.	0.45	15	18.55	.25	20.00
Leicester Square-Charing Cross	1.05	..	20.00	.30	16.67

Speed, including stops, 17.79 m.p.h. Hampstead round trip, 38 minutes. Golder's Green round trip, 45 minutes.

Highbury to Charing Cross Division.

Stations.	Running time.	Stops.	Lapsed time.	Dis-tance.	Speed.
Highbury-Tufnell Park	1.52	15	2.07	.56	17.97
Tufnell Park-Kentish Town	1.28	15	3.50	.49	20.56
Kentish Town-So. Kentish Town	1.14	15	5.19	.36	17.56
So. Kentish Town-Camden Town	1.11	15	6.45	.36	18.30
Camden Town-Mornington Crescent	1.20	15	8.20	.40	18.04
Mornington Crescent-Euston	1.20	15	9.55	.52	23.46
Euston-Warren Street	1.05	15	11.15	.36	20.00
Warren Street-Goodge Street	0.55	15	12.25	.29	19.33
Goodge Street-Tottenham Court Road	1.15	15	13.55	.39	18.72
Tottenham Court Road-Leicester Sq.	0.45	15	14.55	.25	20.00
Leicester Sq.-Charing Cross	1.05	..	16.00	.30	16.67

Speed, including stops, 16.05 m.p.h. Round-trip time, 36 minutes.

LONDON UNDERGROUND ELECTRIC RAILWAYS—STATISTICS OF POWER CONSUMPTION AND TRAIN SERVICE FOR WEEK ENDING JULY 10, 1909.

	Actual No. of Trips	TRAIN MILES			CAR MILES			Cars per Train in Service	Current Consumption Traction Units	Kw.Hours per Car Total Mile
		Service	Idle	Total	Service	Idle	Total			
BAKER STREET & WATERLOO RAILWAY										
Total this week	2828	23,995	152	24,147	72,038	462	72,500	3.00	153,570	2.12
Total last week	2813	23,869	168	24,037	71,608	487	72,095	3.00	154,350	2.14
Total this half year	4134	35,075	226	35,301	105,279	681	105,960	3.00	225,230	2.13
GREAT NORTHERN, PICCADILLY & BROMPTON RAILWAY										
Total this week	2417	44,102	326	44,428	131,123	939	132,062	2.97	254,921	1.93
Total last week	2422	44,215	323	44,538	130,756	909	131,665	2.96	251,208	1.91
Total this half year	3528	64,352	472	64,824	191,351	1357	192,708	2.97	370,469	1.92
CHARING CROSS, EUSTON & HAMPSTEAD RAILWAY										
Total this week	4083	39,199	784	39,983	114,812	3082	117,894	2.93	281,833	2.39
Total last week	4081	39,241	778	40,019	114,783	3077	117,860	2.92	276,126	2.34
Total this half year	5950½	57,068	1146	58,214	167,444	4478	171,922	2.92	407,197	2.37

To.....100

Superintendent of the Line.



prevail if a motorman were taken ill and fell on to his controller, the signal trip being struck with the controller in the "full-on" position. Speeds were taken at the time of striking the train stop. The train which was used for all of the tests had been in regular service the previous day and had run 616 miles since it was last in the shops. The cars were furnished with Frood fiber brake shoes, and the brake rigging had been used 130 miles since its last adjustment.

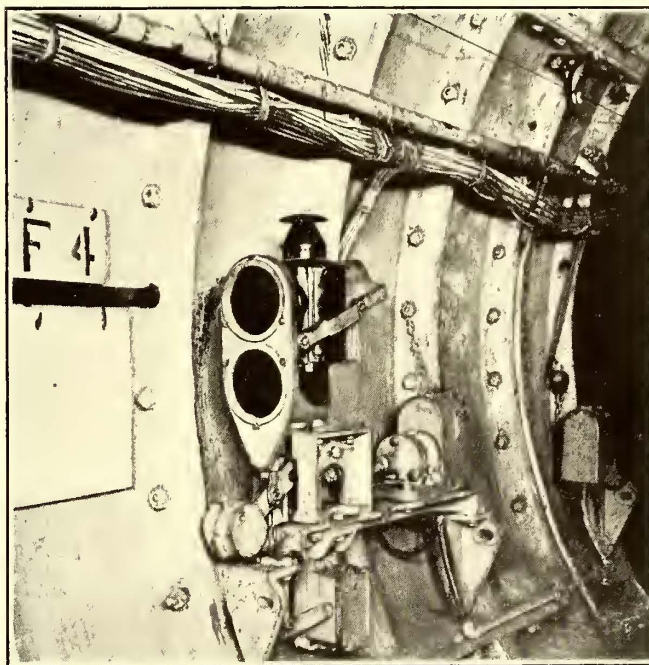
Referring next to the five Piccadilly tests given in the second table below. Test No. 1 was made under emergency conditions

mersmith, and ran at the signal at full speed. The brake shoes were also of fiber, and had been in regular use for three days preceding the test runs.

Referring last to the Charing Cross tests as detailed in the third table below: Test No. 1 was made under emergency conditions, the train being started from Mornington Crescent Station, 0.40 mile from Camden Town and the controller kept open until the train was tripped. Test No. 2 was made under conditions similar to test No. 1. Test No. 3 was an ordinary service run, but it will be noted that the speed and the dis-



London Underground—Showing Position of Train Stop Outside the Rails



London Underground—Electro-Pneumatic Signal and Valve for Train Stop

and run at maximum speed through Holborn Station. Test No. 2 was a service run, and the power was shut off at the white marks previously mentioned. In test No. 3 the signal was approached at maximum speed and the full current kept on until the trip-cock was struck. Test No. 4 was made under service conditions, the current being cut off shortly after leaving Caledonian Road, 0.73 miles from York Road, and the train allowed to coast down to the signal. In test No. 5 the train was started from Baron's Court, 0.44 mile from Ham-

tance which the train traveled after being tripped were about the same. This was due to the white shut-off mark being quite close to the signal. Test No. 4 was made under ordinary service conditions. Test No. 5 was made under emergency conditions, but the speed shown may be somewhat misleading, and does not represent the actual speed at which the train struck the signal. This was due to the motorman being rather slow in getting into full parallel, and he had not done so until the train had partly covered the measured distance over which

BAKER STREET & WATERLOO RAILWAY—SIGNAL TRAIN STOP TESTS ON OCT. 9, 1908, WITH 3-CAR TRAIN NO. 15 (CARS NOS. 19, 229 AND 102).

Test No.	Cars in Train	Signal	Grade	Curve Chains	Speed m.p.h.	Seconds Traveled after Striking Trip	Feet Traveled after Striking Trip	Deceleration m.p.h. per Second	Feet from Tripcock to Nose of Switch after Train had Stopped
1	3	Edgware Road (Home).....	Up, 1 in 300	15	17.66	7	116	2.52	.....
2	3	Ditto.....	Ditto	15	19.46	7.5	154	2.59	.....
3	3	Ditto.....	Ditto	15	20.44	7.5	158	2.72	246½
4	3	Elephant and Castle (Home).....	Down, 1 in 60	6	24.12	8	146	3.02	.....
5	3	Ditto.....	Ditto	6	29.15	10.5	240	2.78	162½

CREAT NORTHERN, PICCADILLY & BROMPTON RAILWAY—SIGNAL TRAIN STOP TESTS ON OCT. 14, 1908, WITH TRAIN NO. 32 (CARS NOS. 65, 203 AND 131).

Test No.	Cars in Train	Signal	Grade	Curve Chains	Speed m.p.h.	Seconds Traveled after Striking Trip	Feet Traveled after Striking Trip	Deceleration m.p.h. per Second	Feet from Tripcock to Nose of Switch after Train had Stopped
1	3	Holborn (East end starter).....	Up, 1 in 110	5	24.07	6	147	4.01	75 from stop to fouling point
2	3	Finsbury Park (Home).....	Up, 1 in 90	40	21.59	5	83.4	4.32	.....
3	3	Ditto.....	Ditto	40	23.67	6	128	3.94	184
4	3	York Road (West home).....	Down, 1 in 85	40	25.58	5	162	5.11	270 from stop to fouling point
5	3	Hammersmith (Home).....	Down, 1 in 264	20	20.78	5	157	4.16	300

CHARING CROSS, EUSTON & HAMPSTEAD RAILWAY—SIGNAL TRAIN STOP TESTS ON NOV. 11, 1908, WITH 4-CAR TRAIN NO. 32 (CARS NOS. 32, 149, 118 AND 46, TWO OF WHICH WERE MOTORS).

Test No.	Cars in Train	Signal	Grade	Curve Chains	Speed m.p.h.	Seconds Traveled after Striking Trip	Feet Traveled after Striking Trip	Deceleration m.p.h. per Second	Feet from Tripcock to Nose of Switch after Train had Stopped
1	4	Camden Town, N. B. (Home)....	Up, 1 in 100	Straight	26.00	6	136½	4.33	.....
2	4	Highgate, N. B. (Home).....	Up, 1 in 60	Ditto	26.69	6.5	144	4.11	225
3	4	Ditto.....	Ditto	Ditto	26.69	5.5	121	4.85	279
4	4	Charing Cross, S. B. (Home)....	Down, 1 in 120	7	20.45	5.5	126	3.72	319
5	4	Ditto.....	Ditto	7	19.29	6.5	153	2.97	291

the speed was taken. This speed, therefore, is stated only to be an average one, and it is estimated that the signal was actually approached at about 25 m.p.h. Speeds were taken in all tests at the time of striking the train stop. The test train had the usual braking equipment which had been adjusted on Nov. 6 and had been in use on Nov. 7 for runs totalling 220 miles.

TESTS OF POWER CONSUMPTION ON UNDERGROUND LINES

During February and March, 1907, tests were carried out on the Bakerloo and Piccadilly lines respectively by James R. Chapman, then chief engineer, to determine the most economical method of train operation from the power, braking and coasting standpoints. These experiments were based on a continuance of the schedule speeds then in vogue, but shortly thereafter it was determined to raise these schedule speeds throughout as previously detailed. Hence the lessons drawn from the trials could be applied only in part. Nevertheless it may be of interest to present an account of the conditions under which the runs were made and to give the data secured on power consumption per ton-mile and car-mile.

The Bakerloo tests were made on Feb. 11, 1907, with a three-car train composed of one 28.4-ton motor car, two 17.6-ton trailers plus the weight of the passengers. Three runs were made in commercial service between 3 p. m. and 6 p. m. with the same motorman for each trip.

integrating watt-meter and were for traction only as measured at the motor terminals, no allowance being made for lighting and transmission losses. The details of each run are summarized below, No. 1 being given somewhat fully.

BAKER STREET & WATERLOO RAILWAY POWER TESTS, RUN NO. 1.—NORTH-BOUND TRAIN, WEIGHING 65 TONS, SCHEDULE SPEED, INCLUDING STOPS, 14.54 M.P.H.; 110 WATT-HOURS PER TON-MILE.

Stations.	Distances in miles.	Stops in seconds.	Running time in seconds.
Elephant & Castle-Westminster Bridge	.564	10	110
Westminster Bridge-Waterloo	.394	13	100
Waterloo-Embankment	.410	6	81
Embankment-Trafalgar Square	.232	12	65
Trafalgar Square-Piccadilly Circus	.339	15	59
Piccadilly Circus-Oxford Circus	.602	17	143
Oxford Circus-Regent's Park	.569	7	114
Regent's Park-Baker Street	.580	..	128
	3.69	80	839

Run No. 1, south-bound train, weighing 65 tons; length of run, 3.68 miles; schedule speed, 14.73 m.p.h.; running time, 842 seconds; stopping time, 57 seconds; power consumption, 80 watt-hours per ton-mile.

Run No. 2, north-bound train, weighing 65 tons; length of run, 3.69 miles; schedule speed, 14.36 m.p.h.; running time, 852 seconds; stopping time, 0.73 seconds; power consumption, 100 watt-hours per ton-mile.

Run No. 2, south-bound train, weighing 65 tons, length of run,

BAKER STREET & WATERLOO RAILWAY—STATISTICS ON POWER TESTS, FEB. 18, 1907.

North & South Bound. Run. No.	Weight of train. Tons.	Power on, per cent.—			Coasting and braking. Per cent.	Watt-hrs. for traction only—			Total time for return trip, including stops. seconds.	Schedule speed, m.p.h., including stops.
		Series.	Parallel.	Total.		Total per run.	Per ton mile.	Per car mile.		
1	65	37.71	22.31	60.02	39.93	46,600	97	2107	1818	14.59
2	65	23.28	19.89	43.17	56.83	40,549	85	1833	1812	14.64
3	66.5	21.18	19.89	41.07	58.93	41,300	84	1868	1871	14.24

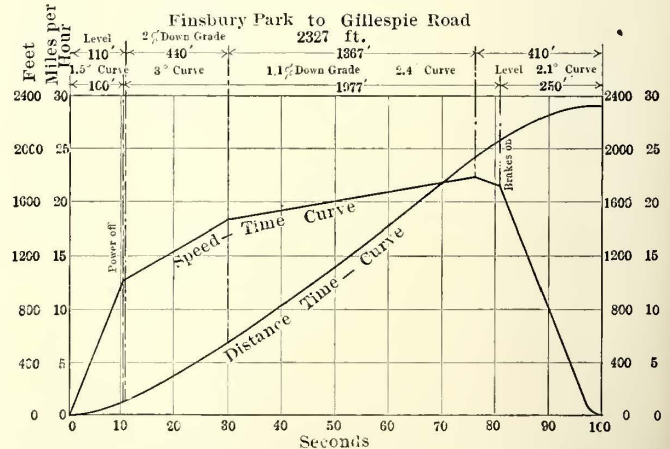
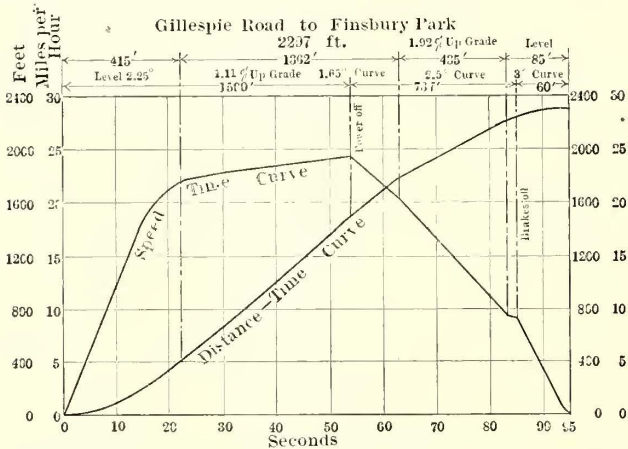
The conditions under which the results presented in the accompanying table was secured, were as follows:

Run No. 1 was made under the then existing running conditions, that is, the motorman operated the controller as usual. Run No. 2 was made in accordance with speed time curves. Blue lights had not yet been installed to indicate the current "on" and "off" points so that the distances were determined by counting the existing white lights and coaching the motorman accordingly. Run No. 3 was made under conditions like No. 2

3.68 miles; schedule speed, 14.94 m.p.h.; running time, 802 seconds; stopping time, 85 seconds; power consumption, 70 watt-hours per ton-mile.

Run No. 3, north-bound train, weighing 66.5 tons; length of run, 3.69 miles; schedule speed, 14.06 m.p.h.; running time, 849 seconds; stopping time, 96 seconds; power consumption, 99 watt-hours per ton-mile.

Run No. 3, south-bound train, weighing 66.5 tons; length of run, 3.68 miles; schedule speed, 14.31 m.p.h.; running time, 797



London Underground—Test Curves Made on the Piccadilly Line Between Gillespie Road and Finsbury Park in Both Directions

and the result showed that a saving in power consumption could be made by running in accordance with the speed time curves. To obtain these results, however, it would be necessary for the motorman to apply power enough to maintain a uniform rate of acceleration to get the full tractive effect of the motors.

The energy required for Run No. 1 was 2107 watt-hours and for No. 2 1833 watt-hours per car-mile, a saving of 12½ per cent. Run No. 3 required 1871 watt-hours per car-mile, owing to a greater passenger weight, but the watt-hours per ton-mile were less than for Run No. 2. The figures for energy consumption were obtained from a portable spring British Thomson-Houston 1000-amp

seconds; stopping time, 0.129 seconds; power consumption 69 watt-hours per ton-mile.

The accompanying speed-time curves of a Bakerloo three-car train were plotted to show the length of time and the equivalent distances during which power braking or coasting should apply. The braking in all cases was taken at 1½ m.p.h. per second. For simplicity in calculation the curves have been expressed in terms of degrees, and the grade in per cent, that is, 1 in 100 is expressed as a 1 per cent grade. For obtaining these results it was assumed that the full current would be used from the first to the last running point on the controller and that the motorman would apply power so as to maintain a uni-

form rate of acceleration to secure the full tractive effort of the motors.

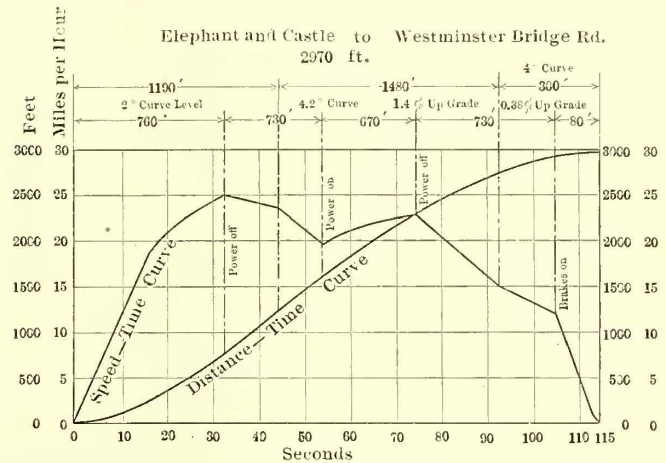
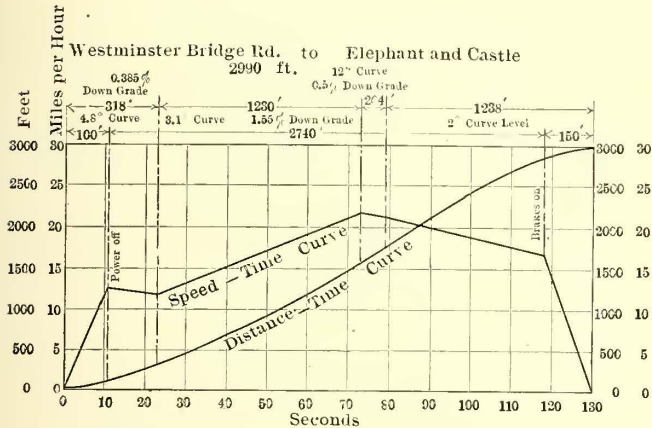
The Piccadilly running tests were made on March 4, 1907, with a train made up of a 27.5-ton motor car and three 16.5-ton trailers, plus the weight of the passengers. The results given herein were obtained from two runs made in commercial service.

Run No. 1 was made by cutting off the power at the blue guiding lights. The running time, not including stops, was 3910 seconds. In Run No. 2 power was cut off 40 ft. to 120 ft. beyond the blue lights. The latter experiment showed that 4 minutes and 7 seconds could be gained at an increased power consumption of 11.8 watt-hours per ton-mile. A series of

curves are reproduced showing the running conditions between the stations on the Piccadilly line. Further details of each trip are given below:

Run No. 1, west-bound train, weighing 81 tons; schedule speed, including stops, 14.46 m.p.h.; power consumption, 68.8 watt-hours per ton-mile. Run No. 1, east-bound train, weighing 81 tons; length of run, 8.889 miles; schedule speed, 14.67 m.p.h.; running time, 1946 seconds; stopping time, 235 seconds; power consumption, 75.9 watt-hours per ton-mile.

Run No. 2, west-bound train, weighing 80 tons; length of run, 8.901 miles; schedule speed, 15.28 m.p.m.; running time, 1856 seconds; stopping time, 241 seconds; power consumption, 78.9 watt-hours per ton-mile. Run No. 2, east-bound train, weighing



London Underground—Test Curves Made on the Bakerloo Line Between Westminister Bridge Road and Elephant and Castle in Both Directions

GREAT NORTHERN, PICADILLY & BROMPTON RAILWAY—STATISTICS ON POWER, MARCH 4, 1907.

Run No.	Weight of train. Tons.	Power on, per cent.			Coasting and braking. Per cent.	Watt-hrs. for traction only.			Total time for return trip, including stops.		Schedule speed, m.p.h., including stops.
		Series.	Parallel.	Total.		Total per run.	Per ton mile.	Per car mile.	seconds.	seconds.	
1	81	15.40	26.42	41.82	58.18	104,260	72.4	1465	4399	14.56	
2	80	14.71	32.53	47.24	52.76	119,940	84.2	1685	4150	15.43	

INNER CIRCLE TRAINS—DISTRICT RLY. & METROPOLITAN RLY GENERAL SUMMARY OF CURRENT CONSUMPTION TESTS.

Date	Run No.	EQUIPMENT	Weight of Empty Train "Tons" (2240 lbs.)	Train Ton Miles	Passenger Ton Miles	Total Ton Miles	POWER CONSUMPTION, WATTS			TIME			Schedule Speed M.p.h.	Signal Stops
							Per Ton Mile	Per Car Mile	Per Car Mile Deducing Passenger Load	Running Secs.	Stop Secs.	Total Min. Sec.		
1908														
Dec. 1	1	Metropolitan train composed of two motor cars and two trailer cars. Motor cars equipped with four Westinghouse type 56 motors each.....	133.6	1746.15	110.24	1856.39	66.2	2350	2220	2395	652	50 47	15.4	2
"	2	Ditto Ditto.....	133.6	1746.15	91.35	1837.50	60.5	2126	2021	2426	531	49 17	15.9	0
"	3	District train composed of two motor cars and two trailer cars. Motors equipped with two G. E. 69 motors each.....	95.3	1245.57	58.67	1304.24	80.9	2018	1927	2624	535	52 39	14.9	2
Dec. 2	1	Metropolitan train composed of one motor car and three trailer cars. Motor car equipped with four G. E. 69 motors.....	109.4	1429.86	120.12	1549.98	70.2	2082	1921	2752	514	54 26	14.4	6
"	2	Ditto Ditto.....	109.4	1429.86	80.73	1510.59	69.0	1994	1888	2591	569	52 40	14.9	0
"	3	Metropolitan train composed of two motor cars and two trailer cars. Motor cars equipped with four G. E. 76 motors each.....	128.65	1681.45	69.60	1751.05	72.5	2429	2333	2659	675	55 34	14.1	4
"	4	Ditto Ditto.....	128.65	1681.45	84.15	1765.60	70.1	2369	2257	2631	585	53 36	14.6	2
Dec. 4	1	District train composed of two motor cars and two trailer cars. Motor cars equipped with two G. E. 69 motors each.....	95.3	1245.57	104.22	1349.79	79.6	2058	1900	2536	694	53 50	14.5	4
"	2	Ditto Ditto.....	95.3	1245.57	107.20	1352.77	86.1	2227	2050	2647	510	52 37	14.9	11
"	3	Metropolitan train composed of two motor cars and two trailer cars. Motor cars equipped with four G. E. 76 motors each.....	128.65	1681.45	61.78	1743.23	65.8	2193	2118	2629	484	51 53	15.1	2
"	4	Ditto Ditto.....	128.65	1681.45	69.49	1750.94	66.5	2227	2139	2612	561	52 53	14.8	2
Dec. 13	1	District train composed of one electric locomotive and four trailer cars. Electric locomotive equipped with four G. E. 69 motors.....	111.15	1452.73	27.79	1480.52	81.8	2317	2270	2548	317	47 45	16.4	†
"	2	Ditto Ditto.....	111.15	1452.73	45.40	1496.13	82.1	2350	2279	2560	465	50 25	15.6	†

\* Watt meters wrongly connected. Results of no value.

† Current consumption per car-mile based on four cars only in order to obtain a basis of comparison.

80 tons; length of run, 8,889 miles; schedule speed, 15.58 m.p.h.; running time, 1,836 seconds; stopping time, 217 seconds; power consumption, 89.6 watt-hours per ton-mile.

The last table shows the results of a series of tests made in December, 1908, on the inner circle railway with various train compositions and equipments. The figures for energy consumption were obtained from two portable spring mounted British Thomson-Houston 1000-amp integrating watt-meters and are for traction only as measured at the railway motor terminals.

## THE CHICAGO PLAN OF STREET RAILWAY SUPERVISION AND CONTROL

BY SIDNEY OSSOSKI, FINANCIAL SECRETARY, CHICAGO RAILWAYS COMPANY

The operation of the surface street railways in the city of Chicago has been conducted under franchise ordinances presenting many unique features which it is now possible to discuss in the light of actual experience, in view of the fact that it is now more than three years since the ordinances became effective. It is well known that many of the more drastic features of this franchise were imposed upon the companies in the midst of a campaign of legal warfare between the railways and the city, and resultant wide-spread antagonism, in consequence of which the companies necessarily had to suffer in any compromise of their rights that could be devised.

Accordingly, the Chicago street railway ordinances contain many provisions which under normal conditions would probably never have been imposed, even if it could be assumed that any company, under ordinary circumstances, would have accepted them.

In view of the almost universal interest that has been excited in this and other countries in respect of the practical outcome of the "Chicago Plan," the time seems to be ripe for the presentation of the views and criticisms of the interested parties.

Down to and including the present time, there have been three general lines of development in respect of street railway franchises in the United States:

First: Complete private ownership, including exclusive right-of-way and ownership of right-of-way, under a perpetual or limited franchise, constituting a contract alterable only by consent of the parties, or revocable at any time (as in Massachusetts) by the local authorities, but only upon the approval of the State Board of Railroad Commissioners.

Second: Company's ownership in its right-of-way and track limited to use for street railway purposes, the municipality retaining complete ownership and control of the streets and of the pavement laid down. Franchises were granted upon such terms as were agreed upon and generally for fixed periods of time, of varying duration.

Third: "The Chicago Plan"—a method evolved in the settlement of the traction difficulties in the city of Chicago.

### THE CHICAGO PLAN

Under the latter method the city retains the right of purchase at a fixed valuation (the computation of which is defined in the grant) at any time (so long as the companies continue to operate, whether before or after the grant has expired), upon due notice given; and may operate the same after such purchase, through its own agencies (designated "municipal operation"); or, free from any limitations or restrictions as to operation. In this latter event, however, the purchase prices paid to the companies would be augmented by a considerable percentage (20 per cent in some of the Chicago ordinances), a provision which protects the companies from the exploitation of their highly developed properties, for the benefit of intriguing third parties. A further safeguard is granted by preserving the right to the city to have the property taken over by a designated licensee at any time that the city might purchase, and upon identical terms, except that the licensee must pay an additional percentage (equal to what the city must pay in case it buys free from any restrictions as to "municipal operation" referred

to above), a provision which is likewise for the protection of the companies against exploitation.

Other distinctive provisions which may be referred to as being of general, rather than local interest, are the following:

First: The permanent fixing of the amount of extensions which the companies are required to build annually.

Second: The obligations of the companies as to service regulations, rolling stock, motive power, supply of power, track and paving construction, buildings, current transmission, plant and machinery are definitely specified.

Third: The companies are subjected to the supervision of a Board of Supervising Engineers consisting of a chairman named in the ordinances and representatives of the city and transportation companies parties to the agreement. The approval of this board is necessary in respect of all plans and specifications in connection with the work referred to in the preceding paragraph. The entire cost of the board for salaries and expenses is imposed upon the companies.

Fourth: The companies' obligations to pay taxes, to stand the cost of paving the right-of-way and maintaining the same, to pay for sprinkling and cleaning the streets, and for removing ice and snow, to permit free use to the city of its poles and conduits, and to carry the city's police and firemen free of charge, and finally, to pay over annually to the city 55 per cent of the net receipts are definitely established. Net receipts are determined as follows: After deducting from the gross receipts (a) all expenses of operation, including maintenance, repairs and renewals and reserve funds; (b) taxation on real and personal property and capital stock tax; (c) 5 per cent on the valuation of the property as defined in the ordinance—the balance, or net receipts, is divided between the city and the company in the ratio of 55 per cent to the former and 45 per cent to the latter.

Fifth: There are special provisions covering the question of what shall constitute "capital expenditures," with the object of preventing the addition of items of cost to capital, other than those referred to in the ordinance. As to certain capital expenditures, such as extensions and subways, the companies must not be required to increase the total capital investment to such an extent that the return thereon, over and above the interest charge of 5 per cent, would be reduced to an inadequate or unreasonably small amount.

Sixth: A fixed 5-cent fare for passengers over the age of 12, 3 cents for passengers under 12; children under seven accompanied by an adult are carried free. This fixed fare is applicable to a ride, no matter how long, within the city limits. Universal transfers, good on all connecting lines of the company, including the right to demand a transfer upon a transfer and through-route requirements in respect of companies operating in the different subdivisions of the city, with the object of providing a trip from one section to another for a single fare.

Seventh: Definite requirements as to the amount that shall be expended annually for (1) maintenance and repairs and for (2) renewals and depreciation, viz., 6 per cent and 8 per cent, respectively, of the gross receipts, are to be expended or reserved in a fund for these purposes, but in no case are the companies to benefit because of any unexpended balance. Moreover, an attempt is made to define and set forth what shall be included in the term "renewals." These requirements are not effective until the completion of the rehabilitation period, three years after acceptance of the ordinances.

Eighth: The companies' obligations as to insurance and the establishment of an adequate fund annually, to take care of personal injury claims, are made the subjects of special provisions. Officers' salaries may be supervised, if objected to as excessive. Annual reports and thorough inspection and audit of accounts are carefully provided for.

Ninth: Stringent provisions as to forfeiture in case of non-performance of the provisions of the ordinance by the companies (not applicable to the bondholders, however), and penalties for the omission or neglect to perform certain obligations of the companies, in respect to rehabilitation work, are worked out with care and precision.

## INSUFFICIENT ELASTICITY OF TERMS

In the way of specific criticism, it may be pointed out, first, that there is not sufficient elasticity in the Chicago grants. They provide no method for alteration of their terms, except by mutual agreement between the city and the companies, and no change can be effected without recourse to the City Council, thereby opening the door to questions of a political character in respect of matters patently of a business nature, solely. This is unfair, both to the companies and to the public. Circumstances arise in every business, with the change of conditions, requiring new methods and altered terms for the transaction of business and most notably is this true of the price of the product offered for sale.

In spite of the added burdens cast upon the companies, namely, increase in length of ride and transfer privileges, better and more costly accommodations and service, higher cost of supplies and materials, higher wages paid, greater comparative contributions to the public revenues—advantages furnished to the public at greatly added cost to the companies—the price of the service has remained exactly the same as it was in the day of the primitive horse car, when the length of ride rarely exceeded 4 miles, over a single line, and usually without transfer privileges.

Legislative grants or ordinances, such as the one under discussion, which, on the one hand, impose regulative terms and conditions entailing expense upon the company and exactions in the way of annual contributions to the public treasury out of the company's resources, and, on the other hand, prescribe exactly how much the company may charge for its service, and how much of its service it must render in return for the price fixed, are an unreasonable invasion of the right of the private owner to conduct and control his own property, and in marked contrast to the more enlightened methods pursued in those communities where respect for the rights of private property and the limitations of the Constitution will stand as a bulwark against popular prejudices.

As an illustration of the "more enlightened" methods referred to, let us take the policy pursued in the Commonwealth of Massachusetts, where the railway public service corporations are under the jurisdiction and control of a Board of Railroad Commissioners—a body that has exercised its functions for over 50 years and is said to be, next to a similar body in the State of New Hampshire, the first established public service commission in the United States.

In Massachusetts, the Board of Railroad Commissioners has power to regulate rates, both upward and downward, but the owners of the properties fix their own rates. If it is desired afterward to increase or reduce the rate, the change may be made, but if a complaint to the commissioners follows, a public hearing must be held and a decision rendered by the board. The same rule covers transfer privileges.

This method concedes to the owners of the property their proper right to fix their own rates, and, furthermore, thereafter to make revision if a change in conditions demands it. Under such a plan, whatever burdens or exactions are imposed on the companies, in the public interests, will be tempered with restraint in view of the fact that every additional expense entailed necessarily diminishes the company's ability to afford the service required at the charges then current—and keep up at the same time payment to the owners of the property of a reasonable return on the money invested. This is sane regulation. It recognizes the rights not only of the public, but of the investor and owner; and so well has it worked in Massachusetts, and with so high a degree of public approval, that I venture to say there is no similar tribunal in the world that has, for so long a period of time, attained to an equal measure of popular commendation and confidence.

The inelasticity referred to is applicable, however, not only to the ordinance provisions fixing the rate of fare, but likewise to all regulative and supervisory terms and conditions and compensation requirements.

These matters are all such as may properly be referred to a tribunal for decision on the application of either party or of

any properly interested person in the same manner as the question of the rate of fare may be referred for determination to a board of commissioners in Massachusetts. In this way burdens which are too severe may be mitigated and new conditions and terms be imposed as reason and justice demand.

## COMPENSATION FEATURE LIMITS SERVICE

Secondly, criticism may be directed against the Chicago franchise, because of the compensation features worked out therein, which were intended to be a solution of the problem of securing to the city a fair return for the privileges granted. As pointed out above, the company is required to pay the city 55 per cent of the net receipts in excess of 5 per cent on the agreed valuations of the properties, as defined in the ordinances. In the three years since the new ordinances went into effect, that is, since Feb. 1, 1907, the Chicago Railways Company and the Chicago City Railway Company have paid into the city's treasury approximately \$4,500,000 as the city's share (55 per cent) of the net receipts, and are paying heavy taxes annually, besides. This new and unique burden imposed upon the company amounts virtually to a tax upon the business or profits, as distinct from taxation upon real and personal property, capital stock or franchise. Moreover, it constitutes an indirect tax upon the public who ride in the cars, for the reason that these sums which might otherwise be expended upon improved service or applied in reduction of fares are now being heaped up in the municipality's treasury vaults "subject to the action of the City Council \* \* \* to be kept and used for the purchase and construction of street railways" by the city.

In a very great measure this tax constitutes a serious limitation upon the company's ability to improve its service. This is the objectionable feature, from the public point of view. From the point of view of the company, the combined requirements for compensation, including taxes and city's 55 per cent of the net receipts, cost of sprinkling and cleaning, street paving and maintenance of pavement, and of snow and ice removal, and the other matters of expense above referred to, constitute too great a burden upon the resources of the company and detract from the attractiveness of street railway properties as an investment.

The aggregate of these contributions to the public treasury on the part of only one of the companies, viz., the Chicago Railways Company, amounted during the year 1909 to a sum total of 16.4 per cent of the gross receipts, and was equivalent to 5.4 per cent of the net income from operation (viz., gross income less operating expenses); or, to state it in terms of dollars and cents, the public received altogether \$2,045,374, which is an aggregate of the following items: Taxes, \$612,176; amount of interest charge on account of cost of all street paving, \$300,000; cost of maintaining paving, \$113,978; cost of removing snow and ice, \$74,751; cost of street cleaning and sprinkling, \$143,039; city's share (55 per cent) of the net receipts, \$801,430.

Is it right that a street railway corporation, unlike a private manufacturing or industrial corporation, should be taxed so highly for its license to do business, and notwithstanding the enormous benefits and advantages which the public gains by granting a franchise for something which it did not have before, namely, transportation?

## BENEFITS OF STREET RAILWAYS

It may be well to recall to the public what some of these benefits and advantages are:

First: Street railways are a well-recognized, prominent factor in the general development of communities, and particularly in creating an enhancement of property values. This rise in property values is of direct benefit, not only to the property owners themselves, but to the public, because of the great pecuniary benefit to the city through enhanced taxable revenue from outlying places made accessible, and from all parts of the city in proximity to the lines. So clearly recognized are the benefits to the community, from the opening or extension of transportation lines, that when the new rapid transit law was adopted, in New York, in 1900, there was

inserted a provision for the construction of lines from funds raised, under certain conditions, by assessment of the cost, in whole or in part, upon the property benefitted.

It has been stated that the increase in land values in northern Manhattan and the Bronx, due to the construction of the present New York subway, would not only have built the entire lines, but would have equipped them, provided the rolling stock, built power houses, and paid every other capital expense, and left a margin.

Among other incidental benefits arising out of the general stimulus and advancement afforded communities by the development of transportation facilities in all large cities may be mentioned the relief granted to overcrowding in congested neighborhoods; the bringing of the country nearer to the city, thereby multiplying the demand for private dwellings and affording the city dweller an opportunity to realize family home life in healthier and better surroundings, to which are attached the added advantages of increased space, light, air, comfort, and—last but not least—improved sanitation.

It would be difficult to overestimate the amount of benefit that has been conferred upon our cities in the foregoing details alone by the spread of transportation.

In the crowded streets of the city the trolley lines may, through some unfortunate accident, from time to time, destroy a human life, but many are the thousands of men, women and children, whose lives have been saved through the possibility they afford to the working classes of living outside of the hemmed in, unsanitary and unmoral walls of a city tenement.

Second: Street cars take up less space per passenger carried than any other type of public conveyance. A street-car line on a public street, therefore, reduces, instead of increases congestion on the public thoroughfares by carrying passengers who would otherwise walk or ride in cabs and omnibuses. Without street cars the congestion on our busy city sidewalks and public roadways would be immensely increased.

Third: The low rate of fare charged by street railways, as compared with fares charged for similar facilities on steam railroads, should be regarded as a public benefit. The benefit, too, is all the greater in view of the fact that for the same mileage a modern street railway in our large cities costs at least twice as much to construct and equip as the average steam railroad, and is also much more expensive to maintain.

Fourth: The quantity and quality of the service rendered are in some instances advantageous solely to the public. For example, lines are to be found on every large street railway system, which are being run at a loss, but are continued in operation for reasons which are certainly not founded on their pecuniary value to the companies. The same is true of the unremunerative all-night service of street railways.

We find, therefore, that besides the actual pecuniary burdens imposed upon the company for the benefit of the public, as above outlined, there are these additional public benefits of great value, the like of which are not afforded by any other class of corporation in the State, and yet all corporations are equally organized for profit, and are equally dependent upon the public for at least their corporate life. The fact that a street railway corporation exercises a quasi-public function of hauling passengers through the public streets should be a reason for reserving to the public a proper supervision and regulation, but affords no reason for imposing unusual burdens in the form of taxation.

#### CAPITAL EXPENDITURES

A third criticism is to be directed against the provisions of the Chicago ordinance, which provide for the definite ascertainment of what shall constitute "capital expenditures." To quote the ordinance: "After such three-year period of immediate rehabilitation, the cost of renewals shall be paid as provided in section 16 hereof, but such expenditures (and only such expenditures) as are made for the purpose of extensions of, or additions to, property, shall thereafter be considered as additions to capital, provided, however, that in the replacement of any principal part of the property, either existing or hereafter acquired, there shall be charged to capital the excess

amount that the new property cost over the original cost of the property displaced." In the Chicago ordinances the companies were required to entirely rehabilitate their properties within three years from their acceptance of the grant. This three-year period is referred to as the period of "immediate rehabilitation." It may be of interest to remark that this work has been substantially performed at an expense up to July, 1910, of approximately \$43,000,000.

The foregoing provision cannot be defended. It entirely disregards the possible future necessity for elaborate and costly changes and substitutions in the physical property of the company, due to a "change in the art," technically termed "obsolescence" (as illustrated by the changes already made from horse traction to cable traction, and from cable traction to electric trolley traction), or changes and substitutions due to present inadequacy on account of growth of business.

It is perfectly clear that no company would be able, out of its earnings, or out of its ordinary reserve funds, to provide sufficient capital with which to perform any such undertakings as those referred to in the foregoing paragraph.

Experience has demonstrated that such extraordinary changes as these, calling for the expenditure of great sums of money, cannot be provided for in the ordinary way, but necessitate the employment of the company's *capital*, whereby the cost of the improvement will be permanently added to and made a part of the investment.

Other items which are equally debarred by the provision of the ordinance just quoted, from participation in the capital expenditures of the Chicago companies, are the following:

First: Cost of municipal control, supervision and regulation after the rehabilitation period. This item amounted to nearly \$300,000 per year, during the period of rehabilitation, and will probably amount to \$100,000 per year during the subsequent franchise period.

Second: Cost of changing grade: The habit of the city authorities to change the grade of streets after a work of track reconstruction has been performed is of rather frequent occurrence. Obviously, the cost of such a work should be a part of the original cost of the work, and, therefore, a capital charge.

Third: Cost of track repairs where changes are made in the method of paving streets. This item is of the same general character as the preceding one.

Fourth: Cost of protecting tracks while sewers, gas pipes, water pipes, electric conduits, etc., are laid under them.

All of the foregoing items of expense are imposed upon the companies, because of exigencies with which they have no concern. But it is apparent that these items are not properly operating charges, as they have to do with the cost of the work and are, therefore, entitled to be capitalized.

A further criticism of the ordinance provision has to do with the consideration of the whole subject of what shall constitute proper maintenance and depreciation charges that may fairly and justly be required to be set aside out of earnings for the purpose of maintaining the utilities employed at their highest standard of efficiency, and preserve the capital investment, as near as may be, intact. It is the writer's opinion that the requirements of the ordinance in these regards are too severe, tending to unnecessary waste and dissipation of the funds set aside to these purposes, and arbitrarily depriving the company of a portion of its revenue, over and above what is reasonably requisite to the accomplishment of the ends desired.

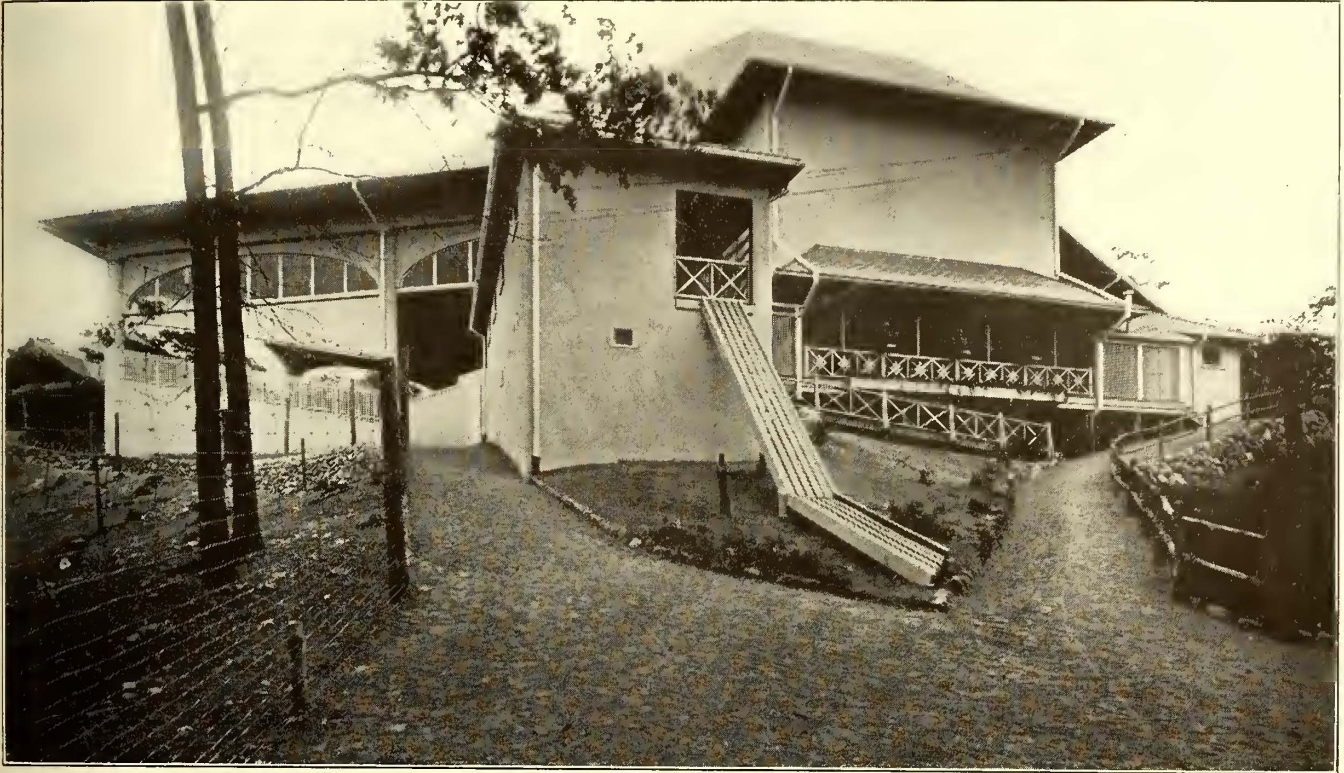
It is announced by the Prussian State Railways Administration that plans are being prepared for the electrification of the main lines between Magdeburg, Zerbst, Leipsic and Halle, especially the Dessau-Bitterfeld section. According to a contemporary, a large central power house is to be erected at the village of Muldenstein, near Bitterfeld, the selection of this locality being due to the large quantities of cheap coal available in the district. Alternating-current electric locomotives are to be used employing current at 10,000 volts. Substations will be erected at Dessau and Bitterfeld.

### NEW THEATER AT NORUMBEGA PARK

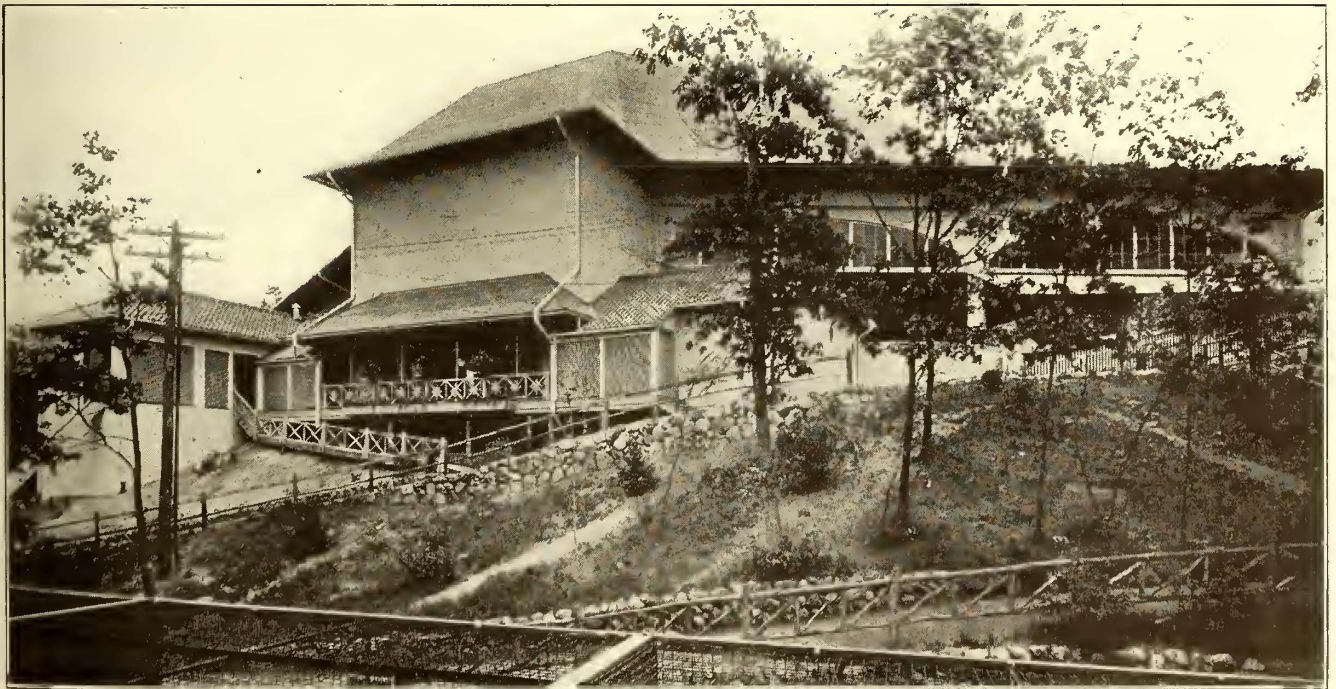
A new steel and concrete open-air theater was opened for patronage at Norumbega Park, Auburndale, Mass., on May 23, on the lines of the Middlesex & Boston Street Railway Company. On June 4, 1909, the theater which had handled the business at the park for a number of years was burned to the

provided for a total seating capacity of over 3600, and served its purpose excellently throughout the balance of the season of 1909. Plans were completed during the winter for a new theater which would be placed in service at the beginning of the present season, and construction was rushed accordingly.

The new theater is located on a knoll on substantially the same site as the former structures. It has a seating capacity of



Norumbega Park Theater—Rear View

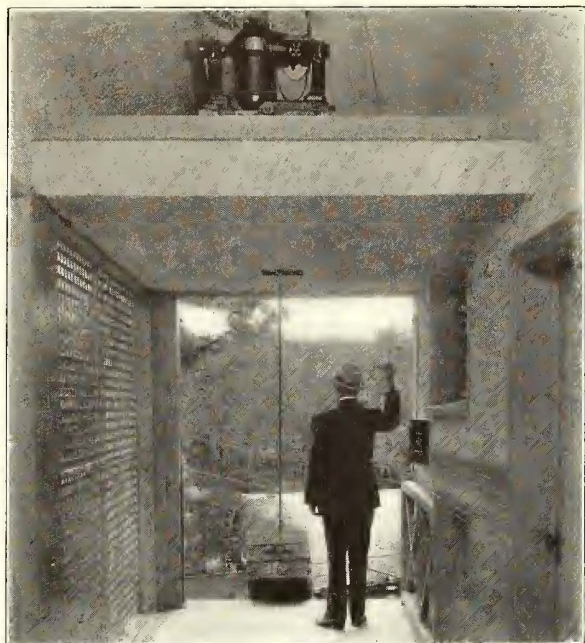


Norumbega Park Theater—Side View

ground, and a temporary structure was built in about a week to carry the patronage through the season. The methods of building the temporary theater were described in the *ELECTRIC RAILWAY JOURNAL* of June 26, 1909, page 1152, the performance being of a record-breaking character in the construction of a theater for street railway park service. The temporary theater

about 3500 and cost about \$50,000. The general design consists of an amphitheater or auditorium of fan shape, with sloping floor focussing upon a central stage, the entire structure being surmounted by a roof of wood felt and asbestos supported on steel girders and cross-bracing. Interior and exterior views are presented. The auditorium is 131 ft. in width from the rear

wall to the footlights, and the two longest roof trusses are each 126 ft. over all and weigh 14 tons each. The stage is 37 ft. long by 33 ft. wide, and there is a total drop in the floor grade of about 20 ft. from the rear of the auditorium to the front. All the trusses are painted a sea-green color, and arches on each side of the stage are fitted with light green translucent "ripple" glass. Awnings are also provided for use in afternoon per-



Norumbega Park Theater—Electric Baggage Hoist

formances when the western sun would otherwise interfere with the comfort of the audience.

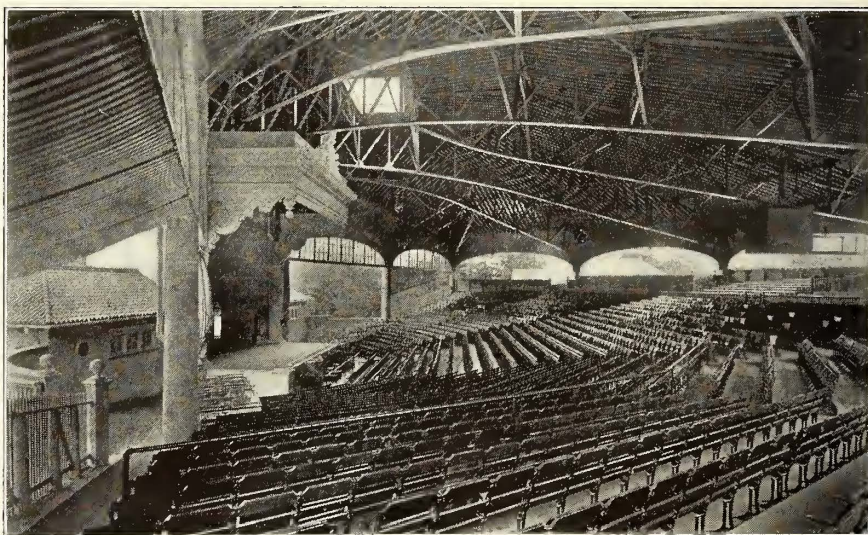
The posts supporting the arches and roof circumference are built of reinforced concrete, and above these are panels carrying wreaths of staff which relieve the otherwise plain surface below the roof. The walls of the theater are 12 in. thick and are built of metal lathing. Ten enclosed arc lamps are provided for lighting the interior of the auditorium, these being run in two series circuits of 550 volts each. The roof contains 170 tons of steel, erected by the New England Structural Company, of Everett, Mass., and designed by J. R. Worcester & Company, of Boston, consulting engineers. Eight boxes are provided at the right and left of the stage, and a platform is built near the rear center of the auditorium for the use of moving-picture and other projecting equipment. All the wiring in the theater is run in conduit. The moving-picture machines are housed in a fireproof box of asbestos and steel. In the old theater this equipment was located on the floor, but in its new situation it occupies no salable space and is wholly out of reach of the audience. The boxes seat nine persons each and there are about 600 free seats in the auditorium. Red Spanish tiles were employed on the roofs of the property rooms, which are among the most complete in the country for open-air service.

The stage is flanked on each side by a dressing and green room, and below are various property rooms. There are five dressing rooms in the establishment, 12 ft. wide and from 8 ft. to 14 ft. long. An orchestral room 37 ft. long and 33 ft. wide is located below the stage, and a modern toilet installation is provided. The dressing rooms are furnished with running water, and all the lighting is controlled from a marble switchboard panel located in a cabinet at the rear of the stage. Each

circuit is provided with a cartridge-type fuse mounted on the front of the board. The switchboard also carries an "Eclipse" ammeter and voltmeter. Every room is equipped with the International sprinkler system, there being a total of 61 heads installed. The operating pressure is about 125 lb. per square inch. The sprinklers are arranged to form a water curtain at the front of the stage, and the stage is provided with a hose line 2½ in. in diameter and 50 ft. long.

The borders, foots and passageways are lighted by incandescent lamps controlled from the stage board. There are 150 32-cp stage lamps, including 35 footlights and 80 frosted lights in the borders. Colored lights are used in the decoration of rustic flower pots at the rear of the stage, and an electric baggage hoist driven by a 2½-hp, 550-volt motor is installed at the rear of the stage. The capacity of the hoist is 800 lb., and the motor, as illustrated, is mounted in a niche above the passageway leading to the property and dressing rooms. Green, blue and other colored lights are used in the decoration of a balustrade at the rear of the stage in order to attract attention from points outside the theater. The theater is provided with a Couch & Seeley telephone equipment for interior service, and there are also various buzzer signals, lamp signals and a 10-station watchman's clock system in use. A telephone is provided in connection with the box office, so that the stage manager can keep in touch at all times with the conditions outside. The appearance of the theater is equally attractive from the front, sides and rear. In its completeness of equipment and excellence of ornamentation it is rivalled by few similar structures used in connection with electric railway operation and patronage. The arrangement in many details is due to Carl Alberte, manager of Norumbega Park, while the general supervision of the work has been handled by Carl A. Sylvester, general manager of the Middlesex & Boston Railway Company. The patronage of the park during the present season is exceeding some of the best records of the past.

According to *South Africa* the Durban Corporation Tramways at Natal, South Africa, is to try the experiment of having a number of car bodies built locally in the shops of the Natal Government Railway. The present cost of the tramways car bodies built in the United States and shipped to Durban is £410 which includes charges of £112 for freight, packing, and in-



Norumbega Park Theater—Interior View

surance, etc. The cost of wiring and fitting these bodies in Durban amounts to about £100, making the total cost about £510. The cost of one experimental car of the same type built at the shops of the Government Railway was £512, and the tramway system has now on order five cars to be built at these shops at an estimated cost of £400. To this sum must be added £420 for the truck and electrical equipment, making a total of £820.



**MEETING OF COMMITTEE ON WAY MATTERS IN NEW YORK**

A meeting of the committee on way matters of the American Street and Interurban Railway Engineering Association was held in New York on Monday, July 25, at the headquarters of the American Street and Interurban Railway Association. The committee members present were George Weston, assistant chief engineer, Board of Supervising Engineers, Chicago Traction, Chicago, Ill.; Martin Schreiber, engineer of maintenance of way, Public Service Railway, Newark, N. J.; M. J. French, engineer of maintenance of way, Utica & Mohawk Valley Railway, Utica, N. Y.; C. L. Crabbs, engineer of way and structure, Brooklyn (N. Y.) Rapid Transit Company. There was also present to assist the committee R. F. Kelker, division engineer track and roadway, Board of Supervising Engineers, Chicago Traction, Chicago, Ill. In addition to these gentlemen, there were present later in the day to discuss rail specifications and special work the following representatives of rail manufacturers and rail inspectors: Victor Angerer, William Wharton, Jr., & Company; H. C. Stiff, Lorain Steel Company; F. D. Carney and C. A. Alden, Pennsylvania Steel Company; C. W. Gennet, Jr., Robert W. Hunt & Company.

The chairman of this committee is E. O. Ackerman, engineer of maintenance of way, Columbus (Ohio) Railway & Light Company, who telegraphed that he would be unable to preside at the meeting owing to the strike in Columbus. At his request, Mr. Schreiber took the chair. Mr. Ackerman, however, mailed to the committee his report on rails, while the other absent member, J. M. Larned, engineer maintenance of way, Pittsburgh (Pa.) Railways Company, mailed his report on specifications for open-hearth steel rails.

In opening the discussion on rail specifications, Mr. Weston referred to those used by the Board of Supervising Engineers, Chicago Traction, and said that the Chicago specification called for high carbon content. While the brittleness thus produced would be dangerous in steam railroad work, that was not the case in paved streets, where a broken rail might be objectionable but not very serious. What the street railway companies wanted for paved streets was an extremely hard rail. Railmakers would agree to manufacture such a rail but they asked an extra price. After discussion with the railmakers and laboratory representatives, Mr. Weston concluded in the Chicago work to reduce the percentage of carbon originally demanded to save paying the additional cost. Mr. Schreiber said that 75 points of carbon gave the finest kinds of results according to the experience of the Interborough Rapid Transit Company of New York. George H. Pegram, chief engineer of that company, had informed him that such rails were giving much longer life than Bessemer.

Mr. Weston brought up the question of joints which had been assigned to him. In his behalf, the committee should not recommend any particular type of joint, but should present a report giving a list of the principal mechanical and welded joints and describe the conditions for which they appear to be most suitable. In other words, a progress report could be presented to be supplemented from year to year as more experience developed in connection with the newer designs. The other members agreed that this was the proper thing to do. Mr. Weston will therefore prepare a report on joints along these lines. There was some discussion on the effect which rail inequalities and irregular alignments have on mechanical joints. Mr. Weston thought that rails at the joints should always be butted and inequalities in the height of the rail should be ground off. Mr. Schreiber then described the machine which John Kerwin, superintendent of tracks of the Detroit United Railway, had devised for successfully grinding old rail and even taking out corrugations.

Mr. Weston then read from the advance proofs of the second annual report of the Board of Supervising Engineers, Chicago Traction, some statements relative to experience with manganese steel track work. Three specimens had been tested to

ascertain if there was any particular difference in the character of the manganese received from the different manufacturers, but both the physical and chemical tests showed that they were practically alike. Mr. French thought that rather than tell the manufacturer just what he ought to use, it would be better to ask for a guarantee of life.

At this point, the representatives of the rail manufacturers and inspection bureau were invited to discuss with the committee the report which Mr. Larned had submitted on rail specifications. "Bled" ingots were first discussed. Mr. Larned's specification read that no ingot should be used from the interior of which the liquid steel had been permitted to escape. Mr. Carney said this paragraph had been applicable only when ingots were cast in pits and that such troubles were very rare in modern manufacture. Mr. Gennet said that in 25 years' experience he had not seen a single "bled" ingot. Mr. Carney also objected to the paragraph on chilled heats which said that no ingot should be used from a heat in which the steel had been pricked or poured over the top of the ladle. He said that this specification really applied to Bessemer practice. It was quite a common thing in open-hearth work for the stoppers to come out and if the mill was not allowed to judge whether the steel was hot enough to use, this particular paragraph would prevent the use of a metal every time it had to be poured over the top of the ladle. Mr. Weston agreed with Mr. Carney that this paragraph was not of vital importance. Mr. Carney said that the specifications might have been all right with the old Bessemer practice where there were great variations in temperature but such variations do not occur in open-hearth practice. Mr. Gennet said the whole paragraph covered rather a small point and might be omitted. Mr. Schreiber was also of the same opinion, and the committee therefore agreed to reserve decision on this point. Decision was also reserved on retaining the paragraph with reference to reheating which stated that care should be taken to avoid burning the steel. Mr. Carney objected to this, saying that if the inspector should happen to find cinders in the corner of one ingot, he might condemn the whole lot. The cinders were burned out anyway and did no harm. There was no objection to the paragraph on analyses.

The next subject was mechanical composition, in which two classifications, "A" and "B," were made. These read as follows:

	Rails Rolled Under Classification A.		
	Lower Limit.	Desired Composition.	Upper Limit.
Carbon .....	0.72 per cent	0.77 per cent	0.85 per cent
Manganese .....	0.60 per cent	0.80 per cent	0.90 per cent
Silicon .....	0.10 per cent	0.15 per cent	0.20 per cent
Phosphorus .....	.....	.....	0.03 per cent
Sulphur .....	.....	.....	0.06 per cent

	Rails Rolled Under Classification B.		
	Lower Limit.	Desired Composition.	Upper Limit.
Carbon .....	0.60 per cent	0.68 per cent	0.75 per cent
Manganese .....	0.60 per cent	0.80 per cent	0.90 per cent
Silicon .....	0.10 per cent	0.15 per cent	0.20 per cent
Phosphorus .....	.....	.....	0.04 per cent
Sulphur .....	.....	.....	0.06 per cent

Mr. Carney thought the percentage of carbon was too high. He said that if two kinds of composition were called for, it meant a difference in price. The Pennsylvania Railroad paid \$2 a ton extra for .03 phosphorus. Classification "B" was all right for unsymmetrical sections and both open-hearth and Bessemer rails would cost the same under that classification. Mr. Schreiber thought that it was very desirable to have both classifications specified irrespective of price. His company had pretty conclusive evidence that higher carbon content would be much better for street railway practice. In the latter, there were no heavy rolling loads, and broken rails were practically unknown. If the manufacturers wanted any more money for such a rail, the railways could figure out for themselves whether it would profit them to pay the additional price. Mr. Carney thought the specification should definitely state that it intended to cover rail for paved streets such as girders and high Ts. Mr. Schreiber said that there was no reason why street railways should be guided by steam railroad conditions. To him, open-hearth rail appeared very desirable. He thought

the rails for the future would be high Ts and heavy girders, having a large groove and laid with the center of the rail offset from the gage line. Mr. Carney said that it would be many years before the present variety of old sections would be eliminated. If the specifications were intended to cover special conditions, they should so state. Mr. Schreiber also doubted whether a general specification should be expected to cover the enormous number of sections now in use. He was therefore willing to put some kind of a limitation in the specifications regarding the sections to which it should be applicable. Mr. Weston said that there was nothing to prevent the manufacturer from objecting to rolling certain shapes in case he thought the specification was unsuitable for them. Mr. Schreiber asked Mr. Carney what changes he would recommend in composition, assuming that two classifications were adopted. Mr. Carney said that, in his opinion, the compositions as they were specified were not logical. For example, carbon was raised 10 points for a difference of .01 in phosphorus. Mr. Carney said, referring to specification "A," in which the carbon ranged from a lower limit of 72 points to an upper limit of 85 points, that he found the manganese all right but did not believe in a lower limit of .10 for silicon. If he drew the specifications, he would not put any lower limit on silicon but would simply say that it should not exceed .20. The amount of silicon depended more or less on the dimensions of the ingot. Mr. Weston said that the Chicago specifications read "Silicon not to exceed .20 but .15 desired." Messrs. Weston and Schreiber agreed that the reference to sulphur could be omitted from the specifications. Mr. Weston asked Mr. Carney that, assuming a steel with the higher limit of carbon was permissible, what his criticism would be about the rest of the specification. Mr. Carney repeated that he would like to see phosphorus .04 as in classification "B."

Mr. Gennet said that by specifying two classifications, the railways could be given absolutely cold steel which had been reheated. This was a serious matter. If a ton of classification "B" were ordered, and there was obtained a heat with 80 points of carbon and .035 phosphorus, the maker could not roll it in the specified rail. He would have to set the ingots aside and reheat them later for rolling for classification "B" rail ordered by some other company. The less there was specified with regard to commercial composition the better. Mr. Schreiber thought that possibly the simplest thing to do would be to specify a certain carbon content and leave the rest of the composition to the judgment of the railmaker. It was decided by the committee to consider carefully the points brought out in the discussion. There was no objection to the paragraph on discards.

The next paragraph was on rolling and stated that the number of passes and speed of trains should be so regulated that on leaving the rails at the final pass, the temperatures of the head of the rails should not exceed 1900 deg. Fahr. for rails weighing 100 lb. and upward and 1700 deg. Fahr. for rails weighing less than 100 lb. Messrs. Carney and Stiff protested against this paragraph, the substance of their objections being that much depended on the character of the rail section, especially the thickness of the web, which might vary from 9-16 in. to 6-16 in. Mr. Weston said that in the original Chicago specification, the final pass heat of 2000 deg. Fahr. had been specified, but after the first year's experience the temperature was reduced to 1900 deg. Mr. Carney said that the Chicago rail section was especially well designed and the conditions that applied to it were not generally applicable to other girder rail and T-sections. Mr. Gennet thought that the temperature requirements were likely to tie up the manufacturer. His experience with pyrometer measurements was that it was very easy to get variations of 150 deg. to 200 deg., especially if the readings were taken at different parts of the rail. There were no objections to the paragraph on branding, straightening, finish, drilling and punching.

The next subject discussed was the conformity of the rail section to the templates, with a list of the following per-

missible variations: Height, 1-64 in. under, 1-32 in. over; height of head and tram,  $\frac{1}{8}$  in. under and over; height of base,  $\frac{1}{8}$  in. under and over; variations in width at gage line not to exceed 1-32 in. Variations in dimensions affecting splice bars not to be permitted.

There was no special discussion on the paragraph relating to the weight of the rails except that Mr. Carney suggested that a greater allowance than  $\frac{1}{2}$  of 1 per cent on the specified weight would possibly be more satisfactory. The subject of rail lengths was then taken up. Mr. Carney said that 30 ft. to 32 ft. were standard lengths for steam railroad work, but the committee members pointed out that in street railway service it was desirable to have the longest possible rails on account of the joints being concealed. Lengths of 60 ft. to 62 ft. were most common. Mr. Weston said that the Chicago limits vary from 56 ft. to 58 ft. Mr. Schreiber said that he had 116-lb. rails which were 62 ft. long and also a 114-lb. rail which was 66 ft. long. The latter length had proved too great, however, to be handled conveniently around street corners and other places. It was finally decided that the paragraph on lengths should include some clause like the following: "Lengths of rails at a temperature of 60 deg. Fahr. shall be 60 ft. to 62 ft. when the weight of the rail per yard will permit. Ten per cent of the entire order will be accepted in shorter lengths. A maximum variation of — in. will be allowed in length."

In accordance with Mr. Gennet's suggestion, the paragraph on drop-testing machines was revised as follows: "The drop-testing machine shall be that recommended by the American Railway Engineering and Maintenance of Way Association." The next subject discussed was that of drop testing. The specification had been left blank for the height of drop covering rails weighing 100 lb. per yard and upward and rails weighing less than 100 lb. per yard. Mr. Carney suggested 8 ft. for the heavier rail, while Mr. Weston thought that not less than 10 ft. should be considered. The Chicago specifications, in fact, called for 18 ft. Mr. Gennet thought it should not be made less than 15 ft. Mr. Carney said that if a high drop was put in, the manufacturer might be tempted to work along to the lower limit of the specification. If the street railways wanted a higher carbon content, they must expect to reduce the drop. Mr. Schreiber agreed with Mr. Carney on this point. Mr. Carney pointed out that another reason for objecting to a high drop was that the rails were unbalanced sections and it would be wrong to submit them to the same requirements as a symmetrical T-rail. Mr. Weston admitted that the drop test was not as important to street railways as to steam railroads, but suggested that the committee adopt 15 ft. for the drop, reducing it later if experience showed that such a drop would limit the carbon percentages. Messrs. Carney and Stiff said that their companies would be willing to make drop tests for the association. Mr. Schreiber suggested that a dozen representative sections might be tried. There was some discussion on the number of drop tests which should be made on each heat. Mr. Weston said that two drop tests were made and if one showed a failure, a third was tried. The heat was rejected if two out of three rails failed. Mr. Carney said that if two drop tests were made on a heat, it meant another short rail. The Baltimore & Ohio Railroad was the only steam railroad in the United States which required two drop tests. All other lines were satisfied with one.

The committee then returned to the subject of branding, and it was decided that the heat number should also be added to each rail at a place where it would not be covered up later by splice bars, and that section numbers should be added immediately after the weight. In considering the paragraph on No. 2 rails, second quality, it was suggested that no reference should be made to the lower price for No. 2 rails, so that the final clause of this paragraph would read: "No. 2 rails will be accepted to the extent of 10 per cent by weight of the entire order. Mr. Gennet suggested that a little more might be said about what kind of rail would be accepted as No. 2, with regard to such defects as lumpiness, pipes, etc. Mr. Car-

ney thought that piped rails could be acceptable as No. 2 if they stood the drop test. Mr. Gennet said that rails which show piping should be cut down to the shortest length permissible and if the pipe was not then visible, the rail could be accepted as No. 2. Rails slightly off section could also be classified at No. 2, but they were not applicable to conditions where plain or braced tie-plates and screw-spikes were used. The rest of the specifications referred to distinguishing marks, handling, loading and inspection. Mr. Weston, in the absence of Mr. Larned, volunteered to prepare the modified specification and forward it to Mr. Ackerman. The committee approved Mr. Larned's report on manganese rails.

Mr. French then submitted some rules for gage and flange-ways in curves and referred briefly to the work that had already been done on that subject by the association, as reported in its last year's proceedings. There was considerable discussion on these rules by Messrs. French, Angerer and Alden, with the result that certain amendments were made. Mr. French said he had included in the Engineering Association's question box the subject of "Clearance between Street Surface or any Other Obstruction and the Rolling Equipment." The answers could be assembled later for the committee's report.

Mr. Ackerman sent in a report on the standardization of girder rail, including nine blue-prints of various sections, four of which had already been recommended in the past by the association. It was the general opinion of the committee that, inasmuch as the standard rail adopted by the committee had not yet been adopted by anybody, although the Cleveland Electric Railway's rail was almost exactly the same, it would be unwise at this time to add any more proposed sections. Mr. Schreiber thought that the matter ought to be allowed to stand over another year, when more information would be available on the behavior of those sections which most closely approach the standard. Mr. Angerer suggested that it might be possible to pick out from some of the present sections a number of standards which could be recommended for general use. The Boston section was worthy of particular attention. One of the members stated that the Connecticut Company which operates in a large number of cities and towns and villages, under various conditions, had found it possible to get along with only two sections, which showed what could be done when there was unity of purpose. Mr. Schreiber said that it was a pity that the standards suggested by the association had not been properly advertised. He thought that the railmakers would have gladly shown them in their catalogs if the matter had been brought to their attention. Mr. Kelker said that the manufacturers could also help standardization along if they would advise the committee what sections were considered obsolete. Mr. French suggested that the proposed standard rail sections should be illustrated in the next committee report.

The next subject was standard layouts for special work, which are to be considered in Mr. Schreiber's report on mechanical maintenance. Mr. Schreiber and the manufacturers of special work present agreed that most of the standardization would have to be on switch pieces rather than on frogs or curve rails. Mr. Schreiber pointed out how he had succeeded in using 100-ft. switches in almost all situations. Messrs. Weston and Kelker also said that while they were obliged to use 80-ft. and 160-ft. switches in Chicago, they had nevertheless succeeded in standardizing a great many details. Mr. Alden stated that, anticipating a discussion of this subject by the committee, there had been held a conference between the principal special work manufacturers, as a result of which they had been prepared a blue-print showing standard switches and mates, standard frogs for turn-outs and cross-overs. The tables and drawings accompanying the print also contained the recommendation that the 100-ft. radius lateral and 200-ft. radius Y should be used wherever practicable. Mr. Alden said that the proposed standard had been approved by the following companies: Barbour-Stockwell Company, Buda Company, New York Switch & Crossing Company, Cleveland Frog & Cross-

ing Company, Lorain Steel Company, Pennsylvania Steel Company, William Wharton, Jr., & Company. Mr. Alden submitted some figures showing that about 52 per cent of the switches made by his company were for 100-ft. radius. Mr. Schreiber said that the point was not necessarily the adoption of a 100-ft. radius switch as the standard, but the primary thing was to get standard dimensions for different radii. To his knowledge, quite a number of large companies were using 100-ft. radius switches, among them being the Public Service Railway, Newark, N. J.; the International Railway Company, Buffalo, N. Y.; the Detroit (Mich.) United Railway, and the Cleveland (Ohio) Electric Railway.

The meeting closed with a discussion on rail corrugation, opened by Mr. Crabbs, who mentioned the various theories. He thought that a harder rail would tend to reduce this trouble. The members also gave the experiences they have had with various grinding machines for removing corrugation.

**RESOLUTIONS ON THE DEATH OF FREDERICK H. LINCOLN**

A committee composed of H. H. Adams, chairman, Paul Winsor and J. S. Doyle which was appointed by W. J. Harvie, acting president of the American Street & Interurban Railway Engineering Association, has sent to the family of Frederick H. Lincoln an engrossed copy of the following resolutions expressing in fitting terms the sorrow of the members of the Engineering Association in his death:

"Whereas, through the tragic death of Frederick H. Lincoln the American Street & Interurban Railway Engineering Association has been deprived of the services and wise counsel of an honored past president and an esteemed and valuable member; and,

"Whereas his associates in the electric railway industry with which he was conspicuously identified for more than 20 years have suffered the loss of a friend, who by his marked ability in electric railway engineering, high character and amiable personality endeared himself to all who knew him, it is hereby

"Resolved that this association place on record in its minutes its profound sorrow and sense of bereavement in his death and its high appreciation of his engineering attainments and inventive achievements; and it is also

"Resolved that an engrossed copy of these resolutions be sent to his family as an expression of heartfelt sympathy from the members of this association."

**HUNGARIAN ELECTRIC RAILWAYS**

The Hungarian Government has issued the following statistics of electric railways of Hungary at the end of 1909:

(a) Interurban.	Single track km.*	Double track km.	Route length km.
Budapest-Budafoek .....	12.470	8.373	13.274
Budapest-Szentlőrincz .....	12.114	8.265	11.690
Hörlak-Frencséntelepiz .....	5.936	—	5.538
Miskolcz-Diósgyör .....	8.277	—	6.943
Poprádfelka-Tátrafüred .....	15.700	—	15.700
(a) Total.....	54.497	16.638	53.145
(b) City.			
Budapest Street Railway.....	71.960	67.955	71.885
Budapest City Railway.....	48.156	45.149	48.085
Franz Josef Subway (in Budapest)...	3.700	3.700	3.700
Budapest-Ujpest-Rákospalota .....	16.488	11.267	17.208
Budapest Suburban Lines Operated by Budapest Street Railway.....	6.841	3.725	6.770
Fiuman .....	4.413	—	3.982
Miskolcz .....	7.347	—	6.578
Nagyszeben .....	2.395	—	2.395
Nagyvárad .....	19.184	1.810	15.763
Pozsony .....	11.027	3.227	7.800
Sopron .....	4.578	—	3.810
Szabadka .....	10.000	—	10.000
Szeged .....	14.436	4.250	14.436
Szombathely .....	3.026	—	2.810
Temesvár .....	10.877	6.849	10.877
(b) Total.....	234.428	147.932	226.099
(a+b) Grand total.....	288.925	164.570	279.244

\* Kilometer = .62 mile.  
The total increase in single trackage over the preceding year was 28,541 km.

### AN ENGINEER'S SUGGESTION TO CONTRACTORS AND MANUFACTURERS' AGENTS

BY E. P. ROBERTS, PRESIDENT THE ROBERTS & ABBOTT COMPANY

Whenever even the vaguest and most fragmentary item is published in the technical press concerning some proposed railway, or other construction work, the consulting engineer for the project is overwhelmed by a mass of letters and advertising matter from labor contractors and manufacturers of every kind of material. As it is impracticable for most consulting engineers to answer all of these letters or acknowledge all of the catalogs thoroughly without a great increase in their office force, a large part of these communications finds its way to the waste-basket to the chagrin of the would-be contractor and to the possible detriment of the engineer's client. This fact does not indicate that the engineer does not desire to be courteous in answering all legitimate inquiries. In fact, he desires to be informed relative to all machinery or material applicable to his line of work, its peculiar or special field, its limitations and its cost; also to know who are the most reliable contractors in different parts of the country. Of course a large part of this information is already in his files, but these files have necessarily to be replenished and renewed continuously, for conditions with regard to men and apparatus are always changing.

The relative position of the engineer and the seller is the same as with ordinary business, the primary interest is that of the seller. He must compete whereas the buyer simply exercises the right of selection. It follows, therefore, that the easier it is for the engineer to reply to the inquiries of the seller the more likely is that seller to attract attention and eventually obtain the coveted order.

First of all it is advisable for the seller to ask all of his questions on a standard form because the engineer will then be more likely to file the questions and answers for his own use when that particular point in the work is reached. An agreement between manufacturers and contractors on the one hand and engineers and architects on the other might be made with regard to the character of such a form. National organizations would be a good medium for the authoritative development and adoption of an inquiry blank of this kind. However, it is not necessary to wait for the necessarily slow action of large bodies since there is nothing to prevent individuals from devising forms to simplify the work of preparing and answering inquiries.

These forms should cover two classes of data as follows:

First, the information the contractor, manufacturer or supply agent wishes to convey relative to himself or to his products; second, the information wanted by the inquirer from the engineer relative to the project. It is desirable, of course, that a stamped return envelope should accompany this request for data, as it will almost assure a reply, or at least an acknowledgment.

The first form, namely that relating to the seller's description of his apparatus, should be either on commercial size letter paper or on a card suitable for card files of a standard size. If the information can be given on a single card (even using both sides), the latter is preferable if a standard size card can be agreed upon. The second form, which contains the questions to be answered by the engineer, should be on commercial size letter paper and be forwarded in duplicate in order that the engineer may retain a copy for his own record. On both of these forms, the spacing between all writing should be liberal so as not to require undue care by the stenographer in registering the data and to avoid misunderstanding.

The wording of the form is important but the following suggestions may be of service:

FORM NO. 1

- No. 1. Business of sender, such as grading contractor, bridge and structural steel, coal and ash handling machinery).
- No. 3. Name of sender.
- No. 4. Address of principal office.

- No. 5. Address of agent nearest engineer's office.
- No. 6. If sending relative to some specific job—so state.
- No. 7. If sending merely to be placed on engineer's principal list—so state.
- No. 8. If forwarding catalog, blue prints, prices, or other data—so state.
- No. 9. If representative is about to call—so state.
- No. 10. If the sender is not known to the engineer, give references. (a) Customers. (b) Financial—bank, etc.
- No. 11. Work done of similar character, especially near home office of engineer.

The following is an example of form No. 1 filled out for an assumed case, it being noted that the portion in brackets is to be filled in and the balance printed as above outlined.

- No. 1. (Grading contractor.) No. 2. Date (Apr. 22, 1910.)
- No. 3. (Jones & Company.)
- No. 4. Principal office (Chicago, 200 X Street).
- No. 5. Agent nearest your Cleveland office (Adams & Company, Cleveland, Ohio).
- No. 6. Are writing to you relative to (the grading for the X-Y Railroad).
- No. 7. Are sending you our name and information requesting that you investigate, and place us on your list of (grading contractors).
- No. 8. Are forwarding by mail \* (Adams)—express catalogs\*, blue prints of.....\*, price list and discount sheet\*, approximate weights\*, approximate general dimensions.
- No. 9. Our Mr. (A. J. Smith) will call on you about (April 5th). He is (not) authorized to quote prices.
- No. 10. We refer to (a) (M. & N. Railroad, chief engineer, A. Brown, Chicago).
- (b) (The First National Bank, Chicago.)
- No. 11. We did the grading on the B. & O. Railroad near Columbus, Ohio.

Note: \*Cross out if to be omitted.

FORM NO. 2

Sent in duplicate—portion in ( ) filled in by Jones & Co.—portion in [ ] filled in only by the engineer.

- No. 1. Relative to (X. & Y. R. R.—grading), Jones & Co. Jones & Co. Serial No (1027).
- No. 2. Received from (The R. & A. Co., consulting engineers, Cleveland, Ohio). Their Serial No. [F-100].
- No. 3. Sent (April 22, 1910), received reply (April 25, 1910).
- No. 4. When will specifications and plans be ready for bidders?—[About June 1, 1910], or [not now known].
- No. 5. Where can we see specifications and plans? [Our Cleveland office.]
- No. 6. Will you send us copy of specifications and plans, we agreeing to be responsible for same and return them when and as instructed, and to pay transportation charges?
- [Yes.]
- [No.]
- [Can not now state.]
- No. 7. Will (grading) be let separately? [Yes.]
- No. 8. Will (grading) be included in bid of (a general contractor)? [May be.]
- Alternative. Example: Will (valves) be included in general piping contractor's bid? [Yes.]
- No. 9. Do you wish us to send you
- (a) Catalogs.
- (b) General dimension prints.
- (c) Weights.
- (d) Prices for estimating.
- (e) Please inform us as to any other information or data you desire relative to our (goods), (work).
- [Send A. & D. for.....]
- No. 10. How long after plans and specifications are on file for bidders before bids must be in?
- [Approximately two weeks.]
- No. 11. Is there any additional information you desire rel-

ative to us, our work, goods, or financial standing, if so, please state.

The writer realizes, of course, that there is other information which the contractor or manufacturer often desires. Some of this information the engineer can not give, and some he may not desired to give until the specifications are complete, as, for example:

- When will bids be opened?
- Where will bids be opened?
- When will contract be awarded?
- Where will contract be awarded?

When the bids are in, the engineer opens and tabulates them and consults his client. This takes time. He may desire further information relative to some of the bids or bidders. He does not want bidders hanging around his office for several days or possibly weeks, and it is not fair to the bidders to put them to this unnecessary expense. The engineer and his client may decide that the contract will be awarded to some one bidder without further notice, or that it is advisable to have two or three appear before them, and so will notify such bidders. It is not fair to notify bidders merely to use them as a club for their competitors, but, unfortunately, this is done. The bidder should be treated honorably in all cases.

The bidder sometimes asks for information as to the financial standing of the "Purchaser" or "Owner." The proper party to answer such question is a credit agency, not the consulting engineer.

### ANNUAL REPORT OF THE VIENNA MUNICIPAL TRAMWAYS

Through the courtesy of director Spangler, the following particulars are available from the annual report of the Vienna municipal street railways for the year 1909: This system comprises 498 km (308.76 miles) of track of which 38 km (23.56 miles) were operated by steam, 30 km (18.6 miles) were operated by electric conduit and the rest by overhead trolley. During the year the electric lines operated 75,923,000 car-km (47,072,260 car miles) over 199 km (123.38 miles) of road, an increase of 9.36 per cent over the car-miles of the preceding year. The passenger revenue was 37,050,835 crowns (\$7,410,167) an increase of 9.4 per cent over the preceding year. This gave an income of 48.8 hellers per car km (15.5 cents per car mile). The operating cost per car km excluding charges for employees' welfare and accidents was 29.9 hellers (9.6 cents per car mile); including all charges the cost was 33.4 hellers per car-km (10.7 cents per car mile). The operating expenses were 60.6 per cent of the gross earnings, excluding welfare and accident charges and 61.1 per cent including them. After paying all fixed charges, reserve fund allotments, 2,700,000 crowns (\$540,000) were turned over to the municipality for the relief of taxes. The largest amount of traffic on any one day was Oct. 30 when 940,000 passengers were carried. This added to the traffic of Oct. 31 made a total of 609,000 passengers carried over 524,000 car-km (324,880 car miles). The day of maximum traffic required 1097 motor cars, 1131 trailers and 5310 platform men.

In view of the increased cost of operation and the larger amounts set aside for various welfare purposes several fare increases were made, among which were the following: Children's fares from 10 hellers (2 cents) to 12 heller (2.4 cents); early morning service up to 7.30 a. m. raised 2 hellers (0.4 cent) and owl car service after 11 p. m. increased 8 hellers (1.6 cents). During the year the municipality built six car houses. Experiments with current time clocks were so successful that it was determined to install these devices on all cars. Extensive tests were also made with both grease and oil for gear lubrications as the result of which oil was adopted as standard. At present experiments are being conducted with interpole motors; motors with oxidized aluminum field coils; various types of brakes including the Ackley; ball bearings for car axles; and the placing of motor grid resistances so that they can be used for heating the car in winter.

### MEETING OF COMMITTEE ON HEAVY ELECTRIC TRACTION

The committee on heavy electric traction of the American Street & Interurban Railway Engineering Association held a meeting at the association office in New York on Aug. 2 to consider proposed changes in the specifications for heat-treated axles which were referred back to this committee at the Denver convention. Those present were: J. S. Doyle, Interborough Rapid Transit Company, chairman; Norman Litchfield, Interborough Rapid Transit Company; W. A. Bostwick, Carnegie Steel Company; E. A. C. Acker, Bethlehem Steel Company; W. P. Barba, Midvale Steel Company; Mr. Furness, Midvale Steel Company, and J. L. Repogle, Cambria Steel Company.

The advisability of presenting two sets of specifications, one covering high-grade material suitable for the most severe service and the other covering moderately good material for ordinary service which could be furnished at a lower price, was first discussed. It was the consensus of opinion that only one specification for high-grade steel should be recommended for adoption as standard, as the service to which any axle is put is such that the best material obtainable at a reasonable price should be used throughout. It was pointed out that during the past year a number of companies had made inquiries for prices on heat-treated axles to be furnished to a specification practically the same as that finally adopted by the meeting.

The details of the proposed standard specification were then taken up and the following physical properties were approved: Ultimate tensile strength, 85,000 lb. per square inch. Elastic limit, 50,000 lb. per square inch. Elongation, 22 per cent. Reduction of area, 45 per cent. The elastic limit is to be determined by extensometer readings, the increments of load between readings above 40,000 lb. to be 1000 lb. The percentage of phosphorus is to be not more than 0.04. It was recommended that warped axles be straightened hot and before offering the axles for test.

The chairman stated that a report of the minutes of the meeting would be sent to each of those present for their criticism or approval before the report is printed for distribution early in September.

### PHILADELPHIA RAPID TRANSIT FIRE INSURANCE

The Philadelphia Rapid Transit Company has completed the placing of its fire insurance. The total amount for which its properties are insured is \$16,000,000; the rate is 50 cents on the hundred dollars. The insurance is divided into four items, as follows:

Buildings, \$4,169,000; contents of buildings, \$5,831,000; rolling stock other than that leased from the Union Traction Company, \$4,500,000; rolling stock leased from the Union Traction Company, \$1,500,000.

It is provided that losses under the first three items shall be payable to the Rapid Transit Company, and that losses under the last item shall be payable to the Commercial Trust Company, trustee of the equipment lease upon which the loan of \$1,500,000 was recently negotiated, by which the Union Traction Company purchased the equipment from the Philadelphia Rapid Transit Company.

The heaviest items of insurance on buildings and their contents are the following: General offices and shops at Eighth and Dauphin streets, buildings, \$220,000; contents, \$200,000; shops at Kensington Avenue and Cumberland Street, buildings, \$235,000; contents, \$200,000; substation, Sansom Street below Eighth, building, \$40,000; contents, \$150,000.

The company's buildings in Delaware County are insured for \$310,500 and their contents for \$120,000, a total of \$430,500. Insurance on the Montgomery County buildings is \$102,000 and on their contents \$222,500.

Green has been adopted as the standard body color for the cars of the Jacksonville (Fla.) Electric Company.

## A. S. &amp; I. R. A. NEWS

J. W. Corning, secretary of the American Street & Interurban Railway Engineering Association, announces the appointment by Acting President Harvie of H. G. Stott, superintendent of motive power of the Interborough Rapid Transit Company, New York, as chairman of the committee on power generation of the Engineering Association. Mr. Stott takes the place made vacant by the resignation of William S. Twining, recently chief engineer of the Philadelphia Rapid Transit Company.

H. C. Donecker, secretary of the American Street & Interurban Railway Association, announces the accession of 16 member companies to the association between Feb. 8 and Aug. 3. Among them are the United Railways Company of St. Louis, Cleveland Railway and the Pennsylvania Railroad, whose membership, as mentioned in a recent issue of this paper, has been taken out on account of its extensive electric railway interests through the operation of the West Jersey & Seashore Railroad, the Long Island Railroad and its New York terminal. A list of these new member companies follows:

Chicago, Aurora & DeKalb Railroad, Aurora, Ill.

Cincinnati, Lawrenceburg & Aurora Electric Street Railroad, Cincinnati, Ohio.

Citizens' Railway, Waco, Tex.

Citizens' Railway & Light Company, Ft. Worth, Tex.

Cleveland Railway, Cleveland, Ohio.

Grand Forks Street Railway, Grand Forks, N. D.

Hornell Traction Company, Hornell, N. Y.

Interurban Company, Helena, Ark.

Missoula Street Railway, Missoula, Mont.

Pennsylvania Railroad, Philadelphia, Pa.

People's Railway, Wilmington, Del.

Pictou County Electric Company, Ltd., New Glasgow, Nova Scotia.

Texarkana Gas & Electric Company, Texarkana, Ark.

United Railways Company of St. Louis, St. Louis, Mo.

Vicksburg Traction Company, Vicksburg, Miss.

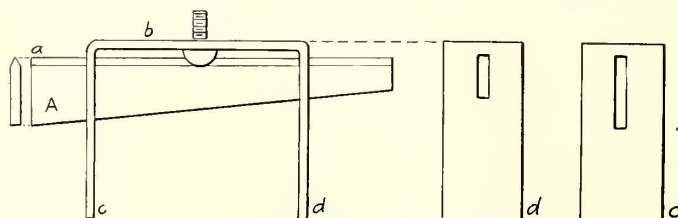
Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.

Secretary Donecker also has announced that 127 associate members have joined the association between Feb. 8 and Aug. 3.

## TO HOLD MACHINE SCREWS

It is often necessary to run the thread further down on machine screws, to cut them shorter, or to file them to a point. To hold them between the jaws of a vise spoils the head and will not hold the screw firmly. The jig shown in the accompanying cut is very simple and easily made, and will hold any screw with a slot.

A is a piece of iron  $\frac{3}{4}$  in. wide,  $\frac{1}{8}$  in. thick and 4 in. long, tapered down to  $\frac{3}{8}$  in., so it can be adjusted to fit any size head.



Device for Holding Machine Screws

Bevel the edge so it will fit slot in the screw as in A. B is made from the same size iron,  $2\frac{1}{4}$  in. long. C and D are 2 in. high.

Cut a slot  $\frac{1}{8}$  in. x  $\frac{3}{4}$  in. in C, and in D  $\frac{1}{8}$  in. x  $\frac{1}{2}$  in. Drill a  $\frac{1}{4}$ -in. hole in the center of B, as shown in the sketch, to hold the screw. Place the screw into the  $\frac{1}{4}$ -in. hole in B and slide the tapered bar A through the oblong hole in C into the screw slot and then through the oblong hole in D. Strike the end of the bar lightly with a hammer, so it will hold the screw firmly. The jig can be clamped (C) into the vice and the necessary work done.

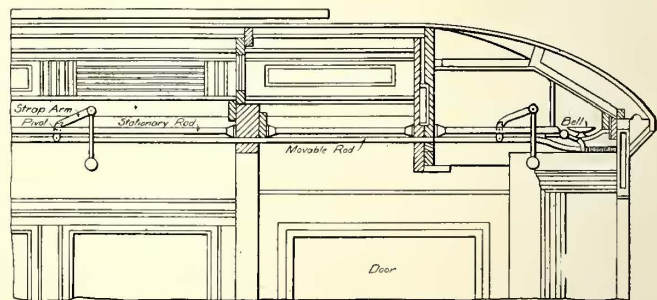
## REPORT OF GLASGOW TRAMWAYS

The annual report of the Glasgow Corporation Tramways for the fiscal year ended May 31, 1910, shows traffic receipts of £893,591 as compared with £889,530 for the previous year. Other receipts were £3,129 last year as compared with the £3,220 in the previous year, making a total income of £896,720 and £892,750 in the 1910 and 1909 fiscal year respectively. The working expenses, excluding depreciation, were £502,911 last year as compared with £505,617. They were equal to 56.083 per cent of receipts in 1910 and 56.636 per cent in 1909. The net balance remaining after all deductions was £53,027 last year against £66,275 in the previous year. The net balance stated was appropriated for the common good in accordance with a section of the Glasgow corporation act passed in 1909 which provides that after the payment of working expenses, interest, sinking fund and depreciation the surplus shall be so utilized.

The amount of the depreciation and permanent way renewals fund at the close of the fiscal year 1910 was £1,537,641; at the close of the previous year it was £1,383,289. To this amount there was added from the revenue for the year to meet depreciation and renewals £193,606. The sum of £39,254 was deducted, being the amount expended during the year. The balance in the fund is invested with the common good and the corporation of Govan. There was expended on the upkeep of the tramway track in ordinary repairs £39,877. In addition £82,918 was laid aside from revenue to meet the cost of renewal of track.

## BELL SIGNAL FOR CARS WITH POWER-OPERATED DOORS

Thomas F. Carey & Company, Boston, Mass., have brought out a passenger signal more particularly intended for cars in which the doors at both ends are operated by power. The signal includes a bell near each door and mechanical means to operate both bells simultaneously from any part of the cars just before the doors are closed. This is accomplished by a movable bar extending longitudinally through the car and so connected with the bells that the movement of the bar in one direction causes both to ring. The bar is supported by a series of levers pivoted to a stationary upper support extending longitudinally through the car. In the drawing this upper supporting bar is suspended from the ceiling of the car by hangers and may also be carried otherwise. The supporting bar shown is provided with slots through which the levers are extended and the latter have upwardly inclined arms to which straps are fastened within easy reach of the conductor. In this case the opposite ends of the movable bar are operatively connected in the following manner:



Bell Signal for Car with Power-Operated Doors

The movable bar is pivotally connected with one end of a striker lever which is pivoted to a suitable support for the bell or gong. The operating levers have their arms extended in the same direction so that the bar will be moved in the same direction by the operation of any one of the levers. For instance, when a strap is pulled down it lowers a corresponding lever arm and turns the lever on its pivot so as to move the lower bar forward in the direction indicated by the arrow. Thus both bells are operated to give a warning that the doors are about to be closed. As soon as the strap is released the bar is drawn back to its normal position by a spring.

### IMPROVED MANHOLE TRANSFORMER

The Westinghouse Electric & Manufacturing Company has recently brought out a new manhole transformer. The magnetic circuits and coils are the same as those of its regular type "S" transformer, but they are mounted in a different style case, especially adapted to manhole service where freedom from flooding is essential. The cases, therefore, have been made water and airtight at the joints between the case and cover and where the leads issue from the case. The transformer can be quickly connected or disconnected from the lines without removing the cover or otherwise opening the case. A safety or relief valve is also provided to avoid danger which is sometimes caused by the expansion of the heated oil compressing the air in the upper portion of the transformer case.

### A SELECTIVE TELEPHONE AND SEMAPHORE SYSTEM

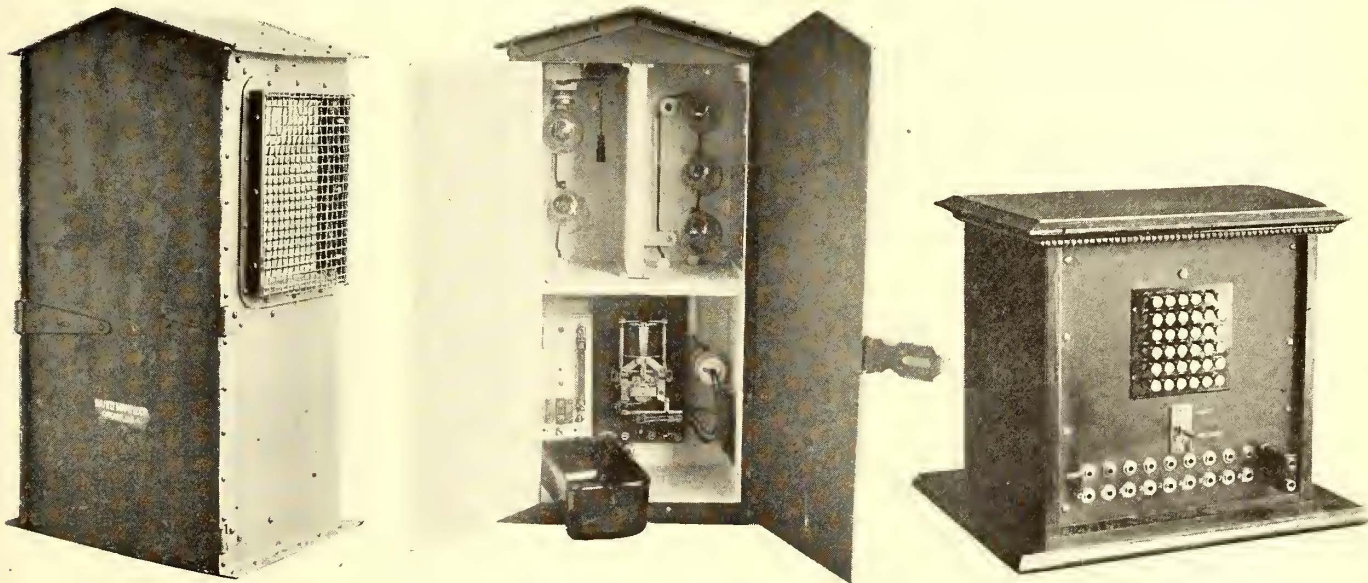
The Baird Electric Company, Chicago, Ill., has brought out a selective telephone and semaphore which provides the train dispatcher or chief operator with a simple means for lighting a set of lamps, ringing a bell or setting a signal. Normally no telephones are connected with the line except that at the dispatcher's office and thus when he calls one station the line is practically clear. With this selective system and with signal lamps at each siding, the dispatcher can turn on any combination of the lights, leave burning those that he wishes and turn off any or all of the others in any order desired. It will be understood, therefore, that the conductor is relieved from resetting

bered buttons corresponding to selective way-stations. A standard portable telephone is used by the dispatcher.

To operate the system, the dispatcher places a twin plug in the jack of the line to be used, depresses a button of the master key corresponding to the number of the station to be selected, holding a small ringing lever in the operating position until he receives a lamp signal. The time required to select depends upon the number of the station wanted, taking about one-sixth second per station: thus, station "6" will require 1 second to select, etc. Only the lamps at the selected station light up. There the approaching car stops, the conductor calls up and hangs up the receiver when through. The dispatcher extinguishes the lamps either before the conversation is completed or afterward and restores all other stations to the normal position by pushing the "C," or "clear," button of the master key.

If it is desired to stop a car when its exact location is not known several way stations in its vicinity may be lighted. This is done like calling one station, except that it is necessary to press the numbered buttons of the master key corresponding to every station to be lighted. All pressed buttons of the master key remain depressed and locked until another is pushed to call the next station, thereby restoring everything automatically. The semaphores at all selected stations light until cleared by the dispatcher. Conductors call the dispatcher by ringing on an ordinary magneto telephone. If the dispatcher is not on the line, a line drop will fall ringing a bell until the drop is restored.

A marked advantage of the system is that telephone bells



Signal Box Closed

Signal Box Open

Dispatcher's Cabinet

the lamps or performing any other duty at the telephone booth when answering the telephone call.

The system includes, first, an ordinary metallic telephone line and telephones. The lamp semaphore cabinet contains all the necessary selective apparatus of a substation and is simply an attachment to the regular telephone system. The semaphore has two 8-in. x 10-in. red windows protected by steel-wire netting so arranged that they appear black even if the sun is shining directly on the cabinet. The entire cabinet is armored with moisture-proof sheet steel. The station selector is enclosed in an air-tight brass case. Each window has three 100-volt lamps, the six being fed from the feeder or trolley. The use of six 100-volt lamps prevents their injury when the potential goes over 600 volts, while, on the other hand, they will appear brilliant even when the potential is as low as 250 volts.

The dispatcher's equipment is small and compact and usually is mounted on a flat-top desk. It consists of line drops and jacks for each line and a selective master key, which controls the master selector, located at any convenient place any distance from the desk. The master key contains small num-

bered buttons corresponding to selective way-stations. They are operated by the dispatcher like the lamp semaphore stations except that the substation signal is a bell instead of a lamp. The telephones at any desired place can be provided with lock-out features, which will absolutely prevent anybody from listening while the line is busy. However, all stations can signal the dispatcher at any time. This feature, together with the inability of stations to signal each other, puts the line under the absolute control of the dispatcher; makes all conversations private and increases the talking efficiency, so that it is equivalent to an independent line to every telephone. If one station desires to talk to another station, it calls the dispatcher, who can cut the stations together almost instantly. In case the dispatcher is not on duty at night, switches may be provided at the necessary stations to enable them to call each other as on a bridging line. The system can be operated over any reasonable distance and the number of stations increased to 50. The master selector will handle several hundred stations. All selective equipment is operated by a dry battery. Batteries in offices of less than 100 telephones are said often to have lasted 18 months.

### IMPROVED TROLLEY RETRIEVER

The Trolley Supply Company, Canton, Ohio, has recently put on the market a new retriever known as the No. 5 Knutson. It employs the same retrieving apparatus as in the No. 2 Knutson. The principal objections found to the No. 2 were the insufficient opening in the case and the method of connecting the rope to the reel by means of a chain, screw-eye, ferrule and rivet. In the construction of the No. 5 the method has been adopted of connecting the rope to the reel by simply tying a knot in end of rope and inserting in slot in reel as shown in the illustration.



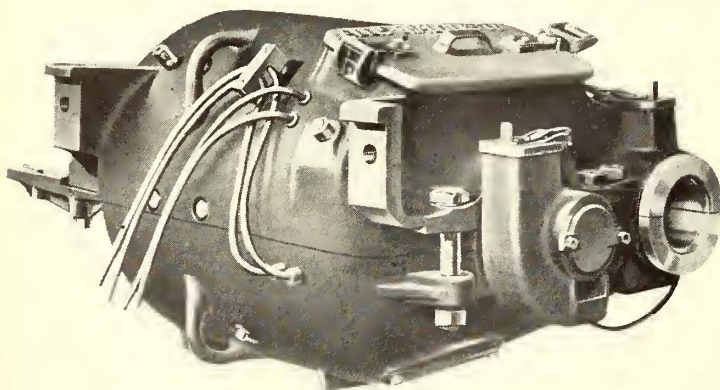
Sectional View of Retriever

As soon as this knot is inserted it releases the knot pawl and throws the weak spring in action. This is considered an important point, because if the rope should break while the retriever is in use, it will not be necessary to take it from the car to replace the rope, as the operator can do this himself in a very few minutes by simply tying a knot in rope and inserting it in slot in reel.

Other features in the No. 5 retriever are: long bearings for the reel; equal balance of the reel; anti-friction design of rope opening and simplicity of construction.

### NEW INTERPOLE RAILWAY MOTOR

The Allis-Chalmers Company has recently placed on the market a new type of railway motor, known as No. 501. It is provided with interpoles and has been developed to meet severe



Exterior of Interpole Motor

conditions of operation, especially on lines which use a potential of 600 volts or over. It also has desirable features for cases where a lower voltage is employed. As is seen by the accompanying engraving, the motor has ample provision for wearing surface in the bearings and special arrangements are made for ventilating.

The field frame is of cast steel and is split horizontally through armature and axle bearings so that it may be opened downward.

The commutator and brushes can be readily inspected by means of an opening of large size which can be covered when the motor is not being inspected. The main pole pieces are of soft steel punchings, securely clamped between malleable iron end plates, to which they are riveted. The interpole or commutating pole pieces are of solid steel. The field coils are of the mummified type. The bearings are bronze with a thin lining of babbitt and are carefully fitted to the bearing housings.

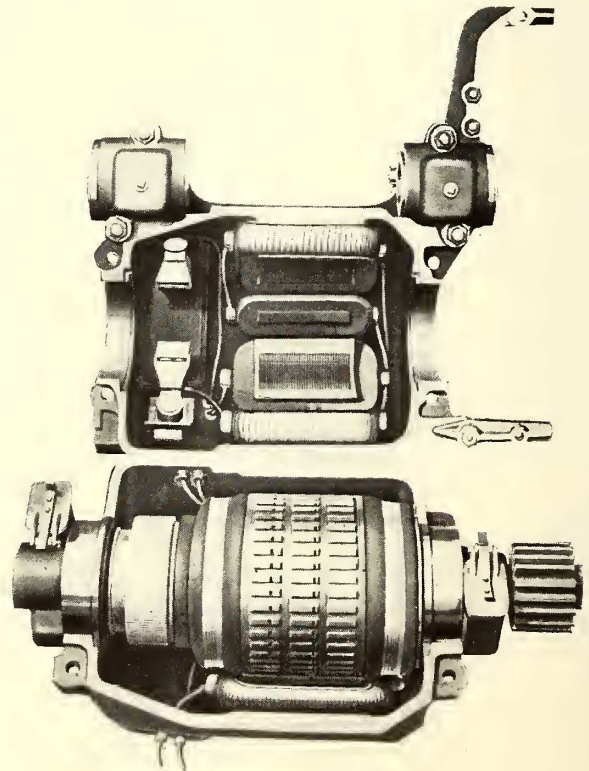
The gears are of high grade cast steel and are furnished either in the solid or split type. The pinions are of hammered steel. The gear case can be supplied either of sheet steel or malleable iron. The former is preferred as it combines lightness with strength and Allis-Chalmers Company has worked out a special construction which does away with difficulties formerly experienced.

The armature core is of soft steel laminations, built up on a cast spider and provided with ventilation ducts. The spider also carries the commutator so that shaft renewals can be made without disturbing the windings. The coils are wire wound and insulated in the usual way but after being pressed in steam heated moulds are cooled under pressure, which gives each the same dimensions. This makes the coils absolutely interchangeable. Hard drawn copper commutator bars are mounted on a cast steel sleeve, and a one-piece mica cone ring is employed.

Two cast brass brush holders are mounted in the top half field frame and each is adjustable to care for commutator wear. The brush end of the copper shunt or "pigtail" is so arranged that an exchange of brushes is easily effected.

The 501 motor has a capacity of 50-hp on 600 volts or 42 hp on 500 volts on the rating and a continuous capacity of 36 amp at 400 volts. The motors are designed for either double or four-motor equipment and standard gear ratios are employed.

The Allis-Chalmers Company is now building—in addition



Interior of Interpole Motor

to the type 501 interpole motor described, the non-interpole type 301 rated at 40 hp, type 302 rated at 55 hp, and type 303 rated at 75 hp.

At the end of 1909 there were 17 electric and 37 horse tramway lines, with a total of 550 miles of track, in operation in Japan.



## ELECTRIC RAILWAY LEGAL DECISIONS

## LIABILITY FOR NEGLIGENCE

**Alabama.**—Death—Injury to Wife—Recovery by Husband—Damages—Amount.

Where plaintiff's wife was thrown on the ground by the premature starting of a street car, and was struck in the right side, injuring and bruising her side and body, and causing her to be confined in bed six weeks, which hastened her death from tuberculosis about thirteen months thereafter, a verdict for \$1,200 was not so excessive as to require a new trial. (*Birmingham Ry., Light & Power Co. vs. Lavender*, 47 S. Rep., 1026.)

**Alabama.**—Street Railroads—Injuries to Persons on Track—Contributory Negligence—Duty of Motorman.

A driver may cross a street railway track, though he sees a car, if he may reasonably suppose he can cross before it will reach him.

It is the duty of a motorman to slacken the speed of his car to avoid a collision, where it becomes apparent to him that a driver has miscalculated the distance, or supposed the car was traveling at a lawful speed when in fact traveling faster, or is not aware of the approach of the car. (*Birmingham Ry., Lt. & Pwr. Co. vs. McLain*, 50 S. Rep., 149.)

**California.**—Injury to Passenger—Negligence—Res Ipsa Loquitur—Burden of Proof.

Mere injury to a passenger while aboard a car or while alighting from it creates no presumption that it was caused by negligence of the carrier operating the car; but it must be first shown the injury came from the movement of the car by those in charge of it, or from something connected therewith, or in control of the carrier, and then it is presumed that the thing causing the injury was due to the carrier's negligence, throwing on it the burden of disproving the prima facie case.

If the alleged negligence in an action for injury to a passenger while alighting is denied, plaintiff must prove it "by a preponderance of the whole evidence."—*Wyatt et al. v. Pacific Electric Ry. Co.* (L. A. 2,273), 103 Pac. Rep., 892.)

**Delaware.**—Right to Use Streets—Care Required—Crossing Warnings—Mutual Duties of Company and Travelers—Injuries—Contributory Negligence—Proximate Cause—Definition—"Ordinary Care"—Effect—Last Chance Doctrine—Injuries to Pedestrians—Weight of Evidence—Death—Measure of Damages.

The public, as well as a street railway company, has the right to use the streets; but, in using them, each is bound to exercise reasonable care to prevent accidents.

The employees in charge of street cars must use reasonable care to see that the cars move at a reasonable speed, and slow up, or stop, if necessary, where danger of collision is imminent, and could, by exercising reasonable care, be seen in time to prevent it.

Street car employees must give proper warning of the car's approach at a public highway crossing.

A street railroad company and pedestrians are both required to exercise reasonable care in the use of streets, and the rights of each must be exercised so as not to unreasonably interfere with the rights of the other, a greater degree of care by both being required as the danger increases; and both the motorman and the pedestrian approaching the car must use their senses of sight and hearing, and exercise such reasonable caution as ordinarily prudent persons in like circumstances would exercise to prevent accidents.

One whose vision is obstructed on approaching a street car crossing must avail himself of his knowledge of the locality, and look for approaching cars in time to avoid collision, and is negligent if he does not do so.

If intestate's death by being struck by a street car was not the result of the company's negligence, it is not liable.

"Negligence" is the want of such care as a reasonably prudent person would exercise under similar circumstances.

The "ordinary care" required in the operation of electric street cars imports all the care and discretion which the place of the danger and the occasion requires, and such care increases or diminishes as the danger of accident increases or diminishes in the operation of the cars.

If intestate's own negligence was the proximate cause of his death by being struck by a street car, or proximately contributed thereto, his administrator cannot recover therefor.

If intestate's death was proximately caused by a street car company's negligent failure to use ordinary care to prevent injuring him after becoming aware of his danger, the company would be liable, though intestate was also negligent; his negligence not being such contributory negligence as bars recovery.

In an action against a street car company for intestate's death by being struck by a car, the company must prove contributory negligence, proximately causing the injury, to the jury's satisfaction, by a preponderance of the evidence, in order to escape liability.

If the motorman saw, or by ordinary care could have seen, a pedestrian on the track in time to stop the car and prevent striking him, the company will be liable for his failure to do so; but if the pedestrian suddenly approached the car, and the motorman used all care to prevent injuring him, but could not stop in time after discovering the danger, the company will not be liable.

In a death action by the administrator against a street car company, the measure of damages would be such sum as decedent would probably have earned during his life, and which would have gone to his next of kin, taking into consideration his age, ability, and disposition to labor, and his habits of life and expenditure.—*Lenkewicz v. Wilmington City Ry. Co.*, 74 Atl. Rep., 11.)

**Indiana.**—Crossing Accidents—Complaint—Negligence—General Allegations—Witnesses—Questions—Earning Capacity—Construction—Death—Damages—Instructions.

In an action for death at a railroad crossing, a complaint, alleging that decedent was traveling westward on the highway, and that defendant at the time negligently ran one of its electric cars over the crossing so that as a consequence, and solely by defendant's negligence, defendant ran its car against decedent's buggy, killing him, sufficiently alleged that decedent was on the highway at the time he was struck.

In the absence of a motion to make more specific, a complaint stating decedent's injury, and alleging that it was caused as a consequence and solely by reason of defendant's negligence, sufficiently charged actionable negligence.

In an action for death of a farmer, a question calling for decedent's earnings for the preceding year from his business as he conducted it was not objectionable as calling for decedent's gross earnings, but was proper as calling for an estimate of the value of his services as a farmer.

Where, in an action for death, the court charged that, if the plaintiff had proved the material allegations of the complaint, they should award such damages as in their judgment would fairly compensate his widow and children, if any, dependent on him for support, not exceeding the amount named in the complaint, a further instruction that the administrator, if entitled to recover, should be allowed such damages as would compensate the widow and children for the injuries sustained, not exceeding the amount demanded in the complaint, unless it appeared from the evidence that decedent was negligent, was not objectionable for failure to limit the jury to the evidence or the law.—(*Indianapolis & Northern Traction Co. v. Newby.* (No. 6,564.) 90 N. E. Rep., 29.)

**Iowa.**—Master and Servant—Injuries to Servant—Contributory Negligence—Evidence—Custom.

Plaintiff, a street car hostler, was sent by the barn foreman to bring in a disabled car, being told that the trolley stand was loose. He climbed on top of the car, and knowing that there was danger of the trolley platform falling down under such circumstances, unless carefully handled, attempted to reverse the pole by swinging it around, and, while so engaged, the platform and pole fell, and plaintiff, falling with them, was injured. Held, that plaintiff was negligent as a matter of law.

Where a car which plaintiff, an employee of a street railroad company, was sent to bring in, was disabled, but not "dead," a custom to send out a wrecking car to bring in "dead" cars was irrelevant on the question of the railroad company's liability for injuries to such employee.—(*Moore v. Des Moines City Ry. Co.*, 123 N. W. Rep., 324.)

**Kentucky.**—Carriage of Passengers—Injuries—Actions—Questions for Jury—Care Required—Duty to Keep a Lookout—Contributory Negligence—Injury Avoidable Notwithstanding.

In an action for injuries to a street car passenger by being struck by another car going in the opposite direction as she was passing around the end of the car from which she had alighted, evidence held to require submission of defendant's negligence and plaintiff's contributory negligence to the jury.

A carrier's duty to exercise a high degree of care toward passengers continues until the passenger alights from the car, and has reasonable opportunity to reach a place of safety.

Where a street car motorman is about to pass a car which has stopped at a street crossing to discharge passengers, it is his duty to keep a sharp lookout for persons alighting from the car, and who might be expected to cross immediately behind it, and to have his car under such control that he might stop it at a moment's warning.

Where a passenger, after alighting from a street car, passed round the end of the car, and was struck by a car traveling in the opposite direction, which she could not see until just before she was struck, she was not barred from recovering by contributory negligence, if the motorman by ordinary care and by keeping a sharp lookout and having his car under control could have stopped the car in time to have avoided the injury. (Louisville Ry. Co. v. Mitchell, 127 S. W. Rep., 770.)

**Louisiana.**—Injuries to Persons on Track—Duty of Motorman.

It is the duty of a motorman in charge of an electric car, moving it up a narrow street, to guard against running it upon vehicles on the track directly in front and in full view of him. He should exercise the greatest prudence and caution to avoid inflicting injury. He has the vantage ground over the parties in front, in knowing the exact situation and condition of affairs ahead of him. He would have no right to take advantage of even tardy action on the part of a driver of a wagon in removing it from the track, to run into and crush it. He should use every exertion to save the situation and enable the vehicle to be placed in a position of safety. (Weisshaus v. New Orleans Ry. & Light Co., 50 S. Rep., 640.) (Syllabus by the Court.)

**Michigan.**—Street Railroads—Death of Pedestrian—Negligence—Jury Question—Evidence—Opinions—Effect.

Whether a street railway company was negligent in suddenly backing a car against a pedestrian, without ringing the gong or having a lookout on the rear platform, held under the evidence a jury question.

In an action for the death of a pedestrian struck at night by a backing street car, the jury were not bound by witness' estimate of the distance between decedent and the car when he stepped upon the track, where he was between witness and the car, and the only light came from the car.—(Canderdy v. Port Huron, St. C. & M. C. Ry. Co., 120 N. W. Rep., 582.)

**Missouri.**—Carriers—Carriage of Passengers—Personal Injuries—Setting Down Passengers—Contributory Negligence.

It is the duty of a carrier of passengers to carry them safely to their destination, and put them off at safe places.

A street car passenger carried by his station and directed to alight in a dark, strange place has the right to assume that the place is safe, in the absence of directions how to reach his destination.

A street car passenger discharged into a dark, strange place between stations, who is ignorant of the fact that he has been carried by his station, must use ordinary care for his safety in proceeding to his destination; but he is not required to walk on the right of way to the next station.—(Cossitt v. St. Louis & S. Ry. Co., 123 S. W. Rep., 569.)

**Missouri.**—Carriers—Injuries to Passenger—Presumptive Negligence—Street Railroads—Sufficiency of Evidence—Negligence—"Accident."

Whenever something unusual occurs in the operation of a public conveyance carrying passengers for hire, proof of such fact and of a consequent injury to a passenger raises the presumption of negligence.

In an action against a street railroad for injuries to a passenger, plaintiff's evidence showed that defendant's cable car on which plaintiff was riding made an unusual and violent stop, so that the glass in the windows of the car was shattered and plaintiff was thrown against a stove; that another

passenger was thrown against a window with such force as to not only break the glass, but to bend the protecting bars, and that the car was run over the crossing at the full speed of the cable, which, according to defendant's testimony, was violative of its rules. There was also evidence tending to show that an iron plate which was along the side of the cable conduit was struck by the grip shank and dented. Held to make out a case of presumptive negligence.

An "accident" is such an unexpected casualty as occurs without any one being to blame for it; that is, without anybody being guilty of negligence in doing or permitting to be done, or omitting to do, the particular things that caused such casualty.—(Briscoe v. Metropolitan St. Ry. Co., 120 S. W. Rep., 1162.)

**New Jersey.**—Negligence—Use of Land—Care as to Trespassers—Unprotected Third Rail—Liability.

A landowner need not keep his premises in a safe condition for the protection of a trespasser, even though the trespasser is an infant, his sole duty being to refrain from wilfully injuring him, and whether the danger is latent, and its extent and gravity, are immaterial.

Where decedent was killed by contact with the unprotected third rail which furnished the electric power for the operation of defendant's street cars, while he was crossing its right of way from a meadow, defendant was not liable for his death, since it was under no obligation to him except not to wilfully injure him, nor would it be liable, under the circumstances, under the rule making a landowner liable for injuries caused by an unguarded excavation upon his land so near to a public highway as to endanger travelers.—(Sutton v. West Jersey & S. Ry. Co., 73 Atl. Rep., 256.)

**New York.**—Master's Liability—Negligence of Servants—Imputed Negligence.

The rule that the negligence of the driver of a vehicle cannot be imputed to another does not apply where the relation of master and servant exists between plaintiff and the driver.

It was the duty of a driver of a vehicle, upon approaching a street upon which he knew vehicles and street cars were continually passing, to exercise care to see whether any street cars, etc., were approaching, and to avoid collision.—(Wood v. Coney Island & B. R. Co., 117 N. Y. Sup., 703.)

**New York.**—Street Railroad—Rights in Streets—Injuries—Actions—Jury Question—Contributory Negligence.

While a street car company has a paramount right to use its tracks in a street, and the driver of a vehicle must leave the track promptly on hearing the signal, he can drive on the street car tracks and assume that a car will not collide with him from the rear without giving him warning of its approach and an opportunity to leave the track, and that the car will not approach in excess of the speed limit.

In an action against a street railroad company to recover damages to plaintiff's horse and wagon, etc., caused by defendant's negligence in striking the rear end of the wagon, whether plaintiff was guilty of contributory negligence held for the jury.—(Normand v. Hudson Valley Ry. Co., 117 N. Y. Sup., 1076.)

**Texas.**—Damages—Personal Injuries—Elements of Damages.

Mental and physical suffering is an element of damage for personal injuries, and the value of lost time or capacity to attend to business or to earn money is also an element of damage, and both of these elements may be considered in fixing the amount of recovery without the verdict being subject to the objection of awarding double damages. (Houston Electric Co. vs. Seegar, 117 S. W. Rep., 900.)

**Texas.**—Damages—Personal Injury—Pleading—Sufficiency—Future Consequences.

Allegations that plaintiff was seriously and permanently injured internally and externally in and on her back, spine, head, etc., and that her nervous system was seriously impaired, warranted proof that she was a mental wreck and her mind was seriously affected 18 months after the accident, and that, if her condition was not cured, she might become insane.

A general allegation of damage from personal injury admits proof of such damages only as naturally and necessarily result from the injury charged, but it is not essential, to warrant proof thereof, that all the results of the act or injury complained of be pleaded in detail, if such results are necessarily or legally implied from the injuries alleged.

Recovery can only be had for such future apprehended consequences of an injury or existing condition as will reasonably or probably result therefrom, and the jury in assessing damages therefor should be confined by the charge to such probable results. *Rapid Transit Ry. Co. vs. Allen*, 117 S. W. Rep., 486.)

#### CHARTERS, ORDINANCES AND FRANCHISES

**California.**—Municipal Corporations—Powers Conferred—Grant of Franchise—Void Condition—Severability—Irregular Contract—Benefits—Estoppel.

A municipal corporation has only such powers as are expressly or by necessary implication conferred on it by the Constitution or by statutes passed thereunder.

Under Municipal Corporation Act (St. 1883, p. 269, c. 49) sec. 862, authorizing trustees of a city of the sixth class to permit the laying of street railroad tracks, etc., under such restrictions as they deem proper, the power to grant leave to build such tracks and impose restrictions is legislative in its nature, and not referable for its support to the power of making contracts.

Under Municipal Corporation Act (St. 1883, p. 269, c. 49) sec. 862, authorizing trustees of cities of the sixth class to permit the laying of street railroad tracks, etc., under such restrictions as they deem proper, a city cannot exact from the grantee of a franchise to lay tracks, etc., an undertaking conditioned on the completion of the road between outlying towns and through the city within a certain time, since the grant, being legislative in character, could have no extraterritorial effect.

Where a city of the sixth class grants a franchise under Municipal Corporation Act (St. 1883, p. 269, c. 49) sec. 862, to lay street railroad tracks, and exacts from the grantee an undertaking conditioned on the completion of the road between outlying towns and through the city, and the undertaking is void because the restriction operates extraterritorially, the condition is not severable so that it could be held good as to the part of the road running through the city, especially in view of the provision of the granting ordinance, declaring that it was not intended to grant a franchise for a street railroad within the limits of the city.

A party contracting with a city regarding a subject-matter within the scope of the city's power may, where he has received the benefit of the contract, be precluded from asserting that the contract was not on the part of the city executed in the manner required by law.

Where, under Municipal Corporation Act (St. 1883, p. 269, c. 49) sec. 862, a city grants a franchise for a street railroad, and exacts from the grantee an undertaking which is void because the condition has an extraterritorial effect, the grantee is not estopped to assert the invalidity of the undertaking, since the undertaking was one without the scope of the city's power to exact.—(*City of Arcata v. Green et al.*, 106 Pac. Rep., 86.)

**Illinois.**—Licenses—In Respect to Land—Estoppel to Revoke—Against City—Acquiescence.

A city ordinance authorized an elevated railway company to cross a river in the city by means of a bridge to be constructed from such plans in such manner as might be approved by the commissioners of public works, and provided that the railway system should be constructed under and subject to inspection and supervision by that officer. The railway company built a bridge pier on clay land near the river, and no objection was made by the city to such use of the land until eight years after the bridge was completed. Held, that the city must be presumed to have consented to the railway company's use of the land, and the company having expended large sums of money thereon, to the knowledge of the city, the city is estopped from revoking its permission and repossessing the property.

A city may be estopped by long acquiescence unaccompanied by any affirmative act of the city.—(*Sanitary Dist. of Chicago v. Metropolitan West Side Elevated Ry. Co. et al.*, 89 N. E. Rep., 800.)

**Kansas.**—Municipal Corporations—Repeal of Street Railway Franchise—Liability of City—"Imposed Duties."

A city is not liable in damages for the repeal of a street railway franchise ordinance which does not engage the city in any private proprietary capacity, nor for the conduct of the officers in publishing and subsequently enforcing the repealing ordinance.

"Imposed duties" for the neglect of which a city may be liable are those which are superadded to merely governmental functions like the special private corporate duty to maintain streets in safe condition for public travel, or the duty to maintain and manage corporate property so that city employees shall have safe places in which to work.—(*Edison v. City of Olathe*, 105 Pac. Rep., 521.)

**Massachusetts.**—Dedication—Misuser or Diversion—Municipal Corporations—Use of Public Land—Tunnels—Construction—Submission to Electors—Street Railroads—Construction of Subway—Powers of Railroad Commission—Constitutional Law—Delegation of Legislative Authority.

Property dedicated by donors to a particular public use cannot, at least without the exercise of the right of eminent domain, be appropriated to a use of a different character, in disregard of the rights of the donors and their legal representatives.

Boston Common was dedicated by its owners in 1634 "for the common use of the inhabitants of Boston as a training field and cow pasture." Held, that the Legislature had authority to authorize, by St. 1906, p. 742, c. 520, the construction of a railway tunnel or subway under part of the Common; such use not being at variance with the general purpose of the donors, it appearing that the occupation above the surface for all proper purposes will be changed hardly perceptibly, and that the increase of facilities for approaching the Common will be a convenience to the public in the use of it.

The city holding the title to Boston Common only in its municipal capacity as an agency of the government for the benefit of the public, and the power of the Legislature to represent this interest being supreme, St. 1906, p. 742, c. 520, authorizing the construction of a railway tunnel or subway under part of the Common is a sufficient authority for such construction, without a vote of the city government or of the citizens of the city.

St. 1906, p. 742, authorizes the construction of a railway tunnel or subway between Cambridge and Boston. Section 23 provides that the tunnel shall, except as otherwise expressly provided herein, be constructed and paid for on the terms, so far as applicable, and with the same rights as to construction, which are hereby conferred for such purposes on the Transit Commission, the Board of Railroad Commissioners, the city of Boston, and its treasurer, the railroad company, and other public officers or parties in interest, respectively, including any persons sustaining damages by the taking of or injury to property by the commission, etc., as are prescribed by St. 1902, p. 449, c. 534, for construction of the tunnel therein provided for, including the rights and powers conferred by section 13 of said act, which section shall also apply to the location of the tunnel and to the construction of the subway referred to in this section, if that is constructed. It also provides that if the Elevated Railway Company is dissatisfied with the decision of the Transit Commission it may apply to the Board of Railway Commissioners, who may finally determine the question. Held, that the said section 23 does not relate to the question whether the tunnel shall be constructed, but only to the question how it shall be constructed after it is determined that it shall be built, and hence does not require the submission to the voters of Boston whether the tunnel shall be constructed.

St. 1906, p. 754, c. 520, sec. 23, authorizing the Boston Transit Commission to construct on the request of the Boston Elevated Railway Company a subway, provides that, if the company is dissatisfied with the determination of the commission as to which of certain structures shall be constructed, it may apply to the Board of Railway Commissioners, who may finally determine the question. Held, that the commission is an administrative board of public officers, whose members do not act judicially in the matter, but as representatives of the public in the administration of the law, and the determination of a majority of a quorum after notice and opportunity to act is binding.

St. 1906, p. 754, c. 520, sec. 23, authorizing the Boston Transit Commission to construct a railway tunnel on such one of two designated routes as the commission may determine, does not involve an unconstitutional delegation of legislative authority.—(*Codman et al. v. Crocker et al.*, 89 N. E. Rep., 178.)

## LONDON LETTER

*(From Our Regular Correspondent)*

The Plymouth Corporation Tramways committee is considering a report by its general manager, Mr. Everson, regarding the advisability of applying for powers to install trackless trolleys on its outlying districts. The report describes very fully the various systems in use in Germany, Austria and Italy, and states that the very latest example of the trackless trolley system is at Mülhausen. This line was opened in October, 1909, and, according to reports, the authorities are well satisfied with the results. There are four trolley lines, two positive and two negative, on this system, and the cars weigh 6000 lb. each. The gradients on this route are very severe, the steepest being 1 in 12. The energy is supplied to the trolley wire at 500 volts, and the price paid is 1d. per unit. Mr. Everson estimates that the cost of the overhead lines and feeding cables would work out at about £1,600 per mile, and the bus itself would cost about £600. He also states that the same overhead wire could be utilized for an ordinary tramcar system, if at any time the traffic should warrant the laying of tram lines, with a very small cost for alteration.

In this connection it is interesting to mention that the bill by which the Corporation of Leeds is seeking powers to operate trackless tramways and which has already passed through the House of Lords, came before the examiners of the House of Commons, and as there was no opposition at this stage the bill was ordered to proceed to its next stage. In his evidence before the committee Mr. Hamilton explained that the capital charge was about one-fifth of the ordinary trams, and that the cost of working was pretty much the same.

Remarkable strides have been made in the matter of electric tramway development all over the country, and perhaps no part of the country has progressed more rapidly than Lancashire. Many of the towns in Lancashire are linked up by various tramway systems, and it is possible to journey from Manchester to Liverpool, and, with a short break, it is also possible to journey from Manchester to Leeds. The latest interesting Lancashire scheme is the proposal to link up Horwich, Chorley and Preston, which would have the effect of putting Manchester and Preston in direct connection by electric tramways.

The Tramways Committee of Leeds has been considering for some time the question of placing on its lines goods trams for the conveyance of parcels and general goods, believing that it would be a convenience to the districts not served by railways.

So satisfied are the directors of the London, Brighton and South Coast Railway with the results of the electrified section that they have now made the statement that they have definitely decided to electrify a further portion of their suburban line as far as the Crystal Palace.

A deputation of tramway managers recently visited Huddersfield to inspect a new type of car which has been built to the order of the Huddersfield Corporation. This car has been built to the specifications of P. Kavanagh, of Liverpool, the special feature about it being that passengers are able to get on and off the car simultaneously. This car has an entrance at the back, as at present, and an exit at the front, enabling passengers to get on at one platform and leave by another. By means of folding and hinged doors, opened and closed automatically, passengers always alight on the safe side of the street, no matter in which direction the car may be running.

At a recent meeting of the London County Council, the finance committee pointed out that the average fare per passenger on the Council's trams was 1.06d., as compared with 1.07d. for the previous year, and that the total expenses for power amount to 1.58d. a car mile, as against 1.71d. in 1908-9. This decrease in the cost of power is due to the development and fuller use of the Greenwich generating station and was fully expected. The surplus on working the electric lines is 5.06d. a car mile, and although the receipts per car mile are decreasing very slightly the expenses are also decreasing, with the result that the surplus of 5d. per car mile on which financial estimates for some years have been based has been maintained. The estimates for 1910-11 provide for the electrification of about 14½ miles of horse lines, which will leave 5½ miles still to be

dealt with. The total length of the system at present is 135½ miles, of which 115½ are already electrified. The total number of passengers carried during the year was 418,000,000 by electric, and 33,000,000 by horse traction, and the car miles run were respectively 39,000,000 and 3,000,000. The new lines to be electrified will cost nearly half a million pounds, and the highways committee recommend that 250 new cars be purchased. It has also been stated by the chairman of the highways committee that permission had now been granted by the Board of Trade for the use of trailer cars, with the object of obviating difficulties arising from the crowding in the early morning. The experiment will be tried first on the line from Euston Road to Hampstead Heath. With regard to the extension of the tramways system from Woolwich to Eltham, as this tramway lies within a 3-mile radius of Greenwich Observatory, and as the traffic is not sufficient to justify the use of the conduit system, the London County Council has adopted a special method of overhead construction, instead of the usual single wire. Two overhead wires have been provided, and the cars are being furnished with two trolley arms. The length of tramway being constructed in this manner is about 5 miles, and throughout this distance the two wires are 3 ft. 6 in. apart, and the center of the two pairs are 8 ft. 6 in. apart. The cars which are to be used on this section are also being equipped with a special switch to alter the connection from the negative overhead wire to the rail for operating on the other portions of the system.

The Corporation of Belfast has decided on important extensions of its tramway system, particulars of which we have referred to in previous issues. Various extensions will be made in different directions, but the most important will be the extension of the tramway to M'Art's Fort, which will entail the construction of a new road and the purchase of about 200 acres of ground contiguous to the tramway on the hill. The idea of the Corporation, following Mr. Nance's recommendation, is to build villas on this ground to rent at about 4s. per week to the working classes of Belfast. It is also intended to acquire both sides of Carr's Glen, to a point about opposite the Horseshoe Curve, and to lay it out as a public park, with various attractions for the entertainment of the public. It is estimated that if the Corporation was able to transplant about 1700 artisan families to this new district, there would be sufficient tramway traffic to support the service. The estimated cost of the scheme is £132,350.

The Bournemouth Town Council has considered the reports of the General Manager and of the Tramways Committee which recommended the abandonment of the conduit system and the substitution therefor of the overhead trolley system through the center of the town. It was decided to seek further advice, and it was agreed that Mr. Fell, the General Manager of the London County Council Tramways, be asked for a report.

The Southampton Corporation, as owner of the electric tramways undertaking, has determined to increase considerably the present service.

The proposal to link Wimbledon and Sutton by the construction of a new railway, to be worked electrically by the District Railway Company, has been assented to by a committee of the House of Commons. The scheme is promoted by local landowners, and the estimated cost of the undertaking is £311,554. From a junction with the District Railway at Wimbledon, the new line will proceed, with six intervening stations, to Sutton, where the terminus will be alongside the station of the London, Brighton & South Coast Railway. The only opponents of the bill before the Commons committee were the last-named company.

The service given by the Dolter surface contact system at Torquay has not been very satisfactory to the tramway company, which some time ago petitioned for leave to replace it with the overhead system. Part of the trouble consists in studs remaining alive when they should not, and part from studs not becoming alive when they should. Excessive cost of repair is also alleged. Messrs. Mordey and Dawbarn recently made a report on the subject and believe the troubles can be remedied. This conclusion has been adopted by the authorities who have authorized the tramway committee to do what it could to retain a surface contact system in Torquay.

A. C. S.

# News of Electric Railways

## Disorder Follows the Columbus Strike

Destruction of property, attacks upon car crews and passengers, attempts to blow up cars with dynamite, and other species of wild riot and disorder characterized the street railway strike at Columbus last week. Mayor Marshall proved to be unable to control the situation. A call was made for State troops by the Mayor, and on July 28 about 1,600 men arrived and pitched their camps near the various car houses, power houses and other places that needed protection.

Headquarters were established in the State-house grounds, and Troop A, of Cleveland, camped there, while the horses are quartered within a roped enclosure on Broad Street, the finest thoroughfare in the city, in order to be ready on a moment's notice. All the troops were thoroughly equipped for strike duty, being provided with clubs, as well as ordinary and riot guns.

No cars were in operation on the night of July 28, and an agreement was reached between the city and the company that no cars should be put into operation on any of the lines until the next afternoon. General W. V. McMaken, in command of the troops, informed Mayor Marshall that his men could not do patrol duty without special arrangements, but that they would be sent to any part of the city to quell outbreaks or preserve order. Seemingly it was the intention of the Mayor that the soldiers should take the place of the patrolmen for this purpose. On the arrival of Governor Harmon from his summer home in Michigan, the decision that soldiers should not do patrol duty was confirmed. However, the trend of events later caused a change in conditions, and the men were distributed over the city to protect the people and property.

The decision to ask for military aid was reached on the night of July 27, after a number of cars had been damaged, and many people hurt by the rioters.

Trouble seems to have broken out all over the city at the same time on the evening of July 27, and it was of a somewhat different variety from that encountered earlier in the week. Attacks were made from corners and dark places in the streets, where the men could not be seen. Such a wide territory was covered in this way that the police department was unable to reach all sections affected. The company sent its cars to the car houses earlier than had been intended, in order to stop the rioting.

Boulders and timbers were placed on the tracks, and when the car crews alighted to remove the obstacles they were attacked by mobs of hundreds of men, women and children. Several of the car men were badly beaten and a number of cars were left standing on the tracks. Switch points were removed on several occasions, in order to make it impossible for the cars to pass over these places.

In his instructions to the commanding officers of the troops, Mayor Marshall stated that the strikers' pickets must be allowed to occupy their places, and that a proposed mass meeting in the State-house yard on Sunday must not be interfered with. He placed special emphasis upon the necessity of guarding the property of the company, however, and looking out for the safety of citizens. A special proclamation was issued to the people, asking that so far as possible they remain in their homes and not subject themselves to the danger of violence on the streets. All saloons were closed Monday, and have remained closed since.

The cars were started again on the afternoon of July 29, and, notwithstanding the presence of the troops, the night following was one of wild disorder. Owing to the order that soldiers could not do patrol duty, there was a misunderstanding as to what they really were expected to do, and their services were not often called for, except in the case of Colonel H. G. Gatrov and his men, who opened up two avenues and allowed the cars to operate. Early in the evening Captain Bush, with two sections of Battery C, dispersed two gatherings by arriving with two rapid-fire guns, mounted on automobiles. These guns have been in service since on several occasions. As a result of the night's work

a number of motormen and conductors were injured, and several cars damaged.

The militia took complete control of the city on July 30, although the civil authority was still in the hands of Mayor Marshall nominally. Details of soldiers were sent out along the car lines in the evening, with instructions to do police duty and co-operate with the department in every way. The city was divided into four districts, and the soldiers were instructed to see that no crowds gathered.

Notwithstanding the activity of the military authorities, the rioting was continued Saturday night. Cars were stoned and men beaten, and the few passengers on the cars were the targets for bricks and other missiles. A large number of arrests were made by the soldiers, and 15 or 20 of the men captured were charged with rioting, the others with being loiterers. The penitentiary authorities have notified the military officials and city officers that there are about 300 vacant cells in the institution, and that if the jails become congested the cells may be used to take care of the prisoners.

So serious has the situation become that two more regiments have been called out, and Maj-Gen. Charles Dick, United States Senator, division commander of the Ohio National Guard, has been ordered to assume command of the troops. The two regiments comprise about 1,500 men, which will make over 3,000 men on duty in Columbus.

On the evening of July 29 the turbulence resulted in the injury of 27 employees of the company, while several passengers were hurt more or less severely, 30 riot calls were received, and a number of cars were demolished.

The Rev. Theodore R. Reese, president, and Joseph Bishop, secretary of the State Board of Arbitration; and Charles Pretzman, president of the Columbus Chamber of Commerce, held a conference with General Manager E. K. Stewart, of the Columbus Railway & Light Company, on the afternoon of July 30, in an endeavor to commence negotiations for a settlement. They were informed by Mr. Stewart that if the men applied for employment as individuals they would be taken back in that capacity, but not otherwise.

Comparative quiet followed the arrival of additional troops, and but few outbreaks occurred on July 31, notwithstanding the fact that a mass meeting was held on the State-house grounds. Those who addressed the meeting did not say anything of an incendiary nature. State guard officials secured positions where they could oversee the crowd.

Governor Harmon, on July 29, began formulating plans to bring about a settlement between the men and the company. After consulting with officers of the company he met representatives of the men at the home of Adjutant General Weybrecht, on the evening of July 31, and asked for a proposition from the men.

Major-General Charles Dick took command of the troops on the morning of Aug. 1, and divided the city on a line with Broad Street, running east and west. General McMaken was put in charge of the southern half, and General Speaks, the northern part, with about 1,500 men each. Each commander has a company of cavalry.

The soldiers have been instructed to report police officials who do not do their duty in cases of disturbances. This was done because it is charged that some of the men are not doing their duty as they should.

## Pittsburg Traction Situation

Mayor Magee has notified the Pittsburg Railways Company that he has signed an ordinance passed by the City Council revoking the franchise of the Pittsburg & East Liberty Passenger Railway. He ordered the company to cease operating cars on lines covered by the franchise. He also ordered the company to see that five-sevenths of the street car passengers on all lines get seats, that no passenger be allowed to stand between the seats of summer cars, that cars be cleaned and fumigated at least once a week

and that the other provisions of ordinances passed recently be observed.

James H. Reed, president of the Philadelphia Company, which controls the Pittsburg Railways, is quoted as saying:

"The company will contest the validity of the ordinances signed by Mayor Magee. As to the ordinance forfeiting the rights of the Pittsburg & East Liberty Passenger Railway, there is nothing in it, as that road has been dead and buried over 40 years. The Pittsburg, Oakland & East Liberty Passenger Railway was built under an entirely different charter and has nothing whatever to do with the Pittsburg & East Liberty Passenger Railway ordinance."

J. D. Callery, president of the Pittsburg Railways, has written City Comptroller Morrow, of Pittsburg, as follows, in reference to a resolution introduced in the Council and referred to the finance committee, asking that committee to have the Comptroller make a demand for the books of several companies:

"The Citizens' Passenger Railway Company, and Citizens' Traction Company maintain separate corporate existences, with a board of directors and officers quite distinct from our organization. Neither I nor any of the officers of the company with which I am associated have possession of the books of either of these companies.

"While I desire to treat yourself and the finance committee of Councils with all proper respect and to give you any assistance which I may in the performance of your duties, you will permit me to suggest that there is nothing in the ordinances of the city of Pittsburg, nor in the legislation of the State, which authorizes the finance committee to call upon me or any of the officers of the Fort Pitt Traction Company, the Consolidated Traction Company, or the Pittsburg Railways Company to produce their books for an examination by your committee."

#### Steam Railroad Statistics of the United States for the Year Ended June 30, 1909

The Interstate Commerce Commission has issued an abstract of its twenty-second annual statistical report, which covers the fiscal year ended June 30, 1909. It shows that the total single track railway mileage in the United States was then 236,868.53 miles, an increase of 3,215.18 miles, as compared with the previous year. Substantially complete returns were received for 235,402.09 miles of line operated. In addition there were 20,949.41 miles of second track, 2,169.55 miles of third track, 1,453.36 miles of fourth track, and 82,376.63 miles of yard track and sidings.

The total number of locomotives in use was 57,212, an increase of 479 over corresponding returns for the previous year. The total number of cars of all classes was 2,218,280, or 12,901 less than on June 30, 1908. This equipment was thus assigned: Passenger service, 45,584 cars; freight service, 2,073,606, and company's service, 99,090. Nearly all cars and engines are now equipped with air brakes and automatic couplers.

The total number of persons employed was 1,502,823, an increase of 66,548. The par value of railway capitalization was \$17,487,868,935, or \$59,259 per mile of line, as represented by the amount outstanding, \$13,711,867,485.

The number of passengers carried was 891,472,425, an increase of 1,462,851, and the passenger mileage was 29,109,322,589, an increase of 26,485,645. The number of tons of freight carried was 1,556,559,741, an increase of 23,577,951 tons over the previous year. The ton-mileage was 218,802,986,929, an increase of 421,432,127. The average receipts per passenger per mile were 1.928 cents; the average receipts per ton mile, 0.763 cent. The ratio of operating expenses to operating revenues was 66.16 per cent.

The report shows that the operating revenues were \$2,418,677,538; the operating expenses were \$1,599,443,410. The corresponding returns for 1908 were: Operating revenues, \$2,393,805,989; and operating expenses, \$1,669,547,876. The operating revenues averaged \$10.381 per mile of line, and the operating expenses averaged \$6.865 per mile of line.

There were 8,722 persons killed and 95,626 injured on the railroads during the year. The number of passengers killed was 253, and the number injured 10,311, a decrease of 128 and 1,245, respectively. Nearly 5,000 of the total killed were trespassers on the railroads, and about 5,750 of such were injured.

#### Association Meetings

Central Electric Traffic Association.—September.

Central Electric Accounting Conference.—Chicago, Ill., September.

Colorado Electric Light, Power & Railway Association.—Glenwood Springs, Col., Sept. 21, 22 and 23.

Oklahoma Public Utilities Association.—Oklahoma City, Okla., Sept. 30 and Oct. 1.

American Street & Interurban Railway Association.—Atlantic City, N. J., Oct. 10, 11, 12, 13 and 14.

**New Line Opened in Mexico.**—The Nuevo Laredo (Mex.) Street Railway on July 17 formally opened for traffic its street railway in Nuevo Laredo. The line was built by F. E. Scoville, of Laredo, Tex. Power is purchased from the Laredo (Tex.) Power Company.

**Passenger Train Through Detroit River Tunnel.**—On July 26 the first passenger train was operated through the tunnel of the Detroit River Tunnel Company, extending from Detroit, Mich., to Windsor, Ont. Regular trains will be operated through the tunnel by Oct. 1.

**Toledo Traction Situation.**—Officials of the Toledo Railway & Light Company have informed Mayor Whitlock that the engineers are now working on the inventory and that each schedule will be turned over to the city as completed. The Mayor has stated that the task is greater than he anticipated.

**New York Electrical Show.**—The fourth annual New York Electrical Show will be held in Madison Square Garden, New York, from Oct. 10 to Oct. 20, 1910. Ninety per cent of last year's exhibitors have already contracted for space. George F. Parker is the general manager of the exhibit.

**New Line Opened in Colorado.**—The Grand Junction & Grand River Valley Railway, Grand Junction, Colo., on July 14 formally opened its line between Grand Junction and Fruita, a distance of 20 miles. The opening was attended by celebrations in which all the towns along the route participated. It is probable that the company will extend the line to Clifton and Palisades.

**Charges Philadelphia Franchise Is Blocked.**—S. S. Neff, president of the Philadelphia & Suburban Elevated Railroad, has issued the following announcement to the public: "We have absolute evidence that at this moment the Philadelphia Rapid Transit Company is the only influence preventing the granting of a franchise to the Philadelphia & Suburban Elevated Railroad Company."

**New Line Desired in Baltimore.**—A petition has been received by the Public Service Commission of Maryland asking that the United Railways & Electric Company of Baltimore operate a line from Southwest Baltimore directly to North and Northwest Baltimore. An order requesting William A. House, president of the company, to confer with the commission on the subject has been passed.

**Referendum Suggested for New Line.**—Citizens of Kansas City, Kan., decided at a mass-meeting to circulate petitions asking for a referendum on the subject of a crosstown railway line between Kansas City and Rosedale. The city commissioners have refused to pass an ordinance for the construction of a line on the ground that the street specified in a recent petition was needed for driving purposes.

**Arrangements for Paving Debt at Toledo.**—An ordinance has been introduced at Toledo, Ohio, providing for the issue of \$18,503.99 bonds to pay the Toledo Railway & Light Company's share of paving Ashland Avenue. When the debt was incurred the city was informed that the company did not have the money for this purpose, but that it would pay its share if made in the form of an assessment over a number of years.

**Riot Follows Attempt to Operate Electric Railway in Bogota.**—The native residents of Bogota object to the operation of the Bogota City Railway, and the attempt on July 19, 1910, to place the line in operation resulted in so much disorder that the cars were withdrawn. The concession for the line in Bogota was granted to Americans during the Presidency of General Reyes. The first attempt to place the line in operation was made on March 7, 1910. A mob attacked the cars and stoned the American lega-

tion. Another attempt to open the line on March 16, 1910, also resulted in disorder.

**Penalty for Delay in Filing Report Disallowed.**—A decision rendered by the United States Circuit Court of Appeals holds that the city of Duluth, Minn., cannot collect a penalty of \$34,000 from the Inter-State Traction Company because it failed to make a report of its earnings at a certain time. The city claimed a penalty of \$100 a day since the report was due and brought suit to collect at this rate for 340 days. It was held by the lower court and is now upheld by the Court of Appeals that, by the practice of accepting reports after they were due and waiving the penalty, the city has lost the right to enforce the penalty.

**Pennsylvania Terminal in Manhattan Officially Opened.**—The new Manhattan terminal station of the Pennsylvania Railroad was declared officially opened on Aug. 1 by James McCrea, president of the company, who accepted from the memorial committee of the board of directors the statue of the late president, Alexander Johnston Cassatt. The statue was unveiled following the presentation by Thomas De Witt Cuyler, chairman of the memorial committee. It is now planned to operate trains in the East River tube on regular schedule, beginning Sept. 8. A description of this terminal was published in the *ELECTRIC RAILWAY JOURNAL* of April 9, 1910, page 656.

**Plans for Geary Street Line in San Francisco.**—The public utilities committee of San Francisco has decided that the overhead trolley is desirable and the underground conduit system impracticable for the proposed municipal road on Geary Street. Judge Van Fleet of the United States Circuit Court has denied the petition of the United Railroads of San Francisco for a temporary order restraining further progress with the plans for the proposed line. The court held that there were no averments to show that the next steps threatened could be taken before a hearing may be had and determined. No injury, however threatened, was irreparable, the court said, which might be prevented before it occurred. The hearing on the petition of the United Railroads to enjoin the board of supervisors from disposing of the Geary Street bonds has been postponed to Aug. 15.

**New Jersey Commission News.**—The Board of Public Utility Commissioners of New Jersey, whose appointment by the Governor was mentioned in a recent issue of the *ELECTRIC RAILWAY JOURNAL*, actively entered into its duties on July 4, under a State law which provides that acts of the Legislature become effective on that date unless some other date is mentioned in the act. As already announced, the commission has appointed Philander Betts chief engineer. The board has appointed Tuesday as the day for holding hearings and has already conducted several hearings at Trenton. The commission will also establish an office at Newark, at which a considerable part of the work connected with electric railways, electric lighting and gas public utilities can more easily be concentrated. The rest of the work, including that connected with the steam railroads of the State, will be conducted at Trenton.

**Milwaukee Socialists on Traction Situation.**—According to an article in the *Milwaukee Journal* of July 27, harmony is threatened among members of the Socialist party as a result of the conditions which have arisen respecting a new franchise for crosstown lines. Alderman Victor Berger, one of the leaders of the party, is quoted by the *Journal* as having said to John I. Beggs, president of the Milwaukee Electric Railway & Light Company, that unless concessions are granted by the company of greater privileges than those for which provision was made in the present general franchise, no new franchises will be passed during this administration. Mr. Beggs is said to have replied: "Then I don't want any. There positively will not be any additional concessions." According to several leading Socialists, the administration is anxious to settle the traction problems.

**Subway Plans in Philadelphia.**—The committee on comprehensive plans for a subway system, appointed by Mayor Reyburn, of Philadelphia, has under consideration an extensive system. The tentative plans provide for the construction of a subway, estimated to cost from \$60,000,000 to \$200,000,000, to be built and owned by the city and leased to operating companies. The plan is to construct the sub-

way under Broad Street, from end to end, with space for four or six tracks. From this central line four branches would be constructed, extending respectively to the northeast, northwest, southeast and southwest sections of the city east of the Schuylkill River. S. S. Neff, president of the projected Philadelphia & Suburban Elevated Railroad, has issued a statement saying that the construction of a system of subways in accordance with this plan would mean the foreclosure of the bonds.

**Association of Railway Electrical Engineers.**—The annual convention of the Association of Electrical Engineers will be held in the Hotel La Salle, Chicago, Sept. 27 to 30, 1910, instead of a week later as originally planned. E. M. Cutting, Southern Pacific Railroad, Oakland, Cal., is president of the association, and George B. Colegrove, Illinois Central Railroad, Chicago, is secretary. The membership, comprising about 400, is made up of engineers who are interested in the electrical problems of a steam railroad, such as car lighting, signaling and motor drive. A feature of the coming convention will be an exhibit by the Railway Electric Supply Manufacturers' Association, an affiliated organization. The president of the manufacturers' association is W. L. Bliss, of the United States Light & Heating Company, of Milwaukee. J. Scribner, of the Chicago office of the General Electric Company, is secretary.

**St. Louis Railway Guide.**—The United Railways Company, of St. Louis, has issued a street railway guide containing descriptions and lists of the points of interest in the city and a series of maps which illustrate the 30 routes extending from the business center into outlying sections and the 247 route intersection points where transfers are given. The book also contains a map of the street railway lines of St. Louis County, indicating the number of stops and the places of interest reached. The guide, which is copyrighted by the company, contains in addition to the valuable information indicated, suggestions to passengers designed to prevent accidents and facilitate the performance of good service, rules for conductors and other brief and important references to the work of the railway. Attention is called to the mutuality of the interest of the public, the city and the railway company. The book was printed at the shop of the United Railways Company.

**Detroit Traction Situation.**—The City Council of Detroit has passed a resolution to increase the daily rental payable by the Detroit United Railway to \$500. J. C. Hutchins, president of the company, has written a letter declining to pay more than \$300 a day. The letter says: "We are compelled to advise you that we deny the statement contained in the preamble of said resolution of July 19, 1910, to the effect that the rights of the company have expired on the street mentioned therein. We are also advised that the requirements to pay such sums of money are illegal for other reasons. We are therefore compelled to inform you that we decline to pay said sum of \$200 per day in addition to the sum we are now paying. We desire to reiterate what we said to you under date of June 30, 1910, and ask you to consider the statements therein contained as a part of this letter." An abstract of the letter to which Mr. Hutchins refers was published in the *ELECTRIC RAILWAY JOURNAL* of July 9, 1910, page 89.

**Defense of Philadelphia Rapid Transit Company Against Penalty Suit.**—An answer has been filed by the Philadelphia Rapid Transit Company, through President Charles O. Kruger, to the suit for \$261,275 damages brought against the company by the borough of Morton for penalties for alleged violations of the ordinance granting the original franchise by which cars are operated. Section 7 of the ordinance required that cars be operated at intervals of every 15 minutes. The answer denies that the ordinance of May 27, 1889, has been violated, and interprets section 7 as requiring that the cars running in both directions shall be operated every 15 minutes. The contention of the borough was that the ordinance required cars to be operated in each direction every 15 minutes. The answer says that cars are run more frequently than the ordinance requires. While contending that the ordinance has not been violated and that the company has done its best under the existing physical conditions, the company states that the large claim is not a proper one, and that if a violation has taken place, the penalty should be \$10.

# Financial and Corporate

## New York Stock and Money Market

August 2, 1910.

During the last week the stock market has recovered much of the loss it sustained under the heavy liquidation of the week previous. The tone has been distinctly better, but the trading has been very light. This is not an unusual condition. For several months, activity has meant selling and lower prices. There has been no buying activity. The traction shares, especially Interborough and Brooklyn Rapid Transit, have continued to carry their full share in the trading and have all recovered proportionately.

The money market remains remarkably easy, with lenders offering funds at low rates. Quotations to-day were: Call, 1 to 2 per cent; 90 days, 3¼ to 4 per cent.

### Other Markets

There has been very little trading in the Philadelphia market during the last week, but prices, following the trend of Wall Street, were a trifle stronger. Rapid Transit has recovered to 18 and Union Traction to 43.

In Boston there has been almost no trading in traction shares. Massachusetts Electric and Boston Elevated have lost much of the activity they enjoyed a few weeks ago, and other issues are not offered.

There have been days during the last week when not a single traction share was sold in the Chicago market. At no time has there been any activity in these issues. A few shares of Chicago Railways Series 2 have been sold at 15.

In Baltimore there is still some dealing in United Railways stock, the prevailing price being about 15¼. The bonds continue to be fairly active at former prices.

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

	July 26.	Aug. 2.
American Railways Company.....	a42½	a42
Aurora, Elgin & Chicago Railroad (common).....	a45	*45
Aurora, Elgin & Chicago Railroad (preferred).....	82	*82
Boston Elevated Railway.....	126	122
Boston & Suburban Electric Companies.....	a15	*15
Boston & Suburban Electric Companies (preferred).....	a74	*74
Boston & Worcester Electric Companies (common).....	a10	a10
Boston & Worcester Electric Companies (preferred).....	37	a37
Brooklyn Rapid Transit Company.....	71¾	74¾
Brooklyn Rap. Transit Company, 1st pref. conv. 4s.....	80	*80
Capital Traction Company, Washington.....	a129	a129
Chicago City Railway.....	a195	a195
Chicago & Oak Park Elevated Railroad (common).....	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred).....	*7¼	*7¼
Chicago Railways, pteptg., ctf. 1.....	a75	a75
Chicago Railways pteptg., ctf. 2.....	a15	a16
Chicago Railways, pteptg., 3.....	a11	a10
Chicago Railways, pteptg., ctf. 4s.....	a5½	*5½
Cleveland Railways.....	*91½	*91½
Consolidated Traction of New Jersey.....	a73	a73
Consolidated Traction of N. J., 5 per cent bonds.....	a105	a103
Detroit United Railway.....	*45	*45
General Electric Company.....	135¼	140½
Georgia Railway & Electric Company (common).....	a107½	a107
Georgia Railway & Electric Company (preferred).....	a86	*86
Interborough-Metropolitan Company (common).....	15	16¼
Interborough-Metropolitan Company (preferred).....	43	46
Interborough-Metropolitan Company (4½s).....	78	77¾
Kansas City Railway & Light Company (common).....	a25½	a25½
Kansas City Railway & Light Company (preferred).....	a79½	a79½
Manhattan Railway.....	128½	128
Massachusetts Electric Companies (common).....	a14¾	a14¾
Massachusetts Electric Companies (preferred).....	a79	a79
Metropolitan West Side, Chicago (common).....	*23½	22
Metropolitan West Side, Chicago (preferred).....	58½	60
Metropolitan Street Railway.....	*15	*15
Milwaukee Electric Railway & Light (preferred).....	*110	*110
North American Company.....	65	67½
Northwestern Elevated Railroad (common).....	18	a18
Northwestern Elevated Railroad (preferred).....	*65	a60
Philadelphia Company, Pittsburg (common).....	a42	a42¾
Philadelphia Company, Pittsburg (preferred).....	a43	a42¼
Philadelphia Rapid Transit Company.....	a16¼	a18
Philadelphia Traction Company.....	*84½	83
Public Service Corporation, 5 per cent col. notes.....	a96	a96
Public Service Corporation, ctf. 5s.....	a99	a99
Seattle Electric Company (common).....	a109	a109
Seattle Electric Company (preferred).....	a99½	a98½
South Side Elevated Railroad (Chicago).....	a67	a63
Third Avenue Railroad, New York.....	8¼	a10½
Toledo Railways & Light Company.....	*7½	65½
Twin City Rapid Transit, Minneapolis (common).....	106	106½
Union Traction Company, Philadelphia.....	a42	a43½
United Rys. & Electric Company, Baltimore.....	a14½	a15¼
United Rys. Inv. Co. (common).....	*30	*27
United Rys. Inv. Co. (preferred).....	60¾	54
Washington Ry. & Electric Company (common).....	a32½	a32½
Washington Ry. & Electric Company (preferred).....	a87	a88
West End Street Railway, Boston (common).....	a88	a87½
West End Street Railway, Boston (preferred).....	a100½	a100
Westinghouse Elec. & Mfg. Company.....	50	55½
Westinghouse Elec. & Mfg. Company (1st pref.).....	*125	*125

a Asked. \* Last Sale.

## Complication in Plan for Consolidation of Chicago Railways and Consolidated Properties

A decision which has a bearing on the pending negotiations for consolidation of the Chicago Railways Company and the Chicago Consolidated Traction Company was rendered on July 29 by Judge Cutting, of the Probate Court of Cook County. The court denied a petition of L. S. Owsley, executor of the estate of Charles T. Yerkes, for permission to deposit Consolidated Traction Company bonds with the reorganization committee. The claim of the Yerkes estate, including principal and interest, is \$5,669,530. Judge Cutting said:

"The plan which is submitted necessarily includes the surrender of dominion over these securities to parties outside of the administration of this estate. It places them in the hands of a depositary not subject to the control of the executor in any way nor of this court. It follows, therefore, that before this compounding can be completed there will be an interval of indefinite length, during which time the assets of this estate will not be in the hands of its executor and will be subject to control by other persons than him.

"If there is one thing better settled than another in the administration of estates it is the absolute liability of the trustee who is named executor for the utmost good faith not only in the disposition of the estate but in the safe-keeping and guarding thereof. The principle is too valuable to be impinged upon by construction. The executor must hold his assets absolutely untouched by any other agency.

"This plan is not offensive to the court's idea of what ought to be done, in its ultimate result. If the proposition were to substitute these bonds here, now or at some future date, for the bonds held by the estate, and the court found, as perhaps it might well find, that it were desirable for the benefit of creditors, primarily, and of the other parties interested in the estate, secondarily, I should have no hesitancy in entering an order, I think, permitting such compound, but no such proposition is before the court.

"It is useless to say, in my opinion, that the depositary is responsible, and that the committee is beyond reproach. Both these things are true, as I believe. But the very fact that I mentioned that the depositary is financially sound and that the committee is beyond reproach is of itself a statement, if it had any force at all, which shows that in another case of like character, presented here, the court might find the exact opposite, namely, that the depositary was not financially sound and that the committee was not beyond reproach."

Judge Cutting authorized the executor to pay \$60,000 to secure the return of the bonds from New York, where they have been held since the death of Mr. Yerkes.

W. W. Ross, of counsel for Mr. Owsley, said, regarding the decision: "There is nothing in the decision that need worry the reorganizers, or prevent the completion of their plans. The court has gone out of his way to indicate in giving his decision that he does not consider the bargain an unjust one, and he has practically said that when the executor comes to him with a definite offer for the immediate exchange of the bonds he considers that he has power to order the compounding of the claim, if he considers it an advantageous compromise. That is one of the principal points involved in the proceedings. I contend that Judge Cutting's decision is an aid to the consolidation plan."

Levy Mayer, of counsel for Mrs. Yerkes, who opposed the plan, said: "The reorganization committee must have the Yerkes bonds in order to apply them in payment for the property when it is foreclosed, and this was the entire controversy. The court denied the executor's petition and held that there was no power in court to permit the bonds to be deposited. This absolutely ends the reorganization plan. The committee can never utilize these bonds unless with the consent of Mrs. Yerkes, and unless these bonds can be used by the committee there is no possible way for the committee to buy the Consolidated property under the foreclosure of its mortgages. Any new plan will meet a similar fate."

Judge Grosscup, of the United States Circuit Court, appointed John M. Roach and David R. Forgan receivers of the Chicago North Shore Street Railway and the Chicago & Jefferson Urban Transit Company, on July 29. These



are two of the underlying companies of the Consolidated system.

Letters have been sent to holders of the Chicago Railways Company participation certificates, series I, asking them to write letters to the directors protesting against the plan for acquisition of the Consolidated property.

#### Interborough Rapid Transit Company Statement

The following comparative statement for the years ended June 30, 1910 and 1909, has been issued by the Interborough Rapid Transit Company of New York:

Year ended June 30.	1910.	1909.	Increase.
Gross operating revenue.....	\$28,987,648	\$26,524,394	\$2,463,254
Operating expenses.....	11,013,143	10,747,443	265,700
Net operating revenue.....	\$17,974,505	\$15,776,951	\$2,197,554
Taxes.....	1,750,422	1,799,807	49,385
Income from operation.....	\$16,224,083	\$13,977,144	\$2,246,939
Non-operating income.....	411,024	1,001,775	† 590,751
Gross income.....	\$16,635,107	\$14,978,919	\$1,656,188
Interest, rentals, etc., including Manhattan guarantee.....	10,552,960	10,389,096	163,864
Net corporate income.....	\$6,082,147	\$4,589,823	\$1,492,324
Dividends.....	3,150,000	3,150,000	.....
Surplus.....	\$2,932,147	\$1,439,823	\$1,492,324
Operating per cent.....	37.99	40.52	* 2.53
Passengers carried.....	562,788,395	514,680,342	48,108,053

\* Decrease. † The decrease in non-operating income is largely due to the policy inaugurated July 1, 1909, of not crediting to the income of the company the interest upon the advances made for the construction of the New York & Long Island Railroad tunnel.

#### Plan for Merger of Chicago Elevated Roads Postponed

Henry A. Blair, who has been conducting negotiations for a consolidation of the Chicago elevated railroads, returned to Chicago on July 27, after a visit to New York, and announced a postponement in the plan for combination of the properties.

Mr. Blair was quoted as follows:

"It is impossible to carry out a financial deal in New York at the present time, such as a merger of the Chicago elevated lines. While I was there the hotels seemed deserted and about everybody who could get away was in the mountains or at seaside resorts. As a result, I did not see the men I expected to hold conferences with. Moreover, there is a blue feeling in New York financial circles just now. Some ascribe it to the crop outlook, and others to legislation against corporations. Under such conditions it is out of the question to carry through an undertaking that involves many millions. I had plans with me for the combination of the elevated lines, but I did not have an opportunity to thrash them out with the men I wanted to see. I feel certain, however, that the deal will be carried out."

**Auburn & Turner Railroad, Turner, Maine.**—It is reported that the control of this company will be purchased by the Lewiston, Augusta & Waterville Street Railway, Lewiston, Maine.

**Binghamton (N. Y.) Railway.**—Gross earnings for the fiscal year ended June 30, 1910, were \$348,786, against \$331,776 in the preceding year. Operating expenses were \$200,253 as compared with \$193,518. Net earnings were \$148,533 last year and \$138,258 in the previous year. Taxes and interest were, respectively, \$15,599 and \$92,829 in the last year, as compared with \$15,126 and \$92,423 in the previous year. The surplus was \$40,105 in the 1910 year and \$30,709 in the 1909 year.

**Coney Island & Brooklyn Railroad, New York, N. Y.**—The New York Public Service Commission, First District, has approved the issue of \$489,539 of 4 per cent bonds under the mortgage executed on Dec. 15, 1904. The bonds are to be sold at not less than 80.

**Denison & Sherman Railway, Denison, Tex.**—The contract by which the J. F. Strickland Company, which controls the Texas Traction Company, operates also the Denison & Sherman Railway, will terminate on Aug. 15, 1910. At that time the owners of the Denison & Sherman Railway will again assume the direct management and operation of that road.

**Duluth (Minn.) Street Railway.**—A trust deed has been filed, securing an issue of \$2,500,000 of 20-year, 5 per cent bonds. The Central Trust Company, New York, is trustee.

**West End Street Railway, Boston, Mass.**—A petition to the Massachusetts Railroad Commission asks for approval of an issue of 27,800 additional common shares, par \$1,390,000. The proceeds are to reimburse the Boston Elevated Railway for cost of permanent additions and improvements. The Boston Elevated Railway has made permanent additions to the West End property from Oct. 1, 1907, to Sept. 30, 1909, amounting to \$2,777,237. The West End Company recently issued \$850,000 bonds, proceeds of which were applied in part payment to Boston Elevated for above improvements. From Oct. 1, 1909, to March 31, 1910, further improvements totaled \$165,396, so that the West End Company is now indebted to the Boston Elevated road for \$2,080,243, payment for which has been asked.

**Groton & Stonington Street Railway, New London, Conn.**—The annual report to shareholders presented by Thomas Hamilton, the president, at the annual meeting on July 21, shows gross earnings for the last fiscal year of \$112,230, as compared with \$108,740 for the previous year. Net earnings were \$56,022, as compared with \$53,699. Receipts from the express business were \$9,085, as compared with \$6,023 in the preceding year.

**International Traction Company, Buffalo, N. Y.**—Louisville, Ky., stockholders have pooled their interests, naming John W. Barr, Jr., president of the Fidelity Trust Company, and John C. Russell, as their representatives. The stock which they hold has been deposited with the Fidelity Trust Company.

**Metropolitan Street Railway, New York, N. Y.**—Judge Lacombe, of the United States Circuit Court, has authorized the receivers to pay the United States corporation tax on the various properties in the system.

**New York City Railway.**—Judge Lacombe, of the United States Circuit Court, has signed an order authorizing Receiver Ladd to sell at public auction stocks and bonds in his possession. The stocks and bonds to be offered include 693 shares Dry Dock, East Broadway & Battery Railway; 8002 shares Forty-second Street, Manhattanville & St. Nicholas Avenue Railway; 22 second mortgage income bonds Forty-second Street, Manhattanville & St. Nicholas Avenue Railway, due June 1, 1915; 5000 shares New York, Westchester & Connecticut Lighting Company, and 2500 first mortgage gold bonds, New York, Westchester & Connecticut Transit Company, due May 1, 1950.

**Ocean Shore Railway, San Francisco, Cal.**—F. S. Stratton, receiver, in a petition filed before Judge Van Fleet, of the United States Circuit Court at San Francisco, says that it will be impossible to run the road during the coming winter without loss, and that it is for the best interests of all concerned that the road and everything connected with it be sold immediately before any more expense is incurred. Mr. Stratton states that during the summer months the road can be operated at a profit, but during the winter months the loss is so great that it exceeds the income from the summer business. Since the receiver took charge the receipts from freight have increased, but those from passenger travel have materially diminished. The decrease is due to the fact that the future of the road is doubtful, and the exploitation and sale of lots in the towns along the line and adjacent thereto has greatly diminished. Total receipts since the receiver took charge on Dec. 9, 1909, were \$345,326, of which all but \$6.79 has been expended.

**Third Avenue Railroad, New York, N. Y.**—The New York Public Service Commission, First District, has disapproved of the reorganization plan of the bondholders' committee. A formal order of disapproval, however, will be held in abeyance, in order that the applicants may have an opportunity to amend their petition and submit proof that the present position of the company justifies the issue of the new securities proposed.

**Toledo (Ohio) Railways & Light Company.**—Robert C. Pev, vice-president of the Sun Oil Company, of Toledo, has been elected a director of the Toledo Railways & Light Company to succeed August Ropke, of Louisville, who resigned following his arrest on the charge of having embezzled funds of the Fidelity Trust Company, of Louisville.

# Traffic and Transportation

## Progress of Arbitration on Wages in Massachusetts

The hearings before the committee on arbitration in the investigation regarding wages on the lines controlled by the New England Investment & Security Company were completed on July 30, after six days of continuous sessions. C. W. Bosworth, Springfield, Mass., conducted the case for the company, and W. B. Fitzgerald, Troy, N. Y., represented the employees.

Mr. Bosworth pointed out that what other companies pay and the conditions of supply and demand for labor are vital considerations. When a company employs men the main point is what it must pay to get them, while with the men, the issue is whether they can get any job elsewhere which pays more. Henry C. Page, general manager of the Worcester Consolidated Street Railway, presented a comparison of wages covering 30 companies in Massachusetts. The comparison showed that on the whole there was not a company which in the long run paid as much as those in Springfield and Worcester, the two largest centers of the New England Investment & Security system. After 6 years' service not a company on the entire list had as favorable terms as those at Worcester and Springfield. In the seventh year the two cities named were from 1 cent to 1.5 cents per hour above the rest, and so in the eighth and ninth years. In the tenth year of service the Worcester and Springfield men obtain 25 cents per hour against 24.2 cents on the Boston Elevated Railway. In Maine and New Hampshire, Mr. Page said that the rates for a full day's work were materially lower, but in the case of an 8-hour day the rates were from 26 to 27 cents per hour on account of the small number of hours in question. In Vermont the rates were lower, with a range of from less than 20 to 22 cents maximum. In Connecticut the rate was somewhat below the Massachusetts standard. Only 5 roads in New England have as high wages as the Worcester and Springfield lines in the first six months, and as for the second 6 months of the first year, only one company equalled Worcester and but one Springfield. Mr. Page said that the Rhode Island Company's rate is pending before an arbitration board. At present the Providence rates are slightly higher than those of Worcester and Springfield, while the wages in Hartford and New Haven are in general slightly lower. Higher pay is given with each of two 5-year sleeve stripes on the Worcester and Springfield lines. The average length of service on the Worcester system is 3.8 years for conductors and 4.81 years for motormen. On the Worcester and Holden line it is 2.5 years average for both.

Comptroller J. T. Harmer of the New England Investment & Security Company stated that on the Westfield division of the Springfield company the average wages are 22.56 cents per hour, or \$13.54 per week, making \$703.94 per year per man, on the basis of 60 hours per week. Most of the men work more than 60 hours per week by asking for overtime. On all the Springfield lines the average is 22.81 cents per hour, or \$711.61 per man per year; on the Worcester and Southbridge, 22.63 cents per hour, or \$706.23 per man per year; on the Worcester Consolidated 23 cents per hour or \$717.60 per year; on the Marlboro and Westboro, 22.76 cents per hour, or \$710.41 per year; on the Worcester and Holden, 22.12 cents per hour, or \$690.33 per year; and on the Blackstone Valley, 21.52 cents per hour, or \$671 per year. In some cases motormen by working overtime made as much as \$21 to \$22.50 per week.

Mr. Fitzgerald interjected that at the end of a year all men should receive the same wages. In reply to this Mr. Bosworth brought out the points through Mr. Page that men of limited experience miss more fares and are liable to more accidents than the older employees.

General Manager Dickson, of the Springfield Street Railway Company stated that the yearly wages of the members of the employees' committee varied from \$651.74 to \$1011.73, which showed the capacity of the service for enabling a man to make a good living.

Mr. Bosworth introduced the report of the Massachusetts Bureau of Statistics of Labor for 1908, and showed that in the automobile industry the average wage was \$752.11; in the manufacture of agricultural implements, \$548.31;

baskets, rattan and willows, \$432; brick and tile, \$468.30; carriages and wagons, \$696.66. The yearly average of glass workers was \$828.53; malt liquors, \$880.73; refrigerators, \$776.64; scales and balances, \$761.18; and show cases, \$809.66. Mr. Bosworth said that employments containing many women were excluded and urged the greater permanence of street railway work.

Continuing, Mr. Harmer gave figures based on the average attained by the first 10 men in each class of employees. For the week ending April 8, Springfield conductors of the highest class received for regular and overtime sums varying from \$15 to \$21.12. Overtime varied from nothing to 13.5 hours. In the \$2.40 class of conductors the highest overtime was 12 hours per week and the highest weekly receipts per man \$19.68. For the \$2.35 class the highest overtime was 14 hours and the maximum receipts, \$19.74. For the \$2.05 class the figures were 14 hours and \$17.22. Motormen's wages varied as much as those of conductors.

Mr. Dickinson said that there was no system of distributing overtime among the men. No preference is given to the men of lowest pay, but the actual overtime is largely a matter of chance. The older men in service have a preference for the extra runs. The older men bid in the runs. In Springfield if a man works a short run of 9 hours he is paid for 10. Not enough men bid in for the theater extras to perform the service.

Mr. Harmer's data showed that in the week ending Oct. 8, 1909, the number of employees was 363 at Springfield, and these earned an average weekly wage of \$15.60, or \$811.20 per year. In April, 1910, the average weekly wage was \$15.16. Mr. Harmer said that the average wage obtained by dividing the total payroll by the total number of men was \$826.68 for Springfield. This included all employees and all earnings. In Worcester the average wages obtained by the men working 60 hours a week and 52 weeks per year was \$717.60, against \$703 for Springfield, taking the two without overtime. For the Springfield, Palmer and Westfield divisions the total average per man per week was 62 regular and 5.5 overtime hours. The average of day runs was about 9.5 hours; for night runs it was from 8 to 8.5 hours.

Mr. Dickson said that the morning extras tended to give the men more money than corresponded to the actual hours which were run, and the evening extras are as a rule run by the day men, who thus earn two or three hours' extra pay daily.

President Storrs said that the company is complying fully with the Massachusetts laws regarding the hours of labor of street railway employees.

Mr. Bosworth then presented additional data regarding the average wages paid in different industries, which in the main ranged from \$500 or \$600 per year. In wood turning and carving the wages averaged \$415 per year.

Mr. Dickinson stated that the company in Springfield had no difficulty in getting all the men it desired; it was, in fact, often embarrassed by too many applications for employment. The number is far in excess of the needs, and only the best men are put on the waiting list. Mr. Page said that the conditions were similar in Worcester.

Mr. Bosworth said that the United States Bureau of Labor of 1909 and the report of the Senate Committee on wages and commodities show that wholesale prices are lower than in 1907. He pointed out that in 1907 the present wage agreement was made, and at that time boarding house keepers were raising prices. He contended that the company's net earnings are decreasing and that it cannot stand the increase of wages desired by the men, although the gross earnings are increasing. Of 100 present motormen and employees who were in the Springfield company's service in 1907, 80 per cent. had received an increase in wages of from 4.16 to 15 per cent. in the last three years.

Final argument for the company was made by Mr. Bosworth. He stated that statistics in evidence showed that on May 1 no street railway in New England pays higher wages than the Worcester and Springfield companies, except the Boston & Worcester and the Milford & Uxbridge companies. On Jan. 1 the Rhode Island Company was the only one paying higher wages. The speaker argued at some length on the desirability of street railway work as an employment, compared with agricultural and other industrial occupations. Only two occupations in Springfield

pay their men over \$700 per year—brass casting and finishing and marble and stone working. In Hampden County copper smithing and sheet iron work are the only occupations which are more remunerative. The average yearly wages in Springfield for occupations employing mostly men are \$665, and in Hampden County only \$590. The Springfield Street Railway Company pays an average of at least \$826.28, and the men work little over 60 hours per week. The regular man in Worcester does slightly better. That is why there are so many applications for employment at the street railway offices in each city. The working principles of the street railway industry can be learned in three weeks, but the men improve greatly in the quality of the service as time goes on. Since efficiency increases with the years, the sliding scale of compensation is equitable. The supply and demand of conductors and motormen is ample for the company's needs.

Mr. Bosworth said that the company admits that the cost of living has increased, but claims that there is much humbug mixed with the truth. At the time the agreement of wages was made, three years ago, the wholesale prices were higher than ever before, and they fell materially afterward. Of the Springfield men 40 per cent are single, and it is probable that for these the cost of living has not increased materially. There was a tendency on the part of the employees not to answer the company's inquiries about their individual cost of living, although these were made entirely in the spirit of finding out what there was in the situation to remedy. The wholesale rate for beef in the last half year of 1907 was \$8.32; for half of 1908 it was \$7.90, and for the last six months of 1909 it was \$8.22. Mr. Bosworth said that if the cost of living should be made the basis of wages the social system would be wrecked. The present year is apparently normal with the Springfield system, but the company is falling behind in its power to pay dividends. The stock must be figured at the premium at which it was purchased. Six per cent is not an adequate return on an average investment of \$134. In Worcester, paying 6.5 per cent with a last surplus of but \$10,000, the surplus might be wiped out by a single costly accident. If wages are increased the money must come out of maintenance. President Storrs has denied absolutely having said that the company could afford to pay more wages. It is not equitable to take higher wages out of the dividends of the stockholders, who are not now receiving more than a fair return upon the money which they have put into the enterprise. As for taking the higher wages out of the public, every company in the country is confronted with the propositions of higher cost of operation and higher wages. It is very hard to raise fares or reduce facilities. It is nothing less than death in front and destruction in the rear. No satisfactory solution can be reached otherwise than by letting supply and demand do their work.

The closing argument was made by Mr. Fitzgerald, who reviewed the testimony which had been introduced on the cost of living. He contended that a man became fully competent earlier than the company maintained, and that the conditions of service were harder in street railway work than in other industries. He argued that the men should be paid 30 cents per hour and allowed to work six days per week. He quoted figures from the annual reports to prove that the company could afford to raise the wages. The committee then took the case under advisement.

**Lectures to School Children on Accident Prevention Planned in Seattle, Wash.**

George C. Carson, claim agent of the Seattle (Wash.) Electric Company, will ask permission of the board of school directors to have lectures delivered in all the public schools in Seattle in the coming year. The lectures will be part of a campaign against accidents, like that which has been conducted successfully in Portland, Ore.

In an interview, discussing his plans, Mr. Carson said: "The effort to train school children to avoid moving street cars and other traffic is becoming nation wide, and so successful has the work been so far and so gratifying have been the results that as soon as possible I will lay my plan before the Seattle school board.

"In Portland the school children and teachers have organized the Portland Safety Society League. Each member

pledges himself or herself to do all possible to save life and limb, first, by using caution in crossing streets where cars are operated, in not crossing ahead of moving cars at all times and, most of all, by example and precept to induce others, and especially little children, to refrain from running or playing in streets where there is constant danger.

"Many of the accidents are due to that mysterious desire of young and old to jump across the tracks in front of a car in the belief that they can get ahead of the car. A great percentage of much of the danger from this cause, it has been demonstrated, can be eliminated by training the children to stand still until the car has passed by and all danger is gone.

"In Portland, as elsewhere, where safety leagues have been organized, the children have been trained also to do their playing and running remote from the street car tracks. It is planned to have well-informed lecturers on these matters speak in all the schools of Seattle during the coming school year and thereafter, if, as is expected, our plan meets the approval of the school authorities, which has been given gladly in other cities."

Lectures on the prevention of accidents are delivered to the trainmen of Seattle each week.

**Accidents in New York City in June**

The New York Public Service Commission, First District, has issued the following report of accidents during June, 1910, as compared with 1908 and 1909:

	June 1908	June 1909	June 1910
Car collisions .....	167	124	118
Persons and vehicles struck by cars.....	1070	928	937
Boarding .....	707	614	707
Alighting .....	1252	1022	1103
Contact electricity .....	50	34	26
Other accidents .....	2493	2161	2135
<b>Totals .....</b>	<b>5739</b>	<b>4883</b>	<b>5086</b>
<i>Injuries.</i>			
Passengers .....	2517	2148	2423
Not passengers .....	639	527	485
Employees .....	634	518	610
<b>Totals .....</b>	<b>3790</b>	<b>3193</b>	<b>3518</b>
<i>Serious (Included in above).</i>			
Killed .....	42	30	27
Fractured skulls .....	16	9	10
Amputated limbs .....	10	4	8
Broken limbs .....	40	33	39
Other serious .....	194	135	175
<b>Totals .....</b>	<b>302</b>	<b>211</b>	<b>259</b>

**Transit Affairs in New York**

Mayor Gaynor, of New York, contributes an article to the *Outlook*, in which he says: "The subway question in the city of New York has now reached a critical point. It needs to be considered in the most even temper of mind, without acrimony or spirit of contention. We are at the parting of the ways. Shall we construct another subway line, disconnected from and independent of the city's present subway system, or shall we construct the natural extensions and branches of the present subway system, and keep on doing so in the future, so that we shall have one growing general system, with a single fare, as was designed from the beginning?"

Stephen M. Hoye, president of the New Jersey & Staten Island Junction Railroad, has announced that plans are under consideration for the construction of a subway to connect the Fourth Avenue (Brooklyn) subway at Eighty-sixth Street with Stapleton, Staten Island.

**Improvements for Employees at Omaha.**—The Omaha & Council Bluffs Street Railway will install pool tables and libraries for employees at four car-houses.

**Transportation and Theater Tickets Combined.**—The People's Railway of Wilmington, Del., has started the operation of special cars to Brandywine Springs Park in the evenings. A charge of 25 cents, which is made on the cars, covers transportation in both directions and admission to the theater at the park.

**Traffic Ordinance in Seattle, Wash.**—A new traffic ordinance effective in Seattle, Wash., beginning on Aug. 12, requires that the speed of street cars in the crowded districts is not to exceed 12 m.p.h. All vehicles must be

kept at least 6 ft. from the steps of a car which is taking on or discharging passengers.

**Strike in Rutland, Vt.**—Thirty trainmen of the Rutland (Vt.) Railway, Light & Power Company struck on July 30 because of the refusal of the company to grant the wages asked. The men have been receiving 18 and 20 cents an hour and asked for a flat rate of 25 cents. The company was prepared for this action and operated the cars.

**Operating Agreement in New Jersey**—The Morris County Traction Company, Morristown, N. J., has made an agreement with the Public Service Railway whereby cars of the former company are operated from the Elizabeth City line at Union Township to the Elizabeth station of the Central Railroad of New Jersey over the tracks of the Public Service Company.

**Collection of Fares Urged in Sioux City, Ia.**—A bulletin has been posted in the car house of the Sioux City Service Company, Sioux City, Ia., directing conductors to collect fares in the future from members of the families of employees. Attention was also called to the order forbidding newspaper carriers to ride to the ends of their routes without the payment of fare.

**Operation of Car Between Schenectady and Troy, N. Y.**—The Public Service Commission, Second District, has closed upon its records the complaint of G. P. German, and other employees of the General Electric Company, as to the operation of a limited car by the Schenectady Railway on week-day evenings from Schenectady to Troy. Arrangements have been made for the operation of the limited car in advance of the local car running between these cities.

**Waiting Room Needed No Longer**—The Public Service Commission of the Second District of New York has authorized the Poughkeepsie City & Wappingers Falls Electric Railway, Poughkeepsie, N. Y., to discontinue the waiting room on the Hospital Branch of the Central New England Railway at North Street, Poughkeepsie. The Hospital Branch is now operated by electricity and the waiting room and shelter will no longer be used or required.

**Service Stripes in Portland, Ore.**—The Portland Railway, Light & Power Company, Portland, Ore., has adopted the plan of having its employees wear service stripes to indicate to the public their length of service with the company. For each year of service up to four years one silver stripe will be worn. For five years' service one gold stripe will be worn, an extra gold stripe to be worn for every additional five years of service.

**Abandonment of Portion of Buffalo Line Approved**—The Public Service Commission of the Second District of New York has approved the abandonment of that portion of the route of the Crosstown Street Railway in Buffalo, in Kehr Street between French Street and Genesee Street. The Common Council of Buffalo has consented to this abandonment and the property owners whose property abuts upon that portion of the route have also consented to it.

**Wages Increased by Winona, Ind., Companies.**—The Winona Interurban Railway and the Winona & Warsaw Railway have announced increases in the wages of trainmen. The new schedule, showing the wages per hour, is as follows: Winona Interurban Railway—First six months, 18 cents; second, 19 cents; third, 20 cents; fourth, 21 cents; fifth, 22 cents; sixth, 23 cents; seventh, 24 cents. Winona & Warsaw Railway—First year's service, 17½ cents; second, 18 cents; third, 19 cents; fourth, 20 cents; fifth, 22 cents.

**New Ordinance Regulating Smoking on Los Angeles Cars.**—Notice has been given by the Los Angeles Railway that smoking will be permitted only on the front platforms, beginning July 28. Employees of the company are instructed to call the attention of the passengers violating a new ordinance on this subject to the fact that they are disobeying the law. If passengers refuse to go to the front platform or to discontinue smoking, employees of the company are instructed to stop the car at the next crossing and notify a policeman.

**Electric Railway Accidents in Pennsylvania.**—Seventeen people were killed and 359 injured on the electric railways of Pennsylvania during May, 1910, according to statistics compiled by the Pennsylvania State Railroad Commission. Of the killed, one was a passenger, and of the injured, 191

were passengers. During May, 1909, 14 people were killed, 3 of whom were passengers, and 379 injured. Of the latter 243 were passengers. Two employees were killed and 16 injured in May, 1910. In May, 1909, no employee was killed, but 23 were injured.

**Five-Cent Fare Claimed in Long Beach, Cal.**—J. McMillan, general manager of the Pacific Electric Railway, has addressed a letter to City Clerk Boynton, of Long Beach, Cal., stating that he does not know of any violation of franchises under which the lines were built. The city council, in accordance with its interpretation of the franchise ordinances, has ordered the city attorney to take steps to compel the company to establish a 5-cent fare in all parts of Long Beach. The city covers a larger area than when the franchises were granted. Mr. McMillan asks for particulars regarding the property which the city council believes to be entitled to a 5-cent fare.

**New Folder Issued by Suburban Lines at Boston**—The Middlesex & Boston Street Railway, Newtonville, Mass., has issued a folder in which points of interest on its lines are described under the title "Around the Hub by Trolley." The folder contains a map of the Middlesex & Boston Street Railway and the Lexington & Boston Street Railway, a large bird's-eye view of Norumbega Park and the Charles River in colors and attractive photographs of the new theatre at Norumbega Park and of points reached by the company's lines. Attention is called to the advantages of special car service. A list of picnic grounds is also included in the publication and the relation of the company's lines to others in the vicinity is indicated.

**Request for Rehearing Denied by Commission.**—The Public Service Commission, Second District, has denied the application made by the Warren & Jamestown Street Railway for a rehearing on the complaint of Wright Broadhead, and others. The commission made an order requiring that just and reasonable service be given by this company and that it be required to stop passenger cars at a point in the town of Kiantone. The commission states that upon the hearing in the case the principal defense made upon the merits was that making the stop required would affect the time schedule of the railroad, also be injurious to its power plant. The company asked for a rehearing upon the ground that the commission had no power to make the order in question, and that the stop was ordered on a private right of way where the statute of the state requires fences to be erected.

**Traffic Conditions in Schenectady.**—Traffic conditions in Schenectady, N. Y., were considered on July 21, at a meeting of aldermen and various city officials, with E. F. Peck, general manager of the Schenectady Railway, and Bertram Penoyer, engineer of maintenance of way. The report of the New York Public Service Commission, Second District, containing various recommendations, was read. The representatives of the company tendered a plan involving changes in routes which they thought would relieve the situation greatly. Mr. Penoyer said that the company was negotiating for the installation of an electric switch. The aldermen voted to invite Commissioners Carlisle and Sague, of the Public Service Commission, to go to Schenectady and have a meeting with the city officials and representatives of the railway company in order to consider the existing conditions.

**Transfers on Staten Island.**—Justice Lester W. Clark, of the Supreme Court, has granted a writ of mandamus requiring the Richmond Light & Railway Company and the Staten Island Midland Railway, Staten Island, New York City, to exchange transfers at three points in West New Brighton. Complaint had been made to the Public Service Commission of the First District of New York in the spring of 1909 by a committee of the Staten Island Chamber of Commerce. Commissioner McCarroll, to whom the matter had been referred, found that an exchange of transfers was required under the terms of an agreement between the two railroads and New Brighton. The joint use of the tracks was held to be an additional reason for requiring transfers under the terms of section 104 of the Railroad Law. On June 4, 1909, the commission adopted an order requiring an exchange of transfers. The companies having failed to obey the order, on Oct. 23, 1909, the counsel to the commission was instructed to appeal to the Supreme Court to secure compliance with the order.

## Personal Mention

**Mr. Norman E. Pilcher** has been appointed general manager of the Sherbrooke (Que.) Street Railway.

**Mr. H. C. Allen** has resigned as general passenger agent of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y.

**Mr. E. H. Clark** has resigned as master mechanic of the Cleveland & Erie Railway to accept a similar position with the Indianapolis, New Castle & Toledo Electric Railway, New Castle, Ind.

**Mr. C. R. Phenciee**, electrical engineer of the Chicago & Milwaukee Electric Railroad, will, in addition to his present work, assume the duties of master mechanic. That position has been made vacant by the resignation of Mr. Walter Silvus.

**Mr. J. H. Leary** has been appointed assistant manager of the Central California Traction Company, Stockton, Cal. Mr. Leary was formerly chief train dispatcher of the Southern Pacific Railroad under Mr. J. D. Brennan, division superintendent.

**Mr. Charles E. Fife** has been appointed superintendent of the Pittsburg, McKeesport & Greensburg Railway, Greensburg, Pa., to succeed Mr. M. A. Coffey, who has been appointed superintendent of transportation of the West Penn Railways, Pittsburg, Pa.

**Mr. J. P. Alexander**, purchasing agent of the Wheeling (Va.) Traction Company, has retired from the company. His resignation was accepted with regret. Mr. Russell Poe has assumed the duties of purchasing agent to fill the vacancy caused by Mr. Alexander's resignation.

**Mr. W. B. Wright** has resigned as auditor of the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., effective Aug. 1. Mr. Wright will enter newspaper work with his brother, Mr. N. Wright, publisher of the *Toledo Blade* and *Cleveland Leader*. Mr. Wright has been auditor of the Indianapolis & Cincinnati Traction Company since August, 1905, and previous to that he was connected with the *Indianapolis Journal*. Mr. F. T. Loftus, chief accountant of the Indianapolis & Cincinnati Traction Company, has been appointed acting auditor to succeed Mr. Wright.

**Mr. Wayne Hendricks**, superintendent of the railway department, Sterling, Dixon & Eastern Electric Railway, Dixon, Ill., has been appointed assistant to Mr. E. H. Vivian, traffic manager of the Chicago & Milwaukee Electric Railroad, Highwood, Ill. Mr. Hendricks has been connected with the Sterling, Dixon & Eastern road for two years, and previous to that time was in the operating organization of the Wisconsin Electric Railway, Oshkosh, Wis.

**Mr. Walter Silvus** has been appointed master mechanic of the Michigan United Railways, with headquarters at Jackson, Mich. During the last year Mr. Silvus has been master mechanic of the Chicago & Milwaukee Electric Railroad. Mr. Silvus began his railroad career with the Baltimore & Ohio Railroad in 1893, remaining with that company for 10 years. He then accepted the position of shop foreman with the Chicago, Lake Shore & Eastern Railroad at Chicago. He resigned that position in January, 1904, to become general inspector of the Twin City Rapid Transit Company, Minneapolis, Minn., where he remained until the fall of 1909, when he went with the Chicago & Milwaukee Electric Railroad as master mechanic.

**Mr. C. D. Phillipp**, who was recently appointed trainmaster of the Oregon Electric Railway with headquarters at Portland, Ore., began railroad work in 1902 with the Chicago & Alton Railway at Bloomington, Ill., as operator, station agent and later as train dispatcher. Mr. Phillipp resigned this position a year later to become connected with the Peoria Railway Terminal Company, Peoria, Ill., as train dispatcher. In this capacity Mr. Phillipp served seven months when he was promoted to the position of chief dispatcher with the same company, a position he held until Jan. 1, 1907, when he was appointed trainmaster. Mr. Phillipp resigned that position in October, 1907, to become chief dispatcher of the Oregon Electric Railway, Portland, Ore.

**Mr. J. W. Brown** has resigned as superintendent of transportation of the West Penn Railways, Connellsville, Pa., to become connected in a similar capacity with the Aurora, Elgin & Chicago Railroad, with headquarters at Wheaton, Ill. The appointment goes into effect Aug. 10. Mr. Brown succeeds Mr. B. E. Merwin, who has been promoted to the position of general superintendent of the Aurora, Elgin & Chicago Railroad, a position just created. Mr. Brown entered the service of the McKeesport, Wilmerding & Duquesne Railway nearly 12 years ago, as night car inspector, also serving as electrician and later as power station engineer. When the Pittsburg, McKeesport & Connellsville Railway, Pittsburg, Pa., was formed, Mr. Brown was made master mechanic of the McKeesport division of that road, and later he was promoted to the position of division superintendent. Seven years ago, when a transportation department was formed, Mr. Brown was placed in charge.

**Mr. Louis P. Baurhenn**, formerly superintendent of the New Jersey & Hudson River Railway & Ferry Company, which has recently been acquired by the Public Service Railway, Newark, N. J., has been retained by that company in his former capacity, in charge of the Bergen division, as the new division will now be known. Mr. Frederick W. Bacon, who was general manager of the Hudson Company, has been assigned to special duty in the office of Mr. R. E. Danforth, general manager of the Public Service Railway, and Mr. William N. Barrows, third vice-president and treasurer of the old company, has been retained, with headquarters in Edgewater, to care for such matters as have been in his charge. Mr. Joseph McCarthy, auditor of the Hudson Company, has been assigned to the general auditor's office, and Mr. Louis Helm, superintendent of ferries, under the old management, is to take a new position. Mr. Edgar Van Name, now in charge of the Bergen Point ferry, will succeed Mr. Helm, and operate both ferries. Mr. George J. Porter, master mechanic of the old company, has been assigned to duty at the Plank Road shops.

**Mr. William A. Heindle** has been appointed manager of railways for the Wilmington & Philadelphia Traction Company and the Southern Pennsylvania Traction Company, with headquarters at Wilmington, Del. Mr. Heindle was graduated from the Lehigh University, with the degree of civil engineer, in 1891. Following his graduation, Mr. Heindle was connected until 1894 with the engineering department of the Baltimore City Passenger Railway in the construction of cable and overhead trolley roads. During the next six years Mr. Heindle was engaged in the construction of conduit and overhead roads in Washington, D. C., and part of that time he served as operating superintendent and engineer of maintenance of way. In 1900 Mr. Heindle severed his connection in Washington to become associated with J. G. White & Company, Ltd., London, Eng., on engineering and construction contracts in Great Britain and Europe. From 1906 until he received his present appointment Mr. Heindle was supervising and street railway engineer with J. G. White & Company, Inc., New York, on the supervision of railway construction and equipment, especially for the Tri-City Railway & Light Company.

### OBITUARY

**James Heywood**, superintendent of lines and cables of the Philadelphia Rapid Transit Company, died July 31 from complications following an unsuccessful operation. Mr. Heywood was born in Bolton, England, 35 years ago and came to this country at the age of five years. He was graduated in 1892 from the Central Manual Training School and immediately entered street railway work in Baltimore, Md. He returned to Philadelphia in 1893 to accept a position with the People's Traction Company, one of the companies later absorbed by the Philadelphia Rapid Transit Company. While very young, Mr. Heywood had been engaged in street railway work for 17 years. His department, lines and cables of the Philadelphia Rapid Transit Company, had been brought under him to a stage of efficiency which made it a model for other systems. Mr. Heywood was chairman this year and also last year of the committee on power distribution of the American Street & Interurban Railway Engineering Association, an associate member of the American Institute of Electrical Engineers and a member of the Railway Signal Association.

# Construction News

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

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

## RECENT INCORPORATIONS

**\*Sterling-Moline Traction Company, Prophetstown, Ill.**—Incorporated in Illinois to build a railroad from Sterling to Prophetstown. Capital stock, \$100,000. Principal office, Sterling. Among the directors are: Joseph Wright, Rock-falls; A. R. Lewis, Morrison; C. P. Sturtevant, Erie; W. McNeil, Prophetstown; Geo. A. Allen, J. W. Harpham and Augustus G. Van Petten, Sterling, Ill.

**\*Valley Park, St. Louis & Eastern Railway, Springfield, Ill.**—Incorporated in Illinois to build a railway starting on the Mississippi River, opposite St. Louis, and extending to a point on the Indiana line in Iroquois County. Capital stock, \$100,000. Incorporators: William C. Plass and Armond R. Plass, St. Louis; Charles Neustadt and John Suess, East St. Louis, and Henry Schrader, Belleville.

**Summit-McComb Motor Line Company, Summit, Miss.**—Application for a charter has been made by this company to build a 6-mile railway to connect Summit, McComb and Godbold Mineral Wells. Capital stock, \$40,000. Officers: T. Blackmore, president and treasurer; Dr. V. Simmons, vice-president; Clem V. Ratcliff, secretary and general manager. [E. R. J., June 18, '10.]

**\*Northwestern Traction Company, Erie, Pa.**—Application will be made on Aug. 29 by this company for a charter to build an electric railway in Pennsylvania. The definite route has not been announced. Incorporators: F. M. Wallace, Chas. E. Shenk, E. G. Germer, M. H. Taylor, Chas. S. Clarke, C. H. Strong, F. D. Schultz, Geo. R. Metcalf, R. W. Potter and S. C. Walker. James Burke, president.

## FRANCHISES

**Mason City, Ia.**—The Mason City & Clear Lake Railway has been granted permission by the Commissioners of Cerro Gordo County to build an electric railway along and upon the highway extending north from Mason City.

**Westminster, Md.**—The Baltimore & Pennsylvania Railway & Power Company, Annapolis, has been granted the right of way by the County Commissioners of Carroll County to build its tracks along the Reistertown and Hanover turnpike. At Reistertown the line will connect with the Emory Grove line of the United Railways, and in Pennsylvania it will connect with the Hanover and York systems near Melrose. When this line is completed it will connect Washington, Baltimore, York and Hanover. J. Pierce Burns, president. [E. R. J., May 28, '10.]

**Great Barrington, Mass.**—The Berkshire Street Railway, Pittsfield, has asked the Council for a franchise to build a railway in Great Barrington. This will be part of a 4-mile extension of this railway from the end of the line in Great Barrington to South Egremont.

**\*St. Charles, Mo.**—O. J. Martin has asked the City Council for a franchise to build a 5-mile railway over certain streets in St. Charles.

**Buffalo, N. Y.**—The Buffalo & Lake Erie Traction Company has asked the Council for a franchise to double-track East Sixth Street, East Twelfth Street, and all the lines near East Park, in Buffalo, in order to serve the workers of the new plant of the General Electric Company.

**\*Niagara Falls, N. Y.**—The Frontier Electric Railway has been granted a franchise by the Common Council to build a railway over certain streets in Niagara Falls. A similar franchise is asked by this company in North Tonawanda.

**Salina, N. Y.**—The Syracuse & South Bay Electric Railroad, Syracuse, has asked the Town Board for a franchise to build a railway over certain streets in Salina.

**Fostoria, Ohio.**—The Fostoria & Fremont Electric Railway has been granted a 25-year franchise by the County Commissioners to build a 21-mile electric railway across the public highways connecting the Lake Shore Electric Railway and the Ohio Western Electric Railway. This is part of a plan to build a railway from Fostoria to Fremont via Havens, Burgoon, Kansas and Amsden. J. D. McDonel, secretary. [E. R. J., July 9, '10.]

**Stratford, Ont.**—The bylaw granting certain franchise privileges to the electric street railway about to be constructed and operated in Stratford and vicinity was carried on July 29 by a substantial majority. It is understood that the railway is backed by Canadian Pacific Railway capital, thus giving the city connections with that system.

**Ashland, Ore.**—John R. Allen, representing Southern Oregon Railway & Power Company, Albany, has asked the Council for a franchise to build an electric railway in Ashland. This projected railway will extend through the Rogue River Valley and Southern Oregon. [E. R. J., June 25, '10.]

**Eugene, Ore.**—The Oregon Electric Railway, Portland, has been granted a franchise by the Council to build an extension of its lines through Eugene.

**\*Erie, Pa.**—The Northwestern Traction Company has asked the Council for a franchise to build an electric railway in Erie. James Burke, president.

**Philadelphia, Pa.**—The Philadelphia Rapid Transit Company will apply to the Council for a franchise to extend its railway from Chester Avenue, Yeadon, to the Sixty-ninth Street terminal.

**\*Moose Jaw, Sask.**—A. A. Dion and Newton J. Ker have been granted a 20-year franchise to build a 6-mile railway in Moose Jaw. John B. McRae, Ottawa, Ont., and Hector A. Dion will supervise the construction of the line.

**Columbia, S. C.**—The Columbia Electric Street Railway Light & Power Company has asked the City Council for a franchise to double-track and extend some of its lines in Columbia.

**Memphis, Tenn.**—The Clarksdale, Covington & Collierville Interurban Railway has asked the Council for a franchise to build 9½ miles of track in Memphis.

**Greenville, Tex.**—S. A. Price, H. J. Meyers, Dayton, Ohio, and associates, have been granted a franchise to build a 5-mile electric railway in Greenville. [E. R. J., April 2, '10.]

**Salt Lake City, Utah.**—The Salt Lake & Ogden Railway has asked the Council for a franchise to operate steam and electric cars through Salt Lake City.

**Bellingham, Wash.**—The Bellingham-Skagit Railway has been granted a franchise by the Council to construct an electric railway over certain streets in Bellingham. It is the intention to build an interurban railway to connect towns in Bellingham and Skagit County. Chas. M. Drummond, president. [E. R. J., July 30, '10.]

**Wheeling, W. Va.**—The City & Elm Grove Railroad has been granted a 1-year extension of its franchise for building a loop around Park View.

**Appleton, Wis.**—The Milwaukee & Fox River Valley Railway, Fond-du-Lac, has been granted a certificate of convenience and necessity by the State Railroad Commission which assures Milwaukee of an electric railway from Appleton to Milwaukee, via Hamilton, Cedarburg, Newburg, Plymouth, Chilton, Stockbridge, Appleton, Kaukauna and Fond-du-Lac.

**Madison, Wis.**—The Chicago & Wisconsin Valley Railroad, Madison, will ask the City Council for a franchise to build an electric railway in Madison. This is part of a plan to build a railway to connect Janesville and Merrill via Friendship, Easton, Portage, Lodi, Middleton and Madison. Allen T. Russell, Chicago, general manager. [E. R. J., June 4, '10.]

**Milwaukee, Wis.**—The Milwaukee Western Electric Railway has asked the Aldermen for a franchise to build a railway in Milwaukee.

## TRACK AND ROADWAY

**Texarkana Gas & Electric Company, Texarkana, Ark.**—This company expects to extend its Rose Hill line 1½ miles to the plant of the Union Glass Company.

**British Columbia Electric Railway, Ltd., Vancouver, B. C.**—This company has just completed and put in operation its 5-mile extension to Chilliwack.

**Northern Electric Railway, Chico, Cal.**—This company is at work ballasting 20 miles of track from Alamos to Sacramento.

**Hanford & Summit Lake Railway, Hanford, Cal.**—This company has let a contract to Libby & Heins, Santa Cruz, for building 18 miles of track from Hanford, Grangeville

and Hardwick to Summit Lake. Work is to be started at once. Maximum grades will be 0.3 per cent and maximum curvature 3 deg. There will be 1500 ft. of pile trestle work. J. B. Rogers, Hanford, chief engineer. [E. R. J., July 16, '10.]

**Los Angeles-Pacific Company, Los Angeles, Cal.**—This company is said to be completing financial arrangements for the construction of the double track subway electric railway to connect Santa Monica, Ocean Park and Venice. The plans of the company are also said to include the building of a terminal and office building. [E. R. J., July 2, '10.]

**Pacific Electric Railway, Los Angeles, Cal.**—This company has started the construction of its 7-mile extension from Covina to San Dimas. Robert Sherer & Sons are the contractors. It has also nearly completed its four-track system from the Indian village to Oneonta Park, which will soon be ready for operation.

**\*Riverside, Cal.**—Press reports state that southern California capitalists are considering plans to build an electric railway to connect Chino, Riverside and Los Angeles and also construct a loop line which will connect Riverside with all the important towns of the county. A. C. Denman is said to be interested.

**Middle Georgia Interurban Railway, Atlanta, Ga.**—This company has been authorized by the Railroad Commission to issue \$100,000 of stock and \$50,000 of bonds for its projected 70-mile electric railway from Griffin to Social Circle via Jackson, Indian Springs and Monticello. [E. R. J., Mar. 5, '10.]

**\*Dalton, Ga.**—F. T. Reynolds and associates are said to be interested in promoting an interurban railway to connect Dalton and Chattanooga, Tenn.

**\*St. Anthony, Idaho.**—Mr. Sewel, and associates are said to have taken preliminary steps for promoting a 40-mile railroad in Fremont County to connect St. Anthony, Sugar and Rexburg. Proposed plans contemplate a capitalization of \$1,000,000.

**Eastern Illinois Railway, Chicago, Ill.**—This company, recently incorporated, has just been organized. It has filed a trust deed in favor of the First Trust and Savings Bank, trustee, to secure an issue of \$5,000,000 in bonds. This 16-mile railway will connect West Hammond, Harvey and Riverdale. T. E. Mitten, president. [E. R. J., Mar. 19, '10.]

**\*Columbus, Ind.**—N. B. Brandenburg, Columbus, is promoting the formation of a company which is to build an electric line between Columbus and North Vernon, a distance of 14 miles. The abandoned roadbed of the Baltimore & Ohio Southwestern Railway, which is graded and ballasted, will be used.

**Citizens' Railway & Light Company, Muscatine, Ia.**—This company has been requested by the City Council to practically rebuild its entire line within the limits of brick paving in Muscatine.

**Manhattan City & Interurban Railway, Manhattan, Kan.**—This company is considering plans for extending its line to Junction City. Surveys have been made on the reservation at Fort Riley, in order to apply to the War Department for a right of way.

**Louisville (Ky.) Railway.**—This company is said to have developed tentative plans for the extension of several of its lines. The Brook Street Line is to be extended farther south into a district which has inadequate facilities so as to provide a through east and west line in the southern part of Louisville. Work on the latter project is awaiting the completion of a viaduct being constructed by the railroads and the city.

**\*Canaan, Maine.**—It is reported that the citizens of Canaan are planning to build an electric railway to connect Hinckley and Canaan, a distance of 5 miles.

**\*Joplin, Mo.**—Franklin Smith, who is promoting a gas-line-motor line to connect Joplin, Mo., and Miami, Okla., is said to have let the contract for the construction of this railway to the Clarke Marshall Construction Company. Work will soon be started at Hattonville and proceed towards Joplin. This line will eventually reach Bartlesville.

**St. Joseph & Savannah Railway, St. Joseph, Mo.**—This company has awarded the contract to H. A. Klepper, Kansas City, for building the bridge across Dillon Creek.

The structure will be 540 ft. long and 100 ft. above the creek bed. John H. Van Brunt, St. Joseph, president.

**St. Louis-Kansas City Electric Railway, St. Louis, Mo.**—It is reported that this company will let contracts Oct. 1 to build its proposed 250-mile railway to connect St. Louis and Kansas City via Blue Springs, Oak Grove, Odessa, Higginsville, Marshall, Arrowrock, New Franklin and Columbia. The line is to be double tracked. Maximum curvature is to be 4 deg. D. C. Nevins, president. [E. R. J., July 30, '10.]

**Jamestown, Chautauqua & Lake Erie Railroad, New York, N. Y.**—This company, whose line extending from Westfield to Jamestown, N. Y., 37½ miles, is operated by the Buffalo & Lake Erie Traction Company, has applied to the Public Service Commission, Second District, for permission to electrify it. The road has been operated by steam and presumably the freight traffic will continue to be handled in this manner.

**Rochester, Syracuse & Eastern Railway, Rochester, N. Y.** Press reports state that this company plans to build an extension from Geneva to Port Gibson via Oak Corners, Phelps and Clifton Springs. At Port Gibson it will connect with the main line. Surveys are now being made and construction will soon start.

**Slippery Rock & Grove City Railway, Grove City, Pa.**—A. E. De Mayo Company, which has the contract for the building of this line, have sublet 3 miles of grading on the Slippery Rock section, also the entire concrete construction work to W. D. Shaner, Beaver. W. J. Eury, Butler, has been awarded the contract to furnish 24,000 ties. All contracts have been let except for structural steel, ballasting and rolling stock. Nearly 4 miles of grading has been completed as far as Barrmore Lake, and this section is now ready for ties. The line will be 9 miles long and will connect Slippery Rock and Grove City. Four gasoline motor cars will be operated upon the completion of the line. James A. Joliffe, secretary. [E. R. J., July 30, '10.]

**Philadelphia & Western Railway, Philadelphia, Pa.**—It is reported that this company will soon build an extension from Villanova to North Wales via Norristown.

**Tarentum, Pa.**—Press reports state that an electric railway will be constructed from Tarentum to Saxonburg and to connect with the Butler & Harmony street railway lines at Mars. Surveys have already been made. Paul Rudert, Saxonburg, is one of the promoters.

**York (Pa.) Railways.**—This company will complete double tracking North Penn Street for which it has been granted a franchise and will also double track the curve at the north-east corner of Market Street and Penn Street as soon as it obtains a franchise from the Council.

**Chattanooga Railway & Light Company, Chattanooga, Tenn.**—This company has been granted an amended charter permitting it to build several new lines in Chattanooga and beyond the city limits.

**Brownwood (Tex.) Southwestern Railway.**—This company has completed surveys and has secured financial backing for its proposed 30-mile railway from Brownwood to Rockwood. It is said the company will build this railway itself. W. S. Walker, Granbury, is interested. [E. R. J., Sept. 19, '08.]

**San Marcos, Tex.**—O. E. Metcalfe has begun the preliminary survey of the street railway to be built in San Marcos. A franchise has recently been granted and it is expected to have the line in operation by Jan. 1. C. L. Hopkins, San Marcos, promotor. [E. R. J., Mar. 5, '10.]

**Richmond & Henrico Railway, Richmond, Va.**—This company has executed a trust deed securing an authorized issue of \$2,500,000 of 5 per cent. gold bonds dated May 2, 1910, and due July 1, 1930, but redeemable at 105 on any interest day. The Union Trust Company, Ltd., Toronto, is trustee. W. S. Forbes, president. [E. R. J., June 18, '10.]

**\*Chehalis, Wash.**—C. Lewis Wilson and W. H. Allen, Chehalis, have secured right-of-way necessary to build an electric railway from Chehalis to Randle via Forest Ethel, Salkum, Silver Creek, Mossyrock and Riffe. It is said eastern capitalists will furnish \$3,000,000 to build this line.

**Chicago & Wisconsin Valley Railroad, Milwaukee, Wis.**—This company has awarded the contract for building its Madison-Stevens Point section to Hornaday & Company

and the Western Indiana Construction Company, Indianapolis. Ultimately, according to plans, the road will be built from Jamestown to Madison and from Stevens Point to Merrill. It is said financial backing will be available as soon as franchises and rights-of-way are secured for this proposed 16-mile railway to connect Janesville, Friendship, Easton, Portage, Lodi, Middleton, Madison and Merrill. Allen T. Russell, manager. [E. R. J., June 4, '10.]

### SHOPS AND BUILDINGS

**Northern Electric Railway, Chico, Cal.**—This company has recently completed a new depot at Thermalito, and work is progressing on a structure at Nicolaus. It will soon start the construction of a new station at Live Oak.

**Cincinnati (Ohio) Traction Company.**—This company reports that it expects to build car storage houses and repair shops on a 6-acre tract of land on Baltimore & Ohio Railroad and Mitchell Avenue, Cincinnati, Ohio. Walter A. Draper, Cincinnati, secretary.

**Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.**—This company has started the construction of a new car house at Niles.

**Oregon Electric Railway, Portland, Ore.**—This company has purchased additional property between Clay Street and Montgomery Street at Portland, adjoining its present terminals, on which it will build new freight terminals.

**Aberdeen (S. D.) Street Railway.**—This company, it is reported, will at once begin the building of car houses in Aberdeen. Estimated cost is \$100,000. Charles N. Herreid, Aberdeen, general manager.

### POWER HOUSES AND SUBSTATIONS

**Great Falls & Old Dominion Railway, Washington, D. C.**—This company is said to be increasing the capacity of its plant at a cost of about \$50,000.

**United Railways & Electric Company, Baltimore, Md.**—This company is increasing the capacity of its power plant by the installation of a 9000-kw turbo unit.

**Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.**—This company reports that it expects to soon purchase stokers for a 3275-hp power house located at Elyria; also coal and ash handling apparatus. E. F. Schneider, Cleveland, general manager.

**Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.**—This company is building a new substation at Niles.

**Johnstown & Altoona Railway, Johnstown, Pa.**—This company, it is reported, will soon let contracts for building a power house. G. W. G. Holman, Johnstown, general manager.

**Sherbrooke (Que.) Street Railway.**—This company has awarded the contract to the Bishop Construction Company, Montreal, for the erection of a power house in Sherbrooke. The Jenckes Machine Company, Ltd., Sherbrooke, is supplying the hydraulic machinery and the Canadian General Electric Company will supply the electrical apparatus. In this project the first development will be about 2500 hp. Messrs. Ross & Holgate, Montreal, consulting electrical engineers.

**Charleston Consolidated Railway & Lighting Company, Charleston, S. C.**—This company has begun the construction of its new power house located at Charlotte Street in Charleston.

**Knoxville Railway & Light Company, Knoxville, Tenn.**—This company has awarded the contract to L. B. Davidson, Knoxville, for building an addition to its power plant on Sixth Avenue, Knoxville. Work has already been started. Estimated cost is about \$3,500.

**Virginia Railway & Power Company, Richmond, Va.**—This company is said to have begun a 5000-kw addition to the capacity of its power plant in Richmond. The cost is estimated to be nearly \$200,000. [E. R. J., Feb. 5, '10.]

**Fairmount & Clarksburg Traction Company, Fairmount, W. Va.**—This company is said to be installing additional machinery at its power plant in Jayenne. A new building will soon be erected and four new generators will be installed.

## Manufactures & Supplies

### ROLLING STOCK

**Oakland (Cal.) Traction Company** will build 20 new cars at its own shops in Oakland.

**Holyoke (Mass.) Street Railway** has ordered four 30-ft. 8-in. cars from the Wason Manufacturing Company.

**Clinton (Ia.) Street Railway** has purchased six 20-ft. 8-in. semi-convertible cars from the American Car Company.

**Windsor, Essex & Lake Shore Rapid Railway, Kingsville, Ont.,** is considering the purchase of an express car.

**East St. Louis (Ill.) Railway** has ordered six 28-ft. 8-in. pay-as-you-enter closed cars from the American Car Company.

**Northampton Traction Company, Easton, Pa.,** has ordered two 30-ft. closed cars from the Wason Manufacturing Company.

**Escanaba (Mich.) Traction Company** expects to place orders during the next few weeks for a snow sweeper and two passenger and freight cars.

**Belleville & Mascoutah Traction Company, Belleville, Ill.,** which is constructing a line between Belleville and Mascoutah, will purchase three cars.

**United Railroads, San Francisco, Cal.,** have issued specifications through Ford, Bacon & Davis, New York, N. Y., for 80 new cars. The specifications call for double-truck, four-motor closed cars, 32 ft. long over corner posts and equipped with prepayment platforms.

**Indianapolis Traction & Terminal Company, Indianapolis, Ind.,** reported in the *ELECTRIC RAILWAY JOURNAL* of July 23, as having ordered 25 single-end closed cars from the Cincinnati Car Company, has specified the following details for these cars:

Bolster centers, length,	21 ft. 2½ in.	Curtain fixtures....Forsythe
Length of body...33 ft. 2½ in.		Curtain material...Pantasote
Width over sills...8 ft. 4 in.		Hand brakes.....Peacock
Sill to trolley base.8 ft. 10 in.		Heating system,
Height from top of rails to sills ..... 33¾ in.		Peter Smith hot water
Body, wood and metal.		Headlights .....Dayton
Interior trim.....cherry		Motors .....2-West.
Underframe .....composite		Registers ....International
Air brakes ..... West.		Sanders...C. C. Co.'s hand
Axles .....4½ in.		Seats .....Long.
Bolsters, body,built-up-steel		Seating material.....rattan
Brakeshoes ..A. B. S.&F. Co.		Trolley retrievers....Wilson
Car trimmings		Trolley poles.....Shelby
	polished bronze	Trolley base.....Union
Couplers ....C. C. Co. radial		Trucks.....Standard 0-50
		Wheels.....34-in. steel

**Twin City Light & Power Company, Centralia, Wash.,** noted in the *ELECTRIC RAILWAY JOURNAL* of April 23, 1910 as having ordered two closed suburban cars from the Niles Car & Manufacturing Company, has drawn the following specifications for these cars:

Seating capacity.....48	Bumpers ..... Niles
Weight (car body only),	Couplers ..... Tomlinson
17,500	Curtain fixtures..... Pinch
Bolster centers, length,	Curtain material..Pantasote
21 ft. 4 in.	Fenders ..... Consolidated
Length of body...32 ft. 7¾ in.	Hand brakes ..... Peacock
Over vestibule...42 ft. 7¾ in.	Heating system ....Consol.
Width over sills...8 ft. 2 in.	Headlights ..... G. E.
Over posts at belt.8 ft. 5 in.	Journal boxes .. Symington
Sill to trolley base..9 ft. 0 in.	Motors ..... G. E.
Height from top of rails to sills .....38¾ in.	Roofs ..... Monitor
Body ..... wood	Sanders ... Nichols-Intern
Interior trim ..... bronze	Sash fixtures ..... Edwards
Underframe .....composite	Seats, style .....H. & K.
Axles .....Standard	Seating material .... rattan
Bolsters, body.....Niles	Trolley retrievers...Knutson
Bolsters, truck....cast steel	Trucks ....Baldwin, 72-18A
	Wheels ..... cast iron

### TRADE NOTES

**Jeffrey Manufacturing Company, Columbus, Ohio,** has moved its Denver office from 1711 Tremont Place to the First National Bank Building.



**E. R. Hibbard**, president of the Grip Nut Company, Chicago, Ill., accompanied by his wife and son, left Chicago, July 28, on a ten weeks' trip to the Orient.

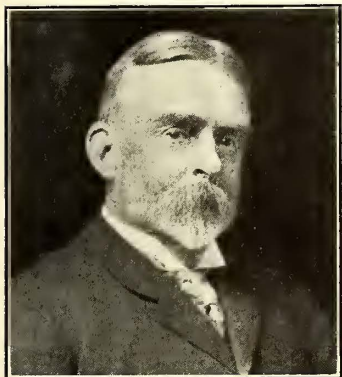
**National Brake & Electric Company, Milwaukee, Wis.**, is building extensive additions to its machine shop and foundry which will practically double the capacity of its plant.

**Whipple Supply Company, New York, N. Y.**, has established western offices in the First National Bank Building, Chicago, Ill., in charge of H. F. Keegan, western manager of sales.

**T. H. Symington Company, Baltimore, Md.**, announces that E. H. Symington, formerly works sales manager, has been transferred to the Chicago office of the company, 316 Railway Exchange Building, with the title of mechanical expert.

**Copper Roller Bearing Trolley Wheel Company, Cocksackie, N. Y.**, has been reorganized and its New York office has been moved to Cocksackie. Several improvements are being made to the company's plant at West Cocksackie. The officers are F. H. Sutherland, president; H. A. Jordan, vice-president; Edwin S. Anthony, secretary, treasurer and general manager. The directors include the officers, F. F. Bedell and G. M. Ranner.

**Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.**, held its annual meeting in Pittsburgh on July 27, and the four directors whose terms of office had expired were re-elected. At a meeting of the directors held July 29, Edward F. Atkins was elected president to succeed George Westinghouse. The election of Mr. Atkins is considered to be the result of friction between Mr. Westinghouse and the financial interests controlling the company. The other officers of the company elected at the meeting of the directors were: Chairman, Robert Mather; vice-presidents, E. M. Herr, L. A. Osborne and Charles A. Terry; acting



Edward F. Atkins

vice-presidents, G. W. Hebard and H. D. Shute; secretary, W. A. Esselstyn; treasurer and assistant secretary, T. W. Seimon; assistant treasurers, H. F. Baetz and E. St. John; auditor and comptroller, James C. Bennett; assistant auditors, F. E. Craig and W. B. Coville, Jr. Mr. Atkins is understood to have accepted the presidency of the company only on the understanding that he was to hold office simply until a permanent successor should be chosen. He is a member of the Boston firm of E. Atkins & Company, sugar importers and manufacturers. From 1889 to 1895 he was a director of the Union Pacific Railway Company, but most of his present corporate connections are in the sugar manufacturing line.

**Archer & Westover, Kansas City, Mo.**, consulting engineers, have issued the following announcement: "The organization that was styled Archer, Rollins & Company has been dissolved, and two companies formed. These are entirely independent of one another and have no business in common whatsoever. Mr. Archer, of the above firm, can now be found at 426-27 Beals Building. Mr. Rollins and Mr. Westover, also of the above firm, are still to be found at the old address, namely, 534-35 Beals Building. It is the wish of all concerned that the previous friendly relations with the trade will be continued in the same satisfactory manner, and that no misunderstandings will arise over the change."

**Ackley Brake Company, New York, N. Y.**, has appointed Frank L. Strong as its representative for the Philippine Islands in the sale of Ackley adjustable brakes. Mr. Strong is located at 34-40 Calle Exchague, Manila, and is one of the foremost dealers of American machinery and supplies in the Islands. Several orders for Ackley brakes have already been received by the New York office of the company for shipment to the Philippines. An agency has also been

established in Australasia, in the firm of R. W. Cameron & Company, with offices at Sydney and Melbourne, and at Wellington, N. Z. An order for 50 Ackley brakes was recently sent in by this agency. The Ackley Brake Company now has, with its English branch, the British Ackley Brake Company, a chain of agencies and distributing stations taking in all the important centers of the Eastern Hemisphere—London, Paris, Berlin, Brussels, Zurich, Tokio, Shanghai, Manila and Sydney.

#### ADVERTISING LITERATURE

**Arthur S. Partridge, St. Louis, Mo.**, has issued list No. 34 of second-hand electrical and steam equipment for May.

**Detroit Stove Works, Detroit, Mich.**, is distributing a folder which describes and illustrates the Jewell street car heater, also heaters for car houses, stations and waiting rooms.

**Conley Frog & Switch Company, Memphis, Tenn.**, has issued Catalog No. 2, which illustrates and describes its line of frogs, switches, crossings, switchstands, rail braces and track equipment.

**George W. Lord Company, Philadelphia, Pa.**, has printed a revised and enlarged 1910 edition of a treatise on "Boiler Troubles and Their Treatment," by George W. Lord, founder of the company.

**Gold Car Heating & Lighting Company, New York, N. Y.**, has issued a new catalog in which are listed and illustrated the various fittings and special devices used in connection with its systems of steam, vapor, hot-water and electric train heating. The catalog is 9 in. x 12 in., and contains 166 pages.

**C. A. Wood Preserver Company, Austin, Tex.**, is mailing to the trade a small sample of wood preserved with its well-known compound. The statement accompanying the sample says: "After 40 years of exposure to rot, the substance still present in preserved ties was analyzed and found to be the same grade of oil as you will find on this very piece of wood, a pure coal-tar distillate."

**Deming Company, Salem, Ohio**, has printed a booklet entitled "A Generation of Progress," which outlines the many uses to which Deming pumps and appliances may be adapted. The company has also issued catalog H, in which are illustrated and described briefly its power pumps of the triplex, deep well and other types. The catalog contains 190 pages and supersedes catalog G.

**The J. G. Brill Company, Philadelphia, Pa.**, prints in the *Brill Magazine* for July a biographical sketch of Albert H. Stanley, general manager of the Underground Electric Railways of London, Eng., and managing director of the London United Tramways. The sketch is accompanied with an excellent portrait of Mr. Stanley as a supplement. Among the feature articles of this issue are the following: "Conditions Which Govern the Type of Car for City Service—Tokyo, Japan," "Single-Truck Open Cars with Plain Arch Roofs for Clarksville, Tenn.," "Some Successful Rules for Snow Fighting," "Open Pay-as-You-Enter Trail Cars for Wichita Falls, Tex.," "A Short Wheel Base Single Truck Equipment for the Chicago & Milwaukee Electric Railroad," "Twelve-Foot Horse Cars for Peru," "Express Car Equipment for Illinois," and "Trail Cars for Pay-as-You-Enter Operation for Northern Texas Traction Company."

#### NEW PUBLICATIONS

**Trolley Trips Through New England and Hudson River Valley.** The Trolley Press, Hartford, Conn.; 144 pages. Price 16 cents by mail.

This little publication really is a guide in more than one sense of the word, and for this reason can be said to have become an institution with that class of leisurely tourists to whom the trolley affords a means of reaching territory that otherwise would remain "unexplored" by them. The publication contains 50 maps. There is an index of cities and towns reached by electric railway and a combined index of trips and of the territory which the guide covers, divided as follows: Connecticut, Eastern Connecticut, Western Massachusetts, Middle Massachusetts, Rhode Island, Southeastern Massachusetts, Boston, Northern Massachusetts, New Hampshire, Maine and the Hudson River Valley.

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. ‡Includes dividend on preferred stock.

Company	Period	Gross Income	Operating Expenses	Gross Income Less Operating Expenses	Deductions From Income	Net Income	Company	Period	Gross Income	Operating Expenses	Gross Income Less Operating Expenses	Deductions From Income	Net Income
AKRON, O. Northern Ohio Tr. & Light Co.	1m., June '10	\$221,773	\$*123,125	\$98,548	\$43,375	\$55,173	LEWISTON, ME. Lewiston, Augusta & Waterville St. Ry.	1m., June '10	47,986	28,692	19,294	14,151	5,143
	1 " " '09	198,203	*107,976	90,227	44,245	45,982		1 " " '09	44,726	31,607	13,119	15,571	4,552
	6 " " '10	1,087,335	*624,230	463,105	259,916	203,188		6 " " '10	526,206	308,538	217,668	177,926	39,742
BATON ROUGE, LA. Baton Rouge Elec. Co.	1m., May '10	8,937	6,127	2,810	1,938	871	6 " " '09	466,277	285,010	181,267	160,890	20,377	
BELLINGHAM, WASH. Whatcom Co. Ry. & Lt. Co.	1 " " '09	8,193	6,657	1,536	1,932	395	MILWAUKEE, WIS. Milwaukee Elec. Ry. & Lt. Co.	1m., June '10	403,874	273,903	129,971	45,505	84,921
	12 " " '10	105,176	69,302	35,875	22,890	12,985	1 " " '09	350,412	223,314	127,098	47,601	79,496	
	12 " " '09	93,740	66,631	27,109			6 " " '10	2,283,217	1,625,656	657,561	278,386	379,175	
CHAMPAIGN, ILL. Illinois Traction System.	1m., May '10	35,404	19,143	16,261	8,370	7,891	6 " " '09	2,038,506	1,357,256	681,250	281,351	399,900	
	1 " " '09	30,607	18,105	12,503	8,074	4,429	Milwaukee Lt., Ht. & Traction Co.	1m., June '10	156,223	57,324	98,899	55,442	43,457
	12 " " '10	418,364	237,584	180,779	101,778	79,602	1 " " '09	128,009	46,836	81,172	51,794	29,378	
CHICAGO, ILL. Aurora, Elgin & Chicago Railroad.	12 " " '09	373,555	217,953	155,602	101,804	53,798	6 " " '10	742,493	296,272	446,221	332,154	114,067	
	1m., May '10	472,255	*295,637	176,618	3,086	173,532	6 " " '09	656,530	245,186	411,344	304,679	106,665	
	1 " " '09	423,616	*250,602	173,013	3,204	169,809	MINNEAPOLIS, MINN. Twin City Rapid Transit Co.	1m., June '10	650,605	301,677	348,927	140,112	208,815
CLEVELAND, O. Cleveland, Painesville & Eastern R.R.	5 " " '10	2,365,774	*1,415,782	949,992	19,950	930,041	1 " " '09	593,101	260,881	332,220	140,251	191,969	
	5 " " '09	2,101,518	*1,208,562	892,955	15,851	877,104	6 " " '10	3,582,248	1,748,128	1,834,120	841,142	992,978	
	5 " " '09	1,422,555	*821,338	601,217	33,562	256,644	6 " " '09	3,250,066	1,622,482	1,627,584	827,758	799,826	
CLEVELAND, O. Cleveland, Painesville & Eastern R.R.	1m., June '10	33,261	*16,244	17,017	9,036	7,980	MONTREAL, CAN. Montreal St. Ry.	1m., June '10	384,564	198,849	185,715	59,053	126,662
	1 " " '09	30,771	*14,221	16,550	9,044	7,506	1 " " '09	354,918	187,320	167,597	51,134	116,463	
	6 " " '10	153,579	*79,115	74,463	52,799	21,665	6 " " '10	3,091,800	1,806,292	1,285,508	377,603	907,904	
Cleveland Southwestern & Columbus Ry.	6 " " '09	136,430	*71,754	64,675	50,169	14,506	9 " " '10	2,791,973	1,688,603	1,103,370	335,691	767,679	
	1m., May '10	86,276	47,014	39,262	27,773	11,529	NASHVILLE, TENN. Nashville Ry. & Lt. Co.	1m., June '10	157,427	91,576	65,851	33,637	32,214
	1 " " '09	77,022	47,172	29,850	25,032	4,818	1 " " '09	144,461	81,946	62,515	33,486	29,029	
Lake Shore Electric Ry.	5 " " '10	367,288	223,227	144,061	139,155	4,906	6 " " '10	887,954	516,589	371,365	202,087	169,278	
	5 " " '09	319,698	203,021	116,677	116,642	35	6 " " '09	831,704	493,616	338,088	196,213	141,875	
	1m., June '10	103,533	*52,244	51,289	34,751	16,537	NEW ORLEANS, LA. New Orleans Ry. & Lt. Co.	1m., May '10	523,339	282,438	240,901	176,423	64,478
DALLAS, TEX. Dallas Electric Corporation.	1 " " '09	95,826	*48,784	47,041	34,479	12,563	1 " " '09	514,897	278,568	236,629	172,700	63,929	
	6 " " '10	526,728	*298,688	228,030	208,610	19,420	5 " " '10	2,664,160	1,390,542	1,273,618	883,502	390,116	
	6 " " '09	474,677	*278,376	196,301	206,650	†10,349	5 " " '09	2,562,954	1,351,695	1,210,259	863,880	346,379	
DULUTH, MINN. Duluth-Superior Trac. Co.	1m., May '10	115,593	81,398	34,194	29,261	7,573	NORFOLK, VA. Norfolk & Portsmouth Trac. Co.	1m., May '10	160,492	93,510	66,982		
	1 " " '09	103,525	66,183	37,342	28,839	8,503	1 " " '09	151,599	92,659	58,939			
	12 " " '10	1,383,893	892,743	491,151	306,007	165,143	6 " " '10	765,607	446,811	318,796			
DULUTH, MINN. Duluth-Superior Trac. Co.	12 " " '09	1,230,639	790,087	440,553	343,417	97,136	6 " " '09	759,016	450,221	308,795			
	1m., June '10	95,340	51,973	43,367	†19,686	23,681	PADUCAH, KY. Paducah Trac. & Lt. Co.	1m., May '10	19,330	11,748	7,582	6,987	595
	1 " " '09	83,036	45,861	37,175	†18,417	18,758	1 " " '09	17,698	10,418	7,280	7,027	253	
EAST ST. LOUIS, ILL. East St. Louis & Suburban Co.	6 " " '10	511,641	305,914	206,627	†116,769	89,858	12 " " '10	236,428	142,229	94,199	81,654	12,544	
	6 " " '09	452,491	279,749	172,742	†110,500	62,242	12 " " '09	222,930	132,169	90,761	82,598	8,162	
	1m., June '10	200,553	112,875	87,678	50,121	37,557	PENSACOLA, FLA. Pensacola Electric Co.	1m., May '10	21,806	13,632	8,174	4,998	3,176
EL PASO, TEX. El Paso Elec. Co.	1 " " '09	164,887	93,604	71,283	49,522	21,761	1 " " '09	20,172	10,902	9,271	4,342	4,928	
	6 " " '10	1,119,353	606,056	513,288	300,517	212,271	12 " " '10	256,079	148,662	107,456	55,313	52,143	
	6 " " '09	957,216	547,535	409,860	297,371	112,489	12 " " '09	228,046	139,199	88,846	52,013	36,834	
FAIRMONT, W. VA. Fairmont & Clarksburg Trac. Co.	1m., June '10	50,993	18,255	32,738	12,611	20,127	PHILADELPHIA, PA. American Railways.	1m., June '10	339,113				
	1 " " '09	42,122	12,946	29,176	12,310	16,866	1 " " '09	319,103					
	6 " " '10	269,711	101,043	168,668	75,295	93,373	12 " " '10	3,402,542					
FT. WAYNE, IND. Ft. Wayne & Wabash Valley Trac. Co.	6 " " '09	212,293	76,886	135,407	133,874	61,533	12 " " '09	3,166,625					
	1m., May '10	122,344	71,294	51,050	44,912	6,138	PLYMOUTH, MASS. Brockton & Plymouth St. Ry. Co.	1m., May '10	9,524	7,526	1,998	1,765	234
	1 " " '09	111,702	66,890	44,812	43,097	1,715	1 " " '09	12,088	7,923	4,166	1,716	2,450	
FORT WORTH, TEX. Northern Texas Elec. Co.	5 " " '10	598,352	343,031	255,321	224,568	30,753	12 " " '10	127,228	93,281	33,947	20,920	13,027	
	5 " " '09	532,674	320,147	212,526	205,936	6,590	12 " " '09	125,866	85,682	40,183	24,705	15,478	
	1m., May '10	117,766	64,484	53,282	19,722	33,560	PORTLAND, ORE. Portland Ry., Lt. & Power Co.	1m., June '10	478,879	199,990	278,889	137,212	141,677
GALVESTON, TEX. Galveston-Houston Elec. Co.	1 " " '09	104,900	57,947	46,953	17,190	29,763	1 " " '09	430,743	194,692	236,051	124,877	111,174	
	12 " " '10	1,332,859	721,490	611,369	212,244	399,125	6 " " '10	2,645,612	1,129,676	1,515,845	796,775	719,072	
	12 " " '09	1,163,602	671,214	492,388	201,085	291,303	6 " " '09	2,272,777	1,072,425	1,200,352	734,040	466,314	
GRAND RAPIDS, MICH. Grand Rapids Ry. Co.	1m., June '10	99,952	47,677	52,275	19,745	32,520	ST. JOSEPH, Mo. St. Joseph Ry., Lt., Ht. & Power Co.	1m., June '10	85,401	46,638	38,763	23,184	15,579
	1 " " '09	91,764	42,838	48,926	19,137	29,779	1 " " '09	80,781	40,517	40,264	21,759	18,505	
	6 " " '10	530,823	264,537	266,286	119,055	147,231	6 " " '10	494,015	273,902	220,113	134,543	85,570	
HARRISBURG, PA. Central Penn. Trac. Co.	6 " " '09	479,809	233,758	246,051	113,711	132,340	6 " " '09	458,605	245,788	212,817	126,627	86,590	
	1m., June '10	73,952	51,111	22,841			SAVANNAH, GA. Savannah Elec. Co.	1m., May '10	52,379	34,307	18,072	18,020	52
	1 " " '09	67,257	51,578	15,679			1 " " '09	50,275	32,624	17,651	17,375	276	
HOUGHTON, MICH. Houghton County Trac. Co.	12 " " '10	393,747	288,132	105,615			12 " " '10	610,360	396,749	213,611	211,779	1,832	
	12 " " '09	358,107	272,356	85,751			12 " " '09	603,848	373,147	230,701	209,357	21,344	
	1m., May '10	25,472	15,100	10,373	6,317	4,056	SEATTLE, WASH. Seattle Electric Co.	1m., May '10	467,961	273,933	194,028	105,736	88,291
JACKSONVILLE, FLA. Jacksonville Elec. Co.	1 " " '09	25,964	13,953	12,011	6,242	5,770	1 " " '09	457,259	274,460	182,799	103,314	79,485	
	12 " " '10	321,633	168,764	152,869	76,083	76,786	12 " " '10	6,060,384	3,515,256	2,545,128	1,281,233	1,263,895	
	12 " " '09	290,184	160,568	129,616	64,718	64,898	12 " " '09	4,791,491	2,845,253	1,946,238	1,168,204	778,034	
TAMPA, FLA. Tampa Elec. Co.	1m., May '10	50,421	30,724	19,697	4,534	15,164	SYDNEY, N. S. Cape Breton Elec. Co., Ltd.	1m., May '10	21,576	12,379	9,196	5,038	4,158
	1 " " '09	47,821	27,162	20,658	4,759	15,900	1 " " '09	18,745	11,671	7,073	5,036	2,037	
	12 " " '10	611,925	350,384	261,541	55,474	206,067	6 " " '10	257,588	144,939	112,649	60,637	52,011	
TOLEDO, OHIO. Toledo Rys. & Lt. Co.	12 " " '09	572,553	358,284	214,269	51,995	162,274	12 " " '09	237,920	141,285	96,635	59,704	36,931	
	1m., June '10	216,345	129,075	87,270	70,917	16,353	TACOMA, WASH. Puget Sound Electric Ry.	1m., May '10	169,190	105,837	63,354	50,680	12,674
	1 " " '09	242,023	157,620	84,403	76,216	8,187	1 " " '09	156,054	108,066	47,988	47,831	158	
TAMPA, FLA. Tampa Elec. Co.	6 " " '10	1,302,586	750,185	552,401	425,569	126,832	12 " " '10	1,940,613	1,289,495	651,118	594,227	56,891	
	6 " " '09	1,462,344	887,937										